

L. A. HERALD-JOURNAL



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RED-HOT CRUCIBLES MOLTEN MAGNESIUM

SHIPBUILDER OUTLINES COMING WEST COAST RESPONSIBILITIES

Ninth Annual Materials Handling Edition

JULY, 1944

L. A. HERALD EXPRESS 9/30/42

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L. A. DAILY NEWS 7/27/42 LOS ANGELES, CALIF

IT'S BIGGER THAN BOULDER DAM

World's Largest Magnesium Plant

Las Vegas, Nevada



BOULDER DAM, a masterpiece of American designing and construction genius, required five years for completion. This achievement was considered a record.

Within the span of just nine months, McNeil Construction Co., has brought into operation an even greater job . . . the world's largest magnesium plant.

Magnesium is now being produced from the first unit and the remaining units are being rushed to completion. Not only is this the largest magnesium plant in the world, but it will produce more chlorine—a vital war necessity—than any other plant in the nation.

From a desert waste to a 100 million dollar plant in less than one year establishes a construction record, we believe, unequalled in the annals of American industrial building.

Not only has McNeil Construction Co. done this job for Defense Plant Corporation, but it has erected 1000 demountable homes for married

workers and their families, a camp to house 6000 single men and constructed and put into operation a fine concrete hospital building.

Some idea of the magnitude of this project may be gained from the following facts:

It required the largest single electrical installation in the history of American industrial construction.

It was necessary to build 26 miles of railroad and 50 miles of temporary dirt road.

In addition, 4,500,000 yards of earth were moved, 6,764,000 bricks of every conceivable size and shape were put into place and 37,699,000 board feet of lumber were required for this mammoth undertaking.

Cold statistics do not begin to tell the dramatic story of the will to get the job done. The preliminary stage of completion of this huge project in such a limited time was possible only through the fine, patriotic spirit exhibited by every member of the McNeil organization, which truly has gone "all out" in this great war effort.

McNEIL CONSTRUCTION CO.
Established 1886
LOS ANGELES

L. A. HERALD EXPRESS 9/30/42

GIANT MAGNESIUM PLANT IN DESERT

By GERRY WATTERSON

From the boiling coconuts of the desert sands in southern Nevada comes a story of the "stuffy" of all construction jobs, the building of the big new magnesium plant in the world, which in itself is a statement without meaning to Mr. and Mrs. Average American, but assumes its proper proportion when it is known that this September little head of construction job is bigger than Boulder Dam.

Everyone has heard of the Boulder Dam and during the five years that it took six great companies to build it, watched with interest its construction progress. Now the battle is again fought in that desert, for within a state's claim of the great dam, the mining of desert land are being transformed almost overnight into the home of cotton and sugarbeet to a Boulder of industry. These magnesium metal is being produced and carried away by the train to the war plants of the nation for the production of incendiary bombs and building of airplanes.

BUILDING RECORD

A year ago this month, Sept. 2, 1941, the McNell Construction Company of Los Angeles was awarded the contract by Defense Plant Corporation to build the \$100,000,000 magnesium plant. Ten days later McNell had bulldozers on the ground scraping the vegetation from the proposed site and leveling the ground for the work that was to start as soon as plans were released.

Construction of temporary office buildings, the building of a flood control dyke to divert possible catastrophic waters from the plant, and the building of a railroad spur to the water house was started at once, with the first pouring of concrete for the actual construction of the plant proper on Nov. 25.

FIRST PRODUCT

But a month ago, nine months and seven days later, the first magnesium rolled from the plant as the first of the eleven coils were put into production.

Materials and man-hours have

each, staggering figures that come and go and additional work are bewildering, and only by inspection does the project come within the comprehension of facts and figures. For instance, 100,000 cubic yards of concrete go into the building of this huge plant. If the concrete used on the magnesium job was poured into the making of a concrete wall six feet high and a half foot thick, it would reach all the way from Los Angeles to the magnesium plant at Las Vegas.

Spaced over an area of 600 acres enclosed by a high wire fence, construction crews are simultaneously working on scores of buildings, steel work and concrete piers back and forth on tall buildings, giant pieces of equipment 476 flying machines, plumbers, electricians, painters, brick layers—25 different classifications of workers are at work whipping the construction to completion in record-breaking time.

NOT A FREE ELEMENT

The mystery metal magnesium comes as a free element. Known for centuries as a salt, it was not until relatively recent years that it was transformed into a metal, and even today it takes a lot of machinery and a precise application of electro-chemistry to produce it. That is why the plant at Las Vegas is so large, specializing in all of 160 construction jobs. At full production, 20 times as much magnesium as was produced in the whole world six years ago, will be produced in this plant being rushed to completion in the desert.

Although some of the individual jobs in the layout of 200 construction units of the whole are in satisfying corners of the great project, the most spectacular of the lot is a series of 59 buildings in one long row—consisting of 10 electrolysis buildings, 10 chlorination buildings, 20 recovery buildings, six rectifier buildings and four metal generating buildings.

MATERIALS USED

Nearly the astounding array of buildings are wash towers, into the building of one having gone 20 carloads of lumber; coal beds in which are stored Canada's entire season's crop of

that vital material, and great mountains of salt, hauled by truck from Death Valley. Two post office buildings, with their 45 degree angle roofs

erect an odd appearance and are unusual because into the roof slabs went 75 carloads of lumber and an additional two carloads of bolts and nuts, steel pipe. Oil in one direction flows 700,000 gallons each, while in another direction is the sewage disposal system, both for the plant and the nearby demonstrable city of 1000 houses.

BRAW MANY WORKERS

A few peaks of construction, Boulder Dam had 3200 men at work. McNell's employment cost doubles that, and the weekly payroll at the plant is greater per week than the Boulder Dam monthly payroll. At least 3000 men have had to be hired for each job, for in this desert project that originally needed almost nothing in the way of housing facilities, the McNell personnel department is drawn and placed 27,000 men in 20 months time to maintain their production pace.

TOUGH PAINT JOB

There was one little job that required painting inside exhaust lines that was very much like deep-sea diving. The paint used was an oil-soluble form, which requires the wearing of protective clothes and gas masks. The painters were lowered into the pipe attached to a rope and at the end of 30 minutes, if they failed to emerge or quit giggling, they were hauled out. Other painters have worked for months painting the inside of the big 15-ton electrolysis tanks sometimes in heat of more than 120 degrees, with no fresh air because the workers were closed to keep the steel all the time.

FLUMBER IN CANNON

Perhaps the plumbing department encounters more downright sweat and indignation on the job than any other tradesman for they have laid another miles of pipe in every direction. Today's plumbing must be different however because pipe is being laid across the original roadway and a great gashed hole obstructs the passage. In about 21 miles of railroad and 20 miles of roads have been built on the job, yet the permanent roads are still to be laid and paved. A regular construction of 4000 has been worked on the job according to the various departments, which reports more than 2,000,000 yards of pipe placed with some 200,000 pipes yet to be installed.

PLUMBER HAS TO WORK

Electrical plumbers have laid 100 miles of pipe inside the tower. The same for outside pipe for the job breaks the world's record, as did the other that vital material, and great mountains of salt, hauled by truck from Death Valley. Two post office buildings, with their 45 degree angle roofs erect an odd appearance and are unusual because into the roof slabs went 75 carloads of lumber and an additional two carloads of bolts and nuts, steel pipe. Oil in one direction flows 700,000 gallons each, while in another direction is the sewage disposal system, both for the plant and the nearby demonstrable city of 1000 houses.

DRINKS OF EVERY VARIETY

Bricks of every variety and shape, some weighing as much as 100 pounds and totaling nearly 7,000,000 bricks in all, are going into the building of the magnesium plant.

FANCY BRICKLAYING

The 800 electrolysis cells take some fancy bricklaying, the cement being mixed with acid. It goes on the job in metal beds, only two quarts at a time, and these beds are in lots of 30.

WHEN IT IS REALIZED

When it is realized that one-fifth of the power of Boulder Dam will be used at the plant when it is in full operation some idea of the magnitude of the electrical installation on the job can be gained. Electrical current used at the magnesium plant in one year will be equivalent to the entire kilowatt hours used by the entire city of Los Angeles in the years 1937 and 1938.

SHORT METAL IS A BIG ITEM

Short metal is a big item on the job, and together the electrical, plumbing, machinery setting and masonry departments are probably handling the largest single jobs of their kinds in the United States.

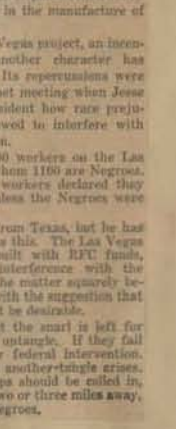
NEVADA IS A HOT COUNTRY

Nevada is a hot country in summer days and ventilators are an important item on the job, 1200 of them, all made on the job and weighing 800 pounds apiece, will go on the permanent buildings.

WARRANTY RECORD

In spite of the fact that a great deal of superpremium work had to be used on the job, the warranty record is believed to be unbroken and is a letter in which L. G. McNell, president of the company, takes particular pride. A great milestone is seen outside the great building the record. "There is the Boulder Dam for industry" which seems to be the motto for the organization. Compared to the Boulder Dam construction, which set a new record in that field of safety with some 3000 ft every 100,000 man-hours worked, the McNell record is considered remarkable. For here only one man-hour has been lost for each 2,500,000 man-hours worked.

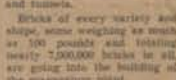
Reviewed one hour on the project, figures of staggering proportions show the eye. Consider the McNell general record department. Working seven buildings, the store have a combined storage space of 481,000 cubic yards within an additional 40 acres of open air storage space is used, where each flow is covered with heavy



and will deliver efficient in its particular duty in details of construction.

Portable Electric Means Allocated

Most summer people may have in keep cool through will power. The war Production Board has placed under complete allocation control all of portable electric fans in the hands of manufacturers. Stock held at present by retailers may be sold without restriction, but there will be no new supply perhaps for the duration.



and tunnels.

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Outlook for BMI Is Not Promising

Governor Studies Future of Plant

CARSON, Aug. 2 (AP)—Gov. E. F. Carville said today the future outlook of Basic Magnesium, Inc., is not too promising at this time.

Five of the original ten units of the huge magnesium plant near Las Vegas, 7000, are now closed and a sixth is in the process of being closed, the governor said. Each unit closed released about 200 workers.

Gov. Carville said he had been checking into the possibility of keeping the remaining four units of the plant open after the war.

"I do not look for the entire plant to be closed before the war is over but it looks as though the government will have had all the magnesium it wants when the war is ended."

L. V. TRIBUNE
8-4-44

Carville Not Hopeful About BMI Operation

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Five of the original ten units of the huge magnesium plant near Las Vegas, Nev., are now closed and a sixth is in the process of being closed, the governor said. Each unit closed released about 250 workers.

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Two More Units Of BMI Ordered Closed by WPB

L. V. REVIEW-JOURNAL
7-26-44

Two More Units Of BMI Ordered Closed by WPB

(Continued from Page One)

4,500,000 pounds per month.

The Dow plant at Marysville, Michigan, with a 4,000,000 pound monthly capacity has been closed entirely, while the electro-metallurgical plant at Spokane has been reduced to 35 per cent and the production of the Dow plants at Velasco, Texas, Freeport, Texas, and Midland, Michigan has been substantially curtailed.

Immediately upon receipt of these instructions Case posted the following bulletin to employees of BMI:

"The rapidly changing scene on all fronts of the global war has necessarily shifted accents in the war production program. Just three and one-half months ago this plant and other concerns producing magnesium were ordered by the war production board to cut their production. Our measure of this curtailment was 40 per cent. At that time we were officially advised that no further curtailment was anticipated.

However, fast moving events of war, with a greater proportion of heavy armaments, demolition bombs and naval ammunition being used as compared to magnesium incendiary bombs, has resulted in increased use of magnesium in munitions with a resultant stock-pile over 100,000,000 pounds in the United States.

"The four units of the plant which remain in production will continue a vital part of the war effort as will the total rated capacity for the production of magnesium. Staffs, equipment, these operations and their maintenance is therefore just as vital though the plant was still operating 100 per cent.

"Under government directive it is the responsibility of the war manpower commission and the U. S. Employment Service to supply and maintain manpower requirements for all essential war industries. It is the considered judgment of management and related federal officials that cessation of hiring and the normal turnover losses due to selective service withdrawals and other justified terminations will offset the manpower reduction involved in this curtailment.

"The Nevada State Manpower Director William Doyle has issued a statement in which he says:

"Employees of BMI are urged to remain on their jobs unless called into military service or are voluntarily released by the company for clearance by the U. S. Employment Service. In other critical or essential war industries. Remaining operations of BMI are vitally necessary for the continued prosecution of the war effort and must be maintained."

"The management of this project is grateful for the loyalty and steadfastness of employees and sincerely regrets the necessity for this curtailment. It is hoped that the adjustments required at this time will be made with a minimum of inconvenience to those who may be affected."

Two More Units Of BMI Ordered Closed by WPB

Two additional units at Basic Magnesium Incorporated's Henderson, Nevada, plant were ordered closed today by War Relocation Administration in order to bring production into line with the present war demands.

The Marysville, Michigan plant of Dow Chemical company, producing 4,000,000 pounds per month, was ordered closed entirely.

The electro-metallurgical plant at Spokane, Washington, was reduced to 35 per cent of capacity, and Dow plants at Velasco and Freeport, Texas, and Midland, Michigan, were substantially cut.

F. O. Case, general manager at BMI, estimated that between 200 and 400 employees would be affected here, and in a bulletin to the workers indicated that realization of being able to justify terminations and selective service withdrawals "will accomplish the manpower curtailment involved."

For the four units remaining a total of approximately 2,500 will be required to produce the 4,500,000 pounds of magnesium monthly which has been assigned to BMI.

Importance of maintaining production of the four units as a vital part in the war effort was stressed both by Case and War Manpower Director William Doyle and workers were urged to remain on the job to keep the assigned quotas of magnesium rolling from the plant together with the electric which has become an important part of the output of BMI.

Case said work was proceeding at the plant on the post-war development program for the use of magnesium in industry, and predicted this would have a salutary effect on the future production of the plant.

A fund of \$250,000 was recently authorized BMI for this purpose.

Case, president of the Delaware Plant Corporation in Case which read as follows:

"At the request of the war relocation board we have had the plant production extended for war purposes, we are asking that your curtail production of the monthly quantity of magnesium call homes which should bring the monthly production down to between 4,000,000 and 4,500,000 pounds."

L. V. AGE
7-18-44

"AMERICA" WITH A PRAYER

There was something here to me, but very appropriate and fitting when at the signing of the exercises at the BMI award Wednesday evening. The audience was called upon to stand and sing "America."

I have been present on many occasions which were opened by that hymn. But this time there was something different. Mrs. E. M. Fitchett, the song leader, when she took her place, said:

"I want you to sing America as you have never sung it before. I want you to sing your hearts when you sing and sing it with a prayer. If you never prayed before, pray for your country, now as you sing."

And the great audience sang.

(Continued on page 2)

Observations

(Continued from Page One)

heard and sang America as they never sang it before. I think there was a lump in every throat and a little moisture in every eye and a swelling in our hearts of love for our country which none of us had ever experienced before under such circumstances.

"I suggest that always in the future when we sing America, we sing it with a prayer. It is a noble hymn and worthy to be part of every service."

THE BMI AWARD

The presentation, Wednesday evening at the National Security Award to General Manager Frank Case of Basic Magnesium, Incorporated, by Colonel Leedom, was of more than ordinary significance.

It was one of only two similar awards made within the state of Nevada and was recognition not alone of the efficiency of the organization, but as well of the good will which pervades all the employees.

It also has significance as an indication that official Washington approves of Basic Magnesium, Inc., and the manner in which it has been developed and operated and, therefore, that in the process of reconversion of war industries, when the time comes, this great enterprise will be among those entitled to be perpetuated.

Largely through the successful operation of BMI, magnesium and its alloys are being accepted by the scientific and industrial world as among the essential metals of the post-war era. The official presentation of the award is an evidence of a permanent and successful future for the "strategic metal."

B. C. HENS
7-15-44

B.M.I. Safety Record Is Praised at OCD Award Session Last Evening

The remarkable production safety record of Basic Magnesium, Inc. and its employees was highly praised last evening by OCD officials, state officials and national leaders in several important fields at the occasion of the presentation of the national security award of OCD at the Basic Football park at Henderson.

High Stambarger, OCD regional director, introduced by W. Harold Kingsley as permanent chairman, lauded the coordination of the departments of BMI and cooperation between management and labor in keeping up uninterrupted production.

There has been no interruption through fire, sabotage or subversive activity, he said, stressing the fact that our armed forces depend on just such efforts and on individual efforts in buying bonds, aid to salvage drives and contributing to and assisting the Red Cross.

Lt. Gov. Vall Pittman spoke of Nevada's justifiable pride in BMI's achievement. This national safety award, he said, should inspire management and workers to even higher levels of cooperation and achievement. He lauded management and labor for loyalty in attaining maximum production in minimum time, stating that today's problem is getting magnesium to the war fronts; tomorrow's will be making magnesium serve in an era of peace as a factor of security.

Col. J. W. Leedom of OCD's 9th region, in making the award warned against letting overconfidence bring them down before final victory.

F. O. Case, BMI general manager, accepted the award, pointing out the great achievement in terms of statistics, but spoke convincingly also of what each safety record means from the human angle.

He read messages of congratulations from Gov. E. F. Carville, Sen. Pat McCarran, Pres. Hobbins of Amasonia, Maj. Gen. McCouch, Wm. Greer, A.F.L. president and Jessie Jones, secretary of commerce.

Lt. Com. Willard Betts, assistant district security officer, 11th U. S. Naval district, and Col. Allen Kimberly of OCD also spoke. The Las Vegas Guttery School band and BMI Legion participated, with the Rev. Peter Moran and the Rev. Roy C. Crouch giving invocation and benediction.

Thirty-one employees, each representing employees of a department of the plant, each received an award from Stambarger.

Preceding the award, some 200 invited guests, business, professional and civic organization leaders, attended a banquet at Anderson's cafeteria. Included among those attending from Boulder were R. H. Row, J. M. Higgins, J. C. Manis, R. G. MacDonald, A. W. Hackwood, Mrs. T. C. Mead, C. F. Peterson and O. E. Rhoades.

The softball game after adjournment was won by the BMI, 6 to 3, who beat the Gunnersy school in an extra inning, the eighth.



...the complete materials-handling department of the world's largest magnesium producer, Basic Magnesium, Inc., at Las Vegas, Nev. This chlorine type tank...
...from chlorine cells and transported in such condition to the refinery without melting loss, then saving fuel. When unloading, the hot metal flows down a chute into pre-heated crucibles.

L. V. REVIEW-JOURNAL
7-10-44

BMI Award Plan Being Completed

Plans for the ceremony...
...of the national security award to the BMI...
...Wednesday were completed with 300 invitations to the officials of the army, navy, air force, federal, state and county leaders, and representatives from the various organizations in the community. It was announced today that the award ceremony will be held at Anderson's at 8 o'clock Wednesday.

BMI Award Program Is Completed Today

The program for the presentation of the National Security Award to the Basic Magnesium plant will be held at 7:30 o'clock tomorrow evening in the B. M. I. softball park, it was announced today.

Selections by the Las Vegas army air field band will open the ceremony. W. Harold Kingsley will be temporary chairman.

One verse of "America," by the band and assembly, will be followed by the pledge of allegiance by the assembly and the invocation by the Rev. Peter Moran, pastor of St. Peter's Parish.

Pittman to Talk

The introduction of permanent chairman Hugh Shamberger, re-

gional director of the office of civilian defense will be followed by an address by the Honorable Vail Pittman, lieutenant-governor of the State of Nevada.

The presentation of the award will be made by Colonel J. W. Leedom, senior field representative of the protective services division, ninth region, to F. O. Case, general manager of Basic Magnesium, incorporated.

Hugh Shamberger will present the token award of emblems to the employees of the plant.

Receiving the awards on behalf of their fellow workers will be the representatives from the following departments:

Chlorine and Caustic, Henry C. Weideman; preparation, James Ryan and Oscar C. McDonald; chlorination, G. W. Neal and W. E. Blankenship; electrolysis, A. Webster, C. B. Johnson, and Rufus Drake; refineries, Frank Greenleaf, John C. Davis, and Evelyn Malmin; metal plant repair, W. B. Mainor; drafting room, Joy Syphus; water treatment, James Keller; electrical, T. P. Benedict; plumbing shop, Yolande Mirabelli; metal shops, Betty Bradshaw; general service, William C. Daniel; boiler plant combustion, Lloyd B. Isham; building maintenance, Evelyn Cherry.

Refractories, Jack Arnold; general ledger, Leona Gravelle; general office, Ruth Lusch; accounting, John Hanson, traffic, John VanderLaan; safety and transportation, Beth Schwartz; guard force, Sergeant Stanley Nelson; fire department, John T. Taylor; hospitals, Bill Byrne; purchasing and stores, Jake Schmidt; and technical service, Donald Musser.

Benediction will be offered by the Rev. Roy C. Crouch, pastor of the Community Church, followed by the National Anthem by the band and assembly, and the recession of colors by the American Legion color guard.

At the adjournment of the presentation ceremony, a softball game between the Las Vegas army air field team one and the B. M. I. riggers.

Preceding the program at which the awards will be presented, there will be a banquet in the Anderson cafeteria, starting at 6 o'clock, to which more than 200 invitations have been seen to prominent leaders throughout the county.

NEV. JOURNAL
17-7503
JULY 12, 1944

VAIL PITTMAN IS BMI SPEAKER

Represents Carville At Presentation

LAS VEGAS, July 11. (UP)—Vail Pittman, lieutenant governor of Nevada, will be the principal speaker here Wednesday night when the national security award is presented Basic Magnesium, Inc.

Pittman was named by Governor E. P. Carville to make the principal address when the chief executive felt it would not be advisable for him to attend because of a recent illness.

Actual presentation of the award—second to be made in Nevada—will be handled by Col. J. W. Leedom, senior field representative protection services division of the ninth region, office of civilian defense.

F. O. Case, general manager of the Sprawling B. M. I. plant, will receive the award.

Hugh Shamberger, Nevada director of civilian defense, will present emblems to the plant's near 5,000 workers. Twenty-five representatives of the various B. M. I. departments have been named to accept the individual awards.

Presentation ceremonies to be held at the B. M. I. baseball park at 7:30 p. m., are to be preceded by a banquet at the Anderson Cafeteria at which all national, state, county and civic leaders will be guests.

A band from the Las Vegas aerial gunnery school will furnish music.

BMI Curtailment Ordered by WPB; Case Reassuring

Second of two curtailments of production in four months ordered by the War Production Board and the Defense Plants Corporation, yesterday closed down two additional units at Basic Magnesium Incorporated.

In an effort to cut down production now exceeding present demands for war purposes, other plants producing magnesium were similarly affected by the order. The Marysville, Mich., plant of Dow Chemical Company, producing 6,000,000 pounds per month, was ordered closed entirely.

The electro-metallurgical plant at Spokane, Wash., was reduced to 36 per cent of capacity, and Dow plants at Velasco and Freeport, Texas, and Midland, Mich., were cut.

F. O. Case, general manager at BMI, was notified by telegram of the curtailment by Albert E. Bassett, vice president of the Defense Plants Corporation. Case estimated that although 300 to 400 workers would be affected by the order, cessation of hiring, "justified terminations" and "selective service withdrawals" would account for the manpower cut at the Basic plant.

Work is proceeding at the plant on the postwar development program for the use of magnesium in industry, Case said. A fund of \$350,000 was recently allocated BMI for this purpose.

L.V.R.J. 3/5/43

Banquet Launches Red Cross Drive In Basic Vicinity

One hundred sixty BMI folks last night attended the send-off dinner for the Red Cross drive opening in the Basic school district today. Anderson's camp dining room was the scene, and Jack Walsh planned the serving of a three-course turkey dinner. The Rev. R. C. Crouch of the Community church gave the invocation. During the dinner the BMI stringed orchestra entertained. Roland Seibert, general chairman of the drive, was toastmaster. He thanked the Hostess club of BMI for the attractive decorations on the speakers' table, red and white satin streamers and bows with red crosses. Mrs. F. O. Case was introduced as chairman of the local branch chapter and M. L. Satterthwaite of BMI responded to his introduction.

Special guests of the evening were Mr. and Mrs. Halley Stewart of Las Vegas. Stewart is the head of the Clark County Red Cross drive and gave a resume of what is expected in the county as a whole.

William Burke entertained during the evening with several songs, and Ben Wolfe, who was once a student of Fritz Kreisler, played several violin solos, written by Kreisler. Rev. Cruze played two sacred numbers on the vibraphone which were enthusiastically received.

The main talk of the evening was given by Price Webb, president of the Townsite Toastmaster's club. Webb explained that the wearing of paper tabs, instead of pins, to show we had given to the Red Cross this year would save 52 tons of metal or enough to build one tank, with enough left over for eight jeeps. The Red Cross has served more than one million men since Pearl Harbor, Webb said, besides the work which constantly goes on in this country in time of need. In answer to popular demand, Norman Kelch sang some numbers and led in the closing song, "God Bless America."

The drive will be on in full swing today and tomorrow. Every home will be called upon in the district, and Seibert urges everyone to join the Red Cross individually. The McNeil Construction company plans a 100 per cent drive among employees, Seibert said.

Those heading the work among the homes are Mrs. H. I. Wilkerson, colonel, who has the district the south side of Water street on the Townsite. The captains working with her are the Mesdames M. A. Hancock, Leigh Hunt, F. Nason and F. N. Natusch. The north side of Water street will be handled by Mrs. A. C. Terrill, colonel, with Mesdames T. P. Turchan, R. C. Crouch, Perry Fallis and Olivia Colgrove as captains. The colonel in charge of the BMI Trailer park is Mrs. R. D. Bailey.

L.V.R.J. 3/8/43

BMI Plant Now At Half-Way Point

With the first refinery unit going into operation, the Basic Magnesium, Inc., plant this week reached the point of 50 per cent production, official sources said today.

Half of the metals plants are now in operation. At the preparation plant half of both the tunnel and rotary kilns are operating. The chloride plant has passed the 50 per cent production point, it was revealed.

Her captains will be Mesdames Adell Gaddis, F. Frasier, H. Nesch and Ethel Norton. The Pittman and Midway Trailer camp will be served by Mrs. P. McElvoy serving as colonel, with her captains Mesdames Harold Smith and Corrine Devlin. In Railroad Pass, Miss Annette Miller as colonel in charge and Mrs. Lee Simpson is captain.

L.V.R.J. 3/5/43

Rotary Club Hears An Interesting Talk

Las Vegas Rotary Club enjoyed an unusually interesting program Thursday noon, when a distinguished former Rotarian, W. Harold Kingsley, who has been president of the Rotary clubs at both Flint, Michigan, and Torrance, California, and who now is connected with Basic Magnesium, Inc., was the guest speaker.

The speaker was introduced by Crosby Lovett. He declared that the newcomer to Basic Magnesium, in contradiction to the idea that there is great discontent among those who have recently moved to that area, are greatly appreciative of the fine spirit of cooperation they have enjoyed with Las Vegas.

"Southern Nevada," he said, "has taken to itself this great 'War Baby.' There are two states I would not have changed. They ought to have a fence built around them. They are Vermont, with its true spirit of the west. We have got it at BMI and are helping to write a new chapter in this state of Nevada."

The speaker recounted the demand for more and more magnesium from the great plant now only fifty per cent in production and recounted several new and novel uses for the metal. He declared that with the immense output of the metal already being produced, the morale of the workers has greatly improved, and that the production of magnesium is taking on new meaning as word of the great happenings in the war areas comes back to us.

"It is an inspiration to see the metal rolling out," he declared. "There is an increasingly great responsibility on you of Las Vegas."

Max Kelch aroused hearty applause by his picture of the outstanding victory over the Japs in the Pacific and their advances in all other war areas.

An invitation was received from the Needles, Cal., Rotary Club to attend the Tri-State Rotary meeting there Saturday evening, March 6.

L.V.R.J. 3/10/43

Scrap Lumber Is Donated To USO In Boulder City

Five huge stacks of scrap lumber, used in the construction of the Basic Magnesium, Inc., plant, have been donated to the U. S. O., it was announced today.

The U. S. O. will act as a medium in disposing of this lumber to the people. With the scarcity of lumber at the present time, this will enable many to obtain lumber which they would be unable to get otherwise.

The public is invited to secure any amount of the lumber they wish, of all shapes and sizes. The lumber must be selected and hauled away by the individual, as transportation for the lumber will not be provided. A desk, operated by the U. S. O., and manned by volunteer workers, has been set up in the plant protection building, where permits will be issued to allow persons entry on the premises where the lumber is stored.

All donations given for the lumber will be used to furnish the Boulder City U. S. O. club which has been recently established. Miss Mary Hanlon, program chairman of the Boulder City club, is acting chairman of this group of volunteers who will be there every day from 10 A. M. to 5 P. M. Further information may be obtained at the U. S. O. office in Las Vegas, located at 209 South Third street.

L.V.R.J. 3/5/43

BMI Notes

Deliveries of 150 bags of chemical fertilizer were made to Victory gardeners in Basic Townsite who attended the third meeting of the club Wednesday evening, and the supply temporarily exhausted. Additional quantities will be available to those who will call on Sunday, at the house of Mrs. Edward Morley, 338 Nebraska Avenue, it was announced.

Recommendations for better control of dogs in the Townsite were made by a garden club subcommittee which included both dog owners and gardeners. Residents at this club meeting, after considering information relative to Nevada laws and Clark county administration, unanimously voted to accept the recommendation of this committee. The following request will be made to the Board of Commissioners at its next board meeting:

"The undersigned hereby petition the Board of Commissioners of Clark County, Nevada to provide at their earliest opportunity some reasonable and adequate form of dog-nuisance control for an area which includes the B.M.I. Townsite and Trailer Park communities, an area bounded by Pittman to the north and the Railroad Pass district to the south.

"The undersigned believe that the type of dog control which has been in force in Boulder City for a number of years is generally applicable to the Townsite area and ask that the Commissioners use their judgment and authority in establishing a similar or somewhat similar control for the Townsite area. All the undersigned are residents of the B.M.I. Townsite or B.M.I. Trailer Park and most of them, as indicated are either dog-owners or Victory gardeners or both, whose welfare can be much benefitted by your action."

In order that dog owners who were not present at this meeting may be informed at this meeting opportunity to present any objections or counter-proposals to the Board of Commissioners on Saturday afternoon, the B.M.I. residents who signed the above petition are requested the Review-Journal to print this petition in full.

L.V.R.J. 3/9/43

Found In The Mail Bag

Boulder City, March 4.
To the editor:

I follow all your articles in the paper. Sometimes your opinions are the same as mine and sometimes they are not. However, sometimes difference of opinions is caused by difference in one's living or work. In this case, I believe our difference of opinions is due to our work and what we see.

The article I wish to comment on is the difference of opinions of Captain Eddie Rickenbacker and a worker in defense of Captain "Eddie's" remarks about war labor.

I think and know they are both wrong—very much wrong.

The worker is very wrong, getting angry and saying regrettable and untrue words which do not do good anyway. Captain "Eddie" is very wrong for saying that labor is laying down on the war job or words to that effect.

Let me illustrate what I mean.

Let's take the magnesium plant for our example. Magnesium is our number one job here in Nevada. Magnesium is one of the number one jobs of the nation. The war production board wants only one thing from the workers in this area and that is—magnesium, all we can produce.

They are getting magnesium much more than they are able to handle. It is packed in the buildings and stacked in the yard in such quantities that these huge piles are visible by passers-by on highway 93 and may soon be a bottleneck in its own production if these piles are not moved out of the workers' way.

There seems only one answer to me for this situation. The answer is that the big shots (in production and government) through red tape binding procedure cannot handle what they get when they get it, then in order to lay the blame on someone, they pass it to the poor laborer who has to keep still or get fired.

I wonder if Captain "Eddie" was gassed in the first world war? If so, he knows how it is. Of course, we don't have bullets flying around, but we do have the gas, and in dangerous quantities. They tell us it won't hurt us, but we can all read our chemistry books and explode that myth and even prove that it is a falsehood.

The bill introduced in the Nevada legislature by James Fernald this year to make chlorine gas at the plant an industrial accident (when victims are gassed with it on the job) was turned down for consideration, so I heard through the grapevine, and I suppose is forgotten by now. So they think that labor is stalling, do they?

Why is there a labor shortage at Basic? Why is there a train load of magnesium ingots piled up in the enclosure? How do we know this is not the case everywhere else? Maybe acres of finished planes are waiting to be taken away from airplane factories.

You know, Mr. Cahlan, I just have a hunch that there are supplies piled up everywhere almost, that labor has produced, and with the help of something besides talk, our yards would be cleared.

Are we entitled to a day or so away from the battle line, to cough chlorine out of our lungs? Maybe it would clear the yard. What do you think?

W. C. H.

L.V.R.J. 3/10/43

Expert At BMI On Ventilation

Dr. Francis R. Holden of the Industrial Hygiene Foundation, University of Pittsburgh, arrived at Basic Magnesium yesterday and will spend some time here in consultation with the engineering department relative to problems of ventilation and hygiene.

The Foundation is maintained at Pittsburgh by the large industrial concerns of the east to conduct research into various problems of industrial hygiene in the big plants and has been highly successful in this field.

While concerned with the general set-up at the plant, Dr. Holden will pay particular attention to the problem of proper ventilation of the cell units, it was stated.

JULY 2, 1949

STEEL MEN OPPOSE IDEA OF DISPERSAL

Gather Data to Support Their
Contention Centralization
Is Economic Necessity

By **KENNETH AUSTIN**

American steel companies, concerned over the Congressional movement led by Senator Patrick J. McCarran, Democrat, of Nevada, to decentralize industry, are collecting data which they will utilize at the proper time in support of the economic and historical reasons for the concentration of iron and steel facilities in a few well defined areas. These facilities, in the main, have been located near the principal coal and iron deposits of the country, or in such manner that whichever of these important materials has to be brought in, cheap transportation is available, generally by water routes.

Senator McCarran, in launching his campaign for dispersion of heavy industry among all the States nearly a year ago, selected the steel industry as his first target. He urged the appropriation of Federal funds to duplicate this industry's 90,000,000-ton annual capacity in States which boasted few or no steel plants, without awaiting an end of the war. A caucus of fifty Representatives and thirty Senators was the sounding board for his appeal. From this joint caucus, which is still in existence, sprang the Special Committee of the Senate to Investigate the Effects of the Centralization of Heavy Industry.

This committee has held one hearing, on basic magnesium, but has made no report and has taken no further action. However, Senator McCarran appeared in February as the principal speaker at a Council of Interstate Cooperation in Carson City, Nev., where his State was the host to strong contingents from California and Utah and a solitary delegate from Oregon. Their goal was to maintain and advance the industrial growth of the West Coast, which has taken place during the war. This expansion included the building of two completely integrated steel plants, operated respectively by the United

Continued on Page 7

Var Dividends s Likely to

with year subscription, points out ten sound and with an average price today of only 25. 1% in the 1936-37 bull market.

Year Lows

Our analysts

Continued From Page 5

States Steel Corporation and Henry J. Kaiser.

There were cogent reasons why these two huge new steel establishments were located in California and Utah. First, there was the risk that the Panama Canal might be bombed and closed for some period; second, there was considerable shipbuilding on the West Coast which the new steel plants were devised to serve. But from a purely economic standpoint, the Geneva Works in Utah are 130 miles from their coal supply, and 225 miles from their iron mines, and the Fontana Works in California are 830 miles from coal and 179 miles from iron. The question of who will own and operate these plants after the war is far from being resolved.

As to Senator McCarran's major thesis, however, that every State should have a heavy industry of its own, the rejoinder might be made that every State should grow its own cotton and lemons and mine own lemons. This probably could be accomplished if costs, to say nothing of profits, could be ignored. The lemons could be grown in Minnesota hot-houses reproducing the necessary actinic, temperature and humidity conditions.

What nature has provided in the way of geographical and geological conditions has, in the main, caused the location and rise and fall of industries. There is no reason why each State should become economically self-sufficient, any more than that each country in the world should become an integrated unit. There have been considerable loose thinking and planning along these lines among nations in recent years, and such considerations have been prominent in our good-neighbor policy and in the post-war planning of many governments, whereas plans to increase

international exchanges of goods and services would do much to promote peace and the welfare of all nations. To inflict the theory of economic independence on the forty-eight States would do immeasurable harm, by weakening our national economic structure, destroying its financial strength, and vitiating its chances for an adequate share in world trade.

To apply the "public utility" theories of government of the last ten years to steel and other major commodities indubitably would be a blow to American capitalism. There is no doubt that Federally-built plants could be operated in such a manner that private plants, however well located, could sell only at a loss. One has only to study the effects of TVA, Bonneville and Grand Coulee developments on neighboring utilities to realize this. There are better ways to enhance the economic strength of all the States: by developing the natural resources that definitely are theirs and by stimulating "home" production of consumer goods which can make advantageous use of such raw materials.

No More Cutbacks Seen For Basic Magnesium; Post-War Plans Studied

SAN FRANCISCO—To alleviate a manpower threat which arose following the recent 40% cut-back ordered for Basic Magnesium, Inc., by the War Production Board, the management of the plant has been assured that there are no further plans for reducing operations.

It is disclosed, furthermore, that federal agencies will complete recreational and library facilities for the town of Henderson, adjacent to the plant.

Additionally it is stated that President James R. Robbins of Basic, who also is president of Anaconda Copper Mining Co., operator of Basic, has presented at Washington four alternative plans which Anaconda holds for post-war operation of the facility. These include addition of fabricating facilities and the addition of sales engineering and promotion for peacetime manufacture and distribution of light metals.

More immediately it is stated that Basic's management is now considering plans for production of sodium and sodium hydroxide at

B. M. I.
Philip D. Wilson, director of the magnesium and aluminum branch of WPB, has wired F. O. Case, general manager of Basic: "In answer to your question regarding the production of magnesium at Basic, there are no plans to make further reductions there. This advice should decrease your terminations and stabilize your employment. If necessary we will recommend that suitable priority be assigned to Basic to enable you to continue present scale operations."

Perry D. Helser of the same WPB branch also is quoted as having stated that "we will not reduce Basic any further."

Release of the information at the plant is indicated to have materially moderated a disturbing labor exodus.

REVIEW-JOURNAL 6-21-44

BMI to Receive Security Award From OCD Office

CARSON CITY, June 21 (UP)—Basic Magnesium, Inc., of Las Vegas, has been selected to receive the second national security award given in Nevada, Hugh Shamberger, state director of civilian defense announced today.

Selection of BMI was made at the national OCD headquarters. Months ago Nevada Mines division of Kennecott Copper company, Ely, was given the first such award made in the state. The award to Kennecott was the seventh in the United States.

No date for presentation of the BMI award has been set, Shamberger said.

B. M. I.'S HOPE FROM THE NORTH

When War Manpower Commission Chief John P. Burns returns to Las Vegas tomorrow he will undoubtedly have more complete word on the picture of Basic Magnesium as is related to recruitment of men in Reno and northern Nevada.

All in the county will hope that the efforts of the manpower commission and of the United States Employment Service will have met with encouragement and that many more men will be available immediately to insure the capacity operation of the six remaining mills at the war plant.

Basic Magnesium has encountered more than a small amount of difficulty in attempting to solve this employment problem.

The warmer weather coming up and the closing of the Henderson schools have each contributed to an exodus of workmen into other sections of the country, some to return to their homes on the discouraging thought that sooner or later B. M. I. will be closed permanently and that they will be out of work then anyway, and they might as well go now and avoid the unpleasantness of summer heat.

It has been that excuse for leaving which B. M. I., the Government's labor agencies here, the Chamber of Commerce and the unions have been attempting to combat.

So far the efforts have been fairly successful, and slowly the people of Clark County are being reassured that the plant is not to be vacated and dismantled.

There is a certain amount of optimism that, even if B. M. I. or the parent body, Anaconda Copper, may decide after the war to turn the plant back to the Government, the Government or some other private concern will operate the plant because of the availability here of magnesium ore, of water power and of Boulder Dam electricity.

B. M. I. and the civic groups, including the labor unions, have been plagued in their educational campaigns by minor irritations such as the reported transfer of the single men's dormitory and cafeteria to a restaurant concessionaire who has not been popular in other departments of the mill with the workers.

A petition signed by many of the men and a delegation of protesters brought forth information from the company that the proposed transfer is not to be made, and that irritation hence has been removed.

It is to be assumed that the workers who had threatened to leave B. M. I. if the deal were consummated now have changed their minds and will remain.

A hopeful factor, in addition to all the education and the hope engendered in the Government's promise not to chop down any more of the mills even though other magnesium mills and aluminum plants in the nation have just been closed, is the new order by which the War Manpower Commission takes over almost complete control of male labor on July 1.

This will serve not only to help keep men in Clark County as B. M. I. workers or potential workers, but will serve to bring other men here from non-critical areas and non-critical industries.

Basic Magnesium Gets High Award

CARSON CITY, Nev., June 21 — Basic Magnesium, Inc., of Las Vegas, has been selected to receive the second national security award given in Nevada, Hugh Shamberger, state director of civilian defense, announced today.

Selection of B.M.I. was made at the national OCD headquarters. Months ago, Nevada mines division of Kennecott Copper Co., Ely, was given the first such award made in the state. The award to Kennecott was the seventh in the United States.

No date for presentation of the BMI award has been set, Shamberger said.

Basic Area Gives Almost \$6,000 To Red Cross

An incomplete report from the Basic school district indicates that a total of \$5,990.70 has been collected, and the war fund drive of the Red Cross still is going full swing in the area under the Basic branch of the Clark county chapter of the Red Cross. Reports from Basic and from the Las Vegas drive took the county quota over the half-way mark, with a total of \$14,413.74 collected toward the county quota of \$28,600.00.

No report has been received from the McNeil Construction company yet, but it was understood unofficially that it had gone over its quota of \$4,000.

The total quota for the Basic district was set at \$10,000.

In Las Vegas to date a total of \$7,030.90 has been raised toward the quota of \$11,500.

Latest contributors of large sums are: \$100.00—El Cortez hotel; \$50.00—Mark S. Schulman; \$40.00—Garehime Music company; \$29.50—El Cortez hotel employees; \$25.00—Lewis and Hawkins, Coca Cola Bottling company and employees, El Rio garage, Musician's Protective Union local 369, City Mercantile company, Fred S. Alward, the Toggery, and Home Lumber company; \$20.00—Rancho Grande Creamery; \$19.65—Clark Market employees; \$15.00—Modern Cleaners; \$12.00—M. W. Davis Jewelers and employees; \$10.00—Griffith, Dr. R. H. Gatewood.

—Sprouse-Reitz company, Car-Gift and Toggery Shop, Mrs. J. R. Lewis, C. A. Huffey, Downtown Motel, Amalgamated Meat Cutters Union Local 457, Central Labor Council of Clark county, Town Barbecue, Ullom Studios, Las Vegas Printing company and employees, Leo A. McNamee, Mathis Dress shop, Mrs. Ruth Griffith, Dr. R. H. Gatewood.

Dog Control Urged By Basic Townsite Victory Gardeners

Commissioners of Clark County Petitioned to Protect BMI Gardens — Dog Control

Victory gardens received not over 150 bags of chemical fertilizer last week in the Basic Townsite. This was not sufficient, but additional quantities of fertilizer are promised later. Mrs. Edward Morley at 338 Nebraska Avenue has been designated to accept calls for more fertilizer.

Recommendations for better control of dogs in the Townsite were made by a garden club sub-committee which included both dog owners and gardeners. Residents at this club meeting, after considering information relative to Nevada laws and Clark county administration, unanimously voted to accept the recommendations of this committee. The following request will be made to the Board of Commissioners at its next board meeting:

"The undersigned hereby petition the Board of Commissioners of Clark County, Nevada, to provide at their earliest opportunity some reasonable and adequate form of dog nuisance control for an area which includes the B.M.I. Townsite and Trailer Park communities, an area bounded by Pittman to the north and the Railroad Pass district to the south.

"The undersigned believe that the type of dog control which has been in force in Boulder City for a number of years is generally applicable to the Townsite area and ask that the Commissioners use their judgment and authority in establishing a similar or somewhat similar control for the Townsite area. All the undersigned are residents of the B. M. I. Townsite or B. M. I. Trailer Park, and most of them, as indicated, are either dog owners or Victory gardeners, or both, whose welfare can be much benefited by your action."

In order that dog owners who were not present at this meeting

may have an opportunity to present any objections or counter-proposals to the Board of Commissioners on Saturday afternoon, the B. M. I. residents who signed the above petition request the printing of this petition in full.

Lumber For Sale By Women of USO

Waste From BMI May Be Secured By People — Proceeds Go To Boulder USO

Lumber, used in the construction of Basic,—five huge stacks of it,—has been donated to the U.S.O. by Mr. F. O. Case, B. M. I. executive. The U. S. O. will act as a medium in disposing of this lumber to the people. With the scarcity of lumber at the present time, this will enable the U. S. O., through the courtesy of B. M. I., to render an invaluable service to the residents of Southern Nevada.

The public is invited to secure any amount of the lumber they wish, of all shapes and sizes. The lumber must be selected and hauled away by the individual, as transportation for the lumber will not be provided. A desk, operated by the U. S. O., and manned by volunteer workers, will be set up in the Plant Protection building, where permits will be issued to allow persons entry on the premises where the lumber is stored.

All donations given for the lumber will be used to furnish the Boulder City U. S. O. Club, which has recently been established. Miss Mary Hanlon, program chairman of the Boulder City Club, is acting chairman of this group of volunteers who will be there every day from 10 a. m. to 5 p. m. For further information please call the U. S. O. office in Las Vegas, located at 209 South Third Street, Phone 2054-J, or the U.S.O. Club in Boulder City, located in the Women's Auxiliary room of the American Legion Hall, Phone 245-R.

Basic Plant Has Reached Half Way Mark in Production

Official sources announced this week that Basic Magnesium plant had reached the point of 50 per cent of its capacity for production. This was announced when the first refinery unit went into operation the fore part of the week.

When this unit of refinery operation went into started one-half of the metals plant was under operation. Half of the rotary kilns and tunnel plant are in operation. The chloride plant has passed the half-way production point, it was announced by officials of the B.M.I.

Magnesium Plant Metal Production

Great Plant Now Turning Out Fifty Per Cent of Estimated Final Capacity

(From "The Big Job," Basic Magnesium News Letter.)

With the first refinery unit going into operation, Basic this week reached the point of 50 per cent production. Half of the metals units are now in operation. At the preparation plant half of both the tunnel and rotary kilns are operating. The chlorine plant has passed the 50 per cent production point.

Mrs. Paul Hughes bespoke the feelings of almost every one around the project when she went to work last week in the billet-shipment department. Said Mrs. Hughes: "I have a boy in the Solomons and somehow when I wrap this bomb metal I feel as though I am putting a weapon into the hands of my son. It may save his life."

Friday, April 2, 1943

Anaconda Copper Officials Visit

A group of officials from the Anaconda Copper Mining company, world famous holding company, arrived Thursday evening at El Rancho Vegas where they will stay during their visit to Las Vegas and the Basic Magnesium plant, recently acquired by Anaconda.

In the group are Mr. and Mrs. Cornelius Kelley, Mr. and Mrs. James R. Hobbins and T. H. O'Brien. Kelley is the chairman of the Anaconda company, Hobbins, the president, and O'Brien is vice president of the Inspiration company, an Anaconda holding located at Inspiration, Arizona.

The Anaconda Copper company was incorporated in 1895 in Montana and has since grown to be one of the outstanding companies of its kind in the world. Its holdings include mines, smelters, refineries and properties in many of the United States and several foreign countries. The head office of the concern is 25 Broadway, New York City.

B.M.I. Lumber Is Still Available To General Public

The USO is still offering to the people of the community, the lumber located at B. M. I.

Miss Mary E. Hanlon and Mrs. Florence Bradford, who head the USO committee that has charge of the "bone piles" at B. M. I., state over 150 permits have been issued and answers given to over 300 inquirers.

"B. M. I. has more or less set a precedent in turning this lumber over to the public, and the USO feels privileged to have the opportunity of acting as the medium in the distribution of this lumber to the people of the surrounding communities," states Miss Margaret M. Bushard, USO Club director.

Caravans of trucks, trailers, pick-ups, and automobiles have been leaving the "bone yard" laden with scrap lumber from the USO lumber piles.

Fences, walks, lath houses, and even cabins are being built from the lumber, which has also proved useful to those engaged in making "Victory Gardens."

This scrap lumber is available to anyone who wishes to haul it away. The USO maintains a desk at Room 14, in the Plant Protection Buildings at BMI to issue the permits.

WESTERN INDUSTRY

"A magazine directed to the men of management in all manufacturing industries in the industrial West."

San Francisco, California

MAY 1944

Fight to Keep Basic In Full Production...

SENATOR McCARRAN of Nevada is making the fur fly in his efforts to keep WPB from putting into effect its proposed order (forecast in the April issue of *Western Industry*) closing down four units of the monster Basic Magnesium, Inc., plant at Las Vegas, Nevada, following the reduction in magnesium output ordered elsewhere.

Reasons assigned by Phillip Wilson, head of the magnesium and aluminum division of WPB, are: (1) a shortage of oil in the West which would be relieved by utilizing the hydro-electric power from Boulder Dam now used by the four units instead of allowing two steam power plants at Los Angeles to consume oil needlessly; (2) the shut-down at BMI would release 1500 men to relieve the labor shortage at Los Angeles; (3) transportation of magnesium from BMI to the East is an economic loss and is creating a bottleneck, and hauling peat moss from Canada wastes transportation needlessly.

Senator McCarran learned that Petroleum Administrator Ickes wrote Donald Nelson the saving in oil would be inconsequential and that gas will soon be avail-

able in Los Angeles to operate the steam plants; that Paul McNutt, War Manpower Commissioner, advised there is no housing available in the Los Angeles area for additional workers; that five cars a day will move all the magnesium that can be produced at BMI and that 60 to 70 per cent of the 600 eastbound freight cars passing Las Vegas every day are empties; and that Anaconda is steadily reducing its use of peat moss and will shortly dispense with it altogether.

Despite the extravagance and inefficiencies of the early days of the project, which the Truman Committee said had made a \$63,000,000 project cost nearly twice that much, the Anaconda Copper Company management has been making steady gains in efficiency. These eventually may challenge the Truman Committee's assertion that the capital expenditures and expenses of transporting the ore 350 miles place a handicap on the project which alone make it difficult to compete with other projects.

It is asserted by Senator McCarran that in January BMI produced metallic magnesium at a cost of \$0.1975 a pound, and the Truman Committee reported that Ana-

conda had reduced the cost from \$0.316 in June 1943 to \$0.235 in November.

"It should be noted," says the Committee, "that the foregoing costs do not include amortization of plant facilities, which of course are borne by both Dow Chemical and Permanente Metals Corporation in the operation of their privately owned plants."

"Although the cost is still above the \$0.205 per pound (Editor's note: Senator McCarran's later figures brings BMI below that figure) at which Dow Chemical is selling magnesium produced in its privately owned plants and the \$0.124 per pound cost of producing magnesium in the plant operated for the Government by Dow Chemical at Velasco, Texas, it is substantially lower than the cost of producing magnesium to date by either the ferrosilicon of the carbothermic processes."

The Truman Committee notes several objections to the BMI project besides the squandering of money in the days before Anaconda was called in to bring order out of chaos. One of these is that it should have been located near Lake Meade, where it would not have been necessary to run a 40-inch pipe line over the mountains for pumping water nor build two 15-mile 230,000-volt transmission lines.

"It is also obvious," say the Committee, "that the plant was wrongly located on the site itself, in that the railroad terminal is

El Centro, Cal., Desert Magazine
Cl. 6-445
JUNE, 1944



Left to right. 1—The prospector, during desert heat and endless miles of hills and sand, deserves credit for locating the great deposits of magnesite from which magnesium is made. Photo by Truman D. Vencill. 2—Magnesite blasted out with dynamite is scooped up with big shovels, dumped into specially designed trucks which carry 20 tons of ore each, in steady stream to Gabbs plant, from where magnesium oxide and other concentrates are hauled to plant at Las Vegas, 334 miles away. 3—Ore is pulverized in a battery of ball mills (center), then moves to classifiers (foreground). Finer material flows out and is carried to the next operation.

Miracle Metal From Nevada Hills

By LELANDE QUICK

Photos courtesy Basic Magnesium, Incorporated

"THE romantic thing to me is that the plant stands squarely astride the old Spanish trail so that I like to refer to it as the Path of Progress." Guernsey Frazer, administrative assistant to the general manager of Basic Magnesium was talking to me as we looked over the enormous plant at Henderson, Nevada.

"That idea pops into my mind oftener than do the facts that confront us daily, such as how we built this third largest city in Nevada in 11 months to house the 5500 permanent workers we now have at BMI—a town complete with hospital, schools, churches, markets and a general shopping center. Construction of the plant itself over a period of only 18 months was the largest construction job ever accomplished in four directions—in refractory brick work, sheet metal, electrical and plumbing installations. It was built by McNeil construction company of Los Angeles between November 15, 1941, and July 31, 1943."

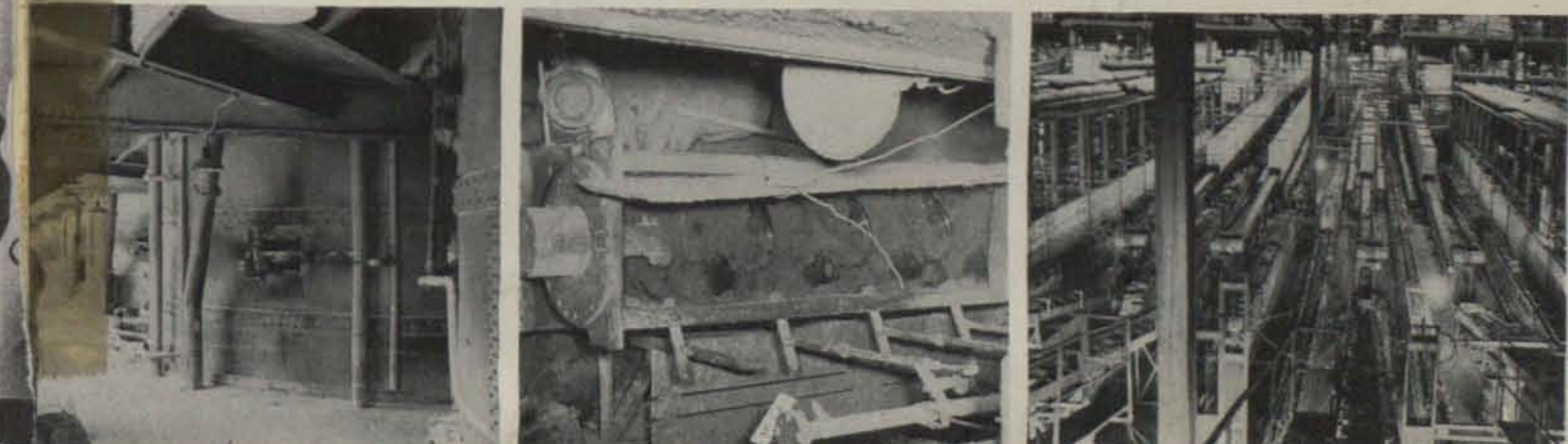
I had spent the whole day with Bill Burke, Frazer's able assistant. I wasn't too tired, for the buildings were so large we had driven right through most of them in our car. Silver-like magnesium has been aptly called the miracle metal. Its use is comparatively new because it used to cost \$5.00 a pound to produce it but now it can be turned out for about 20 cents. Magnesium is about two-thirds the weight of aluminum but it has the tensile strength of hot rolled or mild steel. Its potentialities for postwar use are unlimited for making the standard things lighter—washing machines that will weigh less than present vacuum cleaners, bath tubs that one man can easily carry. And because it is cheaper to produce, the cost of items made from it will be reduced in two directions for it is an axiom in the metal industry that "if you save a pound you save a dollar."

BMI, as they always refer to Basic Magnesium, Inc., is the largest magnesium plant in the world, using more Boulder

Dam power daily than the city of Los Angeles. It cost more than \$140,000,000, and beside it other war plants authorized by Defense Plant corporation were really minute. The electrical installation alone cost \$40,000,000. Of this amount \$23,000,000 went into solid silver bus bars. All of this silver had been mined in Nevada and stored in eastern vaults at West Point, New York, but because of the acute shortage of needed copper, usually used for bus bars, the silver was processed into equipment in the east and came home again to Nevada as a substitute for the copper bars in six of the ten electrolysis units now operating at the plant.

Aside from the cold and unromantic statistics of the accomplishment the real romance was in the successful fight of more than 13,000 construction workers (Boulder Dam had but 5250 at the peak) to accomplish their purpose in the face of natural difficulties and lack of living quarters. With the combination of natural

Left to right. 4—In battery of roasters magnesium oxide is calcined. Partially moist magnesium oxide, introduced at top of these seven-story units, is subjected to intense heat generated by oil burners. Last process at Gabbs mill. 5—One of a battery of wet mixers in which coal, peat moss, magnesium oxide, magnesium chloride are mixed. From mixture cakes of magnesium are extruded, cut into slabs by piano wire. 6—Here cakes of raw materials pass through long tunnel kilns, thoroughly dried. Process consumes some of the coal and peat moss, leaving cakes porous.



EVERY PLANT
should have a
BEATTY-SAFWAY
MAINTENANCE
TOWER
always available
TO SAVE
TIME AND
ACCIDENTS



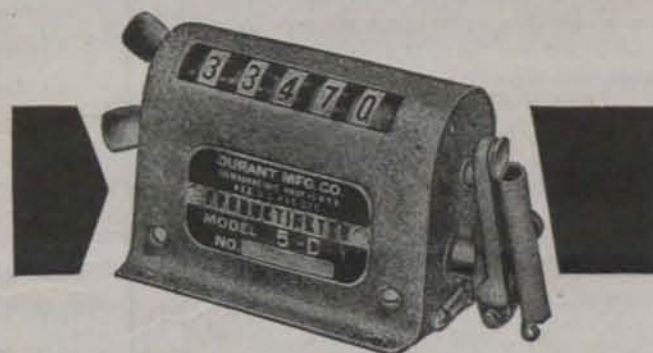
This 15 ft. rolling tower set up in 10 minutes

BEATTY SAFWAY
Steel
SCAFFOLD

SCAFFOLD
FOR
EVERY
PURPOSE

SOLD OR RENTED
by the Beatty-Safway
Distributor in your Territory

Manufactured by
BEATTY STEEL
PRODUCTS CO.
415-421 BRYANT STREET
SAN FRANCISCO



a little **PRODUCTIMETER**
that does a **BIG** counting job!

Use it on small machines, such as drill presses, bench presses, scales, conveyors, food packers, cutters, folders... it's a sturdy counter, especially recommended for light service... it has a die cast base, steel stamped cover, oil-less bearings, 1/4" legible black figures... available in sizes to count from 1000 to 1,000,000.

There's a unit in the Productimeter Line to meet practically every need, in Stroke, Rotary, Lineal and Electric models.

Standard models stocked for prompt shipment on West Coast. Write our nearest distributor for complete information.

Irving G. King & Company, Los Angeles
Mailler Searles, Inc., at San Francisco, Portland and Seattle
Catalog No. 100 on request!

DURANT MANUFACTURING COMPANY

1969 North Buffum Street **PRODUCTIMETERS** Milwaukee, Wisconsin
THE SPEEDMETERS OF INDUSTRY

automotive accessory, cinematographic equipment."

With all due respect to this highly-respected pioneer publication of the advertising world, the answer is "What with?"

Value of Western Oil Shale Deposits

In regard to the development of the oil shales in the Rocky Mountain region, reported from Washington in the April issue of *Western Industry* as about to be authorized by Congress, Per K. Frolich, president of the American Chemical Society, describes them as the most important in the United States.

In a paper entitled "Petroleum, past present and future" he states that a much larger potential supply of liquid hydrocarbons is obtainable from the oil shales in the United States than from the natural gas reserves, which are in turn equal to about 75 per cent of the proved reserves of petroleum. At the present rate of consumption, Mr. Frolich, who is director of the chemical division of the research laboratories of the Standard Oil Company of New Jersey, says the proven gas supply should last about 30 years, or twice as long as the oil supply.

"From 1925 to 1929 the Bureau of Mines experimented with the recovery of oil from Colorado shales," he reports. "Although no commercial scale production was undertaken, sufficient work was done to demonstrate the practicability of producing oil from this source. The oil obtained by retorting of shale differs from conventional crude oil in that it has a higher percentage of unsaturated hydrocarbons, a lower percentage of gasoline, a higher wax content, and relatively high content of phenolic compounds and nitrogen bases. Additional work therefore remains to be done on the development of satisfactory refining methods."

Gold Mining Relief

Permission to resume limited milling of ore to meet maintenance costs has been granted by WPB to two of the nation's largest gold producers, the Idaho Maryland and Empire Star mines at Grass Valley, California. Maintenance workers and miners non-essential to higher urgency war production were made available, also critical equipment, subject to prior call to military or other production. It was shown that the two mines included over 400 miles of underground tunnels and mining developments, that nearby communities were dependent upon the gold mining industry and that over 100 homes had been closed as a result of the stop order on gold mining. This step was taken to indicate that WPB's policy will be to give consideration to appeals from authorized producers who are faced with drastic losses to property.


YOUR Job is a WAR Job



Your job—and ours and every good American's—is to win the war as conclusively and as quickly as possible. Every man and woman engaged in American industry, in whatever capacity, is a Citizen Soldier charged with the duty to work full time, produce to the limit, and conserve vital materials and machines. It is a duty that will not be fully discharged until Victory is won. It's up to all of us to *stay on the job and finish the job.*

GUARD PRECIOUS EQUIPMENT

The machines and equipment you use must be kept on the job top. To help you, we are producing vastly increased quantities of first quality lubricants for protective maintenance and more efficient operation. We are also developing new and remarkably better lubricants to meet today's requirements. Your Associated representative "knows the score" on wartime lubrication problems and their solution. His knowledge and experience are at your disposal, without obligation, at all times.


GASOLINE POWERS THE ATTACK
—DON'T WASTE A DROP!



TIDE WATER ASSOCIATED OIL COMPANY

VEEDOL AND TYDOL MOTOR OILS • CADEL A. P. HEAVY DUTY LUBRICANT
CYCOL INDUSTRIAL LUBRICANTS • ASSOCIATED AVIATION ETHYL AND
FLYING A GASOLINES • FISK TIRES • AERO BATTERIES

WESTERN INDUSTRY

"A magazine directed to the men of management in all manufacturing industries in the industrial West."

San Francisco, California

MAY 1944

at the lowest point and all materials entering into the construction and operation of the plant must be carried up to their point of use . . . proper consideration was not given to prevailing winds in the area and the corrosive fumes of chlorine are carried against the expensive transformer and distribution equipment with a deteriorating and injurious effect."

Machining Problems In Magnesium

The questions as to what types of tool steel are best for cutting tools for magnesium, and what cutting angles and clearance angles are best for flat drills, were recently submitted to the San Francisco office of Smaller War Plants Corporation technical advisory service in San Francisco by a manufacturer of cutting tools for machining magnesium incendiary bombs.

Tungsten carbide tipped tools and other alloys for high production work were generally recommended by the authorities from the SWPC consulted. One source advised that tools used for machining magnesium should have the following characteristics: (1) smooth faces, (2) large peripheral clearances, (3) large chip spaces, (4) small areas of tool in contact with the work, and (5) comparatively small rake angles (undercuts).

Tool materials were rated by one source in the following manner in order of increasing tool life: (1) high-speed steels, (2) high-speed steels plus surface treatments, (3) non-ferrous tool materials, (4) carbide-tipped tools.

Compared to the average cutter, the milling cutters for magnesium should have less teeth, more undercut, greater angle of spiral, and more chip space, was the opinion from another source.

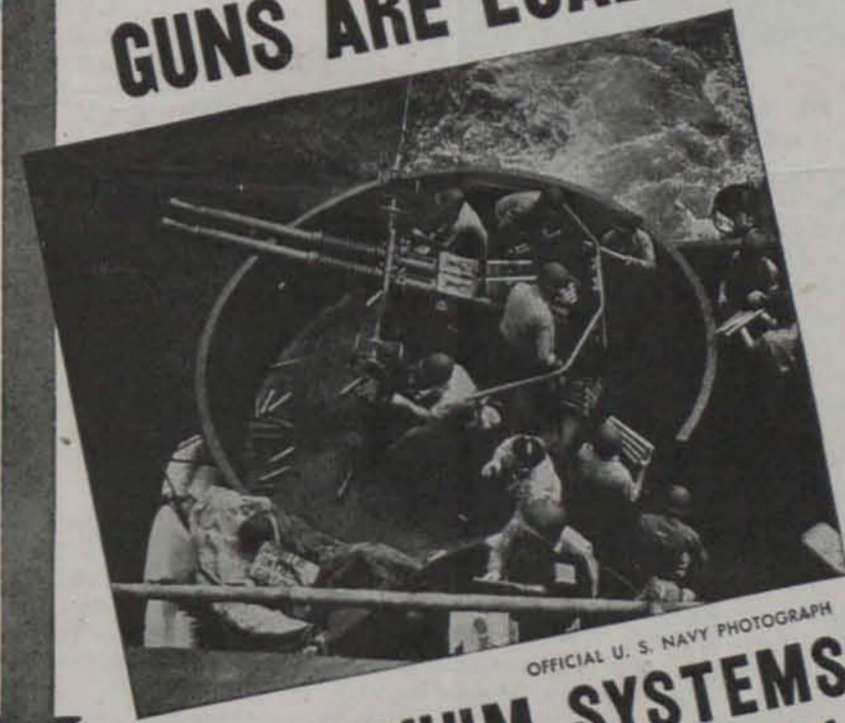
One metallurgist advised against the use of flat drills for magnesium, recommending instead spiral drills for ordinary or shallow depth holes and fast spiral drill for rapid chip removal, saying it was necessary to use extreme clearance and regular angles for the free cutting of magnesium.

Consolidated's First Postwar Plane

A 48-passenger commercial transport plane has been announced by Consolidated Vultee Aircraft Corporation as its first postwar ship. This Model 39 incorporates the Davis wing, power-plant and landing gear of the Convair Liberator bomber together with a specially designed fuselage. It is designed for long range operations and will carry 48 passengers with baggage and 1200 pounds of mail on flights up to 2500 miles. As a sleeper plane, it will accommodate 24 passengers and a cargo version is expected to carry a payload of 12,000 pounds over similar distances.

Normal cruising speed for the ship will be 240 miles per hour contrasted with 180 miles per hour for present day planes.

BEFORE THE GUNS ARE LOADED . . .



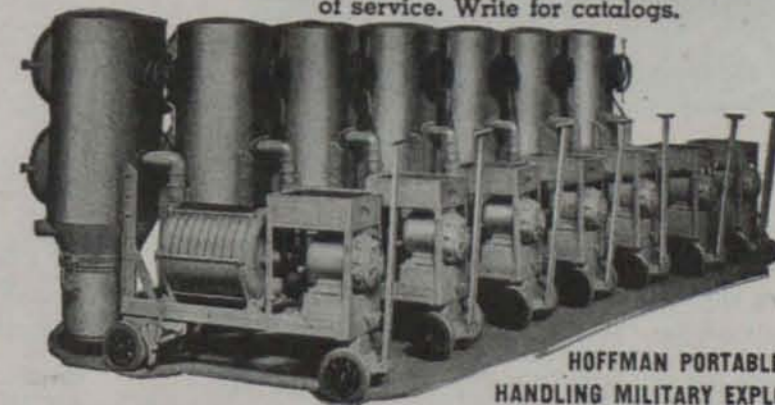
OFFICIAL U. S. NAVY PHOTOGRAPH

HOFFMAN VACUUM SYSTEMS HELP LOAD THE SHELLS!

Special Hoffman Stationary Dust Control Systems are performing vital service in production operations in Army and Navy ammunition loading plants — handling dusts from military explosives.

Separate Hoffman Vacuum Cleaning Units — both stationary and portable — are also used to clean floors, walls, overhead and machinery — providing an efficient method of good housekeeping in these important plants.

Perhaps you have a dust problem interfering with war production, or a dust hazard, on which we can be of service. Write for catalogs.



HOFFMAN PORTABLES FOR HANDLING MILITARY EXPLOSIVES

U.S. HOFFMAN MACHINERY CORPORATION

AIR APPLIANCE DIVISION, 92 EAST 12TH ST., NEW YORK 3, N. Y.

WESTERN MARKETERS AND MARKETING

A monthly column devoted to the promotional and advertising plans of western manufacturers

Dar Johnson has been newly appointed sales and advertising manager for *Willamette-Hyster Co.*, Portland, Ore. and Peoria, Ill., filling the vacancy created when Manford Pate resigned to join the Royce MacCandliss Agency. Johnson was formerly public relations and industrial promotion manager for the Peoria Journal Transcript.

Now associated with the *Knollin Advertising Agency*, San Francisco, is Norman Erickson as art director, and Thomas J. McNamara as account executive. Erickson comes from Chicago where he operated his own studios; McNamara from the San Francisco office of J. Walter Thompson.

Replacing Ralph Dorland as manager of production and promotion for *Western Industry* is Robert C. Williams, formerly advertising manager of Stauffer Chemical Co., San Francisco. Dorland resigned to join the merchant marine.

New president of the Los Angeles chapter of the *National Industrial Advertisers Ass'n* is R. Calvert Haws, manager of ad-

vertising and sales promotion for Western Precipitation Corp.

Alec Lansing Corp., Los Angeles, account, electronic equipment, to the Davis & Beaven agency. The campaign in industrial journals and direct mail will be supervised by Ford C. McElligott.

The *Olds Alloys Co.*, South Gate, Calif., has appointed the *Darwin H. Clark* agency to supervise its advertising. Media will be national industrial publications.

To the *Hillman-Shane & Breyer* agency, Los Angeles, as manager goes Hassell Smith, formerly manager of the L. A. office of Botsford, Constantine & Gardner.

The *Davis-Beaven Agency*, Los Angeles, adds Jerry Coleman to its staff as head of the planning board. Coleman was formerly advertising manager for White King Soap Company.

Malcolm Dewees retires as Pacific Coast manager for Kelly, Nason & Roosevelt to join the San Francisco office of *Botsford, Constantine & Gardner*.

Add to list of accounts serviced by Brischler, Van Norden & Staff, San Francisco, the *Ray Oil Burner Co.*, same city.

Lloyd Thorpe, assistant advertising manager of *Weyerhaeuser Timber Co.*, has been elected president of the *Tacoma Advertising and Sales Club*.

Frederick Henning, who has been operating his own agency in San Francisco, has joined forces with the *Garfield & Guild Advertising Agency*.

Drop and Pick-up Air Mail Without Stopping

Permission to provide airmail and express cargo service to more than 100 California cities not previously served by air transportation facilities is being applied for by the Ryan School of Aeronautics at San Diego. Plans call for operation of twin-engine airliners equipped with an aerial pick-up device after the method of taking on mail pouches from a moving train, for service at communities between the regular landing stops. No landing field, only an unobstructed area for flying close to the ground, would be necessary at such points.

The pick-up unit in the plane consists of an electrically operated winch with a shock-absorbing device, a rope and a pick-up arm, which retracts into the bottom of the plane when not in use. Approaching the pick-up station at an altitude of only 20 feet, the pilot trips a release and the fiber-encased delivery container drops to the ground.

At the same time the arm with the pick-up hook strikes a transfer loop suspended between two 14-foot upright poles, setting in motion the energy-absorbing device on the unit in the cabin. This operation absorbs the shock of contact to such an extent that it is hardly noticed in the plane. After the pick-up is made the container is automatically pulled into the plane by the electrically operated winch.



Repair them Quickly with SPEED-PATCH

★ Worn, broken floors, loading platforms and other areas contribute to shipping delays by upsetting loaded trucks and damaging critical materials. Put an end to these costly interruptions by repairing with *ready-mixed, spark-proof Speed Patch*.

Speed Patch "sets" immediately. No need for traffic detours. Truck over repaired area without waiting. Simple directions are: Fill broken area with Speed Patch, tamp solid and open to traffic. Nothing is easier—nothing is faster—nothing is better. Order Speed Patch, recognized the best by leading industries,

Ask about Heavy Duty *ROCK-TRED* for Complete Resurfacing
REPRESENTATIVES IN PRINCIPAL CITIES

ROCK-TRED CORPORATION

629 W. Washington, Chicago 6, Ill.
WARREN & BAILEY CO., 350 SOUTH ANDERSON STREET, LOS ANGELES
PETERSON-COBBY CO., 363 CLEMENTINA STREET, SAN FRANCISCO

PUNCH-LOK

• • • • • the Easiest, Fastest, Most Dependable and Economical Method for SOLVING HOSE CLAMPING PROBLEMS

The **PUNCH-LOK** Hose Clamp is a mechanical device for clamping fittings, menders, or ordinary pipe to a hose. A broad, flat, high tensile strength galvanized steel band is double-wrapped around the joint. After tensioning with a pull of 1000 pounds within the **LOKING-TOOL**, the ends are securely locked together under tension without loss of tension. The excess band is then cut off flush with the Lok so that the entire joint is streamlined for safety.

Once the **PUNCH-LOK** Hose Clamp has been locked, vibration or rough handling cannot loosen it. There is no possibility of injuring or cutting the hose in any way—the clamp will outwear the hose—and the cost is no more than the ordinary clamp of yesterday. Stop your hose leaks and troubles with **PUNCH-LOK**.

15 SECONDS TIME STOPS COSTLY LEAK LOSS.

Write today to Department B for illustrated folder or contact Harry M. Thomas, Pacific Coast Representative, 1554 Oakland Avenue, Piedmont 11, California, for the name of your nearest distributor.



• THE BAND
Double-Wrapped



• THE TOOL
Heat-Treated



• THE JOINT
Punch-Loked

PUNCH-LOK COMPANY

321 N. Justine St. Chicago, Illinois
DISTRIBUTORS IN PRINCIPAL WESTERN CITIES

WESTERN INDUSTRY—May, 1944

Parade of the Pentstemons

By MARY BEAL

CONTINUING the Pentstemon quest, we select a few without the fiery brilliance of the Scarlet Buglers described in the May issue of Desert Magazine. One of the loveliest, Palmer's Pentstemon, is rather widespread at moderate to high altitudes, its graceful wands of delicately colored bloom lighting up slopes, washes and canyons, and exhaling a delightful fragrance. Etched in my memory is the vision of a magnificent clump over 5 feet tall, supremely beautiful in the late afternoon light. It appeared like magic at a bend of the road skirting the Providence mountains in eastern Mojave desert. It was standing at the edge of a shallow rainwash, its dozens of flower-strung stems gently swaying in the breeze.

Pentstemon palmeri

Several to many slender erect stems 1½ to over 5 feet tall, from a woody base, more leafy below, the herbage hairless and lightly covered with a bloom, the narrow sessile leaves mostly lanceolate with shallow sharp teeth. The inch-long (or more) corolla is pale pink (or deeper) or orchid pink, with crimson lines in the throat extending well down the 3-lobed lower lip, the short tube abruptly dilated into the wide-open throat, showing the hairy palate and densely hairy tip of the sterile filament. Frequent from 3500 to 6500 feet in Mojave desert, Arizona, southern Nevada and Utah.

Pentstemon spectabilis

This showy species has ventured into the

desert from bordering ranges on the west, making itself at home on dry hills and in rocky canyons. Its stately clusters of stems, 2 or 3 feet tall, are generously bedecked with flowers of an entrancing gamut of color tones, the corollas over an inch long, bright blue or purplish blue, lighter at base, the abruptly dilated, bell shaped throat lilac or red-purple. A panicle often has 50 or more blossoms. The pale-green leaves are sharply toothed, the sterile stamens beardless. Look for it in April and May along the western edge of Colorado desert and in the western and southern borders of Mojave desert.

Pentstemon albomarginatus

A smaller species, growing in low clumps 6 to 10 inches high with several leafy stems from the long fleshy root, the herbage pale grey-green with a sheen. Leaves and sepals white-margined, flowers whorled in a spike-like leafy panicle, the corolla light to deep rose pink, throat paler with bright reddish lines and dense yellow beard. Found infrequently at moderate altitudes in April and May in sandy areas of western Arizona, southern Nevada and eastern Mojave desert.

Pentstemon antirrhinoides

An intricately-branched leafy shrub 2 to 7 feet high, with many small glossy rich-green leaves on pale woody branches. The very broad, gaping corolla is sulphur-yellow, washed with terra cotta or russet outside, the sterile filament densely bearded. Rather common up to 5000 feet in rocky canyons and mesas of southern and western



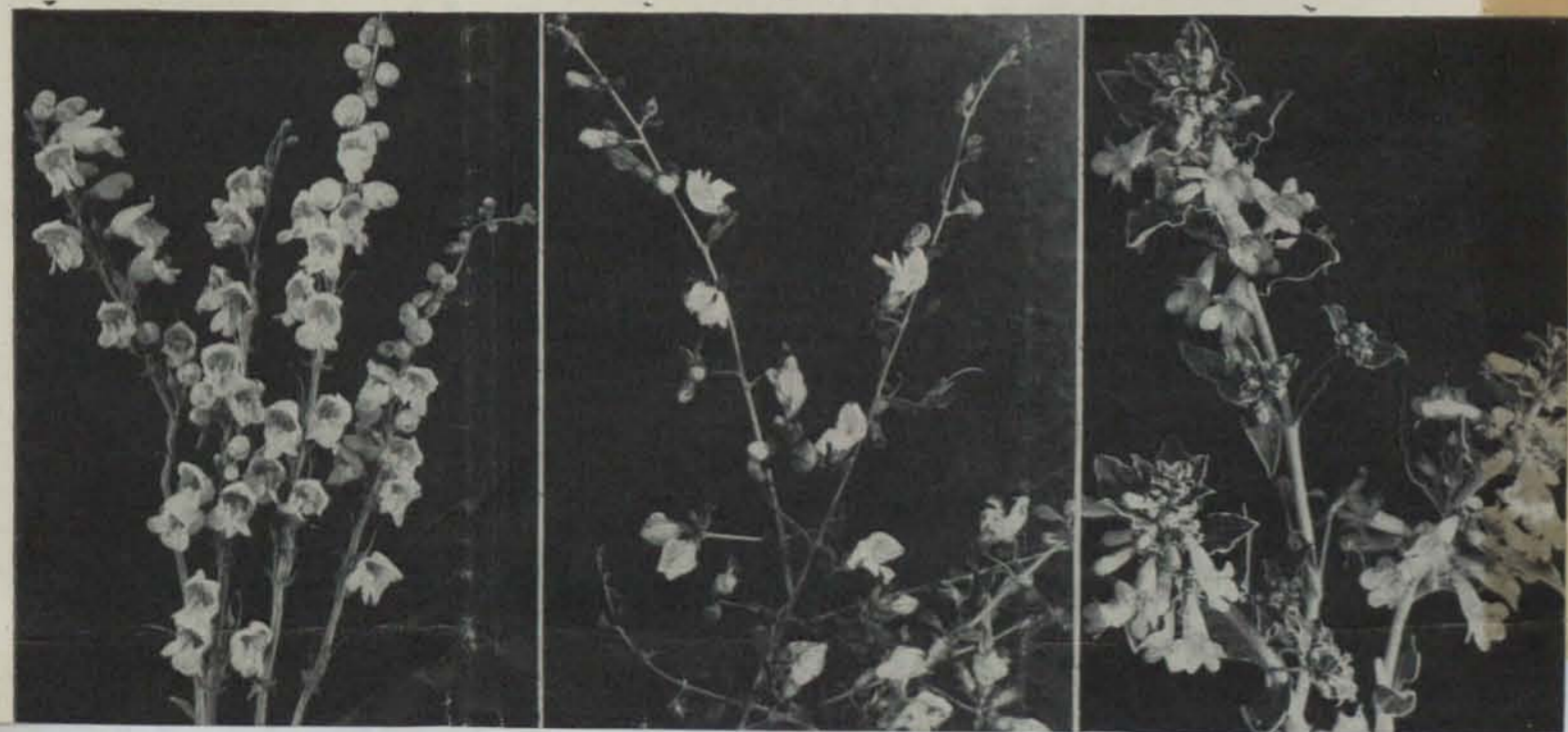
Blue Beard-tongue (*Pentstemon spectabilis*). Photographed by the author in southwestern Mojave desert, California.

Arizona, southern and eastern Mojave desert and along the western edge of Colorado desert from April to June.

Pentstemon pseudospectabilis

A beautiful plant with several erect stems up to 4 feet tall, the oblong-ovate leaves sharply serrate, the corolla about an inch long, gradually inflated to the spreading lips, bright pink to rose-purple. Common in sandy washes and open ground up to 6500 feet in mountains of eastern Colorado desert, Arizona and southwestern New Mexico, blooming in spring and summer, according to altitude.

Left to right—Scented Pentstemon (*P. palmeri*), a favorite of honey bees in eastern Mojave desert. Bushy Beard-tongue (*P. antirrhinoides*), specimen from Providence mountains of eastern Mojave desert. White-margined Pentstemon (*P. albomarginatus*), usually growing in drifting sand. Photographed specimen from a colony found by the author near black lava bed surrounding Pisgah Crater.



Desert Magazine
June, 1944



Left to right. 7—Cakes of raw materials after being conveyed from oven kilns. From here they are conveyed to crushers which break them into small pellets, which go to chlorinators where magnesium oxide is transformed into magnesium chloride. 8—From chlorinators molten magnesium chloride is carried in electrical jeeps and poured into cells. In cells are other chlorides. Direct current of high amperage, low voltage, passes through. Electro-chemical action causes metallic magnesium to rise to surface, while chlorine passes out to be re-used in process. 9—From electrolytic cells metallic magnesium is skimmed from top and poured into pots. Worker at left is ready to sprinkle flux in pot in case molten magnesium catches fire. There are 880 of these cells at Basic plant, in operation 24 hours a day, 7 days a week.

and man-made hazards a world safety record was established despite 75,000 recorded accidents which resulted in but ten deaths. That many fatalities reasonably could occur in any community of 10,000 persons following normal pursuits in an 18-month period. Never had there been a more concentrated effort to whip the immutable forces of the desert to make it serve man.

They tell you at BMI that while the magnesite ore exists all around them they get it from deposits nearby that had been worked earlier. "Nearby" is the Gabbs valley, 334 miles northeast of the plant. The Pacific ocean is the same distance from BMI! But distance is not the tangible thing in the desert that it is in cities. A few hundred miles of desert is not awesome to a man working in a plant so large that one section of it has more than 50 buildings in a row. Gabbs valley contains mountains of magnesite ore which is crushed and processed into magnesium oxides and other concentrates at the mine and then hauled in huge trailer trucks south to the plant at BMI which is 15 miles east of Las Vegas.

There are other magnesium plants in the country but they recover the magne-

sium from sea water. Only BMI uses the electrolysis process, through a strange combination of circumstances. Germany first developed the process and then she helped England build a plant at a time when her purpose was to keep England stronger than the France she feared and believed strong. Later England needed our magnesium and through lendlease arranged to pass along the secret to us in exchange for the incendiary bomb material. The magnesite of Gabbs valley in the desert drops on the cities of Europe almost nightly to destroy the factories producing materials for the enemy.

Frazer continued his conversation as we sat in his office at the end of the day. "I always have been a close student of Nevada history and as near as I have been able to learn, Father Silvestre Velez de Escalante was the first white man to go through here. He made the trail through these vegas or meadows in the summer of 1776, the trail that later was used by Jed Smith, Jefferson Hunt and the first occupant Bringhurst, sent down here by Brigham Young in 1855.

The founding fathers in Philadelphia, ringing their liberty bell at almost the same hour, did not dream of this vast land being

explored by Escalante, a land whose magnesium would one day help save the liberties they were founding. Ever since then we've celebrated the 4th of July and the fireworks have been steadily improved in magnificence due to magnesium. But now, with cheap production of this flare material, a community need only spend a hundred dollars for an evening of fireworks where it used to spend a thousand."

"Just why did you build at this spot?" I wanted to know.

"We had to use Boulder Dam power and Lake Mead water—lots of it, and it was better to bring the ore to the power and water than vice versa. We had many unique problems to solve here, but the strangest of all was that mortar set too fast on the bricks for the furnaces, or refractories as we call them. In these desert temperatures the mortar became as hard as a bride's first cake in less time than it takes to say BMI. We solved that problem by mixing mortar in ice cream freezers."

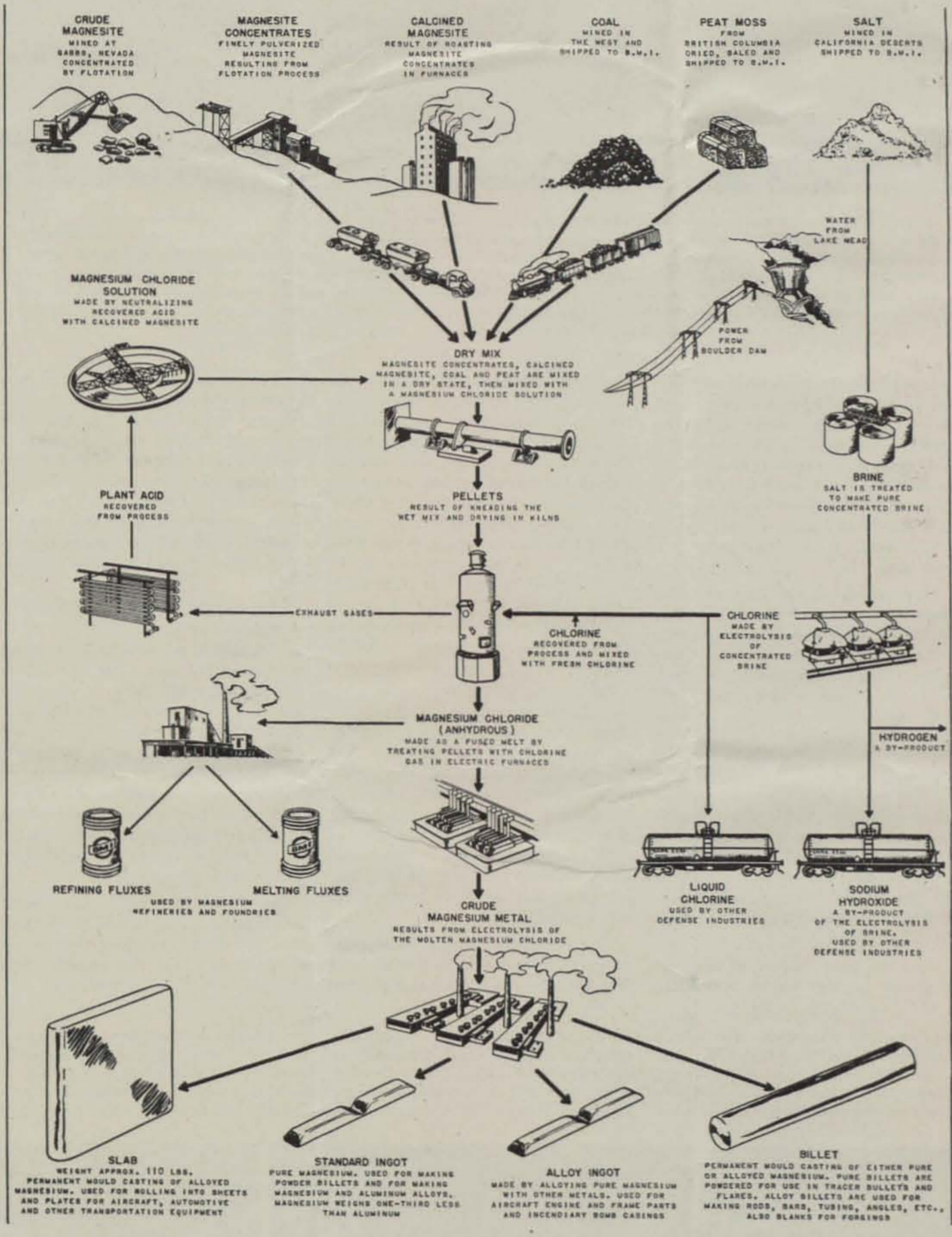
"Yes, I read about that," I said. "I saw the special ice plant you built for the purpose. Bill Burke was telling me how the mortar hardened like glass so that it was air tight, acid tight, current tight, gas

Left to right. 10—After molten white metal is ladled from cells into pots, it is poured into containers as shown here. 11—Magnesium "cheeses" go into crucibles at BMI refineries, where other alloying metals are introduced. Various alloys are made—for incendiary bombs, sheet magnesium, airplane parts, tracer bullets, flares. 12—Crucibles of still-hot magnesium alloy go into ingot pouring machine which is kept hot by gas flames, tips automatically, keeping outpoured magnesium alloy flowing steadily into moving molds. Ingot molds move down line to right, cooling as they go. At end, they drop into bins—a finished product.



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El Centro, Cal. Desert Magazine
 Cir. 9448
 JUNE, 1944



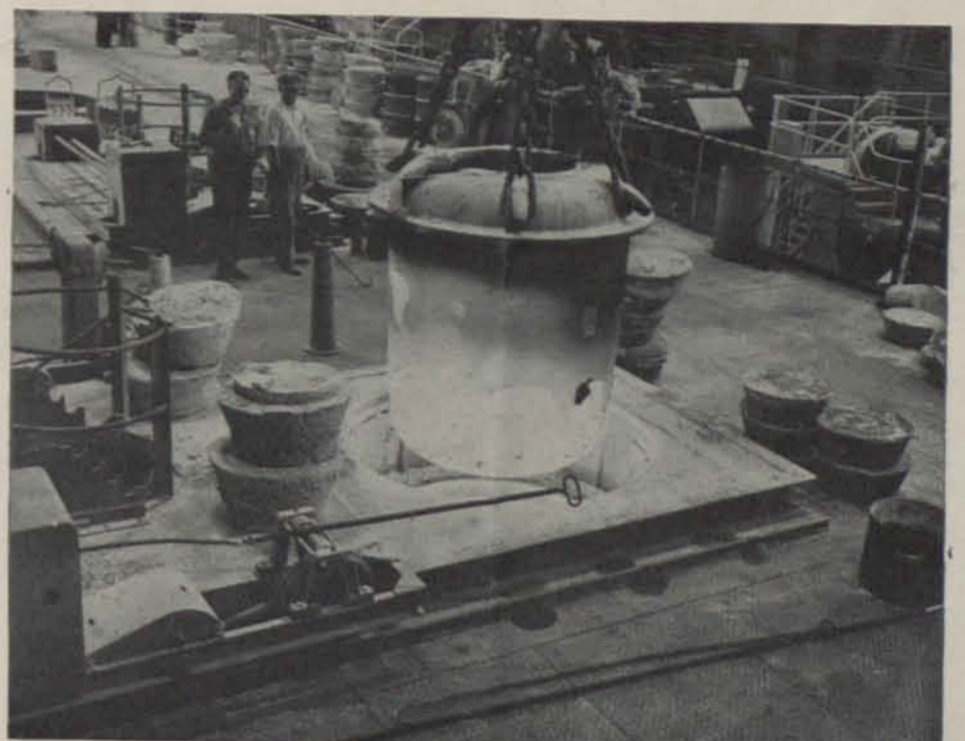
Nevada's Light Metal Industry

How Basic Magnesium, Incorporated, turns Nevada's raw materials into strategic magnesium products which are used around the world in the Allied cause.

tight and corrosion resistant—and that's tighter than a funeral drum, I guess."

And then Frazer asked me, after I had peered into every tunnel, furnace and laboratory for eight hours, if I knew what was going on at BMI. "No," I said, "what do you make?" After the loudest guffaw ever heard in southern Nevada the genial Frazer said, "Tell him again, Bill. He's seen so much today we've got him dizzy."

"Well, I helped string up the first power line here," Bill Burke replied, "but I vaguely understand it all myself. After we get the materials in from Gabbs, the magnesite concentrates, calcined magnesia, coal and peat are mixed in a dry state and then mixed in a solution of magnesium chloride. After kneading the wet mix and drying in kilns the material is made into pellets. Then anhydrous magnesium chloride is made as a fused melt by treating the pellets with chlorine gas in electric furnaces. Crude magnesium metal results from electrolysis of the molten magnesium chloride. From this we get slabs for rolling into sheets and plates for aircraft, automotive and other transportation equipment. Then we get a standard ingot for making powder billets and magnesium and aluminum alloys. The billets are powdered for use in tracer bullets and flares. We also make alloy ingots for aircraft engine and frame parts and for incendiary bomb casings. It's a big step from the first magnesium used in the flash when



Crucible, loaded with two tons of white hot magnesium alloy, has been lifted from gas furnace by overhead conveyor in one of the three BMI refinery units. It is being lowered to cooler before being sent to ingot-pouring machine (See No. 12).

grandma had her tintype taken—but it's not so complicated, is it?"

"Simpler than the solar system," I replied.

"We get a lot of things besides magnesium, too," continued Bill. "See those big tank cars? They're super-thermos bottles.

In shipping department, finished ingots are strapped with steel and packed into cardboard cartons for shipping.



We load them with liquid chlorine and they are lined so that the contents never vary more than ten degrees while in transit regardless of the outside temperature. That goes back to Pittsburgh to make glass. Then we get sodium hydroxide as another by-product of the electrolysis of the brine. This is used by many other defense industries. We use mountains of salt from the deserts roundabout to make the brine and we couldn't get far with our ore if we didn't have all this water, salt and electricity we get near the plant."

Then I asked Frazer what postwar would mean to BMI. "It will mean many things," he said, "but this is no 'war baby.' Magnesium will be in terrific demand for postwar recovery and industries."

Even so, the possibility of a shutdown is a real nightmare to every BMI employee. But the Anaconda Copper company, greatest name in metals, operates BMI and they have an easily understood urge to do to aluminum what aluminum did to copper. Whatever happens two things are practically assured—the metal business will be revolutionized and the desert will be industrialized. They brought the cotton mills to the cotton fields and the romance of the deep South faded. Now they bring the furnaces and foundries to the ore deposits of the deserts, but we hope that at least the peace of the desert will not be too disturbed.



AUTHENTIC BONANZA HISTORY PUBLISHED BY MINES BUREAU

THE HISTORY OF THE COM-STOCK LODE, by Grant H. Smith, is a comprehensive mining history of the Lode from 1850 to 1920. For the experts or specialists it contains a progressive record of the development work carried out, the failures encountered, the bonanzas discovered, and the production reports of the mines. But for the layman the work is as absorbing reading as fiction.

The rise and fall of fortunes in the roaring days when the Lode was most active, and the personal lives of the men who developed it color each page of this chronicle. Historically exact and authentic in every detail, it is fascinating reading because it tells the story of one of the most romantic and brilliant periods in American history.

Publication of Nevada State Bureau of Mines, 1943. 290 pp. Appendix, production records, illustrations. Spec. ed. for Nev. residents, 75c. Library edition, \$2.00.

—A. M.

SPANISH LANGUAGE GUIDES FOR THE ARMY AIR FORCE

CONVERSATIONAL SPANISH, by Solomon Lipp and Henry V. Besso, was especially written for the army air forces of the United States, but can be just as useful to the civilian. Special words, useful to the flyer only, are common throughout the book, but these can be omitted by civilians, or others substituted from the vocabulary with good results. The thousands of other idioms, words and expressions easily can be used by anyone. The simple construction and direct method make the book one of the best for an earnest beginner. Cloth-bound, \$1.25; paper, 75c. 6x9 inches, 168 pages.

CONVERSACION, by H. V. Besso and S. Lipp, is a more advanced book, to follow the completion of Conversational Spanish, especially for use of both army and navy. The story and cartoons are amusing and interesting enough to lead the advanced student from lesson to lesson. The book also contains much valuable information on Spanish America, vocabularies, grammar review and all necessary material for a real student. Cloth \$1.50, paper \$1.00. 6x9 inches, 294 pages. Both titles published in 1943 by Hastings House, New York.

—Arthur L. Eaton

STUDY DISCLOSES NEW PUEBLO INDIAN CRAFT

PUEBLO INDIAN EMBROIDERY, title of volume four of *Memoirs of the Laboratory of Anthropology*, Santa Fe, New Mexico, will come as a surprise to most readers. Although it is well known that weaving of textiles is one of the crafts of the Hopis of northern Arizona and other Pueblo tribes of New Mexico, examples of these textiles embellished with embroidery are rare. During his intensive search for material on this subject, the author, H. P. Mera, found less than 100 examples dating prior to 1880.

This craft is believed by some to be of prehistoric origin, by others a result entirely of European influence. Mera gives evidence supporting both theories, but concludes that present knowledge cannot prove either theory, although he would tentatively accept an aboriginal origin in the Southwest, at least as early as the twelfth century.

Most of the 73 pages of the monograph are devoted to a study of the embroidery style and technique on both cotton and wool fabrics. Twenty-six page plates, three in full color, show both embroidered garments and remnants which have been found in ancient Indian dwellings, and many detailed studies of specific designs.

Altogether, this is an unusual and interesting study, despite scarcity of material. Since it is doubtful much additional material will be uncovered, this presentation of the subject in monograph form at least calls attention to another American craft which can take its place beside those of pottery-making, weaving and silver work.

WHEN LAW WAS MADE BY MEN QUICK ON THE DRAW

When Frank Goodnight rode into Sherman City on an errand of personal revenge he discovered nearly everyone in the cattle community belonged to one of two rival law-dispensing factions from which he could not remain free. As one oldtimer put it, "I guess I'm the only one in town that ain't lined up." Personal motives are interwoven with those of the rival desert and hill cattlemen to make Ernest Haycox' *THE WILD BUNCH* a tense emotional story of conflict in the Old West. Published by Little, Brown, Boston, 1943. \$2.00.

BOOK'S OF INDL

Charles
book-of-th
writes of a

describes the life of a young white boy who is brought up with and influenced by contact with southwestern Indian tribes. Mr. Nichols himself was raised on 11 different Indian reservations where his father was a special agent for the U. S. department of interior. The author has used his special, intimate knowledge of Indian life, character and customs in writing one of the most interesting and original stories that has been produced in some time.

South Boy, young son of a white cattleman, spent a lonely childhood in the partially uncivilized and wholly forsaken regions along the Colorado river. Most of his time was spent among his Mojave friends who accepted him as an equal and initiated him into their tribal lore and superstitions. His education, consequently, was a peculiar mixture of redmen's doctrines and what his dainty mother referred to as Cultural Advancement and Christian Instruction against Rough and Heathen Worlds!

The plot of *CRAZY WEATHER* concerns itself with the development of South Boy's character and attitude—the resolving of his mind from confused loyalties to courageous, purposeful decisions. He runs away from home to join a Mojave war party heading south to fight the Piutes in the blazing heat of summer. Through these brief, strange events South Boy emerges a man.

Refreshing elements in the book are its complete lack of any "love interests," its frank simplicity and its very natural and responsive dialogue. Macmillan Co., 1944. \$2.00.

—Aliton Marsh

THE FANTASTIC CLAN



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DESERT CRAFTS SHOP
636 State St. El Centro, California

BIG MAGNESIUM PLANT HOPEFUL

Anaconda Spokesman Discusses Post-War Outlook Before Aircraft Executives

LAS VEGAS, Nev.—On the recent visit of a party of airline executives and representatives of aircraft makers to Anaconda Copper Mining Co.'s Basic Magnesium, Inc., plant near here, the group were addressed by Ross A. Ross of Basic on post-war prospects for the light metal. Notwithstanding that Basic has been cut back to 60% of capacity recently by WPB, Mr. Ross was markedly hopeful for the post-war outlook for the plant.

After reviewing the condition in which last year's output in the United States reached as much in tons as it did in pounds at the peak of World War I, with Basic producing 40% of the 1943 national output, Mr. Ross said:

"Second only to our opportunity to contribute to the war effort has been our opportunity to contribute to the future of magnesium as an important post-war metal.

Cooperative Research

"Because magnesium is a relatively new metal whose characteristics and possibilities are not yet fully known, most producers, fabricators and Government agencies have recognized the value of cooperative research, so that all companies can get the maximum benefit of all new data on the properties and uses of magnesium.

"Last year saw the greatest amount of information ever furnished to the magnesium industry and we have every reason to believe this will continue and that much of the great amount of experimental work now being done on the uses and applications of magnesium will be for the benefit of all in the industry.

"The urgent war need for magnesium was for its pyrotechnic properties—tracer bullets, flares, incendiary bombs—and most of the tremendously increased production has been thus used—nevertheless, fabricating capacity for magnesium, other than bomb casting, has also expanded and now is about one-third of the total ingot production capacity. This seems rather remarkable. In addition to this one-third, there are approximately 1,000 aluminum fabricators whose equipment is largely adaptable to casting magnesium. So it would appear that consumers of magnesium parts can look forward to increased fabricating capacity to serve them.

Post-War Operation Recommended

"The third fact which should hearten consumers of our product is the recommendation of the Truman Committee that operation of Basic Magnesium be continued after the war in order to eliminate the monopoly which existed prior to the war—and to provide all consumers with more than one market to buy it.

"A free, competitive production market is a good market to buy in, and we hope the post-war market for magnesium will be such.

This article was clipped from

SCIENCE NEWS LETTER

"Published by Science Service. Weekly illustrated magazine for quick reading—new items in science written non-technically by experts." Washington, D. C.

JUN 2 1944

Swiss Rolling Process Successful for Magnesium

A NEW industrial process, a method for rolling sheets of magnesium and its alloys, presented by a Swiss inventor, Julius Zueblin of Glarisegg, was awarded a United States patent, 2,349,395.

Lubricants used in rolling most metals are useless in handling the chemically more active magnesium, it was discovered quite early in the development of magnesium metallurgy. Dry rolling was marked by an annoying flaking off of the surface, necessitating constant brushing and polishing of both sheets and working rollers. The new process substitutes for the conventional lubricants one of a number of resin-like substances, such as tar oil, anthracene oil, etc. The surface layer thus formed also protects the magnesium during subsequent processing and storage.

Science News Letter, June 2, 1944

there would be no magnesium or aluminum available for the aircraft industry. We hope that, although the statistic is true, the condition won't occur.

"With the demonstrated and established advantages of magnesium's light weight, excellent machinability, high fatigue strength and vibration dampening characteristics and the three favorable conditions I have mentioned, namely, cooperative research, increased fabricating facilities and a non-monopolistic market for you to buy magnesium in, we cannot help but feel rather cheerful about our post-war future and yours—there's a long period of commercial expansion ahead for both of us."

L. V. R. JOURNAL
5-19-44

Friday, May 19, 1944

Editorials and Features

This page is a regular feature in the Las Vegas Evening Review-Journal and Boulder City Journal which are published every Sunday in the Review-Journal Building, 118 South First Street, Las Vegas, Nevada. The Review-Journal is entered in the U. S. Postoffice at Las Vegas as second class matter. Subscription price \$100 per month by mail or carrier. Member United Press, Associated Press, American Newspaper Publishers Association.

F. P. Garside, Publisher Phone 6 A. E. Cahlan, Managing Editor

Should Clear the Atmosphere

The statement yesterday that Phillip D. Wilson, director of WPB's aluminum and magnesium division that production at BMI will not be further curtailed, should set at rest all the wild rumors which have been floating around for weeks, most of which had for their theme the prediction Basic would be closed entirely within a few months.

These rumors have had serious results so far as the manpower situation at the plant is concerned. Hundreds of men have terminated here to seek work in other war plants which appeared to offer promise of longer employment. And this has brought about a critical condition which, if not checked, might actually force the shutdown of the plant for lack of men to run it.

Anticipating this possibility, however, the WPB chief says if the terminations don't cease, steps will be taken to assign a labor priority to BMI which will assure the necessary number to insure maximum production from the six operating units.

This statement is significant two ways. In the first place, it indicates BMI has lost none of its importance to the war effort, because production has been cut forty per cent. The remaining sixty per cent is just as vital as we have been led to believe the plant was from the beginning. And there are those who know what they're talking about who are predicting the four idle units will be back in production by fall, basing their prediction on the theory the army has underestimated its magnesium needs and will have to send out an S.O.S. before very long, to step up production again.

Second point to be made in connection with the proposed labor priority is that if such a priority is forthcoming, it may result in bringing back many workers who have left to seek employment elsewhere, for in the distribution of manpower, those with experience here would be the first to be chosen by the U. S. Employment service to fill the need.

All in all, the WPB declaration should have a stabilizing effect on the entire BMI picture, and should have the effect of halting the flow of workers out of the community which has been largely inspired by fear the plant would close and the feeling among many that the production of magnesium is no longer as important to the war effort as other plants in which they might be needed.

Magnesium is vital to the war effort and BMI's production is the backbone of the nation's supply. Workmen there MUST accept this message and stick with their jobs. They're as essential where they are as men on the fighting front. For after all, the air force and its bomb forays are still absolutely necessary to the success of our victory campaign.

SANTA BARBARA, CALIF.
NEWS-PRESS, Inc. Ed. Cl. 10-600
JUNE 21, 1944

SECURITY AWARDS MADE

CARSON CITY, Nev., June 21 (AP)—Basic Magnesium at Henderson, Nevada, has been given the National Security award for outstanding accomplishment in plant protection and security. Hugh Shamberger, director of the state council of defense, announced Wednesday. Public presentation ceremonies are planned, he said.

WPB Pledges No Further BMI Cut

Plant Status Is Firm, Wilson Says

WMC Regulations May Be Changed to Get Labor on Job

Seattle (Wn) Star
May 23, 1944

Definite assurance that no further slash in the production rate at Basic Magnesium Inc., is contemplated, was received by officials of the company this morning from Phillip D. Wilson, director of the aluminum and magnesium branch of the war production board.

Further than that, a determination to keep the plant operating on its present scale so that the war effort will not be impeded, was indicated when Wilson, in a wire to F. O. Case, general manager, reported that, if necessary, changes in the manpower regulations for this area might be made to insure sufficient labor to keep the plant at full production in the six units now operating.

Wire Answered

Officials at the plant recently dispatched a wire to Wilson asking the WPB for its stand on the future operation of the plant, and this morning a wire was received from Wilson giving that information.

"In answer to your question regarding production at Basic Magnesium," the wire read, "the WPB has no plans to make further reduction there. This advice should decrease terminations and stabilize employment at the plant. If necessary, we will recommend that suitable labor priorities be assigned to Basic Magnesium to enable you to continue on the present scale of operations."

Officials at the plant were jubilant that Wilson had made the telegraphic report, declaring that the information in the wire should set at rest the rumors, rampant in this area, that the plant would be shut down completely and the men now on the job left to seek new employment.

The officials said that the statement regarding labor priorities indicated that the WPB was determined to keep the plant in operation at its present capacity, even if WMC regulations now in effect had to be altered.

B. C. NEWS
6-24-44

B.M.I. Receives Second Nevada Security Award

RENO, June 23 — The second presentation of the National Security Award to a Nevada industry for maintenance of protection services resulting in maximum production will be made to Basic Magnesium Incorporated sometime during July. Hugh Shamberger, state director of the Office of Civilian Defense, announced last night.

Shamberger said he received word of the award from Kenneth Hammaker, regional OCD officer in San Francisco, who complimented the Nevada OCD, saying it was through the Nevada organization's efforts that a second presentation of the high award has been made possible in this state.

Only recently Kennecott Copper company at Ruth was presented the first National Security Award to a Nevada industry and the seventh such award in the nation.

Basic Magnesium To Shut Down Four Of 10 Units Soon

LAS VEGAS, Nev., April 15 (AP)—Shutting down of one unit of the huge Basic Magnesium, Inc., plant was reported yesterday, and it was understood that a total of four of the plant's ten units will be idle by May 31.

Superintendent Frank O. Case refused to confirm or deny the report. BMI has been operated by the Anaconda company for the Defense Plant Corporation.

Sen. Pat McCarran, Nev., declared if a shut-down order has been issued, "I and the members of the U. S. Senate committee I head will fight to have such an order revoked."

Reports have been recurrent here that production at the BMI plant, largest in the world, would be curtailed because production of magnesium has exceeded requirements. The plant reportedly has anticipated the action by not replacing drafted employees.

CHEMICAL INDUSTRIES

"Devoted to economic and business problems of making and marketing, buying and using of chemicals."

New York City

MAY 1944

Anti-Monopoly Again

TOUCHED OFF BY THE REPORTED SALE of the government-financed Basic Magnesium plant at Las Vegas, Nevada, to Anaconda Copper Company, Rep. Voorhis of California has introduced in the House still another bill aimed at industrial monopolies. He will be recalled as having already authored a number of such bills—one requiring American corporations to register all cartel agreements with the Department of Justice, another aimed at companies acquiring blocks of patents allegedly to withhold them from competitive use.

The latest measure by Mr. Voorhis would make sales of government-owned plants or industries subject to veto by the Smaller War Plants Corporation where, in that agency's opinion, the sale might act to the competitive disadvantage of smaller concerns in the field, and would give the Federal government power to terminate any lease of such properties for private operation, whenever such plants began to be operated at 75 per cent of capacity or less.

Sale of the Basic plant, incidentally, was made after it and two others were shut down and three more partially curtailed due to magnesium production having overtaken the original large estimated needs of the armed services. The government stockpile and the capacity of existing facilities made it appear unnecessary to continue Basic's operation, it was explained recently by Phillip D. Wilson, chief of the Aluminum-Magnesium Division of WPB.

STEEL

Cleveland, Ohio

MAY 1 1944

JANUARY ALUMINUM OUTPUT DOWN 10 PER CENT

WASHINGTON—Production of primary aluminum ingots in January amounted to 169,600,000 pounds, down 10 per cent from December output.

MAGNESIUM UNITS ORDERED TO SUSPEND

LAS VEGAS, Nev.—Basic Magnesium Inc. has been ordered to switch out four of its ten production units, but to keep them in condition for resumption. Management says there should be no widespread layoff of workers.

REVIEW-JOURNAL
6-21-44

No Big Change At BMI Is Seen By Nelson Order

The recent order of Donald M. Nelson, chairman of the war production board, releasing magnesium for commercial use, will make no radical change in the handling of metal produced at the Basic Magnesium, Inc., plant, according to F. O. Case, general manager.

If a manufacturer needs magnesium for commercial purposes or development and can show that its use will not interfere with the war effort either in use of equipment or manpower, then the metal will be allocated, Case pointed out.

However, if there is an immediate demand for the metal for some phase of the war effort, the supply going to the commercial manufacturer would be cut off.

This is substantially the same ruling that has been in effect for some time, which permitted manufacturers to obtain a limited amount of magnesium for post-war experimentation. Now it is designated for present commercial uses if the manufacturer meets the requirement.

Nelson's order was announced during the week end. A meeting of Defense Plants Corporation officials in Washington was called early this week to interpret the effect on the production of magnesium. Their report to Case indicates the limitations still placed on the use of the metal in commercial lines.

From
WALL ST. JOURNAL
New York, N. Y.

Business and Finance

INDUSTRIAL RECONVERSION plans, which were announced by W.P.B. Chairman Nelson over the week-end, met opposition in War Department quarters. Army procurement officials declared they were having difficulty in getting manpower, facilities and materials for expanded artillery and tank production. While their stand may necessitate some changes in the W.P.B. program, Mr. Nelson proposed two steps to help industry prepare for reconversion: (1) Manufacturers will be allowed to obtain materials for a single working model of any product planned for post-war output; (2) Starting July 1, they may place orders for machines, tools and dies needed for civilian production. Mr. Nelson also disclosed that restrictions on magnesium and aluminum were being lifted to permit the output of civilian goods from these metals.

S. F. CAL. COMMERCIAL NEWS
Cir. 1,200
JUNE 22, 1944

—The Bureaucrats Must Go—
CARSON CITY, Nev., — Basic Magnesium, Inc., of Las Vegas, has been selected to receive the second National Security award given in Nevada. Hugh Shamberger, state director of civilian defense, announced.

L.V. AGE 3/19/43

Girl Scouts Gather Lumber For Fence

A party of six Girl Scouts, in the troop under the direction of Miss Adelyn M. Rotholtz, climbed the USO "bone piles" at B.M.I. and gathered lumber for the fence which they are constructing at the Residence Club. A truck, donated by Robert Underhill, was loaded and brought the lumber to the club.

Girls participating in this activity were: Jean La Fran, 6-A-2; Marilyn Schofield, 6-A-2; Barbara Gardner, 4-A-1; Carolyn Gardner, 6-A-2; Donna Downey, 6-A-2; Darleen Snider, 5-B-2; Joann Dayton, 7-A-1; Corinne Jenni, 5-A-4; Kathleen Goldstrom, 7-A-1; Donna Lee Allan; Joan Underhill, Jeannene Fitzgerald, Gladys Scott, Irene Belmont and Kathleen Sprague.

L.V.R.J. 3/29/43

NEW UNIT NEAR

Unit number seven of Basic Magnesium's Las Vegas plant will go into production on Wednesday or Thursday of this week, it was learned this morning.

L.V. AGE 4/2/43

Police Undertake Cleanup of Jungle

Chief of Police Don Borax, under direction of Police Commissioner C. R. Clark, undertook a general cleanup of undesirables in Las Vegas this week.

Approximately one hundred residents in "the Jungle" were picked up and given the edict of either working or fighting. Something like 40 of them were sent out to Basic Magnesium in the expectation that they would find jobs and go to work.

At the same time bartenders and owners of taverns were given warning not to sell drinks to those who appeared intoxicated. The owners were congratulated on their action in closing bars at midnight.

L.V.R.J. 4/1/43

Anaconda Chiefs Arrive This Eve

A. J. Hobbins, president of Anaconda Copper company and Basic Magnesium, Inc., and C. F. Kelley, chairman of the board of directors of Anaconda, will arrive this evening from the east to spend a few days inspecting the local plant.

Both executives are accompanied by their wives and will register at El Rancho Vegas.

is making recommendations for better control of dogs in the community. All gardeners and residents interested in action on these proposals are urged to attend and vote. New Victory gardeners will be welcomed to membership in the club, it was stated. The general committee for the club is composed of the following members: Frederick Pingree, Boyd Weaver, Mrs. Morley, William Mann and Louis Barkley.

BMI Notes

The local Red Cross war fund drive will start Friday in the Basic Townsite district. Thursday evening at 8 p. m. there will be a dinner and pep meeting at Anderson's dining room for all workers and their husbands or wives. Roland Selbert is general chairman, and Elmo Ellsworth is chairman of contributions.

Substantial progress has been made by the Victory Garden club in the past week. Most members have nearly completed the spading of garden plots and fertilizer is still being delivered to Townsite addresses, with peat moss soon to follow. Prior to the Basic department store's opening, two of the club's committees are packaging the chemical fertilizers bought on ration. Vigoro, bone meal and chicken wire will be sold for vegetable garden use at the club's third meeting at the school this evening at 7:30 in room 7. A committee of gardeners, all of whom have owned or now own dogs,

L.V.R.J. 4/1/43

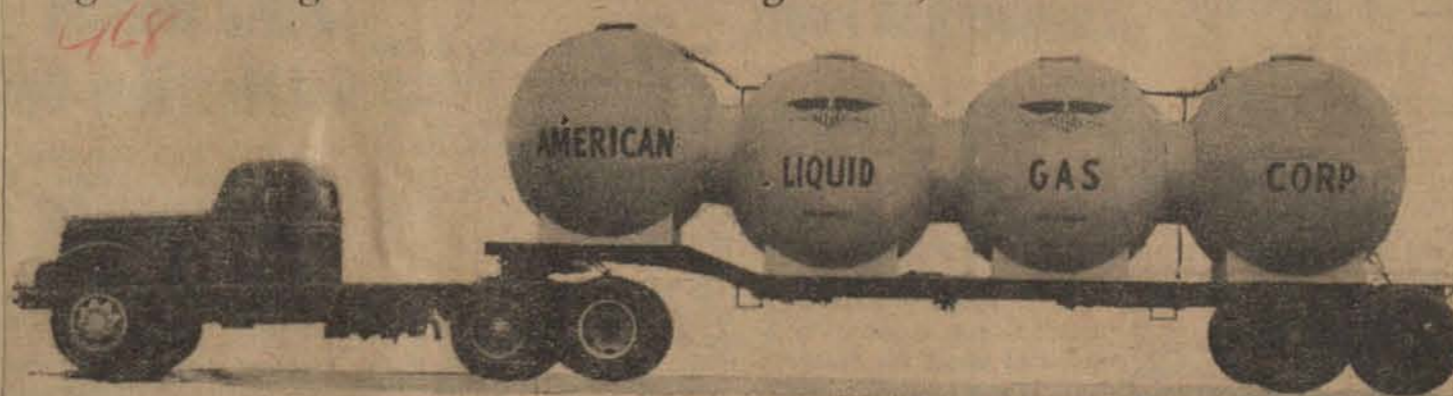
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Both executives are accompanied by their wives and will register at El Rancho Vegas.

LAS VEGAS, NEV. REVIEW-JOURNAL
APRIL 26, 1943

Huge Truck Rig Hauls Gas To Basic Magnesium, Inc.



Above is shown a truck of the American Liquid Gas Corporation, which consists of four huge steel spheres of 250 pounds per square inch designed working pressure, with a capacity of approximately 6,250 gallons net for the four. The rig is used to transport propane gas from Kern county, California, to the BMI plant here, a distance of approximately 300 miles, for use in the BMI refinery and its portable crucibles. This is said to be the first and only rig of this type put into service, insofar as capacity and pressure resistance are concerned.

El Centro, Cal., Desert Magazine
Circ. 6445
APRIL, 1943

Carson City, Nevada

The Nevada state museum soon will house a standard ingot of magnesium produced at the Basic Magnesium plant near Las Vegas. The metal was presented to Lieutenant-Governor Vail Pittman of Nevada at ceremonies held February 9. The gift was made by F. O. Case, general manager of B.M.I.

LAS VEGAS AGE 4/9/43

ANACONDA AND BASIC

Cornelius F. Kelly, chairman of the board of Anaconda Copper Company, and James R. Hobbins, president of that great organization, spoke reassuring words to a few of the leaders of Southern Nevada last Tuesday evening at a reception rendered them by Manager F. O. Case of Basic Magnesium, Inc.

Mr. Kelly, born in the old camp of Mineral Hill in Eureka County, Nevada, has had a notable career in the mining industry and his words carry the weight of authority.

"Basic Magnesium will not be a war baby if all the skill and science embodied in Anaconda Copper can prevent it," Mr. Kelly said. In this declaration he was seconded by President Hobbins.

"At this date the BMI plant is turning out more magnesium metal than its original planners dreamed possible. The results have been most gratifying," continued Mr. Kelly.

In the face of such optimism on the part of men who deal solely in the cold facts of finance and science, the pessimism we sometimes hear from uninformed sources is of little importance.

The post-war world will enter an era of light metal and plastic construction which probably will displace some other metals in many lines of industry. If Basic Magnesium shall be able to produce enough of the light metal to meet the demands of growing industries there is no danger of its post-war decline.

S. F. CAL. PACIFIC BUILDER
APRIL 6, 1943
A substantial part of the Parker Dam power is being delivered to Basic Magnesium, Inc., to assist in the operation of the giant magnesium plant located between Las Vegas and Boulder City.

L.V.R.J. 4/8/43

Give Them A Hand

The lengthy interruption of power service Tuesday night was one of those things that, under the circumstances, could hardly have been avoided.

The cause was unique in the history of electric power transmission. So far as is known, it never happened anywhere else before. It was purely a combination of circumstances that would probably be found here only.

The one comment we feel called upon to make is one of praise for the crew of workers, many of them volunteers from Basic and McNeil, who worked most of the night in a driving rain to restore service.

The average individual is inclined to cuss the power company and let it go at that. While we didn't like the black-out any better than the next fellow, the thought of those workers out there in the storm took all the anger and cuss-words out of our system.

AMERICAN METAL MARKET
"Leading Iron, Steel and Metal Newspaper—
Recognized price and market authority."
New York City

APR 2 1943

Recovery Of Magnesia From Dolomite Now Possible By New Process

WASHINGTON, April 1.—As the result of many months of intensive research, the Bureau of Mines of the Department of the Interior announced today that it had developed a process whereby a 400,000,000-ton dolomite deposit near Las Vegas, Nev., in the Boulder Dam area, could be utilized to produce "many millions of tons" of magnesia which is a raw material of magnesium, the highly important lightweight metal used extensively in airplane construction.

The Bureau reported to Secretary Ickes that the recovery of high quality magnesia from the dolomite resulted from studies conducted at its laboratories and pilot plants at Boulder City, Nev. While one pilot plant turned out magnesia, another was operated to produce metallic magnesium by a new electrolytic process in which the oxide is added directly to the electrolytic bath.

Bureau engineers have pointed out that the dolomite deposit, which is at Sloan, 19 miles southwest of Las Vegas, could be developed to serve the new plant of Basic Magnesium, Inc., at Royson, Nev., near Las Vegas. This plant, destined to be the largest in the nation, now produces metallic magnesium from magnesia extracted from magnesite at its property in the Paradise Mountain Range, Nye County, Nev. This magnesite must be treated in a \$5,000,000 milling and calcining plant at Luning, Nev., and then transported more than 1,000 miles by rail to the magnesium plant of Basic Magnesium, Inc., at Royson, since there are no direct railroad connections between the main plant and Luning.

The proposed small scale plant suggested by the Bureau would cost considerably less and could produce from 30 to 50 tons of magnesia daily. Such a plant if authorized, would be built and operated in cooperation with Basic Magnesium, Inc., with the United States Lime Products Corporation providing the raw material. The smaller plant could be the nucleus of any larger plant which might be constructed to treat the ore.

RENO, NEV. JOURNAL
APRIL 7, 1943

Anaconda Heads See Basic Plant

A group of officials from the Anaconda Copper Mining Company, world famous holding company, arrived Thursday evening at El Rancho Vegas where they will stay during their visit to Las Vegas and the Basic Magnesium plant, recently acquired by Anaconda, the Review-Journal stated.

In the group are Mr. and Mrs. Cornelius (Con) Kelley, Mr. and Mrs. James R. Hobbins and T. H. O'Brien. Kelley is the chairman of the Anaconda board, Hobbins is president and O'Brien is vice-president of the Inspiration company, an Anaconda holding located at Inspiration, Arizona.

The Anaconda Copper Company was incorporated in 1895 in Montana and has since grown to be one of the outstanding companies of its kind in the world. Its holdings include mines, smelters, refineries and properties in many of the United States and several foreign countries. The head office of the concern is 25 Broadway, New York City.

Peter Edson

The full sad story of Basic Magnesium, Inc., one of the war production extravaganzas of the war effort, is revealed through publication of a special report from the Senate subcommittee on the national defense program.

Final cost of this project is estimated at \$133,000,000, or nearly twice the original estimates.

The record goes back to 1936 when the Basic Refractories, Inc., headed by Howard Eells Jr. of Cleveland, Ohio, leased deposits of brucite and magnesite ores in Nevada. The magnesium deposits were held by a subsidiary, Basic Ores, Inc., at a book value of \$25,000. This was the Eells. Later, DPC was to buy out the Eells interests in these ore deposits for \$450,000, on an appraisal of \$1,500,000.

On July 19, 1941, the under secretary of war recommended that an agreement be negotiated between the war department, defense plant corporation and Basic Refractories for a project of a capacity of 112,000,000 pounds, to cost \$63,820,633.

"In the opinion of the committee," says the Truman report, "this was one of the most outrageous and unjustified con-

tracts proposed in connection with the war program and represented a wholly unwarranted gift of government funds by defense plant corporation to a newly organized corporation which had no financial resources and only the most meager experience and talent."

The plant site was chosen near Basic properties at Luning, Nev., 300 miles from the mines near Gabbs, Nev., to which there was no transportation whatever. Ore had to be back-hauled from the mines to Ogden, Utah, thence to Luning—950 miles at \$6 a ton.

A 40 inch pipeline over the mountains to Lake Meade and two power transmission lines to Boulder dam, estimated to cost \$8,000,000, actually cost over \$12,000,000.

There were numerous delays. Production of first metal was scheduled for May 1942 but was not achieved till Aug. 31.

There were minor extravagances, such as 700 executives, 100 of whom drew over \$5000 a year. Stenographers' desks cost \$95.

The ore contained greater impurities than estimated. Construction and the mines at Gabbs, estimated to cost \$3,000,000, actually cost \$7,000,000.

Daily News April 1, 1944

Page Twelve Saturday, April 22, 1944

Editorials and Features

This page is a regular feature in the Las Vegas Evening Review-Journal and Boulder City Journal which are published evenings except Sunday in the Review-Journal Building, 113 South First Street, Las Vegas, Nevada. The Review-Journal is entered in the U. S. Postoffice at Las Vegas as second class matter. Subscription price \$1.00 per month by mail or carrier.

Member United Press, Associated Press, American Newspaper Publishers Association, E. F. Garde, Publisher Phone 5 A. E. Cahlan, Managing Editor

Mr. Wilson Explains

Director Philip Wilson of the War Production Board's aluminum and magnesium division, is still alibiing for the proposed curtailment of the Las Vegas plant of Basic Magnesium, Inc., and attempting to explain away the charges made by Senator Pat McCarran that the shut-down is unwarranted and unsound.

The eminent Mr. Wilson, with all his explaining, reminds us of the fictional character who, faced with a similar situation, declared: "Methinks he protesteth too much."

His most recent statement was in the form of a letter to Representative Albert Engle of Michigan in which he gave two reasons for the decision to cut BMI's output 40 per cent by shutting down four of the ten production units.

First Wilson declared on his own authority, that this move would effect an annual saving of between 1,400,000 to 1,600,000 barrels of fuel oil which would help ease a daily deficit of 120,000 barrels on the west coast. The theory of that, of course, is that by cutting off four units, sufficient power will be saved to eliminate steam generating plants in southern California which burn oil.

To those not familiar with the facts, the Wilson explanation sounds quite plausible. It does NOT square with actualities, however, as Senator McCarran pointed out at a recent Washington hearing. First, the power to be saved at BMI cannot be transmitted to southern California regularly in that quantity. Second, the amount of oil which would be saved if the power could be transmitted is 1,300,000 barrels a year. Third, of that amount 900,000 MUST be used in the steam plants in regulation of peak loads AND operation of the frequency changers in the area served by the Los Angeles Bureau of Power and Light which operates on 50 cycles instead of the standard 60.

That leaves an ACTUAL saving, not of 1,300,000 barrels a year but 400,000 barrels which is LESS than one day's consumption in southern California. Quite a difference!

The WPB official then quotes a war manpower commission statement that 1,600 men will be released by the curtailment and that they would help alleviate the shortage in group I labor areas of Los Angeles, San Francisco and other centers.

That also would be a considerable factor IF 1,600 men would be released. However, the WMC is as right on that figure as it has been on most everything else so far. Comparison between the number of men needed to operate BMI's ten units by July first, and the number required to keep six units in production under the program outlined by management is NOT 1,600 but THREE HUNDRED.

The fact that Wilson persists in these two mis-statements AFTER his error has been repeatedly pointed out to him by COMPETENT authority—in fact by the MOST competent authority, fully justifies the opinion that the real reason for the order is NOT as announced, but goes considerably deeper.

L. V. R. JOURNAL 5-5-44

Engineering Unit Formed in Vegas

Organization of the Clark County members of the Institute of Mining and Metallurgical Engineers has been started, J. A. Carpenter, secretary and H. C. Lee, executive committee, of the Nevada section announced today.

At a dinner meeting held recently at the BMI cafe, officers were appointed to act temporarily until elections can be held at a later date. H. G. Satterthwaite will be acting chairman; A. A. Hoffman, vice chairman; and C. P. Keegel, secretary-treasurer.

A planning committee also was appointed to prepare for a meeting of the Nevada section to be held on May 17 and 18, when C. A. Fulton, president of the organization and A. B. Parsons, secretary will visit this area.

Members of the planning committee include: J. W. Wilson, chairman, B. D. Harden, A. T. Newell, J. H. Bradford, E. H. Clary, R. G. Knickerbocker, A. L. Hagen, and E. E. Kinney.

A large attendance is expected at the meeting, it was stated, and program plans will be announced at a later date.

LAS VEGAS TRIBUNE 5-6-44

Doctor Wants Rolling Mill Here for BMI

Dr. Harold B. Foutz got himself all hot and bothered yesterday about Las Vegas' failure so far to do anything about making this city the "Pittsburgh of the West," then heard himself boomed for United States senator.

Speaking to the Lions Club yesterday noon, Dr. Foutz said the city was sitting collectively on its trousers and permitting Dow Chemical and the Aluminum Corporation of America to close down, mill by mill, the big Basic Magnesium plant here.

"What we need here is a rolling mill to process airplane parts," the doctor said, "because magnesium is stronger and lighter than any other metal and because airplanes of magnesium can carry heavier loads."

Lloyd Trittle proposed formation of a "Foutz for Senator" organization so the doctor could promote his plans to publicize the need of a rolling mill for B. M. I.

LOS ANGELES, CAL., IND. REVIEW MAY 19, 1944



Albert S. Brown

Official DEMOCRATIC REPORTER

By Publicity Chairman, County Central Committee

DEMOCRATIC WINNER!
If you won the nomination held this last Tuesday—it is probably due to three contributing factors: (1) The "money-bags" of the Republican party underestimated your democratic strength; (2) A lot of intensive campaigning was successfully done in all too short a time; (3) Your district may have been preponderantly partisan in your favor. Your hard work has just begun, unless by some magic stroke of good fortune you have won on both tickets. That is rare!

DEMOCRATIC LOSER!
You are the victim, unfortunately, of many factors that impinged upon this particular primary election, just held. Let's enumerate some of them. (1) Too small a "turn-out" at the polls? Remember, democrats are mostly those in moderate circumstances—they are more politically minded when they are out of a job and hungry; (2) The ceaseless deluge of anti-democratic propaganda, coupled with the likelihood that poisonous personal emetics were administered to your otherwise tractable voters; (3) Entrenched interests supported your opponent, perhaps more than you had reason to suspect; (not uncommon for them to lay some "dovey-me" on both sides. (4) The ubiquitous "haters of Roosevelt and the new deal" (whose venal mongering is a stench even to the imperious ilk of capitalistic despots) helped in the sinking of your campaign—or running it on the rocks, because you had perhaps too often and too volubly advocated and endorsed the great Commander in Chief; (5) The concentration of the spoils of corruption and graft was poured into these primaries against every thing and everybody inimical to those of the entrenched greed.

that sum was 10 times its average profits before the war. So, dear children, — the bed-time stories related to you by the ebullient and loquacious, and almost cradled Mr. Fulton Lewis, Jr., upon whose surprising (?) revelations of manipulation, of the bottle-necks, and the "bureaucratic bungling" the hungry Roosevelt haters hang with bated breath, is just a little "fairy story" as compared to what his playmates are stealing. Lewis does find isolated cases of deception, yes, of fraud, and perhaps more often those instances where some subordinate functionary holds up an important line-of-supply or material for fear he may lose his job or spend the rest of his days in the "jug."

HATE ROOSEVELT SEQUEL
Some editors, columnists, commentators, public speakers, congressmen, etcetera, have become so thoroughly inoculated with the virulent poison dispensed by professional concoctors of such nebulous sophistry and have become so vehement in their denunciation of the new deal, Roosevelt, Eleanor, Bureaucrats, and democrats, that they will never as to be ridiculous. They'll never win the election by merely offering "hate, vituperation and exhortation." As this writer has said before, "The opposition has no rallying point other than vilification and slander.—It has no constructive program, no known answers to our complex governmental problems and no leader.

The more they "hate Roosevelt" as a means of attempting to regain control, the more they are literally pushing people to stay closer to the greatest Chief Executive and the smartest Commander in Chief this nation has ever had.

Good bye now.—Stay Democratic!
ALBERT S. BROWN

LOS ANGELES, CAL., IND. REVIEW MAY 19, 1944

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Nevada Magnesium Plant Looks Beyond War Boom

Officials of vast desert industry forecast great postwar opportunity to follow temporary slump—Transportation business is expected to demand more and more of this lightest of fabricated metals.

By Kimmis Hendrick
Special Correspondent of The Christian Science Monitor

HENDERSON, Nev. — Tremendous peacetime opportunity is foreseen for one of the biggest magnesium plants in the world, war-born enterprise developed here near the middle of the vast American desert.

Men responsible for running it are maintaining this outlook although four of the plant's ten giant units have lately been shut down—a signal that this entire emergency war project is likely to be curtailed completely—and although many economic factors pertaining to its future seem problematic rather than promising.

But these men are believers in magnesium, the lightest of the fabricated metals. They are also believers in Basic Magnesium, Incorporated. They call their plant "miracle of the desert." Large enough to cover the entire central business section of Los Angeles, it was built in this wilderness in less than a year.

They admit it may be liquidated for a period when the war demand for magnesium ceases, but they are hopeful the day will come when full production will be the order once again.

Plant Has Improved Methods
Turning out magnesium for incendiary bombs, flares and aircraft parts, this plant has made vital improvements in its production processes. It deserves honorable mention as a prime contributor to the arsenal of democracy. Before the war, Germany was the chief producer of magnesium. Total world output was 68,355,000 pounds a year. B. M. I.'s yearly capacity as just one American plant producing the metal for this war is estimated at 112,000,000 pounds.

And tomorrow, say men at B. M. I., the transportation field alone will need all this, plus all the rest the country's magnesium producers can turn out.

Ross A. Ross, statistician for B. M. I., says if the automobile industry decides to use just a little more than 400 pounds of aluminum and magnesium a post-war car, the entire present capacity of every magnesium plant in the country, including B. M. I.'s, will be required.

Price Is Big Factor
The key to Mr. Ross' prediction, of course, is "if." Magnesium is still expensive. Price stands just above 20 cents a pound. That compares most favorably, certainly, with the 1915 price of \$5 but not favorably with steel's present price of about 3 cents a pound.

BOSTON, MASS., CHRISTIAN SCIENCE MONITOR, CH. 117, 175 MAY 25, 1944

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PRODUCTION RATE AT BMI IS ASSURED

'No Further Plans' WPB Wires Plant Officials

Definite assurance that no further slash in the production rate at Basic Magnesium Inc. is contemplated, was received by officials of the company Thursday from Philip D. Wilson, director of the aluminum and magnesium branch of the war production board, says the Las Vegas Review.

Further than that, a determination to keep the plant operating on its present scale so that the war effort will not be impeded, was indicated when Wilson, in a wire to F. O. Case, general manager, reported that, if necessary, changes in the manpower regulations for this area might be made in insure sufficient labor to keep the plant at full production in the six units now operating.

Officials at the plant recently dispatched a wire to Wilson asking the WPB for its stand on the future operation of the plant, and this morning a wire was received from Wilson giving that information.

"In answer to your question regarding production at Basic Magnesium," the wire read, "the WPB has no plans to make further reduction there. This advice should decrease termination and stabilize employment at the plant. If necessary, we will recommend that suitable labor priorities be assigned to Basic Magnesium to enable you to continue on the present scale of operations."

Officials at the plant were jubilant that Wilson had made the telegraphic report declaring that telegraphic report, declaring that the information in the wire should set at rest the rumors, rampant in this area, that the plant would be shut down completely and the men now on the job left to seek new employment.

The officials said that the statement regarding labor priorities indicated that the WPB was determined to keep the plant in operation at its present capacity, even if WMC regulation now in effect had to be altered.

LAS VEGAS TRIBUNE 5-26-44

B. M. I. Workers Sign Petition of Protest Against Turning Over Dormitory, Cafeteria to Andersons

Laboring men were hot under their collar yesterday as A. F. L., C. I. O. members and war veterans added signatures to a petition protesting government release of a men's dormitory and cafeteria at Victory Addition to Anderson Brothers.

Anderson Brothers already operate a concession at Basic. Under a new move, just announced, they are to take over the single men's dormitory and restaurant which

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5-21-44

With No Further BMI Cut Situation Seems Clarified

The WPB statement a few days ago that magnesium production at BMI will not be further curtailed was received with gratification in this area and has gone far towards dispelling unfortunate rumors and clarifying the situation as regards the great plant. Four of the ten units have recently been shut down by board order and there were persistent reports that more units, or even the entire industry here, might be dispensed with.

In addressing the southern Nevada meeting of the American Institute of Mining and Metallurgical Engineers in the Basic cafeteria Perry D. Helser, Washington, chief of the WPB magnesium division, commended the BMI management on the increased efficiency and economy effected by new short cuts in the manufacturing processes.

It was disclosed at the chamber of commerce luncheon Tuesday, however, that a possible manpower shortage confronts the plant, and a number of other local and state industries, through threat to remove this area from No. 1 priority. The chamber voted unanimously to protest

such removal in a message to William Royle, division of war manpower commission for Nevada.

General Manager F. O. Case of BMI, Personnel Manager Carl L. Hyde, and Manager John P. Burns of the United States employment service, appeared before the chamber and explained employment conditions and urged stabilization.

Burns stated later that while a California war construction project is drawing workers from here Nevada may not take any from there if the area is removed from war manpower commission's No. 1 list. He cites 14 industries, aside from BMI, that will be directly affected, including mining activities, lead, zinc, manganese, and products needed at BMI, transportation facilities from motor to train, bureau of reclamation, and even Las Vegas army airfield civilian occupations.

IRON AGE

Philadelphia, Pa.

MAY 4 1944

of accelerated ore production.

For the Record

••• Four of Basic Magnesium, Inc.'s 10 production units at Las Vegas, Nev., have been ordered closed, but kept in condition for resumption. No widespread layoffs are contemplated by the management however.

World's Greatest Magnesium Plant Is in Production While Being Built

Dangerous chlorine and molten metals controlled; Las Vegas plant is importing vast quantities of silver to replace copper.

LAS VEGAS, N. V.—Indicative of the immense use that Basic Magnesium contemplates for insulation and similar uses, to take the place of copper, Magnesium has gathered to date 1,139,570 pounds of silver valued at approximately \$21,500,000. The total amount of silver to be used for non-consumptive purposes is expected to be 2,500,000 pounds, worth approximately \$50,000,000.

The silver is loaned to the project by the government for the duration in lieu of copper, the silver to be returned when copper again becomes available after the war. Silver is one of Nevada's main products and like copper is a number 1 conductor of electricity.

By E. T. GREEN
Chief Safety Engineer

The production of magnesium at Basic is accomplished by the electrolysis of anhydrous magnesium chloride. One of our important raw materials is chlorine, and we have built one of the world's largest chlorine plants here on the Nevada desert. We have had the advantage of many years of experience of Hooker Electrochemical Company in designing the chlorine plant and, with their help, have eliminated many of the hazards usually encountered in the production of chlorine.

Other raw materials are prepared for chlorination in the preparation plant, and the production of anhydrous magnesium chloride is accomplished by mixing these raw materials

with chloride gas at high temperatures. The molten magnesium chloride is then electrolyzed in specially designed electrolytic cells, and the molten magnesium material is ladled off, cast, refined, and alloyed with other metals.

Some idea of the magnitude of the plant may be gained by recording that over four thousand tons of copper and a million and one-half pounds of silver have gone into the bus bars which carry the electric energy to the cells. Because of the magnitude of the plant, and the necessity of pioneering the process (no similar plant has ever been constructed in the United States), the safety problems of the preparation plant and the metals units have been a constant challenge to the resourcefulness and ingenuity of the safety department.

Further, because of the immediate urgency of producing metal for our armed forces, it frequently has been necessary to carry on operations simultaneously with construction work. The War Department has constantly impressed upon us the fact that one pound of magnesium produced during the month of December might conceivably be of far greater necessity to the successful prosecution of the war than 10 pounds produced a half year later. Consequently, many temporary hazards have had to be overcome which should not exist when construction is completed. Combining operations and construction activities has frequently caused leakage of chlorine and hydrochloric acid gases, and necessitated the require-

ment that all workers in the metal plant areas carry gas masks or respirators.

We have installed the airport type of wind direction socks on the roofs of all buildings to indicate wind direction, so that workers may quickly ascertain from which direction the wind is blowing, and seek refuge on the windward side if these leaks should occur.

The lading off of the molten metal from the electrolytic cells can only be performed safely by equipping all cell attendants with face shields, asbestos gloves, and safety goggles. Likewise, all employes engaged in handling hot metal are urged to wear high top safety shoes. A division of the activities of the safety department will also include the fire-proofing of all workmen's clothing. The importance of thoroughly training cell attendants in the necessity of pre-heating all tools which come in contact with hot metal is constantly emphasized, and this practice is reducing accidents.

Production of metal began in the late summer of 1942, and daily production has constantly risen. This increased production has necessitated the training and educating of hundreds of new men, and it has been no simple task to allay the fears of these new workmen regarding the temporary effects of inhaling chlorine gas. It has been difficult to impress upon them the difference between a noxious odor and the real danger of actually coming in contact with a concentration of chlorine gas. Naturally,

(Continued on Page 57)

Industrial Safety Aids War Effort

Douglas Employees Receive a Thorough Safety Training Right at the Start

Company manuals, safety posters, explanations, inspections, help to make employes safety-conscious during every work hour.

By WILLIAM S. RHODES

Chief Safety Engineer, Douglas Aircraft Co., Inc.

A unique program has been established at the Douglas Aircraft Company, Inc., to bring about safety consciousness in Douglas employes. By following a typical Douglas worker from the time he makes application until he is on the job, an insight can be obtained which will show the value of such a safety program.

The typical Douglas employe, after making application and being accepted for the job, is given a complete physical examination, including an eyesight test, chest X-ray and examination, and a urine and blood test. Any defects that show up from the examination will guide the employment department in placing the applicant. If he is to do sandblast, foundry, or paint spray work, he will be given a physical recheck every six months which consists of a blood-count check and a chest X-ray.

After the pre-employment physical examination, the Douglas employe is shown a sound motion picture on safe practices which must be followed in the shop. He is then given a company manual containing a set of safety rules and regulations to guide him in performing his work safely.

As he clocks in to begin his first day on the job, he notices a safety poster over the clock station. Later, as his foreman explains the job, his attention is called to the guards placed on the machines for his protection and he is told that gloves for hand protection, goggles for eye protection, and any other personal protective equipment which is needed for his job can be obtained at his department tool crib. There is a two-color painting scheme on the machines—the sta-

tionary parts are painted a light gray and the moving parts a light buff to relieve eye strain and focus attention on the moving parts. These are all things that have been taken care of by the safety department.

In the afternoon, a departmental volunteer safety inspector calls on the employe and explains to him that he is one of the 300 volunteer inspectors

who have the responsibility of checking safety conditions in the different departments. Some time later, our employe may be doing a drilling operation without wearing his goggles. A light tap will come on his shoulder and one of the plant safety inspectors, who roams the plant continuously looking for just such incidents, will caution

(Continued on Page 57)



Various types of personal safety equipment used by Douglas, including safety shoes.

PACIFIC FACTORY
MARCH 1943

(Continued from Page 32)

some nervousness was encountered during the first few months of operations, but with proper education this misunderstanding has been corrected. Each worker is supplied with respirators and instructed in the limitation and use of all breathing apparatus equipment. Each man is taught to obtain a new respirator or gas mask just as soon as he detects any taste of chlorine.

As of January 1, no serious injuries or fatalities have occurred in connection with any of the company's operations in the production of magnesium. The severity figure for the year was 0.308, which is in contrast to a much higher nation-wide severity in the metals industry.

The scarcity of safety supplies, due to the enormous demands of the

country's war industries, has made it necessary for us to make our own asbestos gloves and establish an instrument repair department for the salvaging and repair of goggles, respirators, and other safety equipment.

Nevada has no specific Safety Orders for the Magnesium Industry, but we are operating strictly in accordance with all the safety codes in effect in California.

Basin King

A SUMMARY of the

Mining Industry's Manpower Problems

ON February 9, 1943, a 48-hour week for the metal mining industry, other than iron, throughout the nation was ordered by the War Manpower Commission. At the same time, Paul V. McNutt, WMC chairman, issued regulations granting broad discretionary authority to area and regional directors in putting the 48-hour week into effect in other industries.

In general, these regulations are designed to ease the transition to the longer week by providing that no firm which must release employes to go on the 48-hour basis shall start the longer week until the federal employment service finds "suitable employment" for the released workers.

Only a small proportion of western mining projects will be affected by the blanket ruling, since the majority of the companies shifted over to the longer work week last September when the War Production Board ordered that all workers in the mining and lumber industries in 12 western states be placed on a 48-hour week with time and one-half for work in excess of 40 hours. Subsequently, in certain instances, OPA raised ceiling levels or decreased quotas to compensate for the extra costs. The changes were largely individual and only covered those who showed themselves to be adversely affected.

Manpower has been a major problem of the mining industry throughout the war period and numerous steps have been taken by government agencies in an effort to alleviate the situation which, in many branches of the industry, has become extremely critical. The first of these steps was the labor "freezing" order, issued September 7, 1942, which applied to all nonferrous metal miners and tunnel workers in the 12 western states.

Under that order, workers desiring to change jobs were required to secure a certificate of separation from the U. S. Employment Service. The plan was designed to halt the "pirating" and migration of workers engaged in the production of war-essential raw materials, and the action was deemed necessary to prevent further decline in the production of copper and other nonferrous metals. A serious drop in copper production during July and August was the cause of the emergency order.

On October 8, 1942, the War Production Board issued Limitation Order L-208, halting production at all "non-essential" mines. According to WPB, the closing order was issued for the purpose of making manpower from those mines available for operations in more essential mining branches. The order encountered strong opposition from the West's gold-mining districts and estimates as to the number of men which the order would release for other mining projects varied in a wide range. Government officials had estimated that the order

The 48-hour work-week order of the War Manpower Commission climaxes a series of steps which have been taken by federal agencies to alleviate the shortage of mine labor, particularly in the 12 western metal mining states. The manpower problem was recognized as being critical following a serious drop in copper production last summer.

would release 3,000 to 4,000 men, while opponents of the order estimated the number at nearer 250 to 300 and this figure proved to be more nearly correct.

In an effort to speed the transfer of miners from the gold mines and other industries to the war-metal mines, the U. S. Employment Service instituted a program under which transportation charges were paid for workers willing to go into the latter branches of the industry. Reports indicated that transportation expenses were provided for over 4,000 families who came principally from industries other than gold mining.

As a further inducement, the government, through its National Housing Agency, has sponsored the construction of numerous housing units for western mining projects, and most of these units already are under construction. About 2,500 houses have been made available in areas where facilities were inadequate.

In October 1942, the Army initiated a program of furloughs designed to release approximately 4,000 qualified hard-rock miners so that they might return to work in the strategic metal mines. It has been stated by mining officials, however, that this program has not worked out as originally planned, and that the majority of the men sent to the metal mines have been coal miners, while the coal mines have received principally hard-rock miners. However, this step did alleviate, to some extent, the manpower shortage in the mines.

In addition, Selective Service has issued several directives intended to aid in relieving the mine manpower shortage. The first of these provided for the reclassification of miners into the 1-A group in cases where they left the mines to take non-essential jobs. The purpose of this directive was to provide "teeth" for the initial "freezing" order.

Later, local draft boards were instructed to grant deferments to experienced men in

the mining and smelting industries, and a directive also was issued providing for the release of key men who had been taken into the services, in order that they might return to their positions in the mines. Release from the armed services of men over 38 who could give satisfactory proof of a prospective job in an essential industry also was initiated, but it has been found that the latter two programs have not provided many men in actual practice.

IN SPITE of these measures, the labor needs of the mines, mills, and smelters remain acute. In commenting on the labor situation recently, Senator Carl Hayden of Arizona stated, "I feel that the primary problems in connection with mine labor supply revolve around maintenance of the present number of workers on the job, which can be done by proper administration of the Selective Service law and by the freezing order, administered by the War Manpower Commission."

There has been considerable agitation for the importation of large numbers of skilled mine workers from Mexico, but Senator Hayden declared that "on the basis of my own experience with this phase of the question, I feel that there is no great hope of securing large numbers of Mexican laborers, because of the attitude of the Mexican government and of our own federal agencies concerned."

It has been pointed out by those opposed to importation of Mexican miners that it would be inadvisable to take skilled men away from the mines of Mexico when the United States at present is consuming the bulk of the output of that country's mines. Organized labor is reported to be opposed to the bringing in of workers from Mexico.

The difficulty encountered in maintaining present nonferrous metal miners in their jobs is attributed by some to the unfavorable wage rates as compared with those of competing industries, many of which are on a cost-plus basis and government contracts. Other factors are the more favorable working and living conditions at the shipyards and aircraft plants which are located near large centers of population.

The more rigid hiring specifications of the mining industry, with regard to physical standards and experience, also are cited as stumbling blocks in the way of miner recruitment. It is stated that those mining companies which maintain only reasonable hiring standards, pay relatively good wages, provide adequate conditions, and train and up-grade workers as rapidly as is necessary to meet their needs, have been able to maintain their crews and have encountered less difficulty in recruiting additional men.

Wage increases have been granted from time to time by the War Labor Board in several of the mining districts in an effort to hold the miners in their jobs and





Igorot girl illustrating how ore was brought out of the Mankayan mine during the period of Spanish operation. The ore basket and ladder were found in old workings. The ladder still was serviceable when found although it had been abandoned in the stope nearly 70 years ago. The rungs were mortised into the side pieces and secured by wooden dowels in lieu of nails.

as for its part in the program of industrializing the Philippine nation. The enterprise was incorporated and its capital raised in the Philippines. Stockholders were predominantly American and Filipino, as were the directors. Engineering was American. Surveyors, assayers, clerks, miners, operators, medical personnel, subforemen, and other workers were Filipino. By far the larger number of these men acquired most of their skill and training at the Lepanto property. Most of the machinery and operating supplies were imported from the United States. In every sense of the word it could be classed as an enterprise in which the two nationalities were inter-dependent, and one which was conducted for the benefit of both. Such enterprises will be numerous throughout the world in the future if the declared objectives of the United Nations are really placed in effect as the result of our victory.

The Municipal District of Mankayan enjoyed a feudal type of prosperity under the Spanish, replacing the head-hunting savagery which preceded. Under American guidance there was no feudalism. Instead, there was vigorous application of modern engineering knowledge, resulting in a prosperity and social progress never before dreamed of in this remote mountain community on an island off the coast of Asia.

We assure the "Levity Lode" that it need not wonder how the Filipinos like their present life under the lash of the Jap.

NEW MANAGERS NAMED FOR PHELPS DODGE MINE UNITS

ANNOUNCEMENT has been made by Harrison M. Lavender, general manager of the Phelps Dodge Corporation, of changes in the managements of two of the corporation's branches, effective March 1, 1943.

J. H. Davis, manager for the past three years of the New Cornelia Branch of Phelps Dodge at Ajo, Arizona, has retired and is being succeeded by L. M. Barker, who formerly was general superintendent. J. F. Berry has been named the new manager of the Moctezuma Copper Company, Phelps Dodge subsidiary at Naco, Sonora, Mexico, to fill the vacancy caused by the death of A. B. Williams.

Davis' retirement, which was due to ill health, followed more than 30 years of service with the Phelps Dodge organization. He first entered the employ of the company at the Copper Queen Branch, Bisbee, Arizona, in 1911 following his graduation from Harvard University. In 1914, he became chief engineer for the Bunker Hill Mines Company at Tombstone, Arizona, then a Phelps Dodge subsidiary. He was appointed to the superintendency of the Tombstone property in 1919 and in 1923 was transferred to Douglas to take charge of the office of the general manager of Phelps Dodge. In 1940 he was named general manager of the New Cornelia Branch.

Barker, who succeeds Davis, majored in metallurgy at the Missouri School of Mines. He was employed as research chemist and metallurgist by the Nevada Consolidated Copper Company and by Utah Copper Company before going as mill superintendent to the United Verde Copper Company at Clarkdale, Arizona, in 1927. Ten years later he was transferred to a similar position at the New Cornelia mill. In July of 1942, when Davis was granted a leave of absence, Barker was appointed general superintendent of Ajo mining and milling operations.

LARGEST SHIP LAUNCHED

One of the largest ships ever built in this country, in significance if not in size, is one built by the California Shipbuilding Company and christened the S. S. Absentee. Unlike other ships, this one, made of pasteboard, represents every industry and every individual in these United States. Company figures show that although their employees' record for building a ship is 29 days under the current rate of lost man-hours due to absenteeism, the record would have been 27 days if every one had stuck to his job like the man on the fighting front does.

The company states that the man who takes time off to spend his overtime pay isn't a bad guy. Only they have never seen or smelled the corpses rotting in the jungles, or had the blood and guts of their buddies spilled on them, or seen white women herded like cattle by the Japs. They don't mean to help Hitler, they just want to have a good time.

Berry, a graduate of the New Mexico School of Mines, has been active in mining in Mexico for over 40 years. During the years 1905 to 1914, he was employed by the American Smelting and Refining Company in various capacities, finally becoming head mine foreman of the company's Anganguero unit. For the next 20 years Berry was employed by Cia. Minera de Santa Gertrudis, S. A., Pachuca, Hidalgo, Mexico, serving as general superintendent for several years. He returned to American Smelting and Refining in 1936 and was made superintendent of the Tezuitlan unit, where he remained until his appointment as general superintendent of the San Carlos property of Phelps Dodge Corporation in Chihuahua, Mexico, in 1939. He continued to serve as general superintendent of that property, after its sale in December 1941 to American Smelting and Refining Company, until his acceptance of the position as manager of the Phelps Dodge Naco, Sonora branch.

DECENTRALIZATION OF WPB IS INDICATED IN NEW ORDER

PROVISIONS for further decentralization of War Production Board activities are contained in a new WPB administrative order which directs that after March 1 applications for priority assistance on Form PD-1A be filed with the nearest of the 131 WPB district offices, and authorizes the 12 regional offices, beginning March 15, to assign preference ratings on PD-1A certificates to deliveries of materials valued at \$100 or less. According to Chairman Donald M. Nelson, the preliminary value limitation of \$100 will be stepped up progressively as the field offices assume greater responsibilities and it is hoped that within six weeks more than 80 per cent of all PD-1A applications will be handled entirely by the regional offices.

Under the new procedure, designed to simplify the problems of businessmen and others needing occasional priority assistance, WPB's field offices will be responsible for seeing that all PD-1A applications are properly filled out and will forward them to Washington, or to regional offices if they fall within the value limitations.

In the early days of the priorities system, Form PD-1, later supplanted by PD-1A, was the principal instrument in the assignment of preference ratings to orders for scarce materials. Later, the Production Requirement Plan, now being superseded by Controlled Materials Plan, provided the means for distribution of the great bulk of material required for primary and essential civilian production. Receipt of the PD-1A forms has dropped from a one-time peak of more than 60,000 a week to a little more than one-half that number. The fact that CMP provides central control over the distribution of scarce materials to claimant agencies makes it possible to decentralize handling of PD-1A's.

Ratings on PD-1A certificates are known as "single-shotters," since the priority assistance they provide is applicable only to the particular delivery for which help is requested. They do not establish the continuing assistance provided by PRP and CMP, and by orders in the "P" series covering specified industries.

to prevent their migration to war plant jobs with higher pay. However, ceiling prices of metals have been kept at low levels and thus effectively prevent material wage inducements.

A NUMBER of the mining companies have instituted training programs for their workers, one known as Training Within Industry, and another as Apprenticeship Training Service. Among the western mining companies which have instituted both types of training programs are the Bisbee and Ajo branches of the Phelps Dodge Corporation in Arizona; the Ray Mines Division of Kennecott Copper Corporation at Ray, Arizona; the Inspiration Consolidated Copper Company at Inspiration, Arizona; the Shattuck Denn Copper Corporation at Lowell, Arizona; Miami Copper Company at Miami, Arizona; and the Anaconda Copper Mining Company at Butte, Montana.

Apprenticeship Training Service programs have been instituted by the following mining companies in the western region: Copper Canyon Lease of International Smelting and Refining Company, Battle Mountain, Nevada; Basic Magnesium, Inc., Las Vegas, Nevada; Nevada Mines Division of Kennecott Copper Corporation at McGill, Nevada; Mountain City Copper Company, Mountain City, Nevada; Amalgamated Pioche Mines and Smelting Corporation, Bristol Silver Mines Company, Combined Metals Reduction Company, and Prince Consolidated Mining Company, all at Pioche, Nevada; Chino Mines Division, Kennecott Copper Corporation, Hurler and Santa Rita, New Mexico; Tintic Standard Mining Company, Eureka, Utah; and Utah Copper Company, Bingham Canyon, Utah.

It is estimated that the current labor needs of the nonferrous metal mines and smelters total 6,000, of which approximately 40 per cent should be skilled workers and 60 per cent, unskilled. The major copper companies would absorb approximately 2,500 of this total, while another 3,000 are needed in the tungsten, molybdenum, vanadium, and chrome mines.

At the present time the Anaconda Copper Mining Company is working out an over-all training program which is expected to serve as a basis for similar programs in other mines. The plan involves an organized method for training new workers, a special program for up-grading and on-the-job training, and a continuing program for training foremen and shift bosses. Anaconda is reported to be training about 350 beginning miners under this plan at present.

The training of beginning workers is carried on underground, except for a two-hour initial period of demonstrations above ground. This demonstration includes an explanation of the various types of mining equipment and mining operations together with instructions on mine safety. Several student stopes have been established underground and groups of four or five beginning miners are assigned to an experienced instructor for the training period.

It is believed that when this program has been perfected and put into operation by other large mining firms, it will aid in alleviating the critical manpower situation now facing the industry.

ABSENTEEISM

Development of a plan for solving the problem of absenteeism among war workers has been announced jointly by the War Production Board and the War Manpower Commission. However, details of the plan will not be revealed until it has been placed before other government units whose cooperation will be asked in making it effective. The joint announcement indicated that virtually every government agency will be asked to assist in policing the plan.

C. F. & I. STARTS IRON PRODUCTION FROM NEW UTAH MINE HOLDINGS

UTAH Construction Company holds the mining contract for the removal of ore from the Iron Mountain property near Cedar City, Utah, recently acquired by the Colorado Fuel and Iron Corporation. The iron ore is being shipped to C. F. & I.'s Minnequa steel plant near Pueblo, Colorado. Hitherto, the steel plant has been supplied solely by the company's iron mines at Sunrise, Wyoming.

Production from the Sunrise mines has been somewhat hampered this winter by the installation of new hoisting equipment. Besides the open-pit workings, the company has underground operations about one mile away. This production is hauled to the pit for removal to the surface. Plans call for sinking a 1,250-foot shaft. Colorado Fuel normally produces about 3,000 tons of ore daily, all of which is sent to its steel plant at Pueblo.

H. A. Wright is superintendent at Sunrise, and W. A. Maxwell, Jr., Continental Oil Building, Denver, is president of Colorado Fuel and Iron.

SILVER DYKE MINE BEING RETURNED TO PRODUCTION

A NEW concern has been organized to operate the old Silver Dyke group of 13 lode claims near Mina, Nevada. Known as the Nevada-Silver Dyke Tungsten Company and headed by M. G. Thomle of 255 California Street, San Francisco, California, the company has reconditioned and put into production the old 25-ton plant at the mine. The 75-ton Marcy mill unit is being worked over and is expected to be ready for operation by mid-April. The mine, originally a silver producer, has been rated by Metals Reserve Company as a new tungsten producer and eligible for the increased price.

The Silver Dyke is located in the Gold Range district of Mineral County near the Southern Pacific railroad and was operated until a few years ago by the Nevada-Massachusetts Company. The mills are at Sodaville Springs on the railroad and Highway 95, nine miles below the mine. Complete mining equipment will be installed and ore will be trucked to the mill. The connecting road is said to be a good one. Over two miles of underground workings have been driven in the property, attaining a maximum depth of 500 feet. Ore will be handled by gravity to the main transportation tunnel on the 500-foot level.

Other officials in the company are A. N. Torkelson of Los Angeles, secretary; James J. Lynch of New York, vice-president; and W. K. Greer of Auburn, California, consulting engineer. At Mina the staff includes J. Lindeberg, general manager; Herman Crowell, assistant general manager and mill superintendent; and Richard Crowell, master mechanic. George F. Beckerley of San Francisco is chief mine and construction engineer. A crew of about 40 men is expected by the time the company is ready for full production.

INCREASED LEAD AND ZINC PREMIUM PRICES ANNOUNCED

JESSE JONES, secretary of commerce, has announced officially that the scope of Metals Reserve Company's premium payment program covering over-quota production of domestic copper, lead, and zinc has been broadened to afford an additional premium for lead and an additional premium or premiums for zinc in cases where such additional premiums are considered essential to insure maximum necessary mine production. Information on the expanded premium payment program was carried in the January 30, 1943, issue of The Mining Journal.

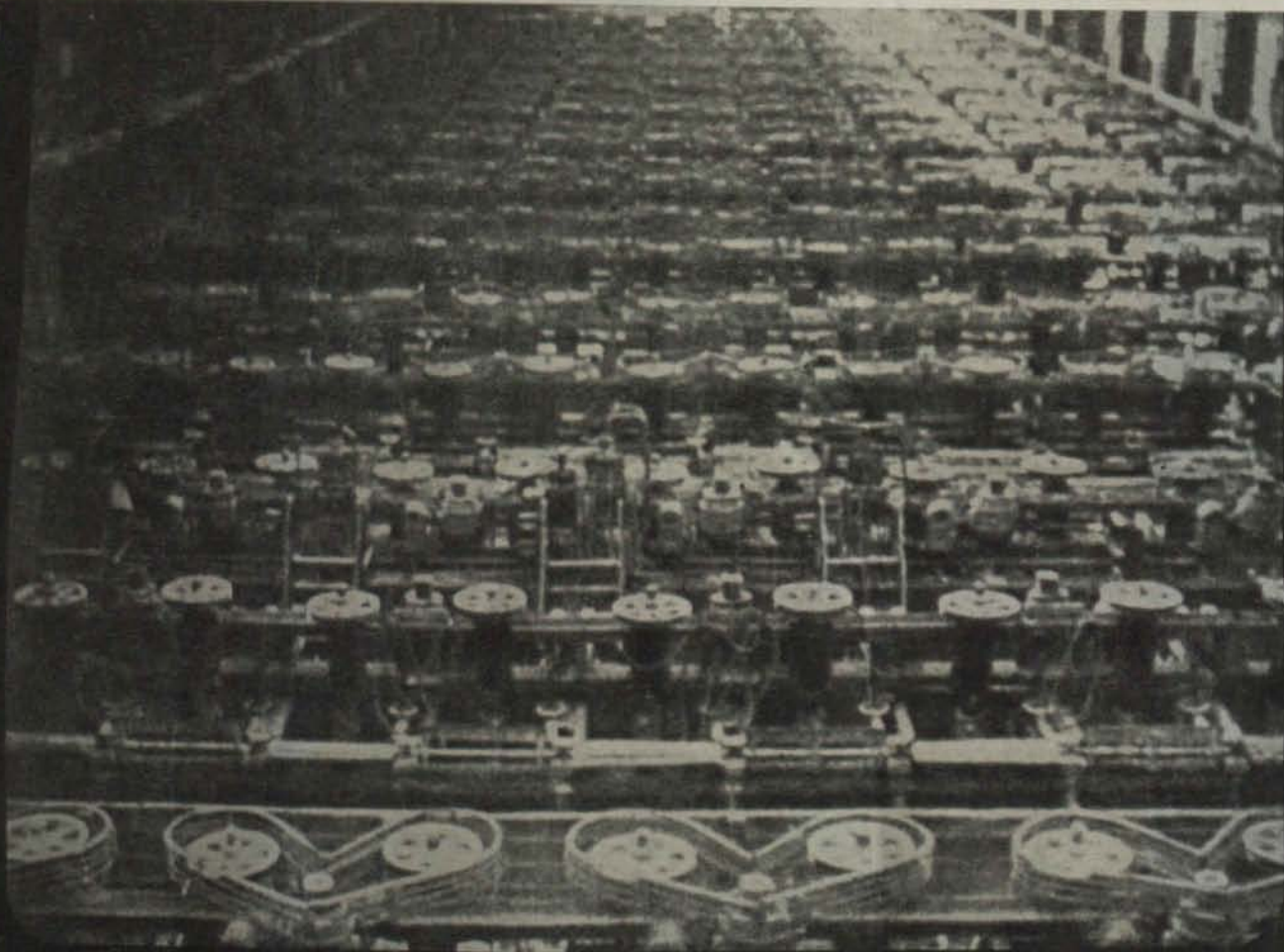
Each case is to be considered independently by the WPB-OPA quota committee, and payment of an additional premium or premiums will be recommended to Metals Reserve Company if deemed necessary in the particular case.

These premium payments are made on production in excess of monthly production quotas established by the quota committee, with the highest premium payable on over-quota production of lead reflecting the difference between the ceiling price and 12 cents per pound, New York basis, and the highest premium payable on over-quota production of zinc reflecting the difference between the ceiling price and 13½ cents per pound, East St. Louis basis, or 16½ cents per pound, East St. Louis basis, depending on the quotas assigned to the particular zinc mine.

Copper is not eligible for any additional premiums; only one additional premium is available for lead, and whether a zinc producer receives one or both of the additional premiums available for that metal is determined by the quota committee.

The quotas on which the additional premiums are based may be increased at any time or may be revoked at any time upon 30 days notice. Metals Reserve Company will not effect any settlement with producers based on the additional premiums in the event of termination of the premium program prior to July 31, 1945.

Metals Reserve Company will function these additional premium payments through the same channels and under the same procedure as heretofore followed in the premium payment program. Inquiries concerning eligibility for additional premium payments on lead and zinc mine production should be directed to Landon F. Strobel, executive secretary, Quota Committee, Premium Price Plan for Copper, Lead, and Zinc, War Production Board, Room 2047, Temporary "R" Building, Washington, D. C.



PHOTOGRAPH PASSED BY CENSOR—COURTESY OF TELENEWS NEWSREEL THEATRES

WANTED: CRITICAL MINERALS

What are they? Here is latest grouping of many critical minerals:

- (1) Chromium, cobalt, copper, copper scrap, magnesium, nickel, nickel scrap, tin, tungsten, zinc, corundum, graphite, and mica;
- (2) Antimony, lead, lithium, manganese, molybdenum, bismuth, phosphate, potash, bauxite, fluorspar, magnesite, rutil, and zircon;
- (3) Silver, coal, feldspar, silica sand, sulphur, and vermiculite.

Increased production of these critical minerals is essential and the entire output of Denver Equipment Company has been devoted to manufacturing machines to speed recovery of these minerals. Such a plant is the one above . . . 400 Denver "Sub-A" Type Flotation Cells in this mill, operating "24 hours per day," produce a critical mineral in a United Nation country that turned back the Axis.

How may we be of help to you in increasing your production of critical minerals as soon as possible?

USE OUR BATCH AND CONTINUOUS ORE TESTING SERVICE



NEW YORK CITY, NEW YORK: 59 Church St.

CHICAGO: Suite 1005, 69 W. Washington St.

SALT LAKE CITY, UTAH: 727 McIntyre Bldg.

TORONTO, ONTARIO: 45 Richmond St. W.

MEXICO, D.F.: Edificio Jalisco, Calle Ejido No. 7

MIDDLESEX, ENG.: 492A, Northolt Rd. S. Harrow

RICHMOND, AUSTRALIA: 530 Victoria Street

JOHANNESBURG, S. AFRICA: 8 Village Road



DENVER EQUIPMENT COMPANY, 1400 17th St., Denver, Colorado

much as the men in the front lines that the production of magnesium might go on.

Off in one corner of the vast area is a modest little building which from outward appearances isn't at all impressive. There are only two or three men at work there, and considered alongside the vast machinery of production, the little unit doesn't amount to much. No towering walls, no great electrical installations, no scurry and bustle of motion that marks most of the rest of the plant.

What goes on in there may determine the future of the magnesium industry in these parts after the war. They're making castings in that building—castings from magnesium produced at the plant. There are all sorts of molds, large wheels, pulleys and such, all of which will be thoroughly tested to determine what ~~this~~ metal will do in the industrial field.

Magnesium is new in this country and its qualities are far superior in strength and lightness to aluminum which has a general usage. The latter metal is well established as monarch of the light metal field. Magnesium is an interloper. It must force its way in and prove itself against all the opposition the mighty King Aluminum can muster.

And this—the BMI plant—will be the proving ground. The men working in this little building are doing the job right now. They'll continue, and as time goes on, their work will be expanded. They're pioneering in a new field and the results attained have been quite satisfactory.

The big battle for BMI's existence will not be fought along this front, important as it is—but with the aluminum trust and the great international cartel which still seeks world control of industry and markets. There are indications on every hand right now Cahlan concludes, that no effort will be spared to knock BMI out of the picture as soon as the war is over.

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STEEL

Editor Of "Western Metals" Summarizes Conditions In Ferrous And Non-Ferrous Markets Of Eleven Western States.

In summarizing the condition of the ferrous and non-ferrous markets in the 11 Western states for the month of March, Don Partridge, editor of "Western Metals," says:

"Despite previous reports that the structural mill of the Geneva Steel Co., Geneva, Utah, would not be completed during the duration, definite orders have been received to complete and operate the mill as soon as possible. On March 22 the first plates were rolled at this plant, and within a few weeks it is expected that full capacity will be obtained.

"The production of open hearth steel ingots in the West is steadily being stepped up, but the Nation's production figures, due primarily to needed furnace repairs, fell slightly below 100 per cent capacity.

Cut-Back Ordered

"The War Production Board has ordered cut-backs, nationally, in the production of magnesium. It is understood that no curtailment will occur at Basic Magnesium, Inc., plant at Las Vegas, Nev., or at Electro-Metallurgical Co. plant near Spokane, Wash.

"Demand for plates continues to hold the spotlight. Only two large awards were reported. Kaiser Co., Vancouver, Wash., booked 60 C1M-AV-1 cargo vessels involving 168,000 tons of plates and 50,000 tons of shapes. Consolidated Steel Corp., Wilmington, Calif., was awarded 18 of these ships, calling for 50,400 tons of plates and 18,000 tons of shapes. Awards aggregating 218,407 tons during March as against 240,970 tons for March last year. Bookings

for the first quarter totaled 608,847 tons as compared with only 298,361 tons for the corresponding period in 1943.

Private Projects

"Structural fabricators report demand for private projects is at a low ebb with little new business in sight. The Pacific Fruit Express Co. placed awards for car frames as follows: 700 tons to Bethlehem Steel Co., San Francisco; 300 tons to Palm Iron Works, Sacramento, and 200 tons to Independent Iron Works, Oakland. Awards totaled 79,208 tons for March, compared with 31,111 tons for March, 1943. Bookings for the first quarter of the year aggregated 178,460 tons, as against 62,952 tons for the same period in 1943.

"Demand for cast iron pipe for private interests is more pronounced than it has been in over two years. Awards included 1,500 tons for the improvement of Airport Way, Seattle; 1,200 tons for Phoenix, Ariz.; 800 tons for the Beacon Hill reservoir, Seattle, and 600 tons for Bremerton, Wash., all placed with the United States Pipe & Foundry Co. Burbank, Calif. placed 259 tons each with United States Pipe & Foundry Co. and American Cast Iron Pipe Co., and 222 tons with National Cast Iron Pipe Co. Bids have been opened on 1,500 tons for the East Bay Municipal Utility District, Oakland, and on 550 tons for Portland, Ore. March lettings totaled 5,383 tons as compared with 704 tons for the same month last year. To date 9,121 tons have been booked as against 5,522 tons for March, 1943."

ORDER REDUCING NEV. MAGNESIUM OUTPUT DEFENDED

WASHINGTON, April 20 (U.P.)—The War Production Board's order cutting back production at the Las Vegas, Nev., Basic Magnesium Corp. plant by 40 per cent was defended today on the grounds that it would make manpower and fuel oil thus saved available in other areas where they are urgently needed.

Director Philip Wilson of the WPB's aluminum and magnesium division said in a letter to Representative Albert Engle (R., Mich.) that the cutback would effect an annual saving of 1,400,000 to 1,600,000 barrels of fuel oil with which to help ease a daily deficit of 120,000 barrels on the West Coast.

Manpower Needed

Wilson quoted a War Manpower Commission statement that "the 1,600 men who might be released in Nevada could be used most effectively in Group 1 labor areas of Los Angeles, San Francisco and other centers of labor shortage."

The WPB official denied a charge by Senator Pat McCarran (D., Nev.) that the cutback decision was influenced by former Dow Chemical Corp. employees now in WPB.

BMI Begins Dismantling of One of 4 Mills

Basic Magnesium's giant war plant has added to its staff, rather than decreasing, since the Government ordered a shutdown of four of the ten units, but when all four units are finally down the employed personnel will have been decreased by between 20 and 30 per cent.

Guernsey Frazer, executive assistant to General Manager Frank O. Case, told the Junior Chamber of Commerce Rumor Clinic at El Rancho Vegas that it was possible to operate all 10 units at Basic with only 300 more employees than normally required for the six units which are to remain operating.

An increase in staff was explained by the necessity of using more men temporarily to dismantle a unit than required to operate it.

The official governmental curtailment order has been received, Mr. Frazer said, and one mill is now being dismantled. Two weeks are required to dismantle each of the four units.

Four Basic Magnesium Units Will Be Closed On or Before May 31

McCarran Said He Was Returning To Washington to Renew Fight Against WPB Order to Shut Down

Governor E. P. Carville announced Saturday that he had been officially informed that one of the 10 units of the Basic Magnesium plant at Las Vegas had been closed and that three more will be closed before May 31.

It was also reported Friday night that the war production board had also ordered the closing of units of the Dow Chemical company's magnesium plant in Texas and units of the Permanente plant in California which produces magnesium.

LAS VEGAS—Part of one unit of the huge Basic Magnesium plant here already has been closed and 40 percent of the world's largest magnesium plant will have ceased operation by May 31, it was learned reliably Saturday.

Frank O. Case, superintendent of the great plant, refused to confirm or deny the report.

United States Senator Patrick A. McCarran, who has led a fight to prevent the closing of any of the plant said he had seen no closing order, but added:

"I am returning to Washington immediately to put forth a renewed and determined effort to see that none of this great industry be closed."

McCarran said if the war production board had issued a closing order, he and the United States senate committee he heads will "fight to have such an order revoked."

It was stressed here closing minimum company of America," McCarran charged.

FROM WASHINGTON

WASHINGTON—Representative Albert Engle, R., Mich., Friday called on the war production board for the "complete factual background" of its decision to cut back magnesium production at the Las Vegas, Nevada, plant of the Basic Magnesium, Inc.

Engle said he had written to Director Philip Wilson of WPB's aluminum and magnesium division for the information, which he said he expects to use in answering charges voiced by Senator Pat McCarran, D., Nevada, that the cutback decision had been prompted by influence of the Dow Chemical corporation, a Michigan company.

Engle specifically asked for "any remarks you care to make regarding McCarran's charges that personalities entered into the decision" and "any further pertinent information."

McCARRAN'S VIEW

Recently in Reno McCarran admitted the fight to keep the big plant here in operation was "on thin ice."

"If the time has come when the great interests can dictate that such a western plant be closed up it is time the west fold up in its fight for industrialization," McCarran said, adding, "I'm not willing to admit we are ready to fold up."

One report here today was that officials of the WPB in issuing the closing order had requested no public announcement be made. To that rumor McCarran said:

"There is no reason for secrecy if such an order has been issued unless an effort is being made to hoodwink the people."

TRUMAN UNFAIR

CLEVELAND—A "public whipping at the hands of the Truman committee is the reward of Basic

From Where I Sit

By A. E. Cahlan

One of the nation's leading aviation experts predicts that air transportation will accomplish what no other means of travel has been able to — the development of the sleeping giant that is China. He says rail and highway construction on any sizeable scale, are impractical because of the numerous rugged mountain ranges covering the entire country. Mountains don't bother airplanes — neither do great distances. Hence, he forecasts, China will come into her own after the war.

There's an IF in there of course — which is that we're able to pry China loose from the grasp of Japan. When a news item appeared not long ago quoting Japanese leaders as stating the war would last 100 years and Japan was prepared for such a lengthy siege, most of us here in the United States laughed right out loud at the effrontery of the Nips. But —

Senator A. B. "Happy" Chandler warned the other day that the Japanese are now driving through the heart of China with a view of dividing the north and the south, destroying communications systems between the two, and forging a ring of steel around the forces of Generalissimo Chiang Kai Shek. If this is successful, says Chandler, we must be prepared for a LONG war which MAY last 100 years, unless we in the United States decide to quit short of final victory.

A New York store, advertising its fur storage facilities in the newspapers, rhapsodizes:

"Oh-h-h-h, Mairzy doats but motheat coats 'n' mothsull nibble foxes — moth'llmunch sable to, wouldn't you?"

NOW we've seen everything!

Then there's the headline in the New York Herald Tribune: "Backs Must Be As Well Groomed as Faces to Do Justice to the New Uncovered Look." Omigosh, what do you suppose THAT means? Summertime's just around the corner — maybe we'll find out ere long.

And here's something for the tipplers to moan about, as if they didn't have enough already what with shortage of liquor and all. The synthetic rubber program is using up alcohol at the rate of 150,000,000 highballs a day, a War Production Board expert calculates. So — if you don't indulge you should be happy —

here's one crisis you won't have to worry about A-tall.

A government pilot plant, near Philadelphia, which for six months has been producing real — not synthetic rubber, has received orders from Washington to fold up. Although only a miniature of apparatus required for mass production, it is four stories tall and cost \$150,000. It was designed exclusively for adapting to American conditions a Russian process of producing rubber from latex of the Russian dandelion, kok-saghyz, the work being carried out under the department of agriculture.

Laboratory officials say the product has been comparable to other natural rubber, that the process has proved more than successful, and that in overcoming one objection — high mineral content — they have just begun to sight perfection. Sounds like BMI which is just reaching the point where it can return the government a profit on the investment and is now to be sabotaged by curtailment.

BMI's plight is charged by Senator Pat McCarran to eastern industrial interests which are desirous of eliminating post-war competition in the light metals field. The plight of the Philadelphia rubber plant is charged by the press of Philadelphia as chargeable to the big oil companies, interested in protecting the synthetic rubber industry from post-war competition. So — where's the Truman Committee?

Smarting under the criticism touched off by the belated disclosure that 23 American transport planes were shot down by mistake during the Sicilian campaign at a cost of 410 American lives, the Army, Navy and Office of War Information have agreed upon a revised war information policy calling for war theatre commanders to make public promptly all battle news not harmful to military security.

That's a grand idea, but it seems we've heard it before, not once but many times. But then, perhaps, the UMTEENTH time may prove a charm. Here's hoping. Hoping also it will apply to the campaign in Burma and India where British censorship has been so complete we haven't heard many of the actual facts of late according to cables British newsmen have sent their home papers.

Basic Magnesium Cutback

LAS VEGAS, Nev.—Basic Magnesium, Inc., it is disclosed, has received orders to take four of its ten production units out of service, but to keep the units ready for immediate resumption when and as ordered. Basic's officials believe that selective service removals and run-off will care for the employment situation and employees have been advised that "the switch-out is not going to cause any widespread lay-off."

Cutbacks of 50% for Electro-Metallurgical Co., Spokane, and Permanente Metals, Manteca, Calif., were ordered in March.

THROW YOUR SCRAP INTO THE FIGHT!

BASIC PROJECT WILL CONTINUE, KELLEY STATES

'It's No War Baby,' Head of Anaconda Declares

Cornelius F. "Con" Kelley, outstanding figure for many years in the mining world and chairman of the board of Anaconda Copper Mining Co., world's largest copper producing and fabricating enterprise, accompanied by James R. Hobbins, president of Anaconda, lately inspected the huge Basic Magnesium Inc. plant near Boulder dam, now controlled and operated by Anaconda.

Chairman Kelley, who made many acquaintances at Goldfield during visits to that camp during the boom period, was born at Mineral Hill in Eureka county, Nevada, 40 miles north of the town of Eureka.

During the seventies Mineral Hill was one of the most productive districts in the state, with output of lead, zinc, silver and gold placed by the Directory of Nevada Mines at \$6,600,000. Old producers in the district are now owned by Senator James G. Scrugham of Nevada.

(Continued on Page 6)

NEW EXPERIMENT STATION AT HONOLULU

BASIC PROJECT WILL CONTINUE KELLEY STATES

(Continued from Page 1)

Quoting the heads of the great metal producing corporation during a reception tendered them at Las Vegas, the Review-Journal of that town published the following report:

"It has always been my ambition to build permanently. Basic Magnesium will not be a war baby if the metallurgical skill and management of Anaconda Copper can help it.

"I am a born optimist and it is my sincere hope that in the light metal era that is to follow the war, our plant will take its place competitively."

This statement by "Con" Kelley, made to a group of southern Nevadans, told the story of the future of the great light metal plant as viewed by the chief executive of the vast western mining concern now operating BMI.

Kelley explained there were many problems facing the company before this could be realized, but pledged that all the scientific brains of Anaconda would be turned to the job of making the plant work competitively.

A native Nevadan, who made his way to the top from the ranks, Kelley revealed a warm spot in his heart for the state of his birth, and referred feelingly to his early days in Eureka county.

Commenting on his company's operation here, Kelley said: "Driving by you see a definite huge plant out there on the hillside, but when you see it from the inside and realize the intricate mechanical electro-metallurgical and technical installations, you gain some appreciation of its magnitude.

"A truly marvelous job has been done in the conception, design and construction of this project."

Paying tribute to the mining industry generally, the industry that has been his life, Kelley declared: "The only enduring things which stand as a monument to man's scientific advancement in this world came from the mines and the quarries."

The Anaconda chief thanked the group for the "splendid cooperation given our company since we came in" and urged its continuance "to the common goal of a successful enterprise."

James R. Hobbins, president of Anaconda, paid compliment to Kelley as one of the nation's outstanding mining men, and discussed some of the problems that must be solved to assure the future of BMI.

"We are making progress steadily," he declared. "We are giving this project the best scientific brains the mining industry affords, and we are producing magnesium in ever-mounting quantities.

"Right now, the process is making more magnesium than its designers ever dreamed it would. The units now in operation are producing more magnesium per unit than anybody connected with the company ever hoped for. The results have been most gratifying."

Hobbins outlined the manner in which Anaconda came into the company originally, and said it was by invitation "of government officials,

Howard Eells of Basic Refractories effort."

"During the negotiations and since, Eells has been most cooperative, and we must never forget that it was his vision, energy and determination that brought this project into being," the Anaconda president declared.

"A remarkable job was done in conceiving and building this plant from the grass roots to its present stage of near-completion.

"There were mistakes made, that is true, but they will all be rectified as time goes on. The main thing now is that we're producing magnesium in quantity for the nation's war feeder belt. A Dorr duplex classifier

Hobbins likewise praised the spirit of cooperation his company had found among the people of Nevada and said it had been an important factor in "making things go."

The reception for the two Anaconda executives, was arranged by F. O. Case, general manager for BMI, who introduced the honored guests.

4168
CALIF. PACIFIC FACTORY
CH 3,816
MAY 1942

MAGNESIUM

Highly critical material is reaching toward its maximum production in Nevada desert

The vast Basic Magnesium plant at Las Vegas, which has been producing while still under construction, is now approaching its full 100 per cent output.

Less than two years ago, the site was just a desert mesa. In April of 1941, H. P. Eells Jr., of Cleveland, and Major Charles Ball of London,

England, proposed that OPM build a sizeable plant to be built by the Government and operated by Basic Magnesium, Inc. The project was financed by the Defense Plant Corporation. Immediately, 14,000 carloads of material and 77,000 tons of material brought by truck were assembled on that lonely desert site, and now there

is a \$100,000,000 production plant whose capacity is said to be many times the capacity of magnesium plants in the whole United States in 1941, only two years ago.

The site for the plant was chosen because there was ample electrical power, an unlimited water supply and an unlimited deposit of magnesium ore

Giant silos, 84 feet high, for the storage of raw materials (basic magnesium).

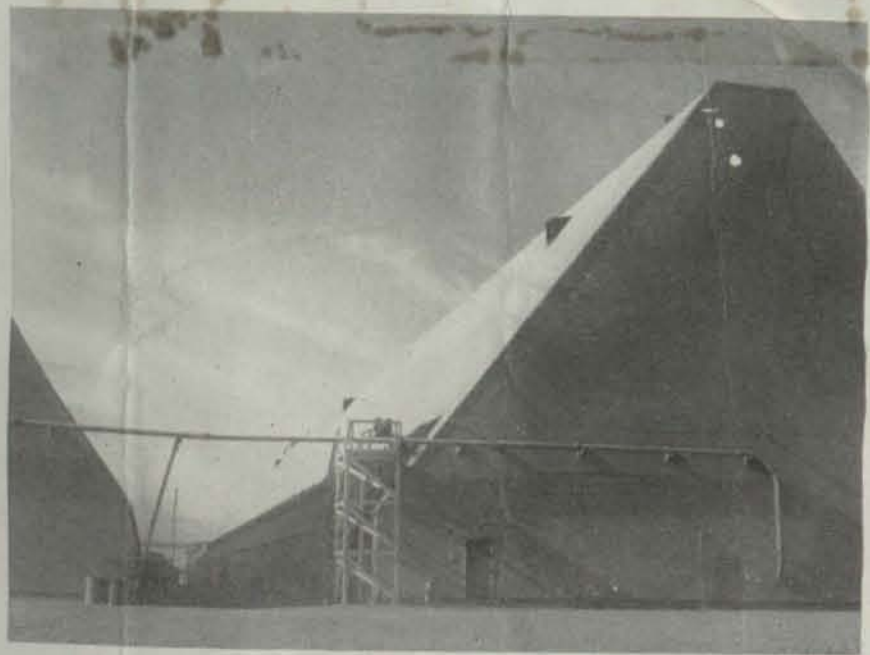
within a reasonable distance. The plant is a direct offspring of Boulder Dam, with its water and electricity ready to be put to use.

Magnesium, with various alloys, is used for many purposes. It is used in the construction of castings, wheels, aircraft engines, sheet forgings and many other things where lightness and strength are necessary. Blended with other materials it is also used for flares, tracer bullets or incendiaries.

The production method is explained by the company as follows:

The ore is mined, concentrated and calcined at the mine. The resulting magnesium oxide is then shipped to Basic Magnesium. This material is ground up, mixed with coal dust and other substances and formed into little pellets about the size of walnuts, or into small bricks. The pellets or bricks are placed into kilns and are subjected to considerable heat which dehydrates them. The bricks or pellets are then placed in a chlorinator, a large cylindrical furnace heated to 800 or 900

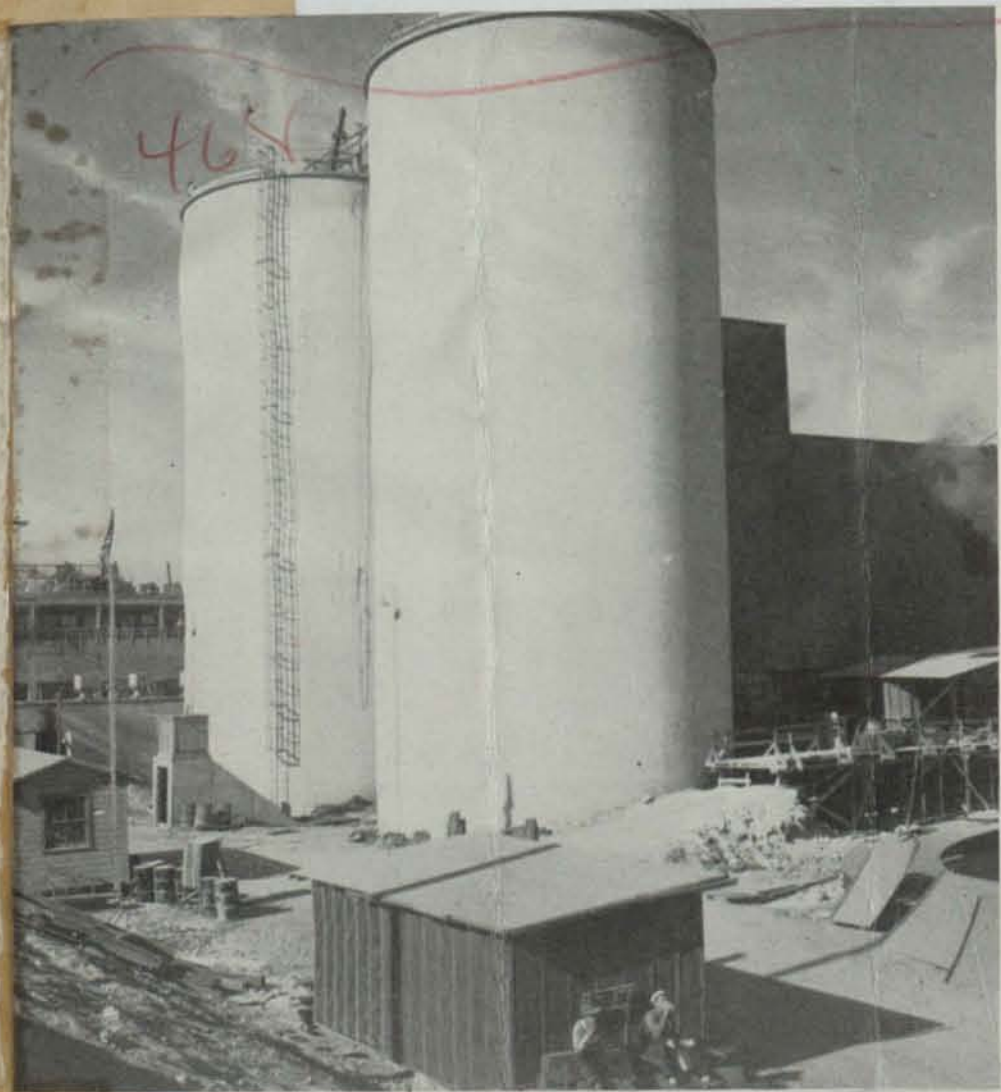
degrees Fahrenheit. This furnace has a bed of carbon bricks upon which the pellets are melted. As they melt,



A NEVADA PYRAMID — Peat storage building, built in this form to hold spreading peat poured in from top.

PACIFIC FACTORY

conditioned dwellings for the workers. This "city" is now in use and this former lonely desert mesa is one of the great centers of industry.



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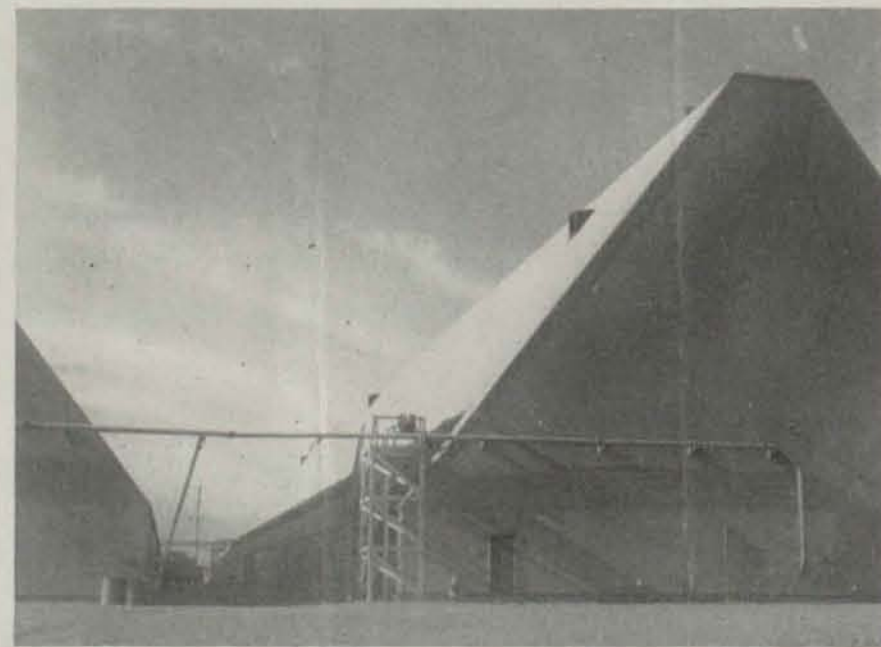
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PACIFIC FACTORY

a stream of pure chlorine gas passes through the furnace.

The result is a molten mass of magnesium chloride which is tapped off and placed in an electrolytic cell which looks almost exactly like a large tiled bathtub. In these bathtubs a strong electric current is passed through the molten magnesium chloride. This current causes the molten magnesium to separate from the chlorine and come to the surface, just as cream comes to the surface of milk. This "cream" is ladled out of the bathtub by hand.

The liquid metal looks like water and pours like water. It quickly hardens, like molten lead, when poured into bar molds.

The chlorine is returned by pipe to the chlorinators. The magnesium is sent to the shippers or alloyed with manganese or other materials.

The unusual shapes of furnaces and cells at the plant required 2400 different shapes of bricks during construction. Because of the dry climate, the mortar used in construction had to be mixed in small quantities and kept on ice until used; otherwise it would set too quickly.

The builders had plenty of construction problems and they incidentally had to build 1000 pre-fabricated, air-conditioned dwellings for the workers. This "city" is now in use and this former lonely desert mesa is one of the great centers of industry.

former secondary to the cast copper shaft housing can be brought down through the shaft. The circular copper alloy short circuiting bar, the upper face of which is contoured to fit the inside of the tank, is mounted horizontally below the two welding wheels.

When the two wheels contact the tank skin the welding circuit is closed by the short circuiting bar. Since the welding current flows through the sheets at two points, two welds are made simultaneously and the 360 degrees of welding is completed in approximately 185 degrees actual rotation of the upper heads.

Bulkheads are then welded to both the left and right hand skins, seven to each shell. This is done in two special semi-automatic welding machines, also designed by Lockheed, the first of which welds three bulkheads in place, the second the remaining four.

The half shell is placed in the machine, where it is supported at the bulkhead stations by copper alloy electrode bars which are machined to exactly fit the outside contour of the

(Continued on Page 34)



TRANSPORTATION TO TOKIO — Finished product, ready to put aboard warplanes.

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PACIFIC FACTORY

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The site for the plant was chosen because there was ample electrical power, an unlimited water supply and an unlimited deposit of magnesium ore

Los Angeles

INDUSTRIAL GIANT OF THE WEST

Casual consideration of the changes which have come over Pacific coast industrial areas since Pearl Harbor might lead one to the conclusion that full credit belongs to government officials who planned our war production program.

But most of the men, materials, machines, and money we have stacked on the boards throughout this western country during the past year and more were there before the government called for them. Some of them were there before officials in Washington knew we had them, and some we were compelled to ballyhoo vigorously before they would believe our claims.

Uncle Sam has demanded production for total war. We are giving it to him. Everywhere in the whole of these Pacific coast states where necessary materials are at hand or can be brought from anywhere in the world, men have been and are now busy at the job of production for total victory.

The industrial area around Los Angeles, while exceeding in magnitude any other such area on the Pacific coast, is typical of all other areas. A few highlights of achievements here and of future prospects are, therefore, only reflections of the work of free men throughout this great western empire, because much of Southern California's varied industry is supplied with materials from mines, mills, forests, and fields all over the west.

Today there are 500,000 people employed in all industries of Los Angeles County. Another 100,000 are expected to be employed within six months. More than 6,000 factories are listed in the county.

How rapid has been the expansion and change throughout southern California, since Pearl Harbor, may be partially glimpsed in the change of Los Angeles County from the nation's fifth in-

dustrial area to second place in total value of war goods production. It is exceeded only by Detroit, but has the advantage of far wider spread in benefits because here is much more variety in industrial plants.

One outstanding thing about the area's war effort, which gives unmistakable evidence that the western pioneering spirit yet prevails on the Pacific coast, is the fact that, although ranking second in war production for the nation, the Los Angeles in-

dustrial area has accomplished its record with less government financial aid than any other industrial area of the country.

Outproducing The Axis

During 1942 the aircraft companies of Los Angeles County outproduced all of Germany and more than doubled the entire Japanese output, and this year's production will double Ger-

many's and be four times greater than Japan's.

In dollar value, 1942 aircraft made here equalled two-thirds of the total automobile passenger car production value of the United States and Canada in the best auto year. In 1943, this county's aircraft production will exceed all automobile passenger value of 1940 by a wide margin.

The Los Angeles County aviation industry alone would support an entire city the size of Cleveland, Ohio. There were four major aircraft companies here in 1939, with 16,000 workmen. In 1940, Detroit employed 191,000 in automobile production, but by the end of 1942 the major aircraft companies, parts suppliers and subcontractors in this area employed so many more workers than Detroit that it had to be a military secret.

The only way to compare airplane production is by weight. One Flying Fortress is equal to 10 basic



NEW CITY HALL'S tall tower rises above buildings of the Los Angeles civic center. Los Angeles River viaducts are in the foreground.

May, 1943

PACIFIC COAST REVIEW

"CAN'T HOLD BACK on the boys in our Armed Forces!"



"You betcha! Our boys deserve the best of everything. That's why the majority of C.H.B. Quality Foods now go to the Army, Navy, Marines, Air Corps and Coast Guard.

"C.H.B. is working hard to fill your grocer's orders for these delicious foods, too! But remember . . . we Can't Hold Back on Uncle Sam's boys, and you wouldn't want us to!

"So if your grocer is temporarily out of the C.H.B. item you are looking for, why not try some C.H.B. variety you haven't tasted before? They're all grand!"

WE
CAN'T HOLD BACK
on
War Bonds & Stamps, either

Just a little Better .. but what a difference.

Reproduction of
advertisement
"CAN'T HOLD
BACK

Thank you, Mr. Dealer!

Authorized by:
CROWE-ROBERTS CO., INC., 114 Sanson
BERT LEVI BROKERAGE CO., 1340 East 6
O. B. GUFLER CO., 203 S.E. Alder
O. B. GUFLER CO., 3010 Western

everybody. Here at C.H.B. we've
your orders and orders for "the
means "CAN'T HAVE BOTH." But
they come first and we want you to
ration and 100% patriotism. And
you all the C.H.B. Products we can.

UNITED STATES PRODUCTS CORPORATION,

Little Miss Pickle Puss

Thursday, May 20, 1943

F. O. C.
MAY 21 1943

Dolomite Process Termed Success By Mines Bureau

RENO, May 19 (Special)—As the result of many months of intensive research, the United States bureau of mines announced that it had developed a process whereby a 400,000,000-ton dolomite deposit near Las Vegas, in the Boulder dam area, could be utilized to produce "many millions of tons" of magnesia which is a raw material of magnesium, the highly-important lightweight metal used extensively in airplane construction.

In describing its successful quest of a method for extracting magnesia from the dolomite, the bureau at the same time disclosed that it also had developed a new electrolytic process for turning this magnesia into metallic magnesium.

Secretary Harold L. Ickes, who characterized the bureau's discoveries as "noted contributions to the department's program of providing needed war metals," stated that the bureau has sufficient data to operate a small commercial-scale plant to process the dolomite and thus pave the way for development of the immense deposit by private interests.

The bureau reported that the recovery of high-quality magnesia from the dolomite resulted from studies conducted at its laboratories and pilot plants at Boulder City.

While one pilot plant turned out magnesia, another was operated to produce metallic magnesium by a new electrolytic process in which the oxide is added directly to the electrolytic bath.

Bureau engineers have pointed out that the dolomite deposit, which is at Sloan, 19 miles southwest of Las Vegas, could be developed to serve the new plant of Basic Magnesium, Inc., at Royson, near Las Vegas.

This plant, destined to be the largest in the nation, now produces metallic magnesium from magnesia extracted from magnesite at its property in the Paradise range, Nye county.

This magnesite must be treated in a \$5,000,000 milling and calcining plant 32 miles from Luning, and then transported more than 1,000 miles by rail to the magnesium plant of Basic Magnesium, Inc., at Royson, since there is no direct railroad connection between the main plant and Luning.

In seeking to eliminate the need for such a long haul, the bureau launched its experiments in the Sloan dolomite and also is conducting research on the possible utilization of low-grade magnesite deposits which are closer to the magnesium plant.

Owned by the United States Lime Products corporation, a portion of the Sloan dolomite-deposit has been worked by that company since 1927. Calcined dolomite and limestone produced by the company are sold principally to steel mills for flux. The limestone underlies the dolomite in the formation.

Basic Magnesium, Inc., which is scheduled to produce eventually 112,000,000 pounds of magnesium metal annually, will require about 300 tons of magnesia daily when it reaches full capacity, the bureau has been informed.

Bureau engineers have found that a processing plant to handle sufficient dolomite to produce 300 tons of high-quality magnesia daily could be built for about \$2,500,000.

The proposed small-scale plant suggested by the bureau would

cost considerably less and could produce from 30 to 50 tons of magnesia daily. Such a plant, if authorized, would be built and operated in cooperation with Basic Magnesium, Inc, with the United States Lime Products corporation providing the raw material. The small plant could be the nucleus of any larger plant which might be constructed to treat the ore.

Las Vegas, Nevada . . . 468
With the first refinery unit going into operation, Basic Magnesium, Inc., reached the point of 50 percent production in March, it was announced.

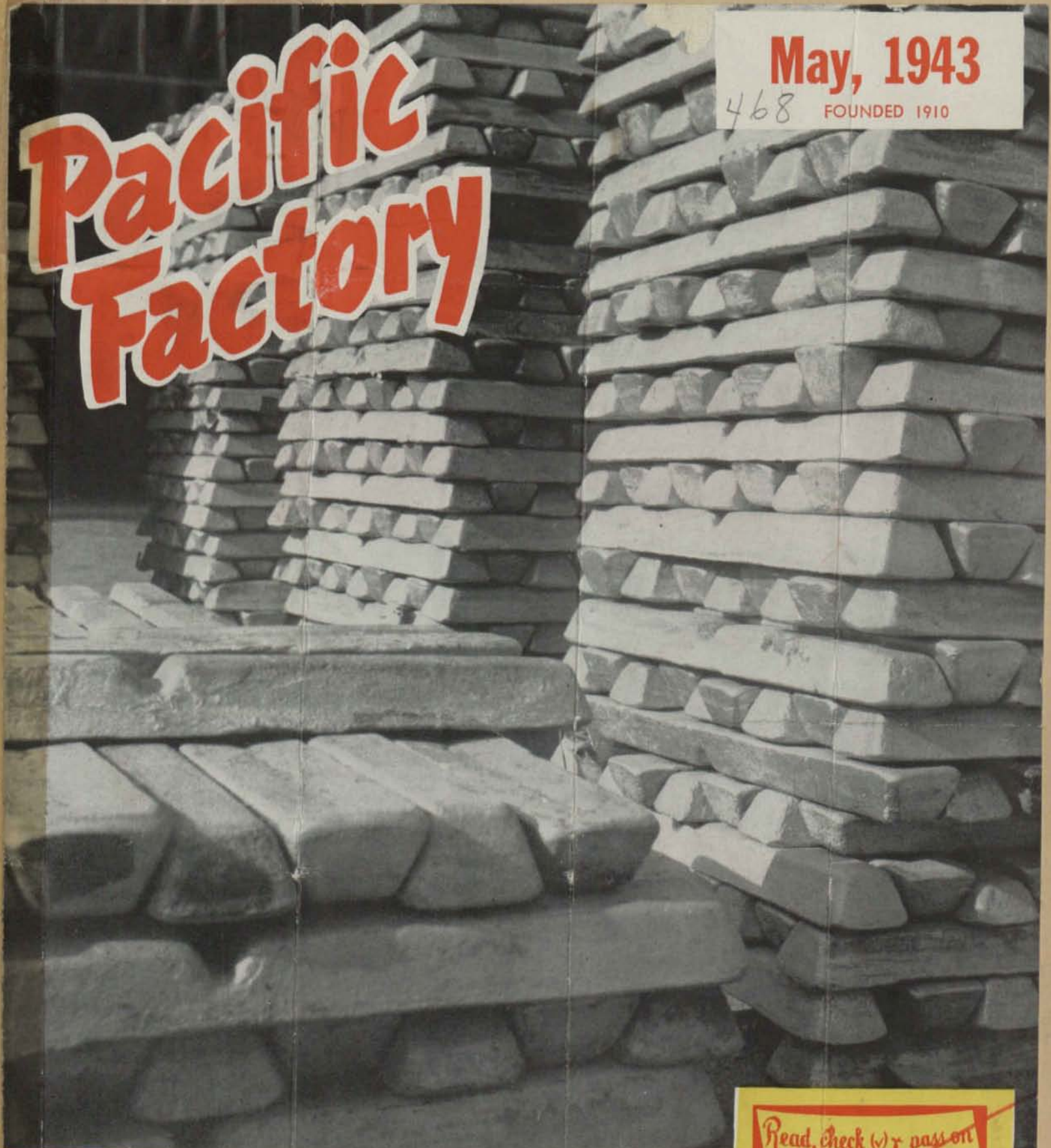
MAY 1943

Pacific Factory

May, 1943

468

FOUNDED 1910



MAGNESIUM INGOTS — BASIC MAGNESIUM PRODUCTION

a clipping
"Labor Freeze" or Else.
Spare Tanks for Planes.

INDUSTRIAL
PLANT
SECTION
(Page 25)

Read, check (✓) or pass on

PRESIDENT	
GENERAL MANAGER	
PURCHASING AGENT	
PLANT MANAGER	
PLANT ENGINEERS	
SHOP	

APR 6 1944

NON-FERROUS METALS

... News and Market Activities

OPA Increase Brass Ingot Prices

••• Increases of 0.75c. a lb. in the principal grades of 85-5-5-5 group of brass and bronze alloy ingot and 1½c. a lb. in the principal grades of the 80-10-10 group were announced March 31 by OPA in amendment 4 to MPR 202 to become effective April 1.

The higher prices are authorized, OPA said, because producers are unable to absorb the higher cost of virgin metal and higher grade scrap which now have to be used in the production of these groups of ingot, because of insufficient supplies of obsolete scrap normally used, such as old automobile radiators.

The 85-5-5-5 group is used in a wide variety of products, including valves and a number of marine castings, while the 80-10-10 group is used primarily for journal bearings, such as are used in railway cars and locomotives.

The new ceilings for the 85-5-5-5 group range from 12.00 to 13.75c. a lb., according to alloy content, while those for the 80-10-10 group range from 13 to 20c. a lb. These prices are for sales in carload lots, including an allowance for transportation not to exceed 25c. per hundredweight.

Increased ingot prices will mean somewhat higher costs to the foundries which use the grades in question. However, the OPA has discussed this matter with its Industry Advisory Subcommittee and is engaged in studying the impact of these increased costs on foundries selling castings subject to RMPR 125. It may be that some modification of that regulation will be required.

Charges Answered

Cleveland

••• Victims of a smear campaign is the position Basic Magnesium, Inc., Cleveland, find themselves in, according to the comments of H. B. Eells, Jr., president of the company. This unhappy position has resulted, according to Mr. Eells, from the Truman Committee report of March 13, in which he said the committee had second-guessed enlarged on, exaggerated, and twisted actions of the company in building its huge Las Vegas magnesium plant so as to place every

possible sinister light upon the company's procedure. The Truman Committee, in brief, accused Basic Magnesium of accepting a contract to build a huge magnesium plant with "only the most meager experience . . . no financial resources . . . standing to net \$840,000 yearly."

Mr. Eells told by way of rebuttal that so far as these charges were concerned Basic Magnesium had called upon Magnesium Electron, Ltd., an English company with magnesium production experience, to supply the know-how which Basic did not have. From the standpoint of finances, Basic Magnesium was merely a management instrument requiring no financial resources by government request and according to this set-up, taxes would have removed 80 per cent of whatever was paid in management fees; thus automatically reducing the \$840,000 profits charged by the Truman Committee to something like \$100,000.

The plant itself, which was designed and rated to provide only 18 per cent of the total magnesium production required by the nation, actually proved in 1943 to have produced approximately 39 per cent of all the magnesium produced in all plants.

As a result of the many faceted attacks during the planning and construction of this plant, according to Mr. Eells, confidence in Basic Magnesium's management was so undermined at Washington that the plant was finally turned over to Anaconda Copper Mining Co. Mr. Eells' remarks are plainly keyed to not only salvage industry's opinions of Basic Magnesium, Inc., but also to protect the valued reputation of Basic Refractories, Inc., the parent company.

Brass Mill Products Critical

Washington

••• About 98 per cent of total brass rod production is used by the screw machine products industry, WPB said on March 29, and brass mill products are still critical despite adequate mill facilities. Manpower shortages prevent full utilization of facilities.

The supply situation for brass rod and other materials was discussed at

the recent Screw Machine Products Industry Advisory Committee meeting. Aluminum is not highly critical, the committee was informed by WPB officials, but conservation for essential uses is desirable. With the exception of magnesium and calcium, most alloying metals cannot be removed readily from aluminum and for this reason aluminum scrap should be carefully segregated.

Advisory committee members said the industry believes it will be able to meet 1944 requirements for screw machine products for the truck production program, if orders are placed well in advance.

The monthly average production of brass mills has increased by approximately 246 per cent over 1940. A maximum production of 93,000,000 lb. was reached in March, 1943. It is estimated that the industry has capacity for approximately 100,000,000 lb. In recent months production has dropped to a level of around 73,000,000. However, increased military requirements have brought about a scheduling of 82,000,000 lb. monthly, the highest rate of the last six months. The Division hopes that one to 2,000,000 lb. brass mill products monthly will be received from Canada. It is apparent, however, that there can be no relaxation of control on the use of brass rod.

E. D. Lucas, Aluminum and Magnesium Division, pointed out that only six companies of the screw machine products industry are now reporting aluminum scrap generation. A company is required to segregate aluminum scrap if it generates in excess of 1000 lb. a month. If it generates over 10,000,000 lb., it is required to file a special report. Several committee members commented that aluminum scrap generation has been reduced to a low rate.

During 1943, smelters received and reprocessed into ingots approximately 400,000,000 lb. of scrap, Mr. Lucas said. January reports show that a larger amount was processed than was received during the month. It is believed that scrap generators, dealers and others have approximately a 2-months' supply on hand.

President Of Basic Magnesium, Inc. Challenges The Findings Of The Truman Committee

CLEVELAND, Mar. 31.—The following statement challenging the findings of the Truman Committee as published in its report entitled MAGNESIUM, dated March 13, 1944, was made on Tuesday, March 28th, by H. P. Eells, Jr., president, Basic Refractories, Inc., which, in 1941, established Basic Magnesium, Inc., a company which has since become a major producer of this war-time metal:

In 1941, the United States needed magnesium desperately. Only one company in this country (Dow Chemical) was experienced in the manufacture of the metal and that company was given all it could do. Incidentally, it has discharged magnificently a tremendous undertaking. Basic Refractories, of Cleveland, thought it could help in this emergency. Basic had ore deposits in Nevada and it had working relations with Magnesium Elektron, Ltd., an English company which had magnesium production experience comparable to Dow's.

We conceived the idea of merging the "know-how" of Magnesium Elektron, Ltd., with the resources of Basic Refractories to give the United States the magnesium it needed to fight the war. Thus, there came into being Basic Magnesium, Inc., the company which under our management designed, in major part built and brought

(Continued on page 4)

into operation the very extensive project near Las Vegas, Nevada.

From the day the Defense Plant Corporation gave the green light to this undertaking, our experience has been an eye opener. The little group of men who set out on this mighty undertaking had to fight their way through a jungle of opposition and obstruction based on selfish interests, and at every step were hampered by politicians, fixers, organized gambling interests, and other parasites. We wanted to get a job done; they wanted something else. We knew the risks involved in not playing ball with these interests, but we took them. We are now reaping our reward—a public whipping at the hands of the Truman Committee.

In making its report, the Committee had the choice of second-guessing us to death, of enlarging on and exaggerating every mistake, of twisting decisions to put them in a sinister light, etc. Or, it could have made a report based on an appreciation of our motives, of the incredible magnitude of the job, and the fact that we did in a year what the Germans had taken over a decade or more to do. The Committee chose to smear us.

Organization of Basic Magnesium brought to the United States the only and the best available experience with the metal among the United Nations. It immediately filled a big gap. Instead of commending us for this initiative, the Truman Committee "charged" that Basic Magnesium had "only the most meager experience", thus creating the impression that the contract for the project should have gone to some company with equal or more experience. Such companies, of course, were non-existent, except for overloaded Dow Chemical.

The public is informed that we had "no financial resources" and that we "stood to net \$840,000 yearly". The facts: Basic Magnesium, like Dow Magnesium, Diamond Magnesium, etc., were management instruments requiring no financial resources. The Government wanted it that way. Secretary Jones wisely provided that these companies should not have such resources or earning records. In this way, 80% of whatever was paid in fees would automatically be returned to the Government in taxes. After such taxes, Basic Magnesium stood to net not \$840,000, but perhaps as much as \$100,000.

The Truman Committee does not point out that Basic Magnesium originally was delegated a project one-tenth of the final size. A smaller project would have been far more favorable to us, for it would have left us a position in the magnesium field after the war. When the Government multiplied the size by ten it: (1), practically eliminated the possibilities for a reward to us through post-war activities; and (2), increased many times our responsibilities. We did not complain.

Our instructions from the War Department were to design a plant co-

incidentally with the building of it and therefore no estimate worthy to be called such was possible until the job was well on toward completion. There is no doubt that a conventional procedure would have saved many millions of dollars but at the expense of time. We assume the War Department weighed these factors before prescribing the more costly method.

The important fact which the report takes pains to conceal is that Basic Magnesium met fully the requirements of the War Department in respect to time and production. Rated to provide 18% of the total production for which plants have been built, "in 1943 it produced about 39% of all the magnesium produced in all plants in the United States". So much for our "demonstrated incompetence".

To this day there is not any scientific comparison of the capital costs of this job with others. A figure of \$1.81 has been reported per pound of magnesium capacity. If one must make a "shirt cuff" comparison, a more accurate figure would be nearer \$0.97.

By the Fall of 1942, we were so hampered by many-sided interference, largely inspired by continual political attacks, that we were glad to turn the responsibility over to able Anaconda Copper Mining Company, whose president, James R. Hobbins, has since been kind enough to say that "a remarkable job was done in conceiving and building this plant from the grass roots".

For information and as documentation of the above comments, Mr. Eells submitted copy, a memorandum of which was presented to the Truman Committee before it made its findings public, which he maintains specifically disposes of a few of the more glaring Truman inaccuracies.

Owing to space limitations we are unable to print this memorandum.

Editor, AMERICAN METAL MARKET.

APR 1 1944

Saturday, April 1, 1944

President Of Basic Magnesium, Inc., Challenges The Findings Of The Truman Committee

(Continued from first page)

this year. He says that even the smallest gardens helped make the difference between scarcity and abundance last year. Department of Agriculture surveys show that 42 per cent of the fresh vegetables consumed in 1943 came from Victory gardens.

Senator Pat McCarran of Nevada, has made a grave charge against members of the War Production Board. He accuses them of seeking to close Basic Magnesium, a huge ore plant near Las Vegas, to advance the interests of competing plants with which they formerly were associated.

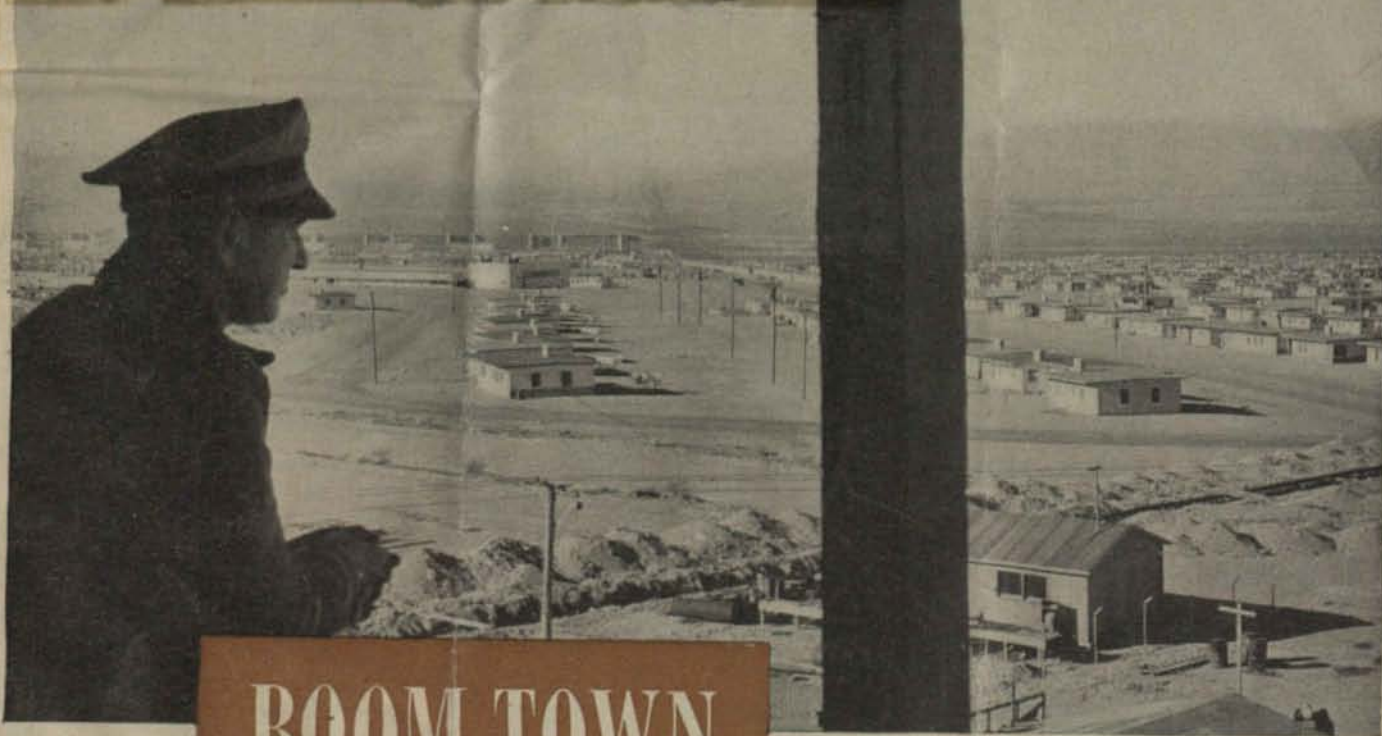
McCarran said in a Senate speech that the WPB recommended that the plant be closed despite the fact it is the largest producer of magnesium in the world. And he shouted that this was done because some board members formerly were officials of Basic Magnesium's chief competitors. He claimed that they sit on the WPB to serve their own interests and not to serve their country's. However, he did not name the men whom he accuses.

Basic Magnesium was built at a cost of \$133,000,000 and is now producing 160 to 165 tons of magnesium a day.

LIBERTY

New York City

5/8/43



A plant guard in a watchtower looks out over the thousand-unit housing development.

BOOM TOWN with a SOMBRERO

First Boulder Dam, then the tourists, and now the biggest magnesium plant in the world have made Las Vegas depression-proof and a gambling heaven

BY ALYCE CANFIELD

A SHOT rings out. Through the gray morning a tall figure runs from the doorway of a hotel and down an alley. In the hotel lobby blazing lights shine down on the still figure of the night clerk. The safe has been jimmied. The killer is gone. Perhaps he already is casually mingling with the crowds on Fremont Street, a block away, where all-night cafes blare canned music to the dawn-gray street. For this is wild and woolly Las Vegas, Nevada—1943 edition!

Sure, murders happen in every

state in the Union. But not with a carnival backdrop. Not to the whirl of roulette wheels and the clink of silver dollars. Not under a jewel-studded night which mocks the tinsel splendor of neon lights.

Although Las Vegas has much of the old West about it, something new has been added. It is incredibly prosperous, high-keyed, and fast-paced. Bars and gambling casinos line its streets. Where sweat-begrimed miners in dust-caked boots once watched the chips fall and the croupier rake them away, newly

rich construction workers now stand beside young divorcees in silver-fox capes and together watch the magic wheel go round.

Because Las Vegas was building Boulder Dam, it never felt the Great Depression. Townspeople expected a slump at its completion, but were swamped with an avalanche of 600,000 tourists a year who came to see the highest dam in the world. With the war, the \$10,000,000 Las Vegas Gunnery School brought the wives and sweethearts of thousands of soldiers to Las Vegas and jammed to capacity all housing.

Then came the giant, dwarfing everything that had gone before—the history-making No. 1 wartime project—\$125,000,000 Basic Magnesium, Inc., largest magnesium plant in the world. Breathing gold dust and spouting dollars, it dumped into the city of Las Vegas every week its fabulous \$1,000,000 pay roll. Overnight its 13,500 workers tripled the population.

Basic Magnesium is using money as men use air. It has built a huge plant. Its workers have fought and licked the desert, mountains, and searing sun to get water from Lake

LIBERTY



At zero hour, American ground crews line up on their bikes to wave good luck to the bomber's crew as it takes off.

UNFORGETTABLE B-17

operational training work together at Sarasota, Florida. Small-featured, blond, with blue eyes from which radiate a tiny network of wrinkles, Sammons—or "Sammy," as he is called—is a drawing, slow-spoken Kentuckian who planned to be a teacher. The only place he sits erect is in his pilot's seat. Elsewhere he is likely to lounge or sprawl, with one long leg crossed over the other, while he talks about "that little old ship." He gestures with one hand as he talks. All these crewmen gesture with their hands when they talk about planes—and they talk about planes most of the time. "She came in like this," they'll say, their open palms weaving and then swooping upward, "and all of a sudden she turned in and . . ."

The particular raid Lieutenant Sammons described was the last from which the Dinah Mite made a successful return—it was over Lille, on October 10, 1942. But he spoke, too, of the six raids which had preceded it, especially his first, on Rouen. That was also the first raid for the other squadrons in the group.

"When I was a little kid," he said, "I had a cousin, and I used to hear him tell about the last war and how, when a bunch of men were asked to volunteer for overseas duty, the whole damn line stepped forward like one person. I used to think that sure was fine, but I thought that if it was me I'd have been scared. And

when we went out to Rouen that first time I expected to be scared plenty.

"Well, sir, it was a funny thing. When we got over the Channel and sighted the French coast, I kept thinking, Well, here it starts. But nothing happened—just a little flak that never even touched us. Then, as we got to the target and went into the bombing run, I thought, All right. This is where it starts. But it didn't start there either, because we just dropped our load and turned around and headed back without being bothered by a single fighter. A lot of other ships were, but ours wasn't. Not on that first trip, anyway. So I never have been scared."

THAT is what Lieutenant Sammons says, and you can believe him. But other members of his crew admit to being scared. But they are scared only in retrospect. They think back and say, "I sure was scared there for a minute," but they never speak of being scared beforehand. After Rouen, for Lieutenant Sammons and the crew of the Dinah Mite, came Rotterdam, St. Omer and some others—and then Lille. Lieutenant Sammons preferred to talk about Lille because, in the first place, it was fresh in his memory, and also because from his point of view it was the most successful operation in which he had participated, as well as the most exciting.

It was highly successful because the most damage was done to the target, and it was the most exciting because the ship had its largest number of enemy encounters on the return.

They all knew the evening before that there was to be a raid and that they were to go on it—but they didn't know where. They were awakened at four-thirty in the morning on that Saturday, last October 10, and after they had breakfasted they went to the briefing room at group headquarters. There the crews of the squadrons which were to participate in the raid were assembled, and there, behind locked doors and with armed guards stationed outside, they learned for the first time that the primary target was to be the Lille Steel and Engineering Works.

That half-hour session in the briefing room was as accurate and as complete a forecast of the Lille raid as was humanly possible. The crews were told the rendezvous at which the bombers would meet their fighter escort, at what time and what altitude. They were given information on the weather they would encounter, the location of anti-aircraft batteries and of enemy airdromes adjacent to their routes; they were shown enlarged reconnaissance photographs of the target and its surrounding territory; they were

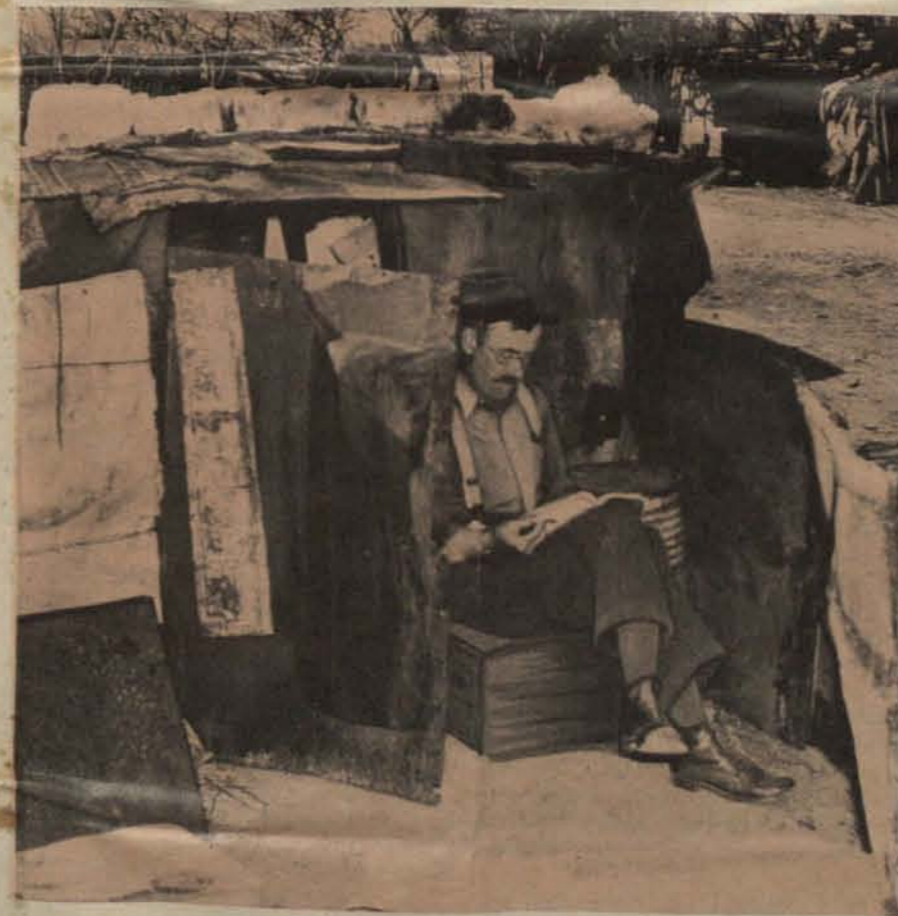
(Continued on page 44)

Mead (backwater of Boulder Dam and largest artificial lake in the world) to the plant. Company construction men straddled the bleak hills with towers and strung them with copper to bring electricity to the job. Flood-control works, storm drains, and a whole sanitary sewer and sewage-disposal system were also designed and constructed. It's a herculean job. Big, tough—and expensive. But by May the plant will be equipped to produce in excess of a hundred million pounds of magnesium a year.

Why this speed for magnesium? Because thousands upon thousands of tons of magnesium is needed by every aircraft factory in the world, because it is lighter than aluminum and just as strong. The lighter the plane the faster it is. Moreover, every fifth bullet from an airplane machine gun is a tracer—made of magnesium. We need them by the millions—to help our gunners see their targets. And when an American bomber swoops down over a blacked-out Jap city, he drops a flare so he can see where to "lower the tailgate." Those flares are made of magnesium. Our flyers need tons of them. When Tokyo goes up in flames, incendiary bombs will start the conflagration. Incendiary bombs



The revenue from gambling in Las Vegas runs into millions.



Make-shift lean-to house many of the boom town's population.

are made from magnesium. That's why the hurry, that's why the \$125,000,000 push behind Basic Magnesium, Inc.

Wherever big money rolls in, boom-town conditions exist, and with the advent of a pay roll which zigzagged from \$750,000 to \$1,000,000 every Friday night, living conditions unprecedented in our history have been created in Las Vegas.

The personnel of Basic Magnesium plus families of soldiers from Camp McCarran and Camp Williston skyrocketed rents, and there they stay, rent ceilings to the contrary. Girls are still living in auto courts and splitting rents of \$170 a month for three people. Single rooms with community baths and no cooking facilities range from sixty to ninety dollars a month, and they are at a premium. People live in camps, in trailers, in caves and makeshift sheet-metal lean-tos. Men earning \$100 a week live in shacks. One year after the start of construction, living conditions are still so crowded that public health is menaced.

And, in spite of this, public health officials say that there is no bed in any hospital in Las Vegas for communicable diseases. It would seem the city of Las Vegas is sitting on a keg of dynamite.

The citizens claim the locust-like population was dumped on them; that because the Basic Magnesium workers and the soldiers do not own property, there is no way to tax them for facilities which would relieve the situation.

Nevada has no sales tax, no inheritance or income tax; the state has no bonded indebtedness, and by constitutional amendment the tax rate is never over five dollars. This is a bonanza for big capital, a boon to the small home owner, but it doesn't pay for schools, hospitals, or other public works to care for the increase in population.

A SHINING new \$283,000 hospital, the best equipped of its kind in the United States, is Basic's way of taking care of its own. Supervised by Josephine Cunningham Lacey, the hospital has forty-two beds, ten bassinets. Twenty-four nurses live in the Nurses' Home.

There are eight grammar and four high-school classrooms at Basic, overcrowded in spite of the fact that classes are doubled up, half the children attending school in the morning, the balance in the afternoon. Facilities now in course of construction will double school capacity.

The new population feels that many local landlords and merchants are taking advantage of the situation and are basking in the profits of cutthroat prices. "One thing you can depend on," said a defense worker bitterly: "the city may not be taxing us, but we'll never leave the state with a dollar we've earned. It all goes just to live!"

Combating the living conditions for Basic workers, the company—through the Defense Plant Corporation—has already built one thousand 100-per-cent electrically equipped homes across from the plant. These houses were called "dismountables," to get by local opposition, but are really permanent structures. Rent, unfurnished, ranges from forty-four to fifty-two dollars a month, including all utilities.

A huge camp housing 4,000 men in dormitories and tents has gone up near the plant. Here 20,000 meals a day are served in a dining room that covers half an acre, with a kitchen and service crew of 350. Over 200 trailer camps have mushroomed overnight, and some camps have as many as 600 trailers. More "dismountables" are in construction; more trailers are ordered. Basic could use 1,000 more men tomorrow if it could provide living accommodations for them.

More fair than many local long-time residents (who in some instances saw a chance to pay for

their homes in a few months because of the terrific housing shortage) is square-shooting Tom Oakey, real-estate man, who built Huntridge, a suburb of 4,000 homes. His houses cost \$5,000. There is no down payment. The purchaser signs a rental option to pay fifty dollars a month. Any time within thirty months the renter can declare his intention to purchase and meanwhile can build up his equity.

A conscientious effort is being made by the Las Vegas Chamber of Commerce to win over newcomers, to acquaint them with the part Nevada is playing in the war effort. Emphasizing the role the new great white metal is playing in winning this war, Las Vegas recalls that it was the silver of the Comstock Lode, the greatest strike in the history of

I SERVED ON BATAAN

By Juanita Redmond

is an army nurse's own story of her experiences in the Philippines from the day of the first Jap bombing. There are no deliberate dramatics in her account of what happened at Manila, on Bataan and Corregidor, yet drama is there in the facts as she sets them down. Here is a book you *must* not miss.

Next Week in Liberty

Abridged to one evening's reading time

the world, that saved the Union during the Civil War.

Moving in to share the wealth is outside capital which has built palatial resort hotels. First on the scene was Tom Hull's \$425,000 El Rancho Vegas, which boasts of a swimming pool, dining room, bar, casino, and cottages. Smart divorcees like Martha Mature made this swank spot their headquarters. And local Basic Magnesium workers jammed the dining room to see the floor show.

A hotel in the heart of the business district came next. Leonard Hicks' \$180,000 El Cortez, which immediately became the meeting place of local business men.

Bob Brooks, coining money in two night spots in Beverly Hills and Hollywood, invested \$400,000 in a hotel, complete with swimming pool, night club, casino, bar, and café. And, in addition, he put up two-bedroom bungalows that look like a whole suburb, facing a paved street with lawns and landscaping. He called the whole thing Bob Brooks' Nevada Biltmore.

R. E. Griffith, who owns and operates some 200 theaters in the Western states, has hired top ar-

chitect Bill Moore to outdistance the pack. His Hotel Last Frontier, a \$550,000 layout, hits every tourist in the eye. Here are hotel rooms, outside cottages, a dining room with orchestra, two bars, and a casino, swimming pools, lush green lawns, and a field where rodeos are held every Sunday.

Definitely, big outside capital does not believe Las Vegas' prosperity is a flash in the pan. Too much money has been invested in permanent industry to have Las Vegas collapse after the war. The city is on the crest of a boom that will last a hundred years and may go on from there. That is the prediction of the president of the telephone company, Ed Clark, who came to Las Vegas in a stagecoach in his mother's arms.

First there was \$212,000,000 Boulder Dam transforming a snowflake in the Colorado mountains to a kilowatt in Los Angeles. Its power is the life blood of the entire Southwest.

Then came the Las Vegas Gunnery School and McCarran Airport, at a construction cost of \$10,000,000. United States Senator Jim Scrugham of Nevada fathered a pilot manganese plant at Boulder City, a \$1,000,000 investment. From this has sprung the \$8,000,000 plant of the Manganese Ore Company. Two roads, one costing \$6,500,000 and the other \$175,000 lead from Basic Magnesium to the manganese plant and to Las Vegas.

Next year Las Vegas will have the \$43,000,000 Davis Dam. And Boulder Dam, usually thought of as completed, is now installing sixteen of the largest generators ever built, at a cost of \$2,225,000 each.

THERE is the \$2,000,000 Shoemaker Wallboard Company, mining gypsum; the Blue Diamond Mine, a \$4,500,000 investment. Add to this a group of men who are dreaming dreams of irrigation for the desert, to tap the enormous agricultural resources, and you have good solid industry that has come to stay.

Basic Magnesium, once its war job is done, is expected to revolutionize the light-metal industry by producing magnesium for the manufacture of autos, ships, refrigerators, kitchen equipment, and many other articles.

The liberal laws will always bring tourists. The revenue from gambling goes into the millions. There are slot machines even in grocery stores. Nevada's quick marriage and divorce laws brought 22,500 people to Las Vegas last year, and the Justice of the Peace made more money than the Chief Justice of the United States Supreme Court.

THE END

LIBERTY

All Nevada Is Interested

(Reno Gazette)

With the world's largest magnesium plant at Las Vegas, all Nevada has an interest in the possibility of the operation of this war-time project when peace comes. If Basic Magnesium can operate profitably during peacetime, Clark county can be a major center for the light metal industry. An indication favorable to after-war operation of BMI was contained in a highly interesting story on the Saturday mining page of the Gazette.

This story chronicled the progress which has been made by scientists of the bureau of mines in working out a process through which BMI could obtain magnesia, the raw material for magnesium, from a great deposit of dolomite at Sloan, which is less than twenty miles southwest of Las Vegas. This deposit is reported in excess of 400,000,000 tons of dolomite, sufficient raw material to supply the Las Vegas plant for a long period of peacetime operation.

At the present time, the raw material source for the BMI plant is magnesite in the Paradise range in Nye county. A calcining plant has been constructed in Gabbs valley and the magnesite is treated and reduced to magnesia, which is then trucked to Luning, where it is loaded in freight cars. Since there is no rail connection between Goldfield and Las Vegas, the raw material is then hauled by rail to Hazen, on the main line of the Southern Pacific, then to Ogden, where it is transferred to the Union Pacific, and on through Salt Lake to Las Vegas, a railroad trip in excess of one thousand miles. If highway transportation were available for a direct haul through Tonopah and Goldfield, the distance from Gabbs to the BMI plant would still be in excess of three hundred miles. This condition alone is a handicap to competitive peacetime operation of BMI, which after the war must face competition from some of the highly successful salt water plants operated by Dow Chemical.

If the new process developed through research at the bureau of mines can be adapted later to the BMI production, it would eliminate the long and costly haul from Gabbs valley, automatically reducing production costs. Nye county would suffer for the loss of the now lusty mining camp at Gabbs, and this would be regrettable, but the larger interest must be in the successful after-war production of magnesium.

If the scientists of the bureau of mines have found a process through which BMI can be assured a place in the competitive light metal field after the war, they will have the gratitude of all Nevada.

OBSERVATIONS

By CHARLES P. SQUIRES

OUR WAR CONTRIBUTION

Other states and cities have war industries employing more men and greater capital than



those in Nevada, but for a basic contribution toward winning the war there are not many enterprises of more value to the nation than that of producing the "magic metal," magnesium.

The great plant of Basic Magnesium is the product of master minds and great executives, working with materials produced mostly within the state of Nevada. The great deposits of magnesium in Gabbs valley form the essential basis on which the entire enterprise is founded.

So it comes about naturally that Nevada, having the great ore deposits in Gabbs Valley and the vast power from Boulder Dam, should be the site of the vast and important Basic Magnesium plant which is probably contributing as much toward bringing victory to the Allied Nations as any other enterprise in the country.

WHERE MAGNESIUM GOES

Where the magnesium goes and how it is used is considerable of a mystery to most of us. This much we assume when we see the carefully wrapped bars of the metal packed in cases—it is going overseas, most of it to plants in Great Britain. There it is used to make the fiery filling of incendiary bombs, of which the British and American forces are dropping hundreds of tons every week on the industrial plants of Germany.

From Las Vegas carloads of the metal go by rail to Boston or Galveston or New Orleans or Baltimore or New York or wherever ships are being loaded to form convoys fleets across the seas.

But not all goes toward the Atlantic. Recently orders were received from the government to ship a trainload of magnesium metal to a Pacific coast seaport. There it was loaded into a Russian ship and taken across the sea to a Russian port on the Pacific, probably Vladivostok, and thence by the Trans-Siberian railroad more than six thousand miles overland to Russia to be used against the Nazis on that front.

It is said that Russian ships carrying magnesium or any other war materials are perfectly safe from Jap submarines because Japan and Russia are still making believe they are at peace with each other and neither desires to provide an excuse just now for an attack by the other.

Which leads to another anomaly which at first glance is most puzzling, but which is quite understandable if you know the facts, have been shipped to various war centers over the world and stored

(Continued on Page 4)

OBSERVATIONS

(Continued from Page 1)

ready for instant use in case Germany and Japan again resort to poison gas.

Perhaps you may have noticed those peculiar railroad cars—round ended steel tanks standing on railroad sidings near the BMI plant. Those cars are used to transport approximately 35 tons a day of liquid gas to where it will be ready for instant use in case of necessity.

Yes, Nevada is really contributing a vital part to the task of winning the war—just as in 1864 Nevada's gold and silver saved the credit of the nation and was an important factor in winning the Civil war and preserving the Union.

L.V. TRIBUNE 5/23/43

Governor Praises Progress at BMI

Governor E. P. Carville expressed amazement at the tremendous progress that has been made at the Basic Magnesium plant during the last few months.

The chief executive visited the gigantic project last Tuesday afternoon and was guided through the plant by Bruce McNeil, of the McNeil Construction company, builders of the plant.

After inspecting the various units and processing plants, the governor learned many interesting facts about the magnesium project from F. O. Case, general manager for BMI.

At the end of the inspection tour, the governor gave much praise to the men responsible for the development of the magnesium plant. "The McNeil Construction company deserves much credit for a magnificent job," Carville said. "The builders of the plant have done what many believed to be impossible. The operators of the project, Basic Magnesium, Incorporated, are now doing a Herculean job, not only to manufacture magnesium metal which is so vitally needed in our war effort, but the management of BMI is already looking into the post war future and is endeavoring to assure the peacetime permanency of the Basic Magnesium plant by studying production methods that will enable the Las Vegas plant to compete with other magnesium manufacturers after the war."

"The men and women working at BMI are to be congratulated for their endurance, for their courage and for their patriotism. Their work is vital to the war effort. They are doing a fine job on a project which already shows promise of becoming the pillar of Nevada's industry."

L.V.A. 5/21/43

HENDERSON POST OFFICE

It is very fitting that former United States Senator Charles B. Henderson should be honored by having the post office and city near the plant of BMI named after him.

About thirty years ago Charlie Henderson of Elko, served Nevada ably as United States Senator. Although for many years since then he has been in the service of the government he has never lost touch with his native state and as chairman of the board of Reconstruction Finance Corporation, he has always turned an attentive ear to the cries of the state for aid.

The main thing just now seems to be to get a building built to house the proposed post office. It is reported that a conflict between government bureaus as to whether the new building should have wooden or concrete floors is holding up the beginning of construction.

L.V.A. 5/21/43

Governor Pleased By Plant Progress

Governor E. P. Carville, here to participate in the Las Vegas Helldorado, on Wednesday visited the Basic Magnesium, Inc., plant. He was accompanied by Art Revert, purchasing agent for the State Highway Department, and Charles DeArmond, member of the Nevada Colorado River Commission. They were shown through the plant under supervision of Tommy Bellis of the project police force.

To Bruce McNeil, Governor Carville expressed amazement at the rapid progress made by the plant and satisfaction that the project was so rapidly advancing toward completion.

LAS VEGAS, NEV., REVIEW-JOURNAL
CIV. 5713
MAY 25, 1943

BMI Plant Now World's Largest Metal Producer

The Basic Magnesium plant, operating on an 85 per cent capacity, today became the world's largest producer of magnesium in a single plant. Eight and a half units, out of a final total of 10 proposed, are now in operation.

Censorship restrictions do not permit the disclosure of the total production now, but it is well above that of the Dow Chemical company's largest plant.

Magnesium!

Basic Magnesium Plant Heads Above Criticism

By the Shift Boss
The recent comments in this column on the Dow testimony before the Truman committee have been misinterpreted in some quarters as intended as criticism of the plant of the Basic Magnesium plant at Las Vegas, Nev., so important to the future economy of the west.

The Dow testimony compared with results obtained by plants which took advantage of Dow "know how" with the government financed plants which employed other methods, but it was not specific as to the processes used. Among the plants employing other than Dow methods was the Las Vegas plant. At the time the testimony was released, allegations were being made that "Dow and Alcoa were endeavoring to have the Basic Magnesium operation shut down."

In fairness to the present operators, capable western metallurgists, who had nothing to do with the design and construction at Las Vegas, and who have been bringing down costs despite the distance from the plant of its raw magnesium-bearing material, it must be pointed out that the plant was included generally with other government financed thermal process plants which have not been entirely successful in the matter of costs and output.

Since the Las Vegas plant is of great importance to the west and because Utah may be considered a potential supplier of magnesium chloride to Basic Magnesium, it is of interest to note that, although no official figures have been presented to the public, it is generally understood that the metallurgists who operate the refinery have cut the cost of magnesium far below the figure they considered possible at the time they assumed responsibility for results.

Future peacetime operation at Las Vegas would seem to depend to a great degree upon the obtaining of its raw magnesium-bearing material from sources closer to the plant and the use of a raw material which does not require the double treatment of conversion into the oxide followed by conversion to the chloride for processing to the metal.

It is said that such new sources of raw material are being considered and are under investigation. Since this seems to be an accepted fact, Utah would appear to be a potential supplier of magnesium chloride for Basic Magnesium because of the rich carnallite beds in the Crescent district of Grand county, attested to by the U. S. bureau of mines and the U. S. geological survey in connection with the cores recovered in the Defense Plant corporation well drilled by the bureau of mines in 1942.

The failure to test this well and the sudden withdrawal of 3,000,000 acres of land in and about the vicinity of the well are subjects of wide discussion as well as being still under investigation by a special senate land committee.

The operators of Basic Magnesium, Inc., cannot be criticized for using the raw material made available, but it is to be hoped the carnallite beds of Utah will not be overlooked as a potential source of raw material for the Las Vegas plant.

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The operators of Basic Magnesium, Inc., cannot be criticized for using the raw material made available, but it is to be hoped the carnallite beds of Utah will not be overlooked as a potential source of raw material for the Las Vegas plant.



Californians will watch with keen interest the fight now being waged in Washington by Senator Pat McCarran, of Nevada, to stop the issuance of an order by the war production board to close down four units of the Basic Magnesium plant at Las Vegas, Nevada.

The fight will be of particular interest to Californians because it appears to be the first of a coming series of moves by eastern industrialists to throttle the industrial development of the West, accelerated by the war, because of their fear of competition.

We had a letter yesterday from an old friend, Guernsey "Doc" Frazer, giving us an interesting angle on the battle which we are passing on to you. Frazer made many friends in Merced while serving as public relations representative for the Santa Fe during their successful battle to obtain their bus franchise with interchangeable tickets.

Says Frazer, in part:

"Attached find clipping from the 'Las Vegas Evening Review-Journal' dated Thursday, March 23rd, being a reprint of an article which appeared in the 'Salt Lake Tribune.'"

"I forward it to you in order that you may be conversant with certain developments which appear to be aking concrete form in Washington and indicate that western industry may well be on guard to prevent curtailment of developments brought about by the war.

"As you know, I have been affiliated with Basic Magnesium, Incorporated as one of the assistants general manager since the inception of the project and, therefore, have some intimate knowledge the developments and the facts.

From
JOURNAL OF COMMERCE
New York, N. Y.
MAR 31 1944

Basic Magnesium Defends Record

(Special to Journal of Commerce)
CLEVELAND, Ohio, March 30.—Basic Refractories, Inc., through its president, H. P. Eels, Jr., charged today that the Truman Committee had distorted the record of Basic Magnesium in its recent report on domestic production of the light metal.

The statement pointed out that Basic conceived the idea of merging the know-how of Magnesium Elektron, Inc., an English company which has magnesium production experience comparable to Dow Chemical, with the resources of Basic Refractories to expedite the production of magnesium.

"Organization of Basic Magnesium brought to the United States the only and the best available experience with the metal among the United Nations," according to Eels.

The statement follows in part: "The public is informed that we had 'no financial resources' and that we 'stood to net \$840,000 yearly.' The facts: Basic Magnesium, like Dow Magnesium, Diamond Magnesium, etc., were management instruments requiring no financial resources. The Government wanted it that way. Secretary Jones wisely provided that these companies should not have such resources or earning records. In this way, 80 per cent of whatever was paid in fees would automatically be returned to the Government in taxes. After such taxes, Basic Magnesium stood to net not \$840,000, but perhaps as much as \$100,000.

"The Truman Committee does not point out that Basic Magnesium originally was delegated a project one-tenth of the final size. A smaller project would have been far more favorable to us, for it would have left us a position in the magnesium field after the war. When the Government multiplied the size by ten it: (1) Practically eliminated the possibilities for a reward to us through postwar activities; and (2) increased many times our responsibilities. We did not complain."

SILICATE P's & Q's

A message to those who use silicates
of soda or could use them

Vol. 24 No. 4
Fourth Month, 1944

AN UNUSUALLY thought-provoking address was recently given before the Virginia Section of the American Chemical Society by Walter Murphy, editor of *Industrial & Engineering Chemistry*, in which he called on scientists (and that includes chemists) to take a more active part in public affairs. In the words of the speaker "we have provided the basic sinews of modern war. . . . Will we have a voice in how these tools are converted into instruments of peace?"

There is no reason to believe that the scientist is not capable of thinking about problems of peace with as much vigor and determination as he tackles problems involved in the war effort. Nor is there any reason, as Mr. Murphy so ably points out, why the chemist should not have a sense of responsibility toward society similar to that held by the physician. That should be a part of his professional training. It should be a part of the "rights and privileges appertaining thereto" with which degrees in science are customarily granted. It is a right and a privilege—and an obligation, but most of us hesitate because we feel inadequate, or we fall back on the old argument "what can one person accomplish?"

We forget the many examples about us of the effect of single but continued effort. Stand beside a weaver at a loom and watch the shuttle fly, laying one single thread between the warps. The heddle frames drop, the beater bangs against the fabric pushing the weft into place, the treadles pull the frames into a new position; back goes the shuttle. It is only one thread at a time that is laid down but continue the operation for an hour and you have a foot or more of fabric, strong and useful.

I am only one; (writes an anonymous author)
But I am one;
I cannot do everything
But I can do something.

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El Centro, Cal. Desert Magazine
Cir. 6485
APRIL, 1944

Mines and Mining . . .

Henderson, Nevada . . .
One hundred million pounds of magnesium, enough for 50 million incendiary fires in Berlin or Tokyo, had been produced at Basic magnesium plant here by February 10 it is reported. This amount is said to be more magnesium than total output of US for 27 years preceding March 1, 1942, and more magnesium than world production total for 1940.

furnaces to reduce it to the oxide and is then mixed with peat (for porosity) and coal and heated to 850°C in an atmosphere of chlorine to form anhydrous magnesium chloride. Next it is transferred in two ton ladles to a battery of electrolytic cells where metallic magnesium is released and removed in molten form, ready for final refining and casting in pigs. These operations require vast buildings and equipment but in addition there are many extra units, as for example a chlorine plant, one of the largest ever built; it has a daily capacity of 200 tons.

The electrolytic cells in which the metal is finally released are of especial interest to us. The photograph shows one row of cells; there are a total of eight rows, eleven cells to a row, each about twice the size of a bath tub. Six steel cathodes and three graphite anodes carry the 20,000 ampere current. Examination of the photo showing the heavy copper bus bars helps to explain why our pennies are now made of steel. Toward the end of the project silver was substituted for the precious copper and eight hundred tons of silver went into that service. Pulled by the heavy current, molten magnesium collects in a pool at the cathode area and once a day is dipped out by hand and cast into "cheeses", later to be refined and recast.

These cells, as well as the eighty chlorinators and the acid scrubbing towers, were protected from attack of the corrosive fluid by enormous quantities of acid resistant tile. Linings twenty inches thick were necessary in the chlorinators, each one of which required some 12,000 pieces, varying in size up to 110 pounds. Joints were precision ground to 1/64" in order to insure complete protection of the metal shells.

Silicate cements were used for setting the tile and over three million pounds of soluble silicates, both sodium and potassium, went into the project. These cements set rapidly but in that very hot and dry climate the reaction was so rapid that it was necessary to resort to an unusual device. A battery of ten ice-cream freezers was set up and into this went chilled silicate, feldspar and other ingredients. The mixed cement was transferred to metal hods set in tubs of ice, from which the

bricks were "battered", one by one, as used. It took over a hundred and fifteen carloads of ice for the job. Even with this extreme care the cement life was only twenty minutes. One can imagine the careful timing necessary to prevent waste of manpower and material.

The blue-grey magnesite ore (chiefly magnesium carbonate) is taken from the earth some 300 miles north of the plant we have been discussing. It is of high grade but for this process it must not contain more than 4% insoluble, 4.5% CaO, 2% Fe₂O₃ and Al₂O₃; the MgO content should be about 40%. To maintain this standard the talc, sericite, serpentine and quartz which are present in the ore are removed by a flotation process. As in most operations of this type a complex series of reagents is required. Aluminum sulfate, sodium metaphosphate, naphthenic acid and sodium silicate are included, each for a special purpose.

Sodium silicate is very commonly used in ore flotation, chiefly to depress the siliceous gangue slimes thereby permitting the valuable metallic particles to be floated off in the froth. "N" brand is preferred and, except for dilution, it is used as received in amounts of one-half to three pounds per ton of ore. At Basic Magnesium, however, a different technique is used. They find it preferable to form a metastable sol by diluting with water and neutralizing with sulfuric acid to a pH of 2.4. A definite aging period follows to promote growth of the silicate micelle and it is then added to the ground ore pulp. In this flotation process its particular purpose is to disperse the slimes and to modify the froth so that the ore particles high in undesired insolubles are rejected to tailings. It has also alleviated a serious froth pumping problem and eliminated the need for a mechanical separation of slimes which existed prior to the adoption of the silica sol.

In this new industry of magnesium production are other interesting uses of the soluble silicates. We hope to be able to tell you more about them in a future issue of P's & Q's.

* * *

We are correcting our mailing list. Won't you please check the enclosed card and drop it in the mail promptly. Thank you.

Philadelphia Quartz Company

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Minerals and Mining

MINERALOGICAL SOCIETY OF AMERICA
PUBLISHED BY THE MINERALOGICAL SOCIETY OF AMERICA
1200 N. WASHINGTON BLVD., WASHINGTON, D. C. 20037
MEMBERSHIP: \$10.00 PER ANNUM IN ADVANCE
SINGLE COPIES: \$3.00 PER COPY
ADVERTISING: \$100.00 PER COLUMN INCH PER ANNUM
CIRCULATION: 10,000 PER ANNUM
ESTABLISHED 1891

S. F. CAL. PACIFIC PURCHASER
CIV. 1933
APRIL 1944

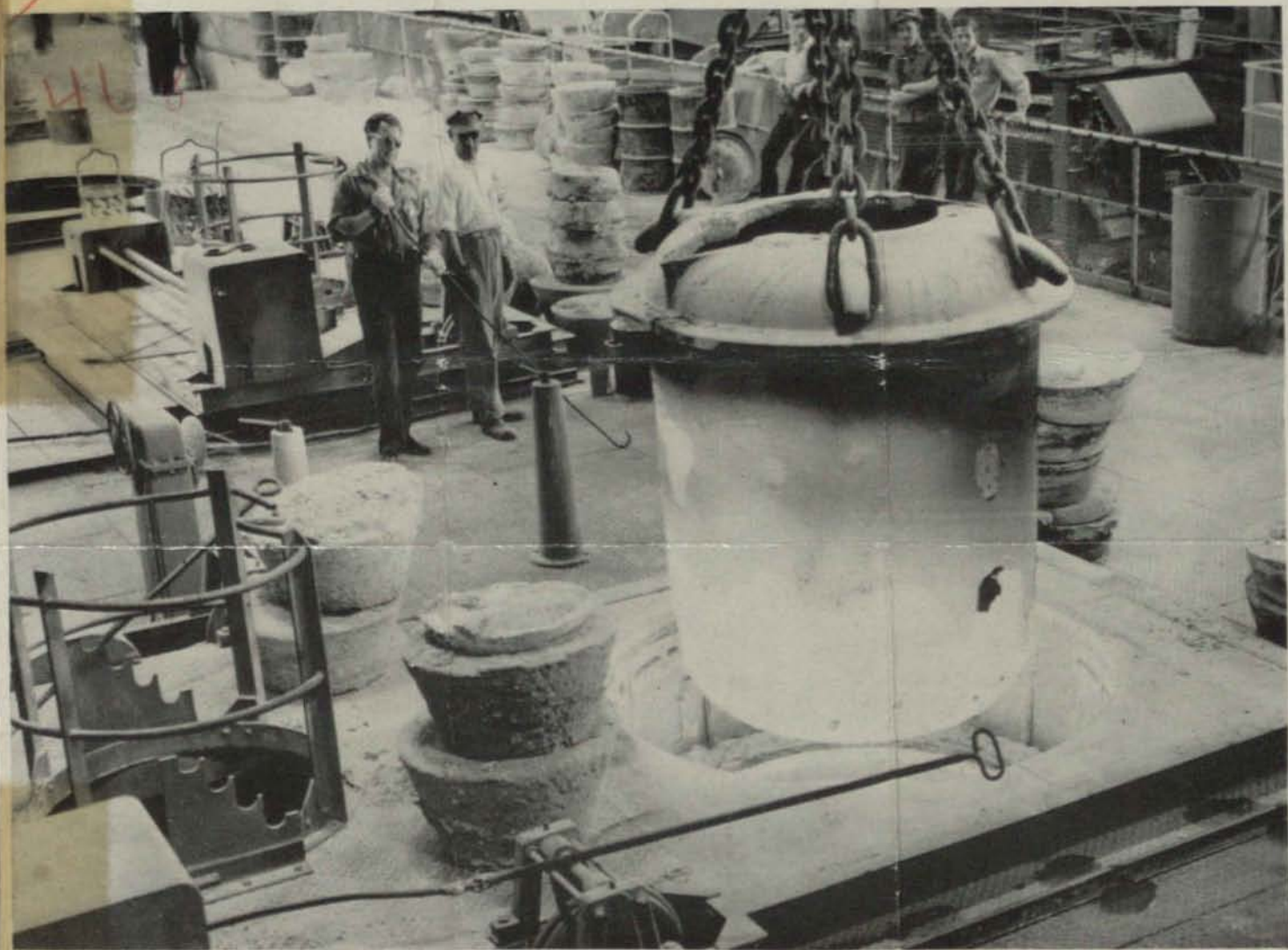


Photo courtesy Westinghouse Electric & Manufacturing Company

MAGNESIUM "CHEESES," WHICH WEIGH ABOUT 100 POUNDS EACH, are taken from the electrochemical processing buildings and lowered in crucibles into alloying furnaces, where two-ton charges are combined with other metals at Basic Magnesium, Inc., Las Vegas, Nevada. At present, numerous alloy combinations have been made at this plant, although only about a dozen are in constant production demand. The alloyed magnesium is poured into ingots to be used for incendiary bombs; formed into billets for castings for airplanes and ships; rolled into sheets or slabs to be used for stampings for many war products; or extruded into wire, rod, or tube for special uses.

McCarran Blasts WPB For Plan To Close BMI Plant

(Continued from Page One)
of magnesium in the world.

"This is being done," he shouted, "because there are on the war production board, members who are former members of the board of Basic Magnesium's chief competitor."

Some WPB members, he said, "sit on the WPB to serve their own interests and not to serve their country's."

"In some countries I could mention," he added, "such members of such a board would not only be fired but would be stood up against a wall and shot at sunrise."

McCarran said that Basic Magnesium was built at a cost of \$133,000,000. The plant now is producing 160 to 165 tons of magnesium a day.

At the outset of the war the United States found itself exceedingly short of magnesium, McCarran said. Britain found itself unable to obtain brucite or magnesite from which to produce magnesium, and brought to the United States blueprints and plans for setting up the British production system.

Nevada was found to have quantities of ore and power and the government appropriated about \$133,000,000 to the construction of the Basic Magnesium plant at Las Vegas, near Boulder dam.

Each day up to date it has been producing at the rate of 160 to 165 tons of magnesium, he said.

"The question now seems to be whether or not there shall be a curtailment of the production of magnesium at Basic Magnesium, in Nevada, and whether or not other plants shall be permitted to operate, notwithstanding the fact that the cost of production is either equal to or greater than the cost of production at Basic Magnesium," he declared.

McCarran said he was "not alone" in protesting against the proposed curtailment of Basic Magnesium's operations and charging WPB members with "outside interests."

"I am not alone," he said, "in proclaiming that in the war production board as it now is constituted, there appear to be men who, in years past, have been active members of the board of great industrial activities, and who, when they came to the war production board, were on the payrolls of their respective institutions, some of them receiving salaries as high as \$65,000 a year."

"It is not to be supposed that these men, many of them geniuses in their respective lines, would lay aside their first love, namely, the institutions they served in years past, and forget the interests of these institutions while serving on WPB."

"To exercise for private advantage any power given to a member of the war production board is unconscionable at this hour when the nation is struggling for its existence."

Basic Magnesium, he continued, had demands for 11,000,000 pounds of magnesium this month. These needs of war agencies, he said, cannot be met if the plant is closed down or curtailed.

He told the senate that both he and his committee had made these charges to WPB itself this week.

"After that, the intimation was given out that notwithstanding the fact that we had met every single argument which they had made and had knocked out every thought they had relative to shutting down of this plant," McCarran said, "the plant will be curtailed in its operations."

WASHINGTON, April 1 (AP)—Senator Pat McCarran, democrat, of Nevada, today accused members of the war production board of seeking to close Basic Magnesium, huge ore plant near Las Vegas, to advance the interests of competing plants with magnesium be closed despite the fact that it is the largest producer.
(Continued on Page Three)

Truman Charges Denied by BMI

The following statement challenging the findings of the Truman committee as published in its report entitled "Magnesium," dated March 13, 1944, was made today, Tuesday, March 28, 1944, by H. P. Eells, jr., president of Basic Refractories, Inc., Cleveland, Ohio, which, in 1941, established Basic Magnesium, Inc., a company which has since become a major producer of this war-vital metal.

CLEVELAND — In 1941, the United States needed magnesium desperately. Only one company in this country (Dow Chemical) was experienced in the manufacture of the metal and that company was given all it could do. Incidentally, it has discharged magnificently a tremendous undertaking. Basic Refractories of Cleveland, thought it could help in this emergency. Basic had ore deposits in Nevada and it had working relations with Magnesium Elektron, Ltd., an English company which had magnesium production experience comparable to Dow's.

We conceived the idea of merging the "know-how" of Magnesium Elektron, Ltd. with the resources of Basic Refractories to give the United States the magnesium it need to fight the war. Thus, there came into being Basic Magnesium, Inc., the company which under our management designed, in major part built and brought into operation the very extensive project near Las Vegas.

From the day the defense plant corporation gave the green light to this undertaking, our experience has been an eye opener. The little group of men who set out on this mighty undertaking had to fight their way through a jungle of opposition and obstruction based on selfish interests, and at every step were hampered by politicians, fixers, organized gambling interests, and other parasites. We wanted to get a job done; they wanted something else. We knew the risks involved in not playing ball with these interests, but we took them. We are now reaping our reward—a public whipping at the hands of the Truman committee.

In making its report, the committee had the choice of second-guessing us to death, of enlarging on and exaggerating every mistake, of twisting decisions to put them in a sinister light, etc. Or, it could have made a report based on an appreciation of our motives, of the incredible magnitude of the job, and the fact that we did in a year what the Germans had taken a decade or more to do. The committee chose to smear us.

Organization of Basic Magnesium brought to the United States the only and the best available experience with the metal among the United Nations. It immediately filled a big gap. Instead of commending us for this initiative, the Truman committee "charged" that Basic Magnesium had "only the most meager experience," thus creating the impression that the contract for the project should have gone to some company with equal or more experience. Such companies, of course, were non-existent, except for overloaded Dow Chemical.

The public is informed that we had "no financial resources" and that we "stood to net \$840,000 yearly." The facts: Basic Magnesium, like Dow Magnesium, Diamond Magnesium, etc., were man-

agement instruments requiring no financial resources. The government wanted it that way. Secretary Jones wisely provided that these companies should not have such resources or earning records. In this way, 80 per cent of whatever was paid in fees would automatically be returned to the government in taxes. After such taxes, Basic Magnesium stood to net not \$840,000, but perhaps as much as \$100,000.

The Truman committee does not point out that Basic Magnesium originally was delegated a project one-tenth of the final size. A smaller project would have been far more favorable to us, for it would have left us a position in the magnesium field after the war. When the government multiplied the size by ten it: (1) practically eliminated the possibilities for a reward to us through post-war activities; and (2) increased many times our responsibilities. We did not complain.

Our instructions from the war department were to design a plant coincidentally with the building of it and therefore no estimate worthy to be called such was possible until the job was well on toward completion. There is no doubt that a conventional procedure would have saved many millions of dollars but at the expense of time. We assume the war department weighed these factors before prescribing the more costly method.

The important fact which the report takes pains to conceal is that Basic Magnesium met fully the requirements of the war department in respect to time and production. Rated to provide 18 per cent of the total production for which plants have been built, "in 1943 it produced about 39 per cent of all the magnesium produced in all plants of the United States."—So much for our "demonstrated incompetence."

To this day there is not any scientific comparison of the capital costs of this job with others. A figure of \$1.81 has been reported per pound of magnesium capacity. If one must make a "shirt cuff" comparison, a more accurate figure would be nearer \$0.97.

By the fall of 1942, we were so hampered by many-sided interference, largely inspired by continual political attacks, that we were glad to turn the responsibility over to the able Anaconda Copper Mining company, whose president, James R. Hobbs, has since been kind enough to say that "a remarkable job was done in conceiving and building this plant from the grass roots."

LINK-BELT NEWS

Devoted to the Application of Materials Handling and Power Transmitting Machinery for Solving the Modern Problems of Industry

Vol. 10, No. 6

Published by LINK-BELT COMPANY

June-July, 1943

HOW L-B HELPS DRY EGGS FOR BOYS OVERSEAS

Conveyors Move Powdered Egg to Shipping Barrel

Dallas, Texas—When the war started, and Uncle Sam signed up to feed not only his own fighting men but much of the armies, navies and civilian population of the world, he needed eggs badly. Humpty-Dumpty, however, was too fat and too fragile for shipment to the distant corners of the world in the volume needed, and, in too many cases, because of lack of refrigeration, the eggs so shipped had to be thrown overboard after a journey of thousands of miles.

American ingenuity pitched in to help Uncle Sam in this phase of the battle for food. As a result, Texas and several other states now have a brand new industry—Drying Whole Eggs. Just another example of how America has drawn from its resources to provide American troops abroad and their allies with scrambled eggs for breakfast!

Processing the Eggs

The processing of the eggs is very simple, yet important. Girls take them from the crates, and candle them. Next, they are placed, in large bucketfuls, alongside a long row of girls who swiftly grab four eggs in each hand, break the shells, and hold them aloft while the yolks and whites splash into a container below. When the containers are filled with eggs, they are dumped into huge vats from which pumps then draw them into stainless steel tanks.

They are thoroughly mixed, and then, by high pressure pumps, sprayed through tiny openings into the drying chamber. Depending upon the size of drying chamber, there are 4 to 8 spray guns working together at one time.

Serving the drying chamber is a furnace which feeds hot air into it through a large duct. At the far end of the chamber is a fan which pulls the air through the furnace

(Continued on page 3)



LIBERTY SHIP CHARLES PIEZ



This 117th Liberty ship to be launched from the Bethlehem-Fairfield Shipyard at Fairfield, Md., was named in honor of Charles Piez, executive head of Link-Belt Company from 1906 until his death in 1933. Mr. Piez was vice-president & general manager, and later director general, of the U. S. Shipping Board Emergency Fleet Corporation during World War I.

Wood-Furniture Plant Now Making Army Truck Bodies

Specially Designed Conveyor Facilitates Two-Stage Paint Dipping, and Drying, of Wooden Parts

Portland, Ore.—To save steel, the U. S. Army Ordnance Department has re-designed its motor truck bodies, and is now building them of wood reinforced with pressed and formed steel parts.

This change required switching production from steel fabricating shops to woodworking plants; and firms already equipped with modern woodworking facilities for producing furniture and similar articles, were naturally able to convert promptly and smoothly to the new work.

Production Problem

In addition to milling the varied shapes of the unit parts of the re-designed body, all such wood parts must be properly painted for military use. And as some of the pieces are as large as 2-in. thick, 8-in. wide, 13-ft. long, they present quite a problem of handling them through the various operations.

The B. P. John Furniture Corp., a Portland, Ore. manufacturer, secured a large contract for these wood bodies, and immediately saw possibilities for improving production by dipping the longer and heavier parts.

Instead of spraying, or laboriously handling them into and out of tanks for two coats of paint, the plant is now making use of a conveyor that has been specially designed for this work.

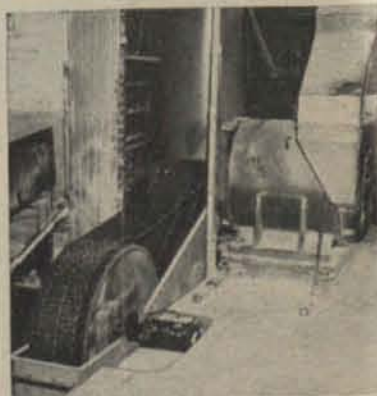
Fundamentally, no new principles are involved, but the following were among the problems to be solved: (1) Dip in two stages, (2) Allow adequate time between coats, and after second coat, for drying, (3) Do it without re-handling before final delivery at the desired discharge point.

The Conveyor

In cooperation with B. P. John's plant staff, the Link-Belt Pacific Division engineering department developed the conveyor arrangement shown in the accompanying sketch and photographs. This conveyor assures continuous output

(Continued on page 6)

\$7.85 SPENT ON 125-H.P. DRIVE IN 21 YEARS



Link-Belt Silverstreak silent chain drive from 125-h.p., 720 r.p.m. electric motor to 144 r.p.m. main drive shaft of wire-drawing bench in mill of Frost Steel & Wire Co. Ltd., Hamilton, Ont. Upper half of casing removed before photo was made, to show the chain and wheels.

Hamilton, Ont.—Back in 1916, the Frost Steel & Wire Company Limited, of Hamilton, installed a 125-h.p. Link-Belt Silverstreak silent chain drive on a wire-drawing bench. This drive was in operation until 1937, when it was removed because a change was made in the manufacturing process.

During the 21 years in which this chain drive was in operation, the total expense incurred for repairs was \$7.85, and it is not surprising that this impressive performance has been responsible for the installation of many other silent chain drives in this plant.

There is a 125-h.p. silent chain drive in operation on another draw bench, and another silent chain drive on a draw bench driven by a 100-h.p. motor. A variety of chain drives have been furnished this

(Continued on page 3)

Mammoth Basic Magnesium Plant Is Now in Operation

You'd Never Know the Old Desert Land on Which Enormous BMI Plant Stands, at Las Vegas, Nevada

Los Angeles, Calif.—Las Vegas (Spanish for "flat lowlands") came into being as a town in Nevada in 1905, when the new railroad connecting Los Angeles and Salt Lake founded it as a division point.

Located in hot, dusty, desert land, it was a town of 2500 before Boulder Dam was built on the Colorado River nearby. Came the Boulder Dam boom, and after the dam had been completed, there arrived thousands of tourists annually to see the dam, spending more money than the construction workers ever did.

Becomes Second Reno

Thus, Las Vegas settled down as Nevada's second Reno, living on tourists and professional gambling (legal in Nevada), and meanwhile increasing its population to 8400 by 1940.

Since then the population has more than doubled, exclusive of two Army camps, for today's Las Vegas is not only producing war-essential magnesium but frontier night life as well. And it has well been said that a visit to this overgrown "last frontier town" is a liberal education in itself.

(Continued on page 2)

SCREW CONVEYOR IN WATER, FOR SHREDED GLASS

Handles Hot Tear-Drop Direct from Furnace

Philadelphia, Pa.—About three years ago, the Armstrong Cork Co. installed at their glass container manufacturing plant in Millville, N. J., a Link-Belt screw conveyor system under each of two melting furnaces, to facilitate disposal of the hot tear-drop gobs of glass that are shunted aside in the process of feeding the molten glass to the molding machines.

Proving highly successful, a third furnace was similarly equipped in 1941, and still another in 1942. These four units, to the best of our knowledge, are the only ones of their kind anywhere, serving this purpose.

How It Works

Each conveyor system consists of a horizontal screw conveyor operating very slowly, completely immersed in cold water, in a water-tight flared steel trough, delivering at far end to a faster-moving screw conveyor of larger diameter, inclined sufficiently to discharge the shredded glass to a box of suitable size, mounted on skids.

Each conveyor of each conveyor system is separately driven from an electric motor through a herringbone-gear speed reducer and enclosed chain drive.

The seventeen chutes from each

(Continued on page 6)

MAGNESIUM PLANT SITE



This picture was taken on Sept. 15, 1941. It's the BMI plant site. A few minutes later, a fleet of bulldozers began clearing the landscape, and from that moment, things have hummed. Sorry we can't show you the enormous plant that now stands there, turning out vital magnesium metal.

(Continued from page 2)

iron, Ltd., of England, and Basic Refractories, Inc., of Cleveland, Ohio. While Basic Refractories were looking around for a market for their rich brucite (magnesium rock) and magnesite deposits near Luning, Nevada, they learned that the British organization planned to build a plant in Canada.

Thus the two ventures came to be joined, with the Americans contributing the ore, and the British the technical knowledge of a complex electrolytic process bought from Germany.

Washington, D. C. (we, the people) provided the money for building the plant, 1 $\frac{3}{4}$ -mi. long, $\frac{3}{4}$ -mi. wide. The British sent a group of experts to Nevada, and the Americans sent 45 technicians to England to study the method.

In more recent months the operational activities of the company have been transferred to the Anaconda Copper Mining Company.

Of the various plants built, and being built, in the United States, for the production of magnesium, several are using the electrochemical process; others a ferro-silicon process, newly developed.

Making Magnesium Metal

The magnesium ore is concentrated at the mine into magnesium oxide (MgO), as fine as flour, and shipped in this form, either by railroad car or in specially-designed airtight trailers, to the Las Vegas plant, where it is unloaded into huge storage silos.

At BMI, the MgO is mixed and ground up with coal and other substances, and formed either into little pellets ranging as large as a walnut, or into small bricks. These are dehydrated in kilns and then placed in a chlorinator.

This results in a molten mass of magnesium chloride, which is tapped off and placed in electrolytic cells.

A strong electric current passed through the molten mixture causes the magnesium to separate from the chlorine and come to the surface in much the same way as cream comes to the surface of milk.

Recovery of the magnesium metal is done by simply ladling it out of the cell by hand.

Mechanical Handling

To facilitate handling and speed up production under the aforesaid

(Continued on page 7)

(Continued from page 5)

process, so briefly described, Link-Belt has had the privilege of furnishing the following types of equipment (quantities purposely omitted);

1. Peat bale conveyors from R.R. cars to breaker.

2. Belt conveyors for handling peat.

3. Pellet trailer conveyors for handling small cars.

4. Harrop ceramic dryer conveyors for handling bricks on edge through kilns for dehydration.

5. Harrop ceramic breaker conveyors.

6. The Link-Belt Roto-Louvre dryer for reducing moisture content of various inorganic salts.

7. Ladle tilting mechanisms.

8. Power transmission equipment, including the Link-Belt P.I.V. Gear speed variator.

9. Discharge gates for storage bins.

ing burned to the ground. This was the
 (Continued on page 7)

What can happen? This happened
 On March 6, 1942, 60,000 feet of build-
 and dirt and clarity
 approved by them and have and monooxy
 cause the most astounding climbing ever
 fighting, down-drown men who have over-
 were being. They are also being, last-
 They are men, who dream dreams and
 with imagination, courage and endurance.
 men behind the plain, itself, are big men—
 These men, however, are in fact. And the
 Big Men? Yes, but everything about
 these men, however, are
 take have passed over the construction of
 in the past, 700 million pounds of mat-
 ever—was care—of all crystals, sparkling
 asked Nevada desert. There are more
 were nations, have arrived in the sun-
 They are taken—outwards—of various
 Los Angeles.

They are taken—outwards—of various
 Los Angeles.

long electricity from Boulder Dam, there
 They are miles of high tension lines
 long and weighing 14,500,000 pounds
 the world, over a 40-inch line, 14 miles
 from Lake Meade, largest artificial lake in
 600,000 gallons of water a day. It costs
 cal. Now H.M.I. is provided with 36,
 The first water was brought in by tank
 gigantic tank.

As H.M.I. every utility had to be provided
 the utilities were automatically provided
 the main lines of the nearby communities and
 plan, you, but they are looking up to the
 men. Other was line project built high
 a whole sanitary and average disposal of
 side flood control works, main drains and
 driers, electricity across the mountains, pro-



WESTERN FAMILY

JUNE 3, 1943



Portrait of
BARBARA STANWYCK
 By Max Mann Ashby

In this issue
FICTION • MOVIES • FOOD TIPS

In the last year 102,500 American lost their lives through accidents. This was more than twice the number of American soldiers killed during the first World War. Accidents also left 320,000 persons in the country permanently disabled and 8,000,000 others.

the new building. The engineering department took over the warehouse. While the fire was still burning, engineers took drafts. Three hundred sets of drawing equipment came in via plane. Drafting tables were built over the week end. The engineering department and the office force lost exactly one-half day.

B.M.L. hit newspapers and radio, requested copies of every letter that had ever been written to B.M.L. of every letter that B.M.L. had sent out. Duplicates of burned photographs were obtained the same way, and the filing system was over more accurate and complete.

There were only two switchboards in the United States big enough to meet requirements. One was in Chicago and was turned over to B.M.L. Sears were ripped out of a transport plane. On it was loaded the giant switchboard. It left Chicago on the 7th, the day after the fire, arrived Sunday, the 8th. Monday morning, there was telephone service as usual. Not only did the office force lose only a half a day, but even plain gurney?

THE BIG JOB

(Continued from Page 1)

immense administration building where worked most of the basic employees—engineers, draftsmen, executors, office workers. Every record, every letter, every photograph was burned. With no water to fight the fire, in one hour the building was smoking.

At two o'clock Saturday afternoon, March 7, the underwriters released the site to B.M.L. Exactly 146 hours later, the building was rebuilt, reoccupied, complete with typewriters, desks, file cases, computing machine! A world's record.

The McNell Construction Company, who are the principal contractor on the project, used the material for 1000 town-sites houses then in construction to put up

That's the kind of people who are building Basic Magnesium, Inc. Out on the wind-corn, heat-blistered, barren dust bowl of Nevada desert, what keeps these men working against such odds? Is it dawn over the mountains, desert sunset, or just plain gurney?

There are no easy jobs at Basic, no plain war-time gummy jobs. Most office workers go full speed and well into over-time. Construction men and production line workers live their three-shift, 24-hour drama at an exacting, nerve-breaking tempo. There's one little job of painting inside exhaust lines that's something like deep-

(Continued on Page 17)

PERMITTING

DALY ILLUSTRATED BY JIMMIE JOHNSON

Collins, and him one of the best players at the Tennis Club." I sighed and decided to drop another eligible young man's address from my list. I was waiting for her to ask my advice as usual, for I had dandled Miss Karin on my knees when I was third chauffeur out at the estate. But she didn't ask advice. She broke into her own defense as we turned off the highway and went up the hill.

"I tell you, it's dishonest, Jimmy." She squeezed my arm. Miss Karin could do anything with men when she wanted to—



...and that the strength... build more houses. The houses are enough they open up. To meet them you have to construct one on B.F. But—in the near future for migration. The size of the Army in America comes to increase. Domestic Movements in Africa and Mac-

...living accommodations, from Rangoon, the 1,700 more men if it could provide... during the war, how many, have could... housing program. It became a problem of... upon the war. It became more than a... for the welfare of people who depended... Defense Plant Corporation to build houses.

B.M.I. moved toward and early and the... 50th and 51st... people live in trailers, in abandoned... the city elsewhere... up for "No Veterans" because he was... movement, that Las Vegas must be squar-

...a view from the front... movement Las Vegas. So soon it this that... toward the attention of all America on... a the entire housing program which has... that overlooking all other problems... the building of B.M.I.

...after from the United States Treasury... dollar put forth million dollar worth of... electricity. The demand for copper for...—the copper—is a No. 1 conductor of... package of orders to a locomotive. Silver

......the fact are... did not... value... million dollar worth of... did not... figures describe any other... figures, it takes four hours work. Next...

...When you make too big it is... good to work... ing in full capacity, the war will be...

...a feeling that when this plant is produc-... part... war in the world. I have... the war. This is the biggest, most im-

...might like the... of the... here? Is it higher...? Is it Las Vegas... I asked one worker: "What keeps you...

...making your... complain about... from. Think of... next time you... to take that our... next on the war...

...own set working under... conditions hardly... turning out a... product. A lot of the... (It's no easy job—building a war plant...

...for to read... they go into the... with a high degree of... (Other plants have to... be kept in... to get out...

...fall to emerge in... time. It, at the end of half an hour, they... They can work only about 30 minutes at a... They go into the... work...

...more practice... comes out... we doing. The...

Continued from page 14



...pound of sugar for every pound of fruit. Sugar for preserves is measured by weight rather than by cup fulls. One pound of refined white sugar measures about two cups.

You may replace a portion of your preserve sugar with syrup or honey if you prefer that method of sugar sweetening. Up to 1/2 the sugar portion may have an equal measure of corn syrup or honey substituted.

But for jam with a well-jellied juice, never substitute corn syrup for more than 1/2 of the sugar.

In planning meals for these days of war economy, a clever kitchen magician will not forget the importance of a good egg. The cost is still comparatively low and the food value is extremely high. The department of agriculture, bureau of home economics, advises at least four or five eggs a week for young children and from three to five for adults. An egg a day for every member of the family should be a household rule, if possible. Every additional egg in the diet means added food value and extra protection," the bulletin states.

Eggs are stressed as a meat alternate and may be used to dress up otherwise... as well as meat... and... at breakfast. Hard-boiled and... with... baked with cheese, scrambled with... tomatoes—there are dozens of ways they may be prepared.

EGGS VS. CHICKENS

It is because of the importance of eggs that OPA and WPA are stressing the increase in egg-producing flocks rather than broilers and fryers in Southern California's chicken farms. In general, egg production results in greater output per unit for feed used, than does broiler and fryer production, and the general tight feed situation

says that although lawyers have a good Former district attorney, Roland Wiley, Supreme Court.

than the Chief Justice of the United States Justice of the Peace made more money divorces in Las Vegas last year, and the laws. There were 22,500 marriages and divorces in Nevada's quick marriage and divorce Also responsible for jamming the hotels to be made weeks in advance.

of his hotel, and even so reservations have whole street lined with bungalows as part list. Bob Brooks Nevada Billmore has a month for three people, have a waiting auto courts, some of them renting for \$170 All hotels are jammed to capacity. All Williams and Adrian Wilson.

being planned and built by architects Paul whole housing unit for colored people is single colored men, a recreation center. The ored people, a 175-room dormitory for Basic is also building 324 homes for col- and dormitories.

city, Andersons, houses 4,000 men in tents them have as many as 800 trailers. A tent camps in and around Las Vegas; some of more are on the way. There are 200 trailer dormitory for single men.

Plans are also being drawn for a 320-room ton, with 300 more on the drafting boards. An additional 300 are now in construc- the plant for families of their employees. Basic built a thousand homes opposite

(Continued from Page 17)

THE BIG JOB

practice handling the regular legal affairs of the town, a good part of their legal revenue comes from out-of-state divorces. In fact, Las Vegas has more lawyers for the size of the town than any other town in the United States. But stary-eyed, quick-martriage brides and groots do not even notice the irony of a gift sign which reads: "Wedding rings, an souvenirs."

In Nevada, gambling is legal. Prostitution is legal. The license fees from bars, casinos, restaurants, liquor stores, and places of amusement make it possible for Nevada to be amazingly x free. There is no sales tax, no inheritance tax, no income tax; the state has no bonded indebtedness and by constitutional amendment the tax rate is never over five dollars.

Once a rendezvous for horse thieves, later the Rancho Vegas, an finally a lazy, sun-baked railroad town where cattle cars stopped to water the animals, Las Vegas—like Rip Van Winkle—is waking from a long sleep. There are few towns in the United States as wide-awake, as aware, as Vegas today.

Gone are the good old days. Gone are the days when everything to be done was in the terms of Mexico's *mamana*. Now excitement is in the very air you breathe. Now you are conscious of big things, of history in the making. When a traveler hits the town of Las Vegas, he can almost feel the electric tautness in the air. It's in the faces of everyone; it's in the bars and

hunk-tonks, it's in the soul of the miner and in the eyes of the girl in the milk coat. There's a constant push and quick tempo and hurry, it's as if America was waiting on this one little town, as if the world was waiting—with a breathless expectancy.

Magnesium is the most vital, most important, most valuable metal in the whole war-effort. A lot of hope is fastened on this mountain-fringed stretch of Nevada where lives and breathes the monster.

In May, when B.M.I. will be equipped to produce millions of pounds of magnesium a year for the airplanes, the tracer bullets, the flares, the incendiary bombs of the world, then the monster will come alive with a roar, and hell will rain from the skies. Not until then will America take a deep breath; not until then will be forecast the savage beginning of the war's end. Today, the eyes of the world are on The Big Job.

EDGAR A. SEYMOUR: Publisher
PAUL L. MITCHELL: Vice Pres. & Mgr. Manager
MARIAN MOORE: Editor
WILL WHITNEY: Art Director; HARRY BEAVER: Circulation Mgr.
Published twice weekly by Seymour Family Publishing Co., Inc., 222 West Peachtree Street, S. E., Atlanta, Ga., U. S. A.
Phone: DIckney 2271.
ADVERTISING OFFICES:
521 Fifth Avenue, New York, N. Y. 9-9771
150 North Dearborn Street, Chicago, Illinois 60610
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WESTERN FAMILY

VOLUME 4
NUMBER 12

COREPAD

<p>Noah Webster Says KFI-S</p> <p>4:45 Little Blue Playhouse KECA-S Lincoln Sam Series KNX-M Overseas Report KHJ-S Cocktails for You KMPC-S</p> <p>5:00 Boddy KFI—Th & F Boy Scouts of America KFI-S</p> <p>5:15 Twilight Tales KECA-F America's Home Front KNX-F Anita Carol Organ KNX-S Boston Symphony KECA-S</p> <p>5:30 Voice of Firestone KFI-M Horace Heidt Chest KFI—Tues Traffic Tribunal KFI-S Paging John Doe KFI—Th</p> <p>5:45 Bill Henry KFI— W Th F Singing Sam KHJ— T & Th Red Cross March of Mercy KFI-S</p> <p>6:00 Burns & Allen KNX— Tues Battle of Sexes KFI— Tues Lux Radio Theatre KNX-M Mayor of the Town KNX—W Eddie Cantor KFI—W Bing Crosby KFI—Th Waltz Time KFI—F Hollywood Showcase KNX-F</p> <p>6:15 Food and Places in News KHJ—MTWTF Ed Tomlinson KECA-S</p> <p>6:25 Lion's Roar KECA— MTWTF</p> <p>6:30 Spotlight Bands KECA—MTWTF Dr. I. Q. KFI—M Bulldog Drummond KHJ-M Fibber McGee & Molly KFI—Tues Suspense KNX—Tues This is Our Enemy KHJ—Tues District Attorney KFI—W Mill Berie KNX—W Stage Door Canteen KNX—Th Bob Burns KFI—Th People Are Funny KFI—F Can You Top This? KFI—S Quiz of Two Cities KHJ—F</p> <p>6:55 War News Roundup KECA—MTWTF</p> <p>7:00 Carnation Hour KFI—M Screen Guild KNX—M Ray Clapper KHJ—M Bob Hope KFI—Tues Inglewood Park Concert KNX—Tues Kay Hyser KFI—W John Gunther KECA—F & S Camel Caravan KNX—F Betty Lou & Riggs KFI—F John B. Hughes KHJ—TWS Sports Newscast KFI—S</p> <p>7:15 Gracie Fields KECA—MTWTF Bulldog Drummond KHJ—Tues Campana Serenade KFI—S Blue Ribbon Town KNX—S Saturday Night Sandwagon KHJ—S</p> <p>7:30 Information Please KFI—M Blondie KNX—M Alec Templeton KECA—MWF Red Skelton KFI—Tues March of Time KFI—Th Bob Ripley KECA—F Cresta Bianca Camelot KNX—W Bullets for Truth KNX—Thurs</p> <p>7:45 Frazier Hunt KNX— T Th S</p>	<p>8:00 Watch the World Go By KECA—MTWTF Fred Waring KFI— MTWTF I Love a Mystery KNX—MTWTF Chicago Theatre of Air KHJ—Th Truth or Conse- quence KFI—S This is the Hour KHJ—S San Quentin on Air KHJ—M Thanks to the Yanks KNX—S Our Secret Weapon KNX—F 8:15 Ceiling Unlimited KNX—M Lum and Abner KECA—MTWTF Fleetwood Lawton KFI—MTWTF Night Editor KFI—Th News KECA—S</p> <p>8:30 Cavalcade of America KFI—M Counter Spy KECA—M Double or Nothing KHJ—M Johnny Presents KFI—Tues Lights Out KNX—Tues Duffy's Tavern KECA—Tues Tommy Dorsey Show KFI—W Manhattan at Mid- night KECA—W Dr. Christian KNX—W Sherlock Holmes KHJ—W Rodriguez & Suther- land KECA—Th Maxwell Coffee Time KFI—Th Whodunnit KFI—F Playhouse KNX—F Abie's Irish Rose KFI—S Hobby Lobby KNX—S</p> <p>9:00 Green Hornet KECA—M Telephone Hour KFI—M John B. Kennedy KNX—M Th Al Jolson KNX—Tues Mr. & Mrs. North KFI—Tues John Freedom KECA—W Paint Sublime KFI—W Aldrich Family KFI—Th Kate Smith KNX—F Furlough Fun KFI—F Hit Parade KNX—S Meet Your Navy KECA—S</p> <p>9:45 Don't You Believe It KNX—S Fulton Lewis, Jr. KHJ—MTWTF</p> <p>10:00 Nation at War KECA—Tues Nat'l Radio Forum KECA—W Amer. Town Meeting KECA—Th Dr. Polytechnic KHJ—MWF Bridge to Dreamland KECA—S News KFI, KNX— MTWTF</p> <p>10:15 Reflex KNX—M M. Lerner Orchestra KFWS—MTWTF</p> <p>10:30 Inside the News KFI—MTWTF Dance Tonight KFWS—MTWTF Uncle Sam Presents KFI—S</p> <p>11:00 News KNX & KFI— MTWTF Philharmonic KECA—MTWTF We the War Workers KHJ—W</p> <p>11:30 Musical Masterworks KNX—MWF</p>
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Folks are congratulating Fred Unsworth, Townsite housing manager. Fred's a brand new grandpa. His son is an admiral, or something, in the Washington navy. By way of celebration, trees will be planted all over the Townsite. Residents of the area might have had grass, too, if only it had been twins.

Warning to kids at Basic and Railroad Pass schools! There's a truant officer on the way! He'll be on the job any day now.

Did you know that warehouseman Earl Thomas was once a big shot in the business agent's office of the Los Angeles Bureau of Power and Light? Well, he was.

Overheard at Anderson's Cafeteria: "... so what's the difference between a Democracy and a Republic?" And we ask, what is the difference?

For the Honor Roll of Car Owners Who Give Rides to Those Who Walk at Basic, we nominate L. A. West, cost accounting; Grace Leaman, general stores; Bertha Gannon, group insurance; Jim Crawford, C and A accounting, and Ed Hickman, timekeeping. There are still too many lone occupants of Townsite cars who could give plant hikers a lift. (I'm the girl with the red carnation in my hair).

Ralph O'Neil, chief of the division of water works, (one of the most responsible jobs at the plant), is taking salutes with both hands these days. He was recently elected to the coveted office of District Commander, Veterans of Foreign Wars. Commander Ralph has a heroic overseas record of combat service in WW I. Watch the VFW go places this year!

Earl E. Keenan, indoctrinated with BMI at Gabbs and now head man at surplus stores here, is an old timer with Anaconda. Drafted from the Anaconda reservation at Butte, Montana, Earl has made a raft of new friends. (Wanna buy a second hand wheelbarrow?)

That new ditch angling from the Ad building to the fire station to the guard hdqtrs, and across the road at gate 2, stopping in the middle of nowhere at the overhead water hose on the edge of the north parking lot, believe it or not, will carry a STEAM HEAT line. That's what L. A. Harris, general service, says.

Orientation and plant education have intensified since the Foremen Training Unit, John Keyes, chief, has been moved to the Personnel building.

The office and staff of the BASIC BOMBARDIER, W. Harold Kingsley, editor, have moved back to the Administration building. That brings the official press service closer to news sources.

Committee Praises BMI Magnesium Production, Largest in the World

With about half the population of the United States had produced nearly six times as much magnesium in 1939 as the Dow Chemical company, America's only producer.

CHEMICAL EXPLANATION

"The committee believes that whenever any corporation obtains a monopoly in the United States in the production of any basic commodity, that company should be called upon to explain why a smaller foreign nation produced several times more than we did and developed new and improved methods of fabrication faster than we did.

"Dow Chemical's explanation was not very satisfactory, and I do not believe that we should permit any such monopoly to be established or continued in the future," Wallgren said.

The committee said the below-schedule production of magnesium in 1943 "indicates the extent to which this country failed in attaining its production objective due to difficulties in completing facilities on schedule and the problems encountered in surmounting the difficulties involved in adapting new techniques of manufactures."

In 1942, the report said, it was estimated that the 1943 supply of magnesium would be 501,000,000 pounds. Estimated requirements were 448,000,000 pounds, but total production for the year was but 391,000,000 pounds of which only 348,000,000 pounds were actually shipped.

BMI PRODUCTION

Turning to the Basic Magnesium project at Las Vegas, the report said:

"During the four months of operation (after completion) in 1942, the project produced 1,299,744 pounds of magnesium metal. In the succeeding 13 months to February, 1944, the project produced an additional 102,520,762 pounds of metal having reached and exceeded capacity operations by July 1943.

"The metal produced at this project since the start of operations accounts for about 25 percent of all the metal produced in all government-owned facilities

since their inception. It produced about 39 percent of all the magnesium produced in all plants in the United States both private and public, in the year 1943 . . . the magnesium produced by this plant was of great value to the war effort."

Wallgren said the "bungling and incompetence" displayed in promotion and construction of the plant made it "most unfortunate that the project was not entrusted to Anaconda Copper originally, so that the benefits of its skill could have been obtained from the outset."

He said about \$500,000,000 in government funds had been spent for the construction of magnesium producing plants and an additional \$15,000,000 for magnesium fabrication facilities.



BASIC MAGNESIUM INDUSTRY INVADES DESERT

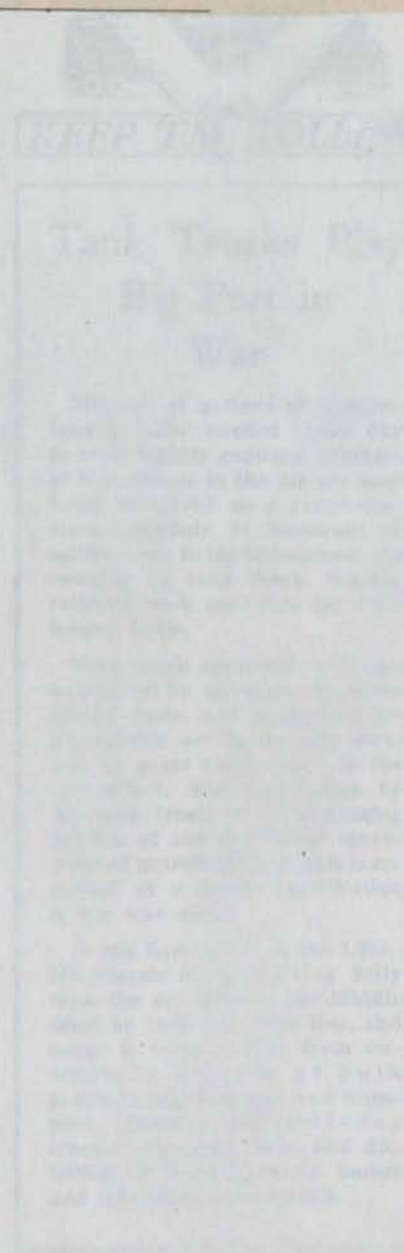
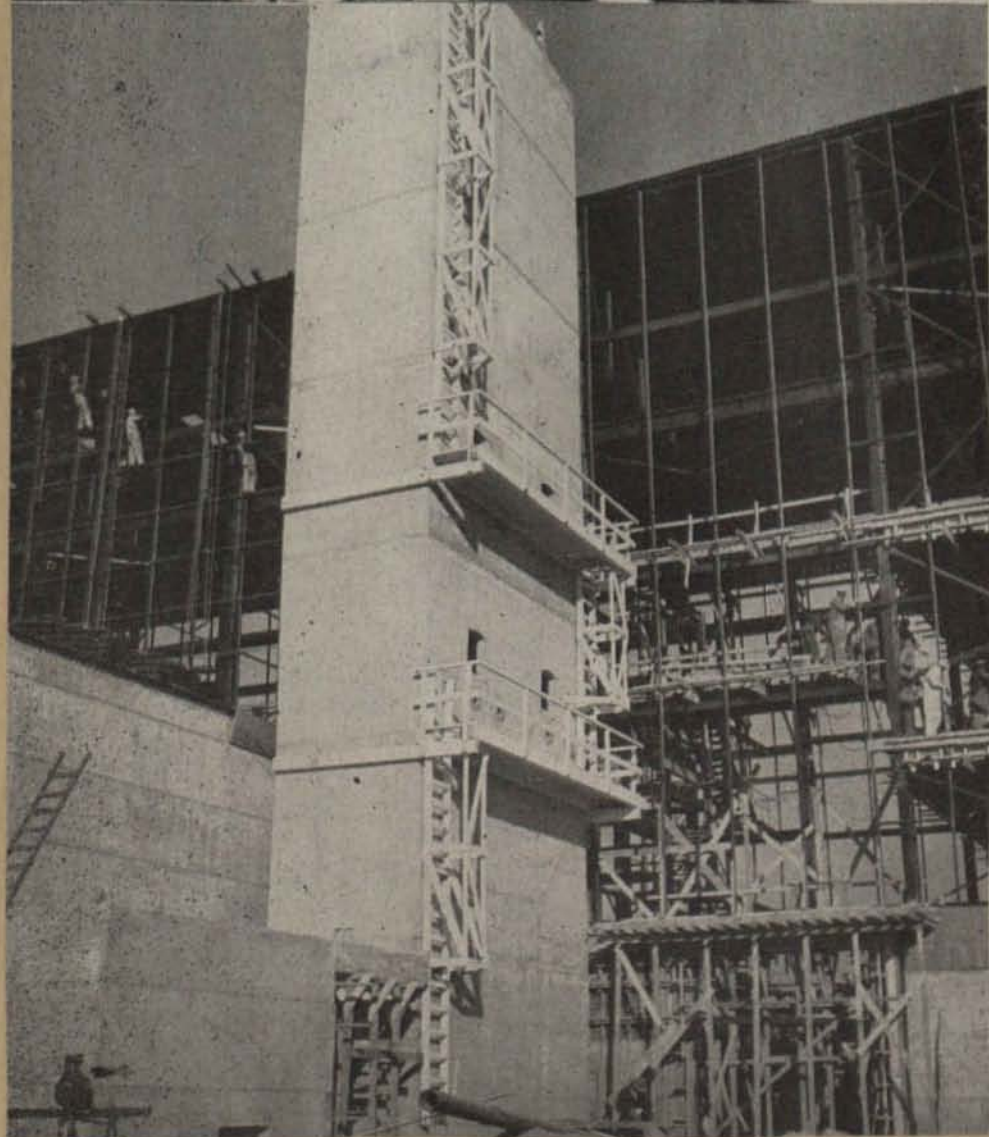
A year ago this location was the barren desert of southern Nevada. Today an industrial city teems with the activities of over 12,000 workers as tons of steel and concrete give rise to the giant plant of Basic Magnesium.

1—Construction sheds and mountains are landscape features at the present time at the thousand-unit housing development for workers at the plant.

2—Enormous asbestos mittens must be worn by men handling the thousands of hot magnesium ingots produced daily at the plant. A number of units of this plant are now in production.

3—This exhaust tower, 90 feet high with a portion of a metal recovery unit, in the background will soon be adding to the huge production of the plant which is scheduled for full operation in the summer of 1943.

Federal Works Agency. Photo



MOTOR TRANSPORTATION

"Covering the Commercial Automotive Industry in the Pacific Region Comprising the 11 Western and Pacific Coast States."

Seattle, Washington

JUN 1943

Here's A New Type of "Global Warfare"



One hundred per cent transportation in essential industry is visualized in this photograph of special equipment operated by the H. & M. Trucking Co., Los Angeles, in the service of the American Liquid Gas Corp. The unique "body" consisting of four spherical containers is mounted on a dual-axle Utility semitrailer. The payload consists of propane or butane. Each container has a diameter of eight feet and a capacity of 1,735 gallons. Transportation is between the refineries in the Bakersfield district and the Basic Magnesium plant at Las Vegas, about 200 miles.



KEEP 'EM ROLLING

Tank Trucks Play Big Part in War

Millions of gallons of high-octane gasoline needed every day to keep rapidly growing numbers of war planes in the air are now being delivered on a round-the-clock schedule to hundreds of military air fields throughout the country by tank truck, leaving railroad tank cars free for vital longer hauls.

Tank-truck operators, although hampered by shortages of manpower, parts, and equipment replacements, are performing services of great importance to the war effort. The assumption by the tank truck of an increasing portion of the short-haul movement of petroleum products is regarded as a major contribution to the war effort.

In the East, much of the 1,250,000 barrels of oil arriving daily from the oil fields of the Middle West by tank car, pipe line, and barge is being moved from terminals to thousands of bulk plants by big over-the-road transports. Smaller local delivery trucks pick it up there and distribute it to millions of homes and commercial consumers.

Enormous Quantities of Oil, Gas Needed for War Machine

PARTIAL evidence of the enormous requirements for petroleum products to keep United States forces fighting on world fronts is divulged in a statement released by the Office of War Information.

A mechanized division burns up 18,000 gallons of gasoline an hour when proceeding along a road at a normal speed.

At cruising speed, a heavy bomber uses 200 gallons of gasoline an hour and a fighter plane needs 100 gallons.

Most of the transport ships that take supplies to the armed forces are oil burners. A round trip from the Pacific Coast to Australia is 14,000 miles. From

New York to the Persian Gulf and return is 28,000 miles. A ship making that trip consumes approximately 225,000 gallons of heavy fuel oil.

Getting petroleum supplies where they are needed at points removed from coastal dumps is a problem that demands solution. They must be there or all machinery stops. As one method, the Army has developed portable pipe lines that convey gasoline to motorized units in the field. They consist of half-mile units that are truck transported. For each unit there is a centrifugal pump driven by an engine that boosts the gasoline along.

Each unit can be used independently or joined with others. They are said to be able to deliver gasoline through swamps and forests or over mountains at a rate of approximately 200 gallons per minute. The pipe also can be used to assist or replace floating tanks for ship-to-shore operations.

In cooperation with the petroleum industry, the Army has worked out a standardization that has resulted in a substantial reduction in the number of grades of lubricants and fuels required. This has helped to simplify the supply system. One grade of oil now serves for tank motors, transmissions and differentials. Tests show that lubricants now used represent a great improvement over any previously used.

Instead of nine commercial grades of internal combustion engine lubricating oil, the ordnance department now has three grades which can be used with equal facility in gasoline or diesel engines under any climatic conditions. The four grades of gasoline formerly used in ordnance vehicles have been replaced by two high standard grades.

Belyea Inspects Pan-American Highway

Brynn W. Belyea, president of Belyea Truck Company, Los Angeles, has completed a report to the Coordinator of Interamerican Affairs following a survey he made recently of the Pan-American Highway. Belyea is a consultant on the staff of the coordinator and made the trip to Central America under his specific instructions. He is not at liberty to divulge any information acquired while on his inspection tour of the highway.

Last summer, Belyea was sent to inspect the Alcan highway as a civilian consultant to the War Department. It is understood that a number of recommendations he made were incorporated later in the plan of operating trucks over the military road

LAS VEGAS, NEV., REVIEW-JOURNAL
JUN 26, 1943

Tenth Unit of BMI Plant Now Is At Full Capacity

New Unit Is Cut In Yesterday Morning At Plant

The world's largest magnesium plant, Basic Magnesium, Inc., brought its tenth and last unit into full production today, according to F. O. Case, general manager.

The last unit was cut in yesterday morning and was producing metal this morning, after the 24-hour cycle of production had been completed.

First In '42

The BMI plant's first unit went into production on August 30, 1942. Since that time one unit per month has been completed and has started producing metal for incendiary bombs and other war uses.

The rated capacity of the plant is 15 tons of metal per unit per 24-hour period, for a total of 150 tons per day. The plant is exceeding its rated capacity daily, but no figures are available for publication on the total production at present.

When the tenth unit was started yesterday, officials of the company who were present included: F. O. Case, general manager; H. G. Satterthwaite, assistant general manager; and V. E. MacDonell, chief engineer. Four men were present who have assisted with cutting in each of the 10 units now in operation. They were: J. R. Coulter, superintendent of production; H. H. "Red" Gillings, electrical superintendent; Art Newell, superintendent of metal plants; and Frank Woodman, superintendent of the electrolysis plant.

The progress of the BMI plant construction has been rapid, as first soil tests were made September 2, 1941, and the first stake driven just one week later. Clearing of brush from the area was started September 11, 1941, and first excavation started October 29, 1941.

While construction at the plant is not yet complete, all necessary building to bring the 10 metal producing units into full operation has been completed. Remaining to be built are several permanent structures, such as an administration building, which will be constructed of steel and concrete. Present temporary buildings will be razed when permanent structures are completed.

This construction program is expected to be completed by early fall.

Officials at the plant pointed out that attention has been directed to completion of structures necessary for the actual production of metal, and that all utilities and other preparations necessary for that purpose were given first consideration. Departments now housed in temporary buildings will be transferred later to permanent structures as soon as they are completed.

El Centro, Cal., Desert Magazine
Cir. 5448 JULY, 1943

MOTOR TRANSPORTATION
JUNE, 1943

Mines and Mining

Las Vegas, Nevada . . .

At request of C. B. Henderson, RFC head and member of defense plants board, Senator James G. Scrugham is investigating feasibility of making government's huge BMI magnesium plant near here a permanent post-war industry. Scrugham said he envisioned a peace time plant to manufacture sheet magnesium and magnesium plastics to develop the larger plane of the future. The senator also is interested in developing by-products of the industry.

MAR 2 1944



A. I. M. E.

Discusses War

and

Postwar Problems

TOPPING last year's attendance, approximately 3000 members met in New York last week at the third wartime annual convention of the American Institute of Mining and Metallurgical Engineers to hear a four-day program, Feb. 21 to Feb. 24, of technical papers, round-table discussions and symposia.

Among the noteworthy events was the awarding of the eighth Robert W. Hunt gold medal and certificate at the Institute of Metals banquet on Wednesday evening, Feb. 23, to Clarence D. King, chairman of the operating committees, United States Steel Corp. of Delaware, for the work done and summarized in his paper, "Washing of Pittsburgh Coking Coals and Results Obtained in Blast Furnaces," presented to the 1943 Cleveland conference of the Blast Furnace and Raw Materials Committee. Mr. King reported that by a relatively simple washing treatment applied to Pittsburgh coking coal, pig iron production could be increased 8 per cent, net furnace coke consumption decreased 8 per cent and flux consumption decreased 15 per cent. In addition, improvement was noted in the regularity of the analysis of the pig iron.

To Alfred H. Geisler, research metallurgist at the Aluminum Research Laboratories, Charles S. Barrett and Robert F. Mehl, both of the Carnegie Technological Institute, went the 11th Institute of Metals Division award for their paper "Aging in the Solid Solution of Silver in Aluminum."

The 18th recipient of the J. E. Johnson, Jr., Award was Leonard A. Tofft, general foreman of the new war-plant

... At their third wartime annual convention, the mining and metallurgical engineers assembled to hear about new research on the powers of boron, powder metallurgy and magnesium reduction.

o o o

blast furnaces of the Inland Steel Co. for "Use of Inwall Temperatures in Determining Improper Gas Flow."

James T. MacKenzie, chief metallurgist of the American Cast Iron Pipe Co., Birmingham, delivered the 21st Howe Memorial lecture on "Cast Iron—Steel Plus Graphite." Mr. MacKenzie discussed the mechanical performance of cast iron and the rela-

tion of this performance to the concept of cast iron as steel plus graphite.

Chester A. Fulton, new president of the A.I.M.E., spoke at the Institute of Metals Dinner where Arthur Phillips, new division chairman, made his inaugural remarks. Inducted as chairman of the Iron and Steel Division was William A. Haven, vice-president of Arthur G. McKee & Co.

o o o

Protecting Boron Additions to Liquid Steel

A STIMULATING paper presented by R. W. Gurry of the research laboratories of the United States Steel Corp. at the Steelmaking and Deoxidation session on "The Relative Deoxidizing Power of Boron in Liquid Steel and the Elimination of Boron in the Open-Hearth Process" raised the question as to what extent any boron present in the scrap charged into the open hearth is oxidized out during melting and subsequent refining. This question is significant because the optimum concentration of boron in the finished steel, which is fairly critical, would be very difficult to attain if the boron in the charge were largely retained in the metal. Moreover, unless boron is substantially eliminated in the open-hearth process, its use on a large scale would

eventually make it impossible to produce boron-free steel except by restricting the charge to virgin material.

Although there is at present virtually no satisfactory direct evidence to provide an answer to this question, there are indications from practice that boron is oxidized out in the open hearth in the production of medium or low carbon steel. It may be retained, however, if the carbon content is fairly high; that is, if the oxygen is kept fairly low.

From thermodynamic calculations it has been shown beyond doubt that boron is an effective deoxidizer for iron and should, therefore, be almost entirely removed during the open-hearth process; more specifically, the deoxidizing power of boron is greater than that of silicon, vanadium or

to absorption of moisture and carbon dioxide.

The disadvantages of wet briquetting are the necessity of a hydration step, a preheating setup and a lower density briquet resulting in a lower charge weight in the retort. The advantages of this method are simpler and less expensive briquetting with high press capacity, production of a much stronger briquet of any desired size, freedom from disintegration of the briquets during reduction. The consequent absence of fines in the retort charge makes it feasible to obtain more complete utilization of silicon and to use a shorter reduction cycle.

The disadvantages of dry briquetting are a difficult and expensive briquetting operation with low press capacity, a relatively weak briquet of small size and a strong tendency to form fines in the charge due to the weakness of the briquets and to their tendency to absorb moisture and carbon dioxide. The presence of fines in the charge causes less efficient utilization of silicon and lower yields of magnesium per unit weight of charge.

The outstanding advantage of dry briquetting is the higher briquet density, which permits higher charge weights and greater magnesium yield per retort.

Earlier in the investigation, it seemed that taking all factors into consideration, the wet briquetting method was preferable. In view of the recent experience with very small dry briquets and particularly the discovery that dry briquet densities in excess of 2.5 grams per cc. can be attained by use of fluorspar, the investigators are inclined under most conditions to favor dry briquetting.

Reduction tests were made in a block of four individually oil-fired retorts. The retorts were of the standard 10-in. i.d. alloy-steel type with 5 ft. of their length in the heated zone. Each retort was connected to a Stokes mechanical vacuum pump of 28 or 50 cu. ft. capacity, so that individual operation was possible.

Charging of wet-process briquets involved handling hot preheated briquets at about 1292 deg. F. and these were weighted in buckets, deposited on a trough and pushed into the retort which was connected to the vacuum line immediately after charging was completed.

The silicon efficiencies obtained were 70 to 75 per cent in 7½ hr. at

vacuum at 2102 deg. F. At a temperature of 2225 deg. F., silicon efficiencies of 78 to 80 per cent were achieved in 7½ hr. at vacuum. Under optimum conditions, comparable efficiencies were reached with dry-process briquets.

Dry briquets were normally charged cold and were weighed out and charged in paper bags to facilitate handling and to avoid breakage. The retorts were left open for 15 to 25 min. prior to evacuation to burn the paper bags and any oil adhering to the briquets. Vacuums of 200 to 250 microns of mercury in 1 to 1½ hr. and final vacuums of 50 to 100 microns were considered to be satisfactory. These conditions were not obtained unless the briquets were low in carbon dioxide and water and the vacuum pumps in good operating condition.

From tests made in a special laboratory furnace it was found necessary to maintain a vacuum of 0.1 to 0.3 mm. in order to obtain a dense metal deposit in the condenser. With increased pressure the condensed metal becomes more porous, with the resultant tendency to burn and with increased losses during the subsequent melting step.

Many materials were tested in the laboratory reduction apparatus to determine whether their inclusion in the calcine-ferrosilicon mix might catalyze the magnesium reduction reaction. Of those tried only CaF₂ and MgF₂ showed catalytic effects. The addition of fluorspar up to 5 per cent substantially increased the magnesium yield.

Laboratory tests with aluminum powder, aluminum-silicon alloys and various aluminum scrap confirmed the advantage of aluminum over silicon as a reducing agent, as to temperature and time.

To get good magnesium deposits there must be good vacuum, freedom of the briquetted charge from volatiles like water and carbon dioxide, and good separation of the alkali metals which are contained in various amounts in the dolomite.

Vacuum Engineering:

THROUGH the use of high vacuum, the distillation or sublimation of many reactive metals such as magnesium can be done industrially at much lower temperatures, and hence in much simpler equipment, than was heretofore thought possible. W. B. Humes, director of research and development, reported in "Vacuum

Engineering as Related to the Dolomite Ferrosilicon Process."

The main function of vacuum in the ferrosilicon process and hence in most vacuum smelting processes is to lower the temperature at which the metal may be rapidly distilled or sublimed from the reduction mixture. A secondary function is to protect the newly produced metal from attack by the furnace atmosphere and to permit the formation of a dense condensate.

In the ferrosilicon process, the metal is produced from a briquetted charge at a free air pressure of about 0.100 mm. (100 μ) of mercury. This low pressure is not needed for the reaction but rather serves to protect the metal vapor from the oxygen or nitrogen of the atmosphere and permits the formation of a dense condensate relatively free from sodium.

However, at pressures above 500 μ the metal yield begins to decline. This does not necessarily mean that the reaction is impeded by the high pressure. It may be that the magnesium vapor oxidizes upon formation and thus remains in the charge. Sight gas observations confirm the fact that actual burning of deposited magnesium occurs at pressures as low as 100 μ (1.0 mm.).

The effect of pressure upon the quality of the condensate has been clearly demonstrated. At pressures above 500 μ, a deposit containing relatively large quantities of oxide, nitride and pyrophoric dust is formed. If sodium and potassium are present, as in the case of most dolomites, these metals usually burst into flame and ignite the pyrophoric magnesium during the discharging of the retort. At lower pressures, a dense metallic crown is formed, low in impurities and difficult to ignite.

It has been found in plants using the ferrosilicon process that the economical temperature for alloy retorts is about 2150 deg. F. and that an 8-hr. cycle is optimum. Under these conditions, it is desirable to maintain an operating pressure of 100 μ or lower and to reach that pressure within 1 hr. from the time of charging. Vacuum pumps perform two functions: (1) To provide for the initial evacuation in which large volumes of gas are produced at relatively high pressures, and (2) supply pumping speed at low pressures for the remainder of the cycle.

During the construction of the magnesium plants, industrial diffusion pumps using both oil and mercury were developed for the process. These pumps, which have extremely large

gas handling capacities at pressures below 100 μ, must be used in combination with a suitable backing pump, such as a rotary mechanical pump. Steam jet ejectors have been employed successfully in one plant which used a small number of very large retorts. A long evacuation cycle plus the large unit vacuum system makes steam jet ejectors particularly applicable in this installation. When suitable protective devices are available, it is possible that they will receive wider use. It is probable that for future operations, various combinations of these three pumping means will be evaluated to provide maximum efficiency.

Most ferrosilicon process plants have used retorts 8 ft. long and 10 in. i.d., making a volume including the condenser space of about 6 cu. ft. Four of these retorts are connected to a manifold and operated as a unit. The time necessary to evacuate this volume is given by the equation:

$$T = \frac{VK}{D}$$

where T is the evacuation time, V the volume of the system, D the pipe displacement in cu. ft. a min., and K a constant depending upon the desired pressure.

In the ferrosilicon process the evacuation time is approximately 2 min. since

$$\begin{aligned} V &= 24 \text{ cu. ft.} \\ K &= 8 \text{ for } .100 \text{ mm.} \\ D &= 100 \text{ cu. ft. a min.} \end{aligned}$$

Actually this condition is realized only when there is no impedance in the pipe lines between the vacuum system and the pump and no leakage or outgassing. In actual plant operations this has not been feasible and in many cases the pumps are placed at different levels from the retorts necessitating pipe lines approximately 50 ft. in length. It has been calculated that when pumps with high capacities in the lower range be used, either the pumps must be placed close to the retorts or large pipes must be used.

Although piping carries only a relatively small external pressure, it must be made extremely non-porous because of the tremendous expanded volume of a small leak at atmospheric pressure. Considerations of the leakage problem led to the use of welded piping and forged steel fittings. Threaded joints are treated with resins paints like "Glyptal." Rubber or composition gaskets are cleaned and wet with grease and oil before assembly. Lubricated plug valves, up

to 6-in. pipe size, have been used with success, although care must be exercised with regard to the lubrication and the condition of the valve seat surfaces.

It has been found that new piping systems are best subjected to an initial pressure and "soap bubble" test, and

that final tests can be made under vacuum. Where thermocouple gages are used, vacuum leaks may be detected by spraying the suspected point with autone or other volatile liquid or hydrogen. As the vapor or hydrogen leak replaces the air leak, rise in pressure is noted on the gage.

Basic Magnesium Enterprise

THE combination of electric power from the Boulder Dam, water from Lake Mead and magnesite ore in Gabbs Valley led to the initial proposal to erect a magnesium reduction plant in southern Nevada.

The process used by Basic Magnesium to extract the metal from the ore is the electrolytic reduction of magnesite, developed initially by the I. G. Farbenindustrie and operated extensively in England by Magnesium Elektron Ltd. of Manchester, C. J. Ball, chairman of the board, Magnesium Elektron, Ltd., England and vice-president Basic Magnesium, Inc., revealed.

The first stage in the reduction process consists of the preparation of the raw materials. The magnesite materials are finely milled and then mixed with certain proportions of coal and of peat moss. The peat is added to give porosity to the pellets and to provide for the more rapid action of the chlorine upon the magnesium oxide content. Magnesium chloride solution made in the recovery and neutralization plant is added as a binder. The mix is then briquetted and dried, and coked in oil heated rotary kilns. The coked briquets are then fed into a shaft furnace or reaction tower lined with special refractory bricks and heated internally using carbon resistors and electrodes. The solid charge rests upon a network of carbon blocks which are heated by their resistance to the passage of 3 phase a.c. As the briquets pass from top to bottom of the reaction tower or chlorinator, which operates at a temperature around 1832 deg. F., they meet a stream of chlorine rising from the bottom of the furnace. The carbon in the briquets acts as a reducing agent and the magnesium oxide is converted to absolutely anhydrous magnesium chloride.

The fused chloride is tapped periodically from the bottom of the reaction tower and fed into special electrolytic cells. Chlorination and

electrolysis take place in one building in which, for the purpose of easy tapping and feeding to the cells, the chlorinators are located in a line along one side of the cell room. The exhaust gases from the chlorinators are washed and the resultant hydrochloric acid solution concentrated, clarified and neutralized with magnesium oxide to provide magnesium chloride solution used in the process.

Each unit contains eight chlorinators and 88 cells, the latter built in eight banks, each of 11 cells, with a capacity of 5600 tons a year.

Electrolysis of the fused magnesium chloride is carried out in electrolytic cells lined with refractory and insulating bricks to take care of the comparatively high working temperature. The electrolytic consists of a salt mixture which inhibits the tendency of anhydrous magnesium chloride to decompose when molten and favorably influences the conductivity, viscosity and specific gravity of the electrolyte.

Provision of electrode surfaces of maximum area and the maintenance of a fixed ratio between the depth of immersion of electrodes and their distance are essential combinations of maximum economy.

The cells are so designed as to allow the separation and collection of the chlorine by use of ceramic curtain walls of high density and of particular properties forming a part of the cell and built in between the parallel electrodes.

Cast steel cathodes and graphite anodes are used. The chlorine which is quite dry and concentrated, collects in the anode compartment, and is drawn off, filtered and recirculated to the chlorinators.

The cell is not externally heated, the electrical input of about 20,000 amp. being sufficient to maintain the temperature of the charge. The power consumption is approximately 9 kw.-hr. per lb. of metal. The magnesium metal collects at the cathode, floats to the surface of the melt and is dipped out every 24 hr.

Hand ladles are used to remove the molten metal and a fairly clean separation can be made between the metal and the fused chloride metal. Under normal operating conditions and with reasonably trained operators this should be more than 98 per cent pure.

This metal then passes to a refinery where it is either refined for sale as pure metal 99.7 per cent or better or alloyed for sale as one of the constructional alloys.

In the refinery the metal is first melted in large cast steel crucibles of 2-ton capacity; during this process Basic Melting flux is used to minimize local oxidation. When the charge is molten, the alloying additions are

made—aluminum and zinc directly; the manganese being added in the form of manganous chloride. The charge is then refined with a refining flux, Basic E, which is stirred into the melt to carry down the suspended particles of chloride from the electrolysis metal and to remove the remains of the melting flux. The refined metal is then poured into a clean crucible and superheated under cover of refining flux at a temperature above 1472 deg. F. for over 15 min. The charge is then cooled rapidly to 1328 to 1382 deg. F. and poured either onto a continuous ingoting machine or into 300 lb. crucibles which are then poured off into extrusion billets or rolling slabs.

In operation the solid charge is fed mechanically into one end of the furnace onto a preheating shelf, from which it is pushed into the bath by the introduction of the next charge. Metal is dipped or pumped out of a well at the opposite end of the furnace.

Consumption of flux for melting magnesium in these units has been the same as previously was required for standard open-pot operation. Similarly the melting loss closely parallels that obtained in the more conventional methods of melting. Fuel efficiency is much better and would amount to about two-thirds of that used in open-pot melting. The outstanding feature of the open hearth operation, Mr. Nelson pointed out, is the very high melting capacity. The units in operation are capable of melting continuously at the rate of 4000 lb. of metal an hour.

Safety of operation is another notable feature, since the charging and preheating is all automatic and splatterings cannot reach the operator. Further, the likelihood of a runout is remote because the refractory construction is cold on the outside.

The field of use of the reverberatory, he continued, is in large-scale continuous melting of magnesium or alloy ingot or heavy scrap. In such a process it operates as a pre-melter for alloying or foundry operations. It is not considered suitable for the melting of fine magnesium or light scrap because of the difficulty of applying adequate mechanical puddling and the development of the large amounts of sludge or dross that accompanies the processing of these materials.

Protection during melting and holding is provided by the open-pot type flux. Ultimate refining of the metal is accomplished in open-pot or crucible process that follows.

The die-casting process makes use of a flux, 57 KCl, 28 CaCl₂, 12.5 BaCl₂ and 2.5 CaF₂, that gives no surface protection but is used only for refining the metal. Surface protection in this method comes from the use of a sulphur dioxide atmosphere, which is maintained in a closed dome over the pot. Only a very little flux is used as protection during melting down and this is stirred through the metal for refining. After a few moments of quiet standing, this flux together with agglomerated oxides and dross, sinks to the bottom of the pot and is removed with the sludge.

The melting and refining of die-casting scrap presents a special problem since a certain proportion of

carbonaceous materials, lubricants and other impurities are present on the scrap. Using the flux described for the die-casting process is not satisfactory as a reddish scum or film of the carbonaceous material seems to stay suspended throughout the metal. This behavior is eliminated through the melting of such scrap in open pots or crucibles using the crucible-type flux. This flux has the necessary characteristics to agglomerate the carbonaceous film and refine this material.

The melting and refining of crystalline magnesium, the product of the ferrosilicon-dolomite reaction, is somewhat difficult, Mr. Nelson said. It is finely divided and hence oxidizes readily. Furthermore, a variable and sometimes appreciable amount of oxide, nitrides and other impurities are occluded with the crystals. Because of these more care must be exercised during the melting of the crystals to use a fluxing technique that will not permit oxidation. Normally this is done by charging the crystals into a "heel" of molten metal purposely left over from a previous batch, or into a bath of melted flux in the bottom of the pot. Liberal quantities of the same flux are dusted over the solid charge and as often as required to prevent the start of oxidation. The crystals are puddled into the metal or flux bath as rapidly as possible. After the charge has all melted down, more flux is added and stirred thoroughly through the bath, in order to separate the oxide and dross inclusions.

If the crystals are particularly clean and free from oxide and other undesirable materials, it may be sufficient to proceed with the normal alloying processes, followed by stirring of the fluxes through the bath and finally settling out of the dross and sludge and pouring of the refined alloy into ingots or castings.

If the crystals contain a large amount of oxide, or appreciable oxidation takes place during the melting, it is desirable to allow a few minutes of quiet settling and then dip from the bottom of the pot as much of the dross and oxide as possible before proceeding to the alloying and refining steps.

The magnesium crystals usually are relatively low in iron content but may contain sodium, potassium, calcium and sometimes silicon as impurities. For all practical purposes, all except the silicon are removed by reaction with the flux in the melting and refining process. The iron content, however, will tend to increase

up to the saturation value if melted in steel pots. The iron may be precipitated after the principal alloying materials have been added, usually by the addition of manganese to a saturation value for a temperature above that at which the metal is to be poured. When manganese is present up to its solubility value, particularly in the presence of aluminum, iron is greatly reduced in solubility or tendency to stay in suspension, and is rapidly precipitated to the bottom of the pot.

Manganese is introduced as manganese chloride or either Dow's No. 250 or 320 manganese flux, the former if the process is carried out in an open-pot and the latter if in a crucible.

The grain structure of magnesium and its alloys can be markedly refined by a superheating treatment of 200 deg. to 400 deg. F. above the melting point. In this behavior, it is considered to be much like cast iron, and the theories and hypotheses used for the explanation of the behavior of cast iron may be applied to magnesium with the substitution only of the alloy and the type of impurities.

Superheating effects may be obtained as low as 1500 deg. F. but the time required at this temperature is rather long, being several hours. As the temperature of superheating is raised to about 1700 deg. to 1750 deg. F., the time required to get the effect gradually drops off to approach zero.

Fluxes in Magnesium Refining

INASMUCH as all melting and refining processes for magnesium and its alloys require the use of fluxes, C. E. Nelson of the Dow Chemical Co.'s metallurgical department emphasized their unique characteristics and proper use in his paper on "Melting and Refining of Magnesium."

Four main types of melting were discussed: Open-pot; crucible; reverberatory, and die-casting. The open-pot method makes use of a flux having the composition 55 KCl, 34 MgCl₂, 9 BaCl₂ and 2 CaF₂. The flux provides protection during melting. It is stirred through the molten metal bath and agglomerates oxide or similar foreign bodies; then on quiet standing separates away, leaving the refined metal ball floating in an encircling layer of molten flux. It forms only a thin fluid film over the surface of the molten metal, which may be parted for hand ladling processes and tends to cover the metal again after the ladle is removed.

The open pot method is used generally in the following process: 1. Alloying and secondary smelting in the production of magnesium ingots; 2. in sand foundries for pre-melting and to a lesser extent for the production of small castings requiring hand ladling; 3. in permanent mold foundries for pre-melting and also direct ladling to castings; 4. for continuous methods of preparing metal in the production of billets or ingots from which wrought products are fabricated, and 5. in general scrap recovery.

For the crucible process of melting and refining magnesium, a flux is

used that is thinly fluid at the start and then dries out or thickens to leave a protecting crust on the pot surface until the time of casting. Such a flux contains 20 KCl, 50 MgCl₂, 15 CaF₂ and 15 MgO. When pouring, the crust can be readily skimmed off or held back, so that the molten metal is not contaminated with the flux.

Crucible melting is used principally in sand and permanent mold casting as a single step melting, refining and pouring operation, or more commonly as a second step following the transfer to a casting crucible of molten metal from pre-melting units like large open pots or tilting crucibles. It is also used in the batch method of melting, alloying and pouring billets or ingots from which wrought products are fabricated and in the refining of die-casting scrap.

Successful experiments in melting magnesium in the resistor-heated type of Detroit electric rocking furnace led to further experiments with a reverberatory hearth furnace having a capacity of 1500 lb. of magnesium and using oil and gas as fuels. Based on these preliminary experiments, a furnace with a capacity of approximately 12,000 to 20,000 lb. of magnesium was put into use. This furnace has operated for about two years and during that time six more similar furnaces have been placed in service.

Below the metal line these furnaces are lined with a refractory that is relatively non-reactive with the fluxes and the magnesium. Linings with the longest service record are of Tercod, a carbon-bonded silicon carbide refractory having a carbon facing next to the metal bath. The walls and roof are of high-grade firebrick.

Bureau of Mines "Baby"—Electrolytic Mn

ELECTROLYTIC manganese production capacity in this country is approximately 5 tons a day, R. S. Dean, assistant director of the Bureau of Mines, reported in "The Present Status of Electrolytic Manganese and Its Alloys." It has been used in magnesium alloy bomb casings, stainless steel tests, by the Mint for new nickels and has been sent to England under lend-lease principally for addition to aluminum alloys.

Present practice, as carried out at the Boulder City project, starts with a manganese dioxide ore containing about 20 per cent manganese which is reduced to MnO. The MnO is dissolved from the ore in spent electrolyte which contains about 38 to 47 grams per liter of free sulphuric acid, 135 grams per liter of ammonium sulphate and 10 to 12 grams per liter of Mn as sulphate. In the leaching step the manganese is built back up to 32 to 36 grams per liter of Mn as sulphate; the pH is adjusted to neutral by gaseous ammonia and passed through thickeners. The electrolyte is purified by adding H₂S which precipitates the heavy metals. After filtering, ferrous sulphate is added to the solution and oxidized with air and the solution is filtered and clarified on a pre-coat filter.

The purified catholyte is electrolyzed in a diaphragm cell using stainless steel cathodes and lead-silver anodes. Current density is about 45 amp. per sq. ft. Current efficiencies of 60 to 65 per cent are regularly obtained. The brittle manganese is stripped from the cathode by bending. The stripping efficiency, in good weeks, has reached 94 or 95 per cent.

The average for a year has been 82.5 per cent. The reduction step has been carried on satisfactorily in either a Skinner muffled-hearth furnace or a Taylor multitube furnace. With either, direct addition of oil is a satisfactory reducing agent.

The manganese is substantially pure, except for 0.03 to 0.07 per cent sulphur.

An interesting use of electrolytic manganese is in an age-hardening alloy of approximately 60 per cent copper, 20 per cent manganese and 20 per cent nickel. This alloy is being rapidly commercialized. Its hardening range (from 80,000 soft to 180,000 hard) and fatigue strength (60,000 lb. per sq. in. for 108 cycles) are substantially greater than that of beryllium copper.

The price of electrolytic manganese has held back the demonstration and utilization on a substantial scale of its possible advantage in ferrous alloys. Experiments undertaken by the Bureau of Mines indicated a recovery of manganese in furnace additions to stainless steel of 87.8 per cent compared with 84 per cent for low carbon ferromanganese and for ladle additions 89.9 per cent, compared with 72.7 per cent for low carbon ferro. There was no measurable increase in the carbon or phosphorus content of the heat. Recovery of manganese was more consistent from heat to heat than when using ferromanganese and because of the convenience of handling, weighing and shoveling, electrolytic manganese and the smaller bulk and weight of the addition, the time required to prepare a heat for tapping is shortened.

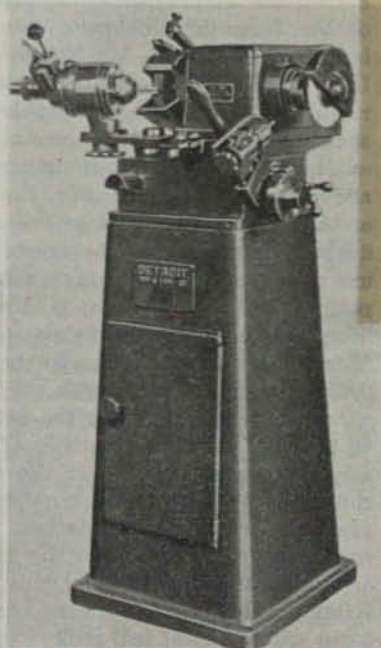
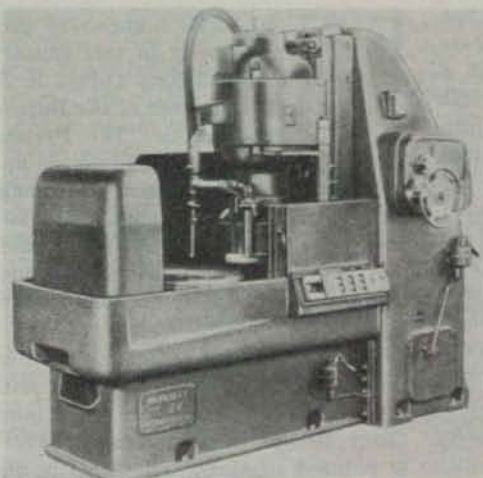
New Equipment . . .

Machine Tools

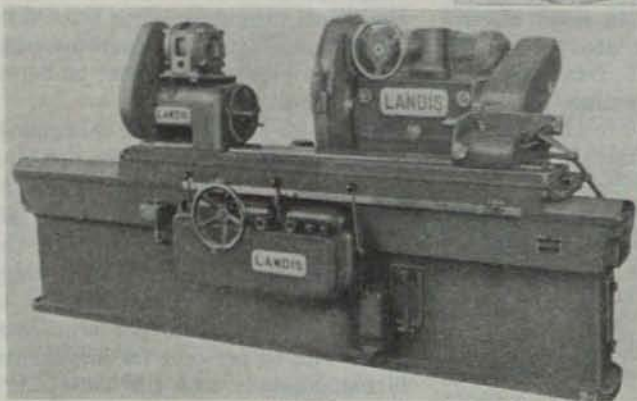
. . . Recent developments in production and tool grinders, boring mills, Swiss type automatics, gear shavers and other units are described and illustrated in the following pages. Other machine tool developments will be described next week.

THE wheel feed mechanism on the 10 and 14 in. Type CH plain hydraulic grinders put on the market by Landis Tool Co., Waynesboro, Pa., has been redesigned. Accurate setting for the hand feed is provided by a large micrometer ring at the rear of the feed-up handwheel. Graduations on the ring are normally read in thousandths in terms of work diameter reduction, but a simple adjustment permits graduations to be read in "tenths." The wheel feed is automatically reset at the end of each grinding cycle without changing the position of the wheel feed handwheel. Hydraulic straight infeed, supplied only on order, retains the automatic wheel feed feature. Stroke of the infeed is adjustable from 1 to 3½ in. and slow feed from 0 to 0.120 in. on the work diameter. An automatic compensating device prevents changes in oil viscosity from influencing accuracy of feed. A hinged hood at the front of the wheel guard is adjusted inward as

proportions are said to be considerably heavier and stronger than conventional type machines of equal capacity. The 30-in. rotary magnetic chuck is equipped with a Neu-T-Rol demagnetizing switch and is traversed into grinding position by push-button control. The grinding wheel head has hand, power or automatic trav-



spindle assembly is mounted on large dovetail ways in the pedestal base. The tap chamfering unit is of the precision collet type and will accommodate collets from the smallest machine screw size up to the 1¼ in. standard tap shank size, including long shank taper taps.



erse with power being furnished by a 2-hp. 900 r.p.m. motor, while the coolant pump is driven by a ½-hp. motor. The grinder is equipped with an ammeter for determining the cutting action of the grinding wheel.

Tap Reconditioner

A NEW spindle head that accommodates interchangeably a wide range of motor types for various service voltages, phases and frequencies has been added to the tap reconditioner marketed by the *Detroit Tap & Tool Co.*, 8432 Butler, Detroit 11. Standard motors are 220 to 440 volt, 3 phase and 110 volt, single phase for either 25 or 60 cycle service. The

the wheel wears down. Smooth headstock face plate rotation is assured through anti-friction bearings and an all multiple V-belt drive. A wheel truing bar with micrometer adjustment is built into the footstock base.

Surface Grinders

THE No. 24 vertical spindle rotary surface grinder has been brought out by *Hanchett Mfg. Co.*, Big Rapids, Mich. The structural

Precision Thread Grinder

THE RU-2 high precision thread grinder manufactured by *Societe Genevoise*, Geneva, Switzerland, grinds internal and external threads and is equipped with a micrometer stop which permits setting to 0.00005 in. Both wheel and work profiles may be inspected as to angle and radius by means of a microscope, which may be tilted out of the way. The wheel truing device is manually operated and has a dial gage reading to 0.0001 in. A temperature compensator permits variation of the pitch of the threads ground, to allow for the cooling effect of the coolant supply. The compensator works in conjunction with a device which automatically corrects for error in pitch of the lead screw. The external grinding wheel is 10 in.

Basic Magnesium at Capacity In Output of Critical Metal

Last of 10 Units to Be Installed in Great Plant Is Turning Out Its Quota of Vital Mineral

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Unit No. 10 of the world's largest magnesium plant was "cut in" on the morning of Friday, June 25, and on the following morning it was producing metallic magnesium, following the standard 24-hour cycle involved in the process.

First unit of the BMI plant went into production on August 30, 1942, and it was pointed out by the Las Vegas Review-Journal that since that day one unit per

month has been completed and has started producing metal for incendiary bombs, airplanes and other war uses.

The rated capacity of the plant is 15 tons of metal per unit per 24-hour period, for a total of 150 tons per day. The plant is exceeding its rated capacity daily, but no figures are available for publication on the total production at present.

When the tenth unit was started officials of the company who were present included: F. O. Case, general manager; H. C. Satterthwaite, assistant general manager, and V. E. MacDonell, chief engineer.

Four men were present who have assisted with cutting in each of the 10 units now in operation. They were: J. R. Coulter, superintendent of production; H. H. "Red" Gillings, electrical superintendent; Art Newell, superintendent of metal plants, and Frank Woodman, superintendent of the electrolysis plant.

The progress of the BMI plant construction has been rapid, as first soil tests were made September 2, 1941, and the first stake driven just one week later. Clearing of brush from the area was started September 11, 1941, and first excavation started October 29, 1941.

While construction at the plant is not yet completed, all necessary building to bring the 10 metal producing units into full operation has been completed. Remaining to be built are several permanent structures such as an administration building, which will be constructed of steel and concrete. Present temporary buildings will be razed when permanent structures are completed.

This construction program is expected to be completed by early fall.

Officials at the plant pointed out that attention had been directed to completion of structures necessary for the actual production of metal, and that all utilities and other preparations necessary for that purpose were given first consideration. Departments now housed in temporary buildings will be transferred later to permanent structures as soon as they are completed.

L.V. Review Journal
July 3, 1943

BMI Employees Get New Service

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Applications will be distributed among Basic employees next week with instructions as to the method of obtaining the new books, it was stated.

WEST COAST . . . OSGOOD MURDOCK

•Magnesium labor cauldron boils in Nevada desert heat . . . Lockheed puts P-38 on moving assembly line . . . Cast iron pipe industry forms basis of post war speculation.



LOS ANGELES—If you think the Athletic Club steam room in July is the hottest spot in the country, you ought to try Las Vegas, in the southern tip of Nevada, sometime this Summer. You won't sweat as much in Vegas, because the heat is dry, desert air, but you will have

A photo of a new West Coast blast furnace appears on page 106.

other attractions such as wide open gambling and bourbonless bars, interspersed in equal proportions, and women completely tarnished except for the gleam in their eyes.

The mystery is not that there is a labor problem in this desert boom town sired by Boulder Dam, but that anyone at all can be found to work there, what with the lack of air cooling in half the government cracker-box housing. A labor problem there is, hot like the weather, constantly boiling, and ready to blow the lid at any moment, crippling production at Uncle Sam's fair haired colossus of magnesium production, Basic Magnesium, Inc.

During the period when the big plant was under construction, some 12,000 or 13,000 workers descended upon the bewildered desert town, barely recovered from the sudden fame descended upon its doorstep by the construction of Boulder, née Hoover, Dam. Some of the BMI construction workers were hangers-on from the dam construction days who hadn't had enough energy to get out

of the place, some were of the booming breed of the west's openest town, some were drained from the still less attractive mining camps, and still others were migrants from the Middle West originally labeled "California or Bust," who had busted at Vegas. No one was busted long, though, for wages were high, in the best construction camp tradition. As construction tapered off early this year, many of the workers switched their time cards from the construction companies to the Basic Magnesium clock itself, which by this time was wound by Anaconda instead of the Howard Eels' interests.

The old-time construction workers, turned factory hands, had lineal allegiance through the construction trade to the AFL, while CIO's blood flowed in the veins of those who had come from the mines and smelters. By the time the National Labor Relations Board got around to holding an election, tempers were hot. CIO carried the poll by eight votes out of about 2000. With its peculiar talent for starting disputes rather than ending them, the NLRB ruled that employees of the semi-monthly payroll could not vote, even though they held the union card. Insofar as the AFL is concerned, the CIO eight vote victory means nothing at all. A protest has been registered, and the general AFL temper seems to be that if it is not heeded, members will walk off the job, leave for the California seashore, and let the Anaconda management work out with the NLRB the problem of attempting to inveigle a new crew into the desert in mid-Summer.

Every responsible government official charged with keeping the situation under control has been having alternate chills and fever, and military representatives have been expounding with zeal the importance of unbroken magnesium production, while holding the big stick of selective service in the background.

GENERALLY speaking, Pacific Coast employers have an advantage over those in other parts of the country in that they are dealing with union leaders, both CIO and AFL, who are better than average in ability and definitely superior in their control over the actions of their membership. Consequently, production has not suffered in this area as a result of the unrest of organized

labor to any great extent. This factor is balanced off, however, by the great gaps between wage scales in shipbuilding and those of other vital industries. The lesser workers in the lesser paid industries naturally are restive under their wage inferiority, and a wage decision favoring the United Mine Workers might easily change the entire equal complexion, setting off major trouble in the aircraft, lumber, mining and smelting industries.

Despite their industry-wide superiority, AFL metals trade workers, labor participants in the Coastwide shipbuilding wage agreement, will probably attempt to squeeze out a little higher scale in pending negotiations. They correctly maintain that the terms of their agreement, signed two years ago, tying their wages to a cost of living index, provide for a raise at this time. Knowing when they are well off, they probably would settle condescendingly for 5c. per hr. additional. Shipyard union leaders maintain that housing and living conditions at most West Coast shipyards are comparable to construction camps, and that a higher wage scale is justified. The argument is not an easy one for the unions to defend, for all Coast industrial workers are in the same boat as to living conditions.

AT Seattle, Boeing Aircraft suspended 159 skilled workers in its tool and die shops last week for three days for refusal to punch company time clocks. So stringent is the Seattle labor shortage that some of the workers were given temporary work clearances by the U. S. Employment Service and accepted three day jobs in other war industries.

At Sunnyvale, Cal., a petty squabble between International Association of Machinists Local 68, always a bad actor, and Joshua Hendy Iron Works, a Kaiser satellite, building engines for the Maritime Commission, almost set production on its ear. The question involved was whether the management had the right to order ten hour work shifts.

As school was out June 26 here in Southern California, so many doting mothers rushed home from their jobs in the aircraft plants that the Aircraft War Production Council declared that "production of warplanes is threatened with serious impairment." Six out of every ten new

BMI to Carry Out Building Program

A portion of the construction work undertaken by McNeil Construction Company for Basic Magnesium, Inc., will be completed about July 31, but the construction company will not be leaving the Basic job until about the middle of October.

Work now under way includes the gigantic ventilating systems being built above the ten units of the great chlorination plant, which will practically double the height of the seven story buildings.

A four-million dollar project for which the money is now available will be carried out by the BMI organizations and will include a group of permanent administration buildings, all administration work to date having been directed from the temporary buildings.

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IRON AGE

Philadelphia, Pa.

JUL 8 1943

WEST COAST

employees hired at the aircraft plants now are women. The area still is desperately short of adequate child care facilities.

The new continuous moving assembly line put in operation last week at Lockheed will double production of P-38 interceptors within the next 60 days and cut manhours per plane 40 per cent, the company claims. The changeover to the new line was accomplished over a period of nine days, during which the P-38's were built on a temporary, open air assembly line while the assembly hangar could be emptied of planes and parts.

THE Ironton No. 2 furnace of Columbia Steel Co. at Provo, Utah, was blown in last Thursday and is now producing pig. This furnace is the second to be blown in in the far West in a little over six months, and means that three furnaces now are producing iron in the far West. Ironton No. 2 is rated at 900 tons daily capacity, and was

moved from Joliet, Ill., by the Defense Plant Corp. where it had been idle. It was largely rebuilt and redesigned when re-erected at Provo. Columbia's No. 1 Ironton 600 ton stack was built some 20 years ago, and until the twilight of 1942 was the only blast furnace in the far West. No steel facilities exist at Provo, and approximately 75 per cent of the pig iron produced at Provo has been shipped to Coast plants of Columbia Steel Co. in the San Francisco and Los Angeles areas, with some foundry grade being marketed. The balance of Provo production has been taken by the neighboring plants of Pacific States Cast Iron Pipe Co., which has been lately pressed to capacity, not only because of wartime demands, but because their principal competitors at Birmingham and on the eastern seaboard have been handicapped by the discontinuance of water shipments. Much cast iron pipe still is being shipped all-rail to the Coast, however. In examining the problem which will be faced by the Utah steel plant after the war in competing with shipments

from the East by water, the prewar history of the Pacific States Cast Iron Pipe Co. might well be examined as a laboratory specimen. Over the years, Pacific States has added a number of specialty items to its line when demand in its restricted sales territory warranted. These have included high pressure pipe, hydrants, valves, fittings, and special associated, products.

Every thorough study of the problem of how to utilize excess pig iron capacity on the Coast in the post war period has hinted cast iron pipe production, possibly in cooperation with either United States Cast Iron Pipe & Foundry Co., or the American Cast Iron Pipe Co., both of which maintain active sales organizations here. In the better prewar years, probably 120,000 tons of cast iron pipe were sold on the Coast annually, the bulk of it in four, six, eight and twelve in. sizes. That tonnage, supported by growing demand in areas of increasing population, could form a nice cushion for a distressed pig iron producer.

BMI to Carry Out Building Program

A portion of the construction work undertaken by McNeil Construction Company for Basic Magnesium, Inc., will be completed about July 31, but the construction company will not be leaving the Basic job until about the middle of October.

Work now under way includes the gigantic ventilating systems being built above the ten units of the great chlorination plant, which will practically double the height of the seven story buildings.

A four-million dollar project for which the money is now available will be carried out by the BMI organizations and will include a group of permanent administration buildings, all administration work to date having been directed from the temporary buildings.

CHEMICAL INDUSTRIES

"Devoted to economic and business problems of making and marketing, buying and using of chemicals."

New York City

FEB 1944

Trademarks of the Month

A Checklist of Chemical and Chemical Specialties Trademarks

404,824. Great Lakes Varnish Works, Inc. Chicago, Ill.; filed Aug. 31, 1942; Ser. No. 455,206; for coating; since June 26, 1942.
 404,861. Rex Chemical Co., Chelsea, Mass.; filed Oct. 15, 1943; Ser. No. 464,185; for wax and polish; since Sept. 1938.
 404,970. Wood Treating Chemicals Co., St. Louis, Mo.; filed July 19, 1943; Ser. No. 462,171; for preservatives; since Nov. 1, 1940.
 437,238. Corning Glass Works, Corning, N. Y.; filed Oct. 24, 1940; for glass; since May 14, 1940.
 441,279. Caled Products Co. Inc., Cottage City, Brentwood, Md.; filed Mar. 6, 1941; for detergents; since Sept. 12, 1940.
 457,505. Phenoglazed Ltd., Croydon, England; filed Dec. 18, 1942; for waterproofing, hardening composition; since Jan. 26, 1940.
 458,089-90. F. F. Chretien & Co. Ltd., Bombay, India, London, England; filed Jan. 23, 1943; for mica; since 1917.
 459,002. George Gallowhur; filed Mar. 10, 1943; for seasickness; since Oct. 3, 1941.
 459,502. The Tremco Mfg. Co., Cleveland, O.; filed Mar. 29, 1943; for leak and rust proofing joints; since Mar. 7, 1928.
 460,039. Union Bag & Paper Corp., N. Y.; filed Apr. 20, 1943; for oils; Apr. 12, 1943.
 460,295. Hart Products Corp., N. Y.; filed Apr. 30, 1943; for finish; since Jan. 1943.
 460,948. Edwin Barrese, Somerville, Mass.; to Gold Cap Chemical Co., Inc., Somerville, Mass.; filed May 27, 1943; for germicide, disinfectant; since Mar. 22, 1943.
 461,054. Perfect Power Corp., Chicago, Ill.; filed May 31, 1943; for lacquers, varnish, paints; since Feb. 24, 1943.
 461,394. Stauffer Chemical Co., San Francisco, Calif.; filed June 14, 1943; for soil sulfur; since 1884.
 461,922. Ferro Enamel Corp., Cleveland, O.; filed July 8, 1943; for vitrified matte enamel finishes; since Apr. 4, 1943.
 462,143. Darlington Veneer Co. Inc., Darlington, S. C.; filed July 17, 1943; for plywood; since May 15, 1943.
 462,196. B & B Toilettries, Chicago, Ill.; filed July 21, 1943; for mosquito and chigger repellent cream; since June 15, 1935.

462,240. United Gilsonite Labs. Scranton, Pa.; filed July 22, 1943; for roof paints and paint pigments; since June 1, 1932.
 462,688. Vladimir Petcoff, Detroit, Mich.; filed Aug. 12, 1943; for cleaner for metals, machinery and hands; since June, 1942.
 462,886. Penn-Champ Oil Corp., Butler, Pa.; filed Aug. 20, 1943; for dry cleaner; since June 30, 1935.
 462,955. Standard Oil Co., of California, Wilmington, Del.; filed Aug. 23, 1943; for asphaltic primers; since Aug. 9, 1937.
 462,966. The Dow Chemical Co., Midland, Mich.; filed Aug. 24, 1943; for films of vinylidene chloride; since Aug. 3, 1943.
 463,170. The General Tire & Rubber Co., Akron, O.; filed Sept. 2, 1943; for synthetic molded rubber channel, gaskets, sealing strips; since Aug. 2, 1943.
 463,281-2. Joseph Wexler as Atlas Paint and Varnish Co., N. Y.; filed Sept. 8, 1943; for paints; since June 11, and May 27, 1942.
 463,314. Crossett Lumber Co. as Crossett Paper Mills, Crossett, Ark.; filed Sept. 10, 1943; for sulfate paper; since Aug. 1937.
 463,318. A. Gusmer, Inc., Hoboken, N. J.; filed Sept. 10, 1943; for cleanser for copper, bronze and brass; since Aug. 23, 1943.
 463,338. Trojan Products & Mfg. Co., Chicago, Ill.; filed Sept. 10, 1943; for absorbent mineral compound; since Jan. 1942.
 463,521. The Klensold Corp., Philadelphia, Pa.; filed Sept. 20, 1943; for removing and preventing boiler scale; since Apr. 6, 1942.
 463,523. The Klensold Corp., Philadelphia, Pa.; filed Sept. 20, 1943; for removing preventing boiler scale; since June, 1942.
 463,737. Marathon Paper Mills Co.; Rothschild, Wis.; filed Sept. 28, 1943; for bonding agent; since July 1, 1943.
 463,854. Acme Chemical Co., Milwaukee, Wis.; filed Oct. 4, 1943; for wax; Oct. 1931.
 463,856-7. Acme Chemical Co., Milwaukee, Wis.; filed Oct. 4, 1943; for cleaning; Feb. 1, 1933 and Jan. 1, 1927.
 463,875. The Petrol Corp., Los Angeles, Calif.; filed Oct. 4, 1943; for gasoline; since Jan. 30, 1941.
 463,931. Lambert Pharmacal Co., Wil-

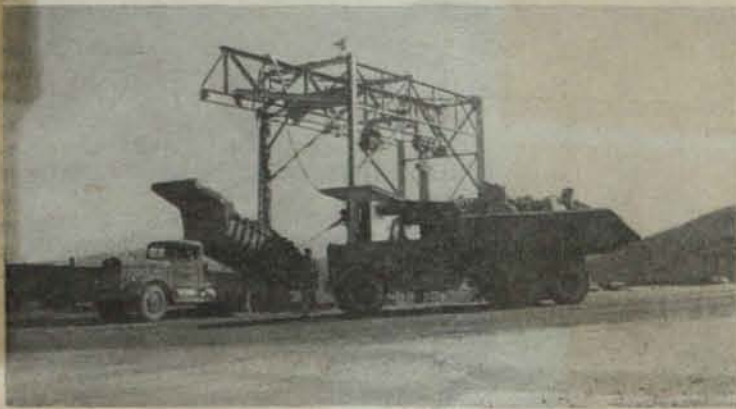
mington, Del.; filed Oct. 6, 1943; for chlorinated water tablet; since Sept. 24, 1943.
 464,022. Lehn & Fink Products Corp., Bloomfield, N. J.; filed Oct. 9, 1943; for hormone preparations; since Aug. 17, 1943.
 464,062. Natural Gas Odorizing Co., Baton Rouge, La.; filed Oct. 11, 1943; for odorizing natural gas; since May 1, 1942.
 464,105. The Dicalite Co., Los Angeles, Calif.; filed Oct. 13, 1943; for dehumidifying air and other gases; since Sept. 10, 1943.
 464,132-3. Geigy Co., Inc., N. Y.; filed Oct. 14, 1943; for insecticides; since Sept. 16, 1943.
 464,142. William Peters, as Sheik Products Co., Freeport, N. Y.; filed Oct. 14, 1943; for shoe polishers; since Nov. 1937.
 464,212. Basic Magnesium Inc., Las Vegas, Nev.; filed Oct. 19, 1943; for melting and refining fluxes; since Aug. 23, 1943.

LAK-KOTE 404,824	STEADY 459,002	Hi-Chemroc 461,922	Saranfilm 462,966		Biotol 464,022
Spencer 404,861	PERMAJOINT 459,502	PERMAWOOD 462,143	GENDIA 463,170		captan 464,062
	UNITOL 460,039	ROBERTA 462,196	HOTELOSOLE 463,281		HUMIDCO 464,105
VYCOR 437,238	KOPANIZED 460,295		Sherlacole 463,282	MARAND 463,	NEOCID 464,133
BRUSH-OUT 441,279		FAST-TO 462,240		ACME SNE 463,8	SHEIK 464,142
PHEENOGLAZE 457,505	Telex 461,054			DISHZE 463,85	
BATTLEAXE 458,089		Aunt Sue's 462,886	"PETROL P.M." 463,875	LUSTEN 463,85	TARTOX 464,259
	Stauffer 461,394	PETROLASTIC 462,955	AQUA-LIC 463,338	S.C.I. 463,931	Easy Way 464,265

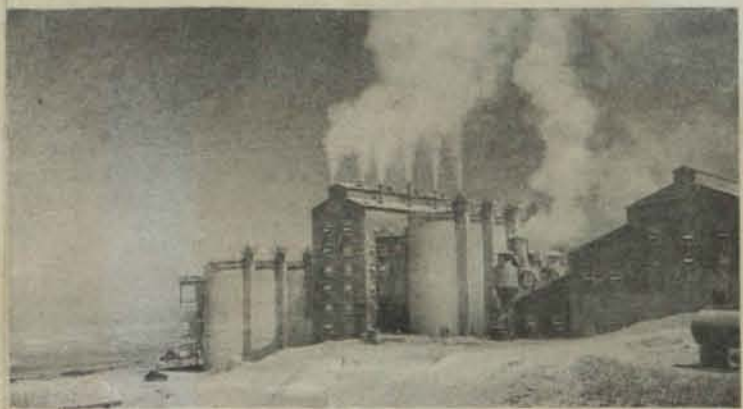


THE STORY OF BASIC MAGNESIUM, INC. IN PICTURES

Plantsite of the world's largest magnesium plant, Basic Magnesium, Inc., near Las Vegas, Nevada. The entire project was constructed in less than two years, but required more than 28 million man-hours of labor. Basic Magnesium claims to be the largest refractory brick job in the world, the largest sheet metal job ever undertaken, the largest plumbing installation in the history of the industry, and the largest electrical installation in the world. Basic Magnesium is said to have required an investment of \$150,000,000, funds being provided by Defense Plant Corporation. In October 1942, Anaconda Copper Mining Company purchased the controlling interest in BMI and took over the management of the company. Under the direction of F. O. Case, general manager, and H. G. Satterthwaite, general superintendent, the project was rushed to completion. Already production is well above rated capacity.



(Above)—Crude magnesite for the project is mined at Gabbs, Nevada. Here are two of the 20-ton ore trucks doing business at the primary cone crusher which takes an entire truckload at one gulp. From the primary crusher the ore is carried to the mill by conveyors. (Below)—Magnesite concentrates, calcined magnesite, coal, and peat moss are mixed in a dry state, then magnesium chloride solution is added. From this mixture cakes of magnesium are extruded, cut in slabs, and passed through gigantic drying kilns. Here are the cakes of raw material after they have passed through the kilns.



(Above)—This is the mill at Gabbs, the structure at the right housing flotation equipment and primary driers. In the seven-story building in the center, a battery of roasters, building high, calcine the magnesium oxide. The "silos" at the left store the processed oxide prior to shipment to Las Vegas. The Gabbs plant produces 400 tons of calcined product daily. (Below)—To make magnesium BMI must first produce chlorine. This is done by the electrolysis of brine. Basic's chlorine plant comprises 900 Hooker-type cells, a portion of which are shown in the picture. Caustic soda is a by-product.



STOCKS AND PRODUCTION OF SLAB ZINC REACH NEW HIGHS

WITH the lifting of censorship on metal production figures, the American Zinc Institute has resumed its reports to industry. The current release brings the records up-to-date since it contains not only the latest, but also the past figures issued during the censorship, as well as yearly averages starting with 1929.

According to the table issued, stocks of slab zinc of all grades at the end of November 1943 were the greatest reported at any time and totaled 159,853 tons. This is in marked contrast to the situation at the beginning of 1941 and again in June of 1942 when total stocks were 17,582 tons and 18,447 tons, respectively. The tabulation of unfilled orders also shows the altered position of the zinc supplies with only 42,151 tons of unfilled orders at the end of November, compared with a high of 125,132 tons at the end of 1940 and 110,552 tons in January 1942.

Commencing with 1940, the accompanying table includes the production from

foreign ores. Thus the report reflects the total output of slab zinc of all grades, as reported by all producers represented in the membership of the American Zinc Institute.

FIGURES ON COPPER OUTPUT AND CONSUMPTION RELEASED

ESTIMATES based on statistics released by the United States Copper Association indicate that the copper consumption in 1943 will treble that of 1938 while domestic production of refined copper will almost double the output of that year. Refined production for the first 11 months of 1943 amounted to 1,102,227 tons (of 2,000 pounds each), and for the entire year, with December production estimated, the output will top 1,200,000 tons by a comfortable margin.

In 1938, refined production was reported at 638,076 tons. In 1940 it crossed the million-ton mark, reaching 1,033,710 tons. In 1941 a slight increase to 1,065,667 was made. The rate of increase was accelerated in 1942 to attain a total output of 1,135,708 tons.

The highest monthly rate in 1943 was recorded in July when production totaled 105,589 tons. During August, September and October, three successive declines occurred, bringing the October total down to 97,274 tons. The trend was reversed in November when a production of 102,136 tons was reported.

Publication of these production figures has been made possible through recent action by WPB and the Office of Censorship in lifting a ban which had been in effect since the start of the war. The action was taken since knowledge of these figures no longer "offers comfort to the enemy," but will be of assistance to industry in making plans for the future.

The Copper Associates also has released figures on net domestic consumption which, of course, is running considerably in excess of production, the difference being made up through imports. For the first 10 months of 1943, consumption totaled 1,437,769 tons for a monthly average of 143,777 tons. The annual total is estimated at 1,700,000 tons. These figures compare with a 1938 total consumption of 526,743 tons, and a 1942 rate of 1,517,983 tons.

Comparison of production and consumption totals, states the organization, gives only an incomplete picture of the current situation since no complete import and inventory figures are as yet available. Industry stocks, including those in hands of consumers, were estimated at 410,000 tons. However, it is pointed out, no true inventory picture can be given without knowledge of copper in government stockpiles and stocks in fabricators' hands, particularly in semi-finished forms.

ARMY DEMANDS MAINTENANCE OF SIX-MONTH COPPER RESERVE

WASHINGTON officials report that the army has insisted that a six-month stockpile of copper must be maintained as a safeguard against adverse developments in the submarine warfare. Any substantial increase in the submarine menace, it is stated, might jeopardize the supply routes over which copper requirements are shipped from South America. It is pointed out that the six-month minimum requirement specified by the army represents a considerable reduction from the two years' supply originally demanded by army officials.

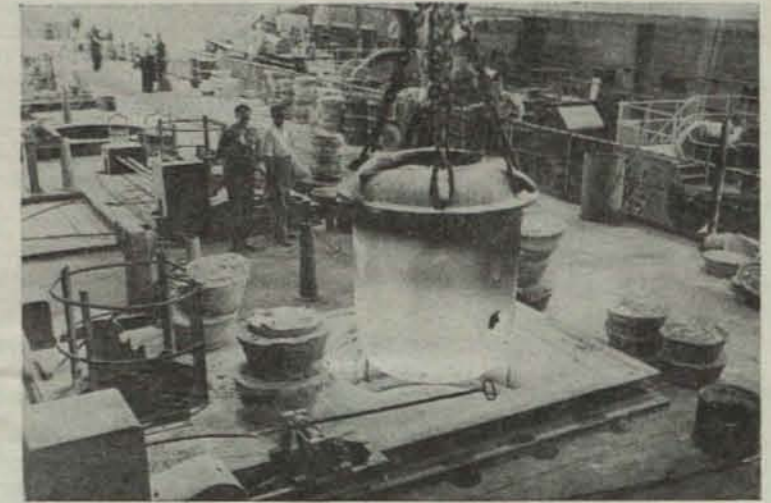
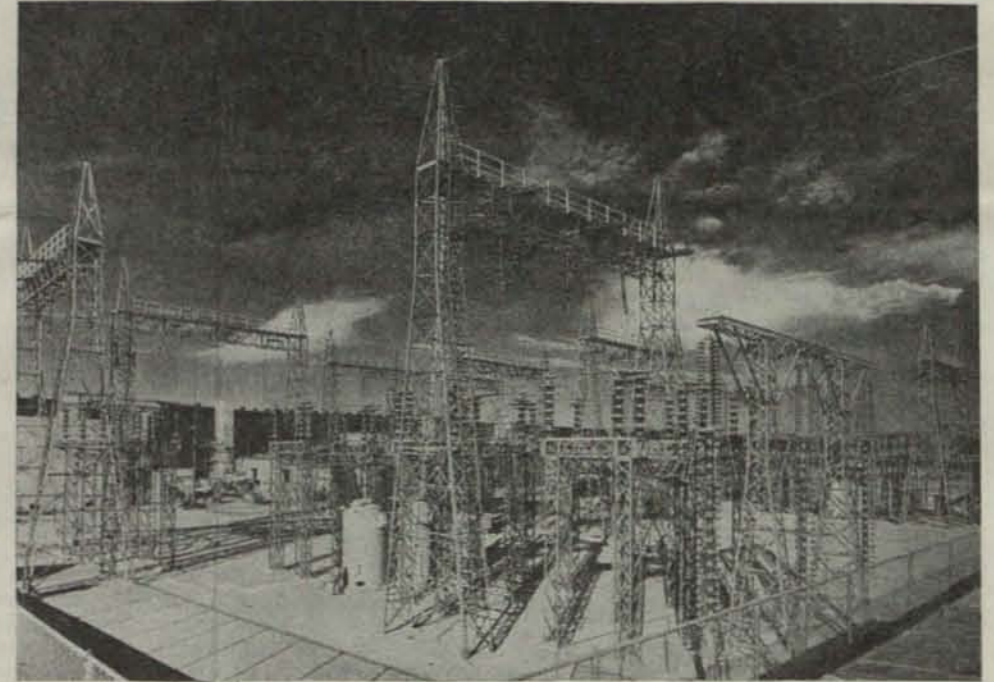
The present stockpile, according to WPB officials, amounts to only one month's supply, and if consumption continues at the present rate it will take until the end of the year to build up the desired six-month emergency reserve. Therefore, it is deemed likely that allocation of copper for civilian use will continue to be scanty throughout the year, despite the general easing up of copper, steel, aluminum, and other metals.

Although the cut-backs in small arms ammunition programs, and in other lines of war production in which copper is used, have served to ease the copper situation considerably, the reductions have been largely offset by stockpile requirements of the army and by the expanded demand for copper wire.

TOTAL SLAB ZINC SMELTER OUTPUT (ALL GRADES) 1929-1943 (Tons of 2,000 Pounds)

Year	Stock at Beginning	Production	SHIPMENTS		Unfilled Orders End of Period	Daily Av. Prod.
			Export & Drawback	Total		
1929	46,430	631,601	596,249	6,352	602,601	18,585
1930	75,430	504,463	436,079	196	436,275	26,651
1931	143,618	300,738	314,473	41	314,514	18,273
1932	129,842	213,531	218,347	170	218,517	8,478
1933	124,856	324,705	343,762	239	344,001	15,978
1934	105,560	366,933	352,515	148	352,663	30,786
1935	118,005	431,499	465,687	59	465,746	51,186
1936	83,758	523,166	561,969	-----	561,969	78,626
1937	44,955	589,619	569,241	-----	569,241	48,339
1938	65,333	456,990	395,554	20	395,554	40,829
1939	126,769	538,198	598,972	-----	598,972	53,751
1940	74,262	706,100	674,615	88,165	762,780	125,132
1941	17,582	863,955	751,276	106,195	857,471	87,666
1942	-----	-----	-----	-----	-----	-----
Jan.	24,066	79,417	67,382	12,166	79,548	110,552
Feb.	23,935	73,579	60,070	14,818	74,888	109,260
Mar.	22,626	79,187	61,612	18,499	80,111	103,297
Apr.	21,702	77,170	63,955	12,358	76,313	98,885
May	22,559	79,545	67,311	16,346	83,657	84,809
June	18,447	75,124	56,892	9,125	66,017	80,104
July	27,554	76,441	59,250	12,159	71,409	65,518
Aug.	32,586	77,002	57,822	15,114	72,936	58,972
Sept.	36,652	74,285	51,461	9,429	60,890	49,289
Oct.	50,047	77,990	61,263	11,369	72,632	46,082
Nov.	55,405	77,171	57,481	9,846	67,327	45,989
Dec.	65,249	82,859	69,419	10,421	79,840	52,752
Total	-----	929,770	733,918	151,650	885,568	-----
Monthly average	77,481	61,160	12,637	73,797	Daily Average 2,547	-----
1943	-----	-----	-----	-----	-----	-----
Jan.	89,458	83,870	66,925	10,296	77,221	69,426
Feb.	96,107	76,667	66,552	8,210	74,762	66,920
Mar.	98,012	83,787	66,111	9,922	76,033	62,879
Apr.	105,766	81,057	73,131	5,650	78,781	60,260
May	108,042	82,399	75,225	4,201	79,426	60,212
June	111,015	78,865	68,271	5,920	74,191	57,879
July	115,689	80,249	67,549	3,229	70,778	51,819
Aug.	125,160	79,736	68,953	2,857	71,810	49,617
Sept.	133,086	79,361	68,180	980	69,160	49,147
Oct.	143,287	83,066	69,845	2,101	71,946	41,532
Nov.	154,407	80,579	73,364	1,769	75,133	42,151

Waters of the Colorado River, harnessed by Boulder Dam, furnish the electric energy for Basic Magnesium, Inc. Two transmission lines with a capacity of 230,000 volts each extend from the dam to the plant, 15 miles away. This forest of steel is the electrical "switchboard" of the plant. In all, more than 100 miles of copper cable weighing approximately 520 tons were strung; 178 steel towers erected; 70 substations constructed and massive 110-ton transformers installed. The main electrical distribution tunnel is almost a mile long and 14 feet wide. It houses the electrical cables which shunt off in substations to the various production units. Insurance against work stoppage because of power failures was the construction of two transmission lines, one of which is maintained as a stand-by. First electric power on the project was turned on May 17, 1942, when the plant and townsite water system went into operation, pumping water from the Lake Mead intake station to the two 15,000,000 gallon reservoirs. More than \$23,000,000 worth of U. S. Treasury silver was drafted for Basic Magnesium, Inc., to replace copper as electric bus bars.



(Above)—This picture shows one of the chlorinators being charged. The pellets of raw material fall into great electric furnaces where chlorine gas is introduced and the magnesium oxide is transformed into magnesium chloride, then transported to the electrolytic cells, 880 of them, where metallic magnesium is recovered by means of electro-chemical action. (Below)—This ingot pouring machine receives the crucibles full of hot metal, tips automatically, and keeps the outpoured magnesium alloy flowing steady into moving molds. At the end they drop into bins—a finished product, ready for manufacture into implements of war.

(Above)—Various alloys are made at the BMI refineries—for incendiary bombs, sheet magnesium, airplane parts, tracer bullets, and flares. This crucible, freighted with two tons of white-hot magnesium alloy, has just been lifted from the gas furnace and is being lowered into a cooler before being transported to the ingot pouring machine. (Below)—F. O. Case, general manager of BMI, presents an incendiary bomb made of Basic metal to Major Robert Morgan, pilot of the famed Memphis Belle, the flying fortress which made 25 trips over Germany. Major Morgan told BMI workers: "O. K. You made it and we'll deliver it."



Why Has War Production Dro

RECENT articles stressing the let-down in production of war materials throughout the United States appear to place the cause of this production decline on overconfidence. If one wished to arrive at the true reason for our production drop, and were not afraid to face the facts as disclosed by a careful analysis of the situation, he would find that our production failures are due entirely to three factors:

1. Red tape and failure of government officials to differentiate between a war worker and a non-essential.

2. The harassing of industry by bureaus and investigators.

3. Disruption of transportation for war workers and war production necessities.

A good example of how the first factor caused a production decline in mining is the following case. A miner, hauling much-needed manganese from a small operation, blew out a tire. He left his loaded truck standing and went to the board for a replacement. He was informed smilingly that the quota was out and he would have to wait his turn. The miner looked astonished and then remarked to a bystander: "I guess the country doesn't need manganese as badly as I thought. I can't leave my loaded truck on the highway and make expenses, so I'll have to dump the ore. I believe I'll close down the mine."

The above case is only one of many. It does not apply only to tires, but to any product necessary for the economical and efficient operation of a mine, industrial plant, plane factory, or shipyard. Even when all requirements for priorities have been fulfilled at an enormous time and money waste, no emergency plan has been developed to help the operator on war necessities.

The second factor interfering with war production is the constant harassing of industry by bureaus and investigators. Since this article is prepared especially for mining men, the references naturally will pertain to the mining industry. However, almost every industry engaged in actual war work has from one to a dozen incompetent investigators checking into its processes and operations. Practically all of the large operators are afraid of public opinion or government regulations, so dare not object to the continued interference to which they are subjected.

One large operator stated that there was no way of telling how much a sabotage agent had cost his operation in money, time, and efficiency. This agent had taken hours of the president's time, employees' time, and thoroughly disrupted the entire organization with his continual persecution. When he had finished, the plant was in worse shape for accidents and possible de-

*Globe, Arizona

The blame for lessened war production should be placed where it belongs, not on overconfidence, but on mismanagement in many phases of our war effort and on our failure to differentiate between what is essential and what is non-essential.

lays than before. The company dared not say anything, but had to take its whipping with a smile.

Another disturbance created by bureau red tape is the quantity of questionnaires which must be filed monthly with Washington. If the company fails to do this, it is threatened with disloyalty, with loss of its priority, or other dire consequences. Many of the inspectors cause no friction, although most of them are unfamiliar with the operation they are inspecting. The filing of forms, waste of time discussing various phases of work unfamiliar to the inspector—and thus we have loss of time for already overworked personnel and nice sabotage for efficient operation.

THE third factor disturbing industrial output is probably the most serious. A war worker or employe of a war industry must spend the same time to acquire gas cards and other needed supplies as a non-essential worker or loafer. After a busy day the war worker must line up and wait his turn for gas cards along with the pleasure rider. He must go through the wait and delay for a tire, a tool, or other implement essential for efficient and cooperative operation.

Most small mines are situated many miles from towns and main roads. Machinery, food, supplies, repairs, and fuel must be transported to the job for distances varying from 10 to 40 miles, over rough mining roads. In most of the mining areas, buses have been taken from the highways, trucks have been utilized for other freight hauls, and private cars have been curtailed by gas rationing. The miner, therefore, must buy the necessary automobiles, or find some other means of transportation which usually is more costly than it has been in the past. But, when the miner tries to buy a truck or car, he finds he is again handicapped by priorities and red tape. He must wait the usual time that any nonessential worker has to wait, and he must conform to the same routine. It is necessary that he go through numerous boards before he can get the needed transportation. Some boards are intelligent in their handling of the problems, but that statement might be questioned if applied to other boards.

During all this delay, critical copper ore, manganese, lead, zinc, and tin ore stay in the ground where they were discovered.

And our soldiers at the front lack the equipment with which to do the job for which they are giving their lives.

A miner stood on the street watching a Packard car go by. It was filled with children and driven by a woman. He remarked, "See those new tires? They are war tires, but I am waiting for tires for a truck I need to haul supplies to camp."

The mismanagement of food supplies for the small miner must be included in the factors retarding the war effort. The small miner gets to town only once a week, or every two weeks; some less frequently. On these trips he must buy enough food to take care of his workers for the period they are in camp. Food rationing has made this so difficult that additional trips have to be made, thus increasing the cost of the operation about 25 per cent and adding another transportation problem.

If the three main factors, red tape, bureau officialism, and faulty transportation, were eliminated from their dominating position in industry, and the individuals participating in industry baiting were put to work as active workers, all production would have a most decided increase, possibly an astonishing volume of increase. This would happen in spite of optimism and overconfidence, both of which are assets instead of liabilities, provided we do not discount the other fellow.

IDAHO BUREAU OFFERS HELP IN FINDING WAR MINERALS

THE Idaho Bureau of Mines and Geology is offering 17 pamphlets containing essential information for prospectors and others interested in the search for war minerals. Joseph Newton, professor of the Idaho School of Mines and metallurgist of the bureau, has prepared 14 of the pamphlets; Lewis S. Prater, assistant metallurgist, wrote two; and A. W. Fahrenwald, dean of the school of mines and director of the bureau, contributed one.

Each leaflet contains a description of the mineral or mineral product, its use, and helpful advice for its discovery. They may be obtained by writing to the director, Idaho Bureau of Mines and Geology, University of Idaho, Moscow, for the sum of 10 cents each.

The complete series is as follows:

1. Beryllium and beryl; 2. tungsten and its ores; 3. tin; 4. mica; 5. crystalline quartz; 6. iron ores; 7. sponge iron; 8. magnesium and magnesite; 9. fluorite or fluorspar; 10. antimony; 11. black sands; 12. mercury (quicksilver); 13. phosphates; 14. refractories and insulating materials; 15. abrasives; 16. some general information (discusses importance of mineral industry, mining literature, mineral identification, assaying, marketing minerals, and other topics); 17. aluminum, alumina, bauxite, and clay.

BMI Pours Its 100 Million Lb Magnesium

Cates Said Pleased With Progress Made At Las Vegas Plant

One hundred million pounds of magnesium, enough for 50 million incendiary fires in Berlin or Tokyo, has been produced at the Basic Magnesium plant at Henderson, Nevada, according to the report received here. It was stated that the record was more magnesium than the total output in the United States for 27 years preceding March 1, 1942 and more magnesium of the entire world for the year of 1940.

LAS VEGAS — "Basic Magnesium is just another example of the splendid job American industry has done all over the nation in answering the country's call for vital war materials and metals," Lewis S. Cates, president of Phelps Dodge Copper company, said here after a trip through the big plant with F. O. Case, general manager.

"At the start of the war there were 35 strategic metals that were listed as critically scarce. Today there is a surplus of every one of the 35," Cates said.

ACHIEVEMENT

The Phelps Dodge executive paid tribute to the miraculous achievement of the Anaconda company in bringing the magnesium plant into full production and ironing out the kinks in a new industry for this country, and characterized as splendid the manner in which Case and his associates have handled the pioneering in this field.

He expressed surprise at the growth and development of the entire area since he was here seven years ago, declaring "it's hard to believe this is still Las Vegas."

Cates was accompanied by Harry Lavender, chief auditor for the company, and the two executives left later for Morenci, Ariz., to be present at the start of production in the new Phelps Dodge copper plant there.

CATES AMAZED AT BMI PLANT

Famed Mine Head Visits Nevada

"Basic Magnesium is another example of the splendid job American industry has done all over the nation in answering the country's call for vital war materials and metals," Louis S. Cates, president of Phelps Dodge Copper Co., said at Las Vegas after a trip through the big plant with F. O. Case, general manager.

"At the start of the war there were 35 strategic metals that were listed as critically scarce. Today there is a surplus of every one of the 35," Cates said.

The Phelps Dodge executive paid tribute to the miraculous achievement of the Anaconda company in bringing the magnesium plant into full production and ironing out the kinks in a new industry for this country, and characterized as splendid the manner in which Case and his associates have handled the pioneering in this field.

He expressed surprise at the growth and development of the entire area since he was here seven years ago, declaring "it's hard to believe this is still Las Vegas."

Cates was accompanied by Harry Lavender, chief auditor for the company, and the two executives left later for Morenci, Ariz., to be present at the start of production in the new Phelps Dodge copper plant there.

MORENO, CALIF. BEE
7:13-54
FEBRUARY 14, 1944

Western Leaders Demand Tax On U.S. Property

CARSON CITY, Nev., Feb. 14. — (UP)—Taxation on federally owned property by state, county and local units was demanded by representatives of five western states at a conference on postwar development of the West here.

A demand that all plants now owned by Defense Plant Corporation be turned over to private ownership, with a guarantee of continued operation in peacetime, also was made by the conference which voted in favor of "immediate completion" of the structural units of the Geneva steel plant at Provo, Utah.

Charge Discrimination
Inquiry into the allegedly discriminatory "effect on western states of federal excise taxes on transportation and communication services" also was demanded, and the conference went on record as opposed to any change in the mileage system of rate making.

Use of the so-called Pittsburgh plus system for determining prices of all steel products produced at the Geneva plant also was asked.

Expansion of federally owned property throughout the West has resulted in the "elimination of local taxes" and has worked a decided hardship on western states, it was explained in the demand for the right to tax such federally owned property until it is placed under private ownership after being opened to competitive bidding.

Ask Management Change
Westerners should be placed in charge of all properties such as Geneva steel when they are returned to private ownership, and such western management is desirable even during federal operation, it was stressed.

A charge the "Geneva project was deliberately delayed by the United States Steel Corporation" was denied in a telegram to the conference from B. F. Fairless, president of the corporation. The charge that "somebody was dragging their feet badly" in connection with the completion of the Geneva plant was made by Chad Calhoun, vice president of the Kaiser Corporation, which operates the Fontana, Calif., steel mill.

In his telegram Fairless said "construction of this (Geneva) giant basic magnesium, Inc. plant will be forced to close when the war ends." Fairless' telegram said, the WPE has refused to consider fabrication plants in the Las Vegas area.

Mining Jrnl
Phoenix Ariz.
2/15/44

HOT-METAL TRANSPORTATION SYSTEM AT BASIC MAGNESIUM

INCLUDED in newly authorized expenditures totaling \$217,000 for Basic Magnesium, Inc., is the provision for a method of transporting hot metal from the cells to the refinery crucibles at the company's Las Vegas, Nevada, plant. This will eliminate "cheeses" which now are allowed to cool and must be remelted in the refinery. The new method will require vehicles designed by BMI technicians and known as hot-metal cars. Twelve of them have been ordered at a cost of \$108,000. The program is expected to result in increased efficiency and reduced costs.

The hot-metal cars are described by BMI engineers as being literally big thermos jugs mounted on standard truck axles. The containers, each with a capacity of over two tons of molten magnesium, have both an inner and an outer shell of sheet steel. The five-inch air space between is packed with insulating material. The cars are three feet deep, five feet eight inches wide, and seven feet ten inches long.

Also included in the improvement program is an addition to the hospital, to cost between \$50,000 and \$60,000. The present wing will be extended to provide 12 private rooms and 14 ward beds. Facilities in the maternity section also will be improved.

The company is producing over 150 tons of metallic magnesium daily at the Las Vegas plant and orders on hand are said to be sufficient to keep the plant in full production for the next nine months. The company's research department, under the direction of Charles H. Mahoney, chief metallurgist, is devoting its time to developing new uses for magnesium metal and its alloys.

LAS VEGAS, NEV., REVIEW-JOURNAL
FEBRUARY 15, 1944

The Problem of BMI

When Senator Pat McCarran told the western industrial conference in Carson City that unless a fabrication plant is built at Basic Magnesium, the big industry will have to fold up after the war, he put his finger on the problem that has been worrying all connected with the operation almost from its inception.

When BMI was first launched on its career, Howard Eells, Jr., and his associates took it for granted a fabrication plant would be built. Their early discussions concerning future plans always included the completion of the process by which the raw metal could be properly alloyed and rolled into sheets or poured into castings ready for the use of manufacturers.

As time went on, however, less and less was heard about this vital unit—more and more about the magnesium plant being strictly a war-baby. AND—there has been NO indication from anyone in authority that a fabrication plant WILL be built.

Senator McCarran declares this is MORE than a "mere coincidence." He doesn't say it, but infers the belief it is part of a carefully-laid plan of eastern industrialists to stifle western industry again, once the war need no longer exists.

That, also, has been a long-time conviction here. It has been contended by the newspaper for many months that if BMI is to survive the war, it will be necessary to beat off the attacks of eastern corporations which are NOT interested in competition from magnesium in the post-war era.

While this goes on, interest in the "miracle metal" grows apace. From all over the west coast, manufacturers, large and small, are beating a pathway to BMI to investigate the possibility of use in their particular product. They are met with the problem of fabrication. Their desire is to purchase the finished product, it is industry after the war isn't successful.

Magnesium has arrived. It is here to stay. All attempts to stifle its development will serve only to hold it back temporarily.

L.V.R. Journal
2-17-44

Editorials and Features

This page is a regular feature in the Las Vegas Evening Review-Journal and Boulder City Journal which are published evenings except Sunday in the Review-Journal Building, 115 South First Street, Las Vegas, Nevada. The Review-Journal is entered in the U. S. Postoffice at Las Vegas as second class matter. Subscription price \$1.00 per month by mail or carrier.

Member United Press, Associated Press, American Newspaper Publishers Association.
F. F. Garalde, Publisher Phone 9 A. E. Cahlan, Managing Editor

Yes, How Come, Anyway?

The reason selective service has functioned so satisfactorily in the United States is its fairness, its equitability, and the fact that by and large, it is without corruption or favoritism.

The general public has complete confidence that everyone is being treated the same—whether rich or poor, prominent or humble, and feels definitely that it is the only method by which the duty of service in the armed forces in a time of crisis can be equally distributed among the whole people.

When it became necessary to draft fathers, an attempt was made to set up a system under which all fathers would be deferred until all single men were taken—then to call them into service in order of the number of dependents, and in order of their essentiality in industry. This proposal was presented to congress, but defeated under administrative pressure.

While there was considerable sentiment in favor of that type of arrangement, once it was defeated there was no further argument, for everybody felt it must be the right thing, and that since all would be treated the same, it was fair.

Comes now the revelation Monday before a congressional committee, that a differentiation has been made between employees of the government and the rest of the people. A point system has been set up for federal draft registrants which determines the order in which they shall be called and decides their deferment status.

Everybody else is called in accordance with the order numbers established in the great national lottery at the beginning of selective service. Government employes are called in accordance with order number AND the special point system.

Points are allocated for several things—age, number of dependents, importance of work done to the war effort. A man of 30, for instance, gets 2 points for age. One of 35, 3 points and so on. Those under 30 don't get any. Two points would be given for each dependent. A man with six children, then would have 12 points. Essentiality is also rated in points—the more necessary an employe is, the more points he is assigned.

This all clears through a government board in Washington which must apply for all deferments for federal employes. Local draft boards, of course, can ignore deferment requests, but the government then can appeal and the case ultimately winds up back in Washington again, where the point system is sacrosanct.

This was all told in testimony before the congressional committee. The system was conceived by War Manpower Director Paul McNutt, approved by Sam Rosenman on behalf of the White House, AFTER congress had turned down similar proposals for all fathers.

The revelation will not set well with the American people who will find it extremely difficult to understand why there should be one set of draft standards for federal employes and another for everybody else.

What's so sacred about being on the government payroll? Why is a Washington bureaucrat, large or small, entitled to any more consideration than a worker in a tank factory, or a builder of airplanes?

What's the difference between a father in government service and one working in a war factory? Why should eight children give him deferment because he's a federal employe when it would NOT if he were working at BMI?

Has our bureaucracy reached the stage where it is the elite, the select, the royalty of the nation, entitled to special privileges when it comes to serving on the battle-line, or in the air or on the sea?

How come, anyway?

Boulder C. News
2-17-44

BASIC PLANT CAN COMPETE, MANAGER CASE TELLS ROTARY

"Under full production the magnesium plant of Basic Magnesium Inc. can compete with anyone, if allowed to continue to operate," F. O. Case, manager of the plant, stated yesterday at a meeting of the Boulder City Rotary club, at the Green Hut cafe.

Magnesium is being produced at approximately half the English cost of production, he said, despite the fact that the English pay much lower salaries.

Case also spoke of the remarkable safety record in the operation of the plant by the Anaconda Copper company, and the fact that the plant is now engaged in turning out war essential products at 100 per cent of the plant's intended capacity.

Praise Predecessors

Case also paid tribute to the excellent work done by Howard Eells and other officials of the original company, in getting the plant going, and to Major Ball, Englishman who was prominent in the planning of the plant and execution of the plans.

Roland Sibert, of the B. M. I. personnel department, gave a description of the workings of the plant at Gabbs, where the magnesite is mined and of the operations of the plant between Boulder City and Las Vegas. He spoke of the fact that it was remarkable that production was under way eleven months after the start of the project.

30-Ton Trucks Used

Showing slides as he spoke, Sibert explained transportation of the mineral to the plant from Gabbs by huge 30-ton trailer trucks, and showed the main processes in the manufacture of magnesium.

The plant, 1 1/4 miles long, has 27 miles of railroad, and uses raw magnesite and calcite magnesite, coal from Utah, peat moss from British Columbia, potash from various parts of the United States and salt from the Mojave desert.

Moritz Expounds Rotary Aims
E. A. Moritz, director of power for Boulder Dam, as program chairman, presented an editorial on the spirit and practice of Rotary, by an Argentinian Rotary leader.

The national Rotary convention was announced for May 15 to 18, in Chicago, and Clarence Watson's appointment as director to fill out the term of Earl Brothers was announced.

A "workpile" committee for post-war planning work was announced, consisting of J. M. Higgins, A. G. Boynton, E. P. Bryant and Robert M. Rose.

Guests at the meeting were Lt. Bob Geogerson, Leonard P. Davis, Frank Case, Bill Sha, Roland Sibert of Basic, Leonard Fayle, Jim Cashman, Howard Davies and Jack Wollenzien of Las Vegas, Jack Lonergan, Don Cameron of Carson City, Omer E. Robb and Don Speer of San Bern.

LAKE CITY, UTAH, TRIBUNE
1221 Sunday 94, 635
FEBRUARY 20, 1944

Basic Magnesium Sets New Record

Production of magnesium metal at the Las Vegas, Nev., plant of Basic Magnesium, Inc., operated for Metals Reserve company by Anaconda Copper Mining company, in January created a new monthly record.

January 30 was the record day of production, when 111 per cent of rated capacity of the plant was produced. On January 20, the hundred millionth pound of magnesium metal was poured by the day shift.

Las Vegas AGE
2-20-44

Future of BMI

Few people realize the great magnesium plant known as BMI was part of a tremendous national awakening and marshalling of effort never before seen in this world.

From a country peacefully dreaming behind her ocean barriers and only mildly disturbed by the fires in the Orient and in Europe, the United States was catapulted into action by Pearl Harbor.

For many months prior to December 7, 1941, however, national uneasiness had begun to replace complacency. The Selective Service act had been passed and a naval building program started and industry began looking forward to a shortage of manpower and materials.

At about the same time Howard Eells and his associates began action in their efforts to establish BMI early in 1941, the government sent out a quiet call to industry to be on the alert for a great training program.

All over the nation industrial experts were called into round table conferences to discuss the quickest and most efficient method by which a great number of men and women could be trained in supervision for the job ahead. There was an extreme shortage of able foremen and other supervisors.

Out of these round table conferences came a pattern which will probably have a profound effect on post-war industry and in the period of conversion which will follow the end of hostilities.

Experts of the country's leading industries established an organization known as the Training-Within-Industry bureau and set up a program for training supervisors in three separate skills: the skill of job instruction, the skill of job planning, and the skill of maintaining good or harmonious job relations.

The nation's great industrial companies were combed for men qualified to start the program, and these men, after working all day in their own industries were sent to other companies for two-hour meetings each night to train supervisors in Job Instruction, Job Methods, and Job Relations—now known as JIT, JMT, and JRT.

Each of the three training methods was divided into five two-hour sessions. They were the most concentrated, streamlined training programs known, condensed from the programs of such industries as General Electric, Western Electric, Ford Motor, Lockheed Aircraft, and a score of others.

Results have been astounding. One aircraft company announced more than 4,000,000 man hours had been saved after a few months of this sort of training. Other companies had similar savings in man-hours, materials.

Although BMI was not in operation when the three programs were launched the staff of engineers which had been sent to England and had returned to take over supervision of the new industry began to apply the principles of JIT, JMT, and JRT. Before a pound of metal had been poured they had established the methods by which they intended to start production.

Some picture of the tremendous job Training-Within-Industry has accomplished is seen in the fact that during 1943 nearly half a million foremen, superintendents, presidents, etc., have studied and applied JIT, JMT, and JRT.

Just Monday night the Association of Foremen.

Probably few other industries in the country have so seriously and conscientiously tried to train their supervisors for the grim days of war remaining and for the trying conversion days which will follow the war.

From Where I Sit— By A. E. CAHLAN

You'll find this story hard to believe, but it is vouched for by reliable persons who are in a position to know the facts. And it's about the most ridiculous instance of bureaucratic functioning I've heard yet—very laughable if it weren't so serious.

It has to do with the installation of coolers in the new housing units built for Basic employees. Twenty-five dwellings were completed recently except for the coolers. Families moved in. Coolers arrived ready for installation and it apparently would be but a day or two until the units were entirely comfortable.

But—a couple of eagle-eyed FPMA inspectors made a horrible discovery. The coolers were powered by one-third horsepower motors while specifications called for quarter-horsepower motors. Moreover, the blades of the cooler fans were 12 inches long while specifications said they should be 14 inches in length.

Investigation revealed there were NO 14-inch fans to be bought and no quarter-horse motors. That, however, failed to daunt the engineers. Specifications are specifications, they opined, even though twenty-five families sweltered in accommodations designed to be artificially cooled in summer. And they refused to permit their installation.

What difference it makes whether the fan blades are 12 or 14 inches long or the motors that drive them are a quarter or a third horsepower, so long as the coolers cool the air, nobody has satisfactorily answered. The decision of the gentlemen in charge (Federal Public Housing Authority) appears to be that it's a far greater error to install coolers varying from specifications than to allow human beings to cook in the low-ceilinged, block dwellings out in the middle of the desert where no shade or vegetation has had a chance to grow yet.

The engineers, I am told, live in air-conditioned houses, so didn't have the least idea what kind of an existence they were wishing on those twenty-five families. When the high point of the summer temperatures hit a few days ago, the heads of those families decided they had had enough and quit their jobs. BMI officials, needing skilled workers, were extremely sorry to see them go. But they had nothing to offer. The cooler blades were two inches short, and some bureaucrat in Washington might get awfully mad if the engineers assigned to the job out here were to take pity on those twenty-five families and install the coolers anyway, on the theory it is more important to keep up the production of magnesium than to put in third-horsepower motors where somebody in authority said quarter horse should be used.

I couldn't find out how the gentlemen in question expected to conjure proper fans and motors into being when there weren't any to be had. But, in the absence of any information, the record up to this point would seem to justify the conclusion they didn't give a hoot—that specifications are specifications, even at 116 degrees in the shade and no shade.

Of course there may be an explanation for all this—an explanation that will tell why the families must be forced to suffer rather than submit to the indignity of being comforted by cool air from 12 inch instead of 14 inch fans, driven by third horsepower motors instead of some a mite less powerful. If there is, I'd be glad to have it. Otherwise, I'll be forced to conclude with a lot of people out at Basic that the Wonderful Wizards of Washington are still very much on the job.

And while on the subject—no connection, of course—Washington is beginning to draw the strings tighter and tighter to keep BMI from developing the local plant into a post-war industry—to assure its demise as soon as the conflict is over and the need for incendiary bombs is no more.

The details would shock you at the moment. And there's no cinch the gentlemen in key spots who are doing the clipping behind the scenes and when nobody's looking, can be beaten. Aluminum Corporation, which owns Dow Chemical, only other sizeable producer of magnesium in the country, is determined Basic Magnesium will NOT survive beyond the war—that their monopoly of the light metal industry will be as complete in the post-war era as it was before.

Southern Nevada should drop everything else and join together in this fight, upon a successful termination of which depends the very future of the entire area and every dollar invested. And it won't be an easy battle either. For we're still a small state compared to those in which Alcoa operates.

The job will rest squarely on the shoulders of Senators Pat McCarran and Jim Scrugam. And there is NO job they have in Washington today more important to it—state of Nevada.

Output From BMI Setting Huge Fires In Nazi-Occupied Europe

The army's significant celebration here of full production, with the Memphis Belle's crew honored representatives, brought out information of particular interest regarding the BMI metal.

One point is that incendiary bombs cause relatively greater destruction in enemy industrial centers than block busters and similar high explosives; and another that this plant's output has for some time set huge fires in Germany and Nazi-occupied Europe, and now probably constitutes a major portion of the blazing vengeance exacted by United Nations flyers. Gordon Reed, director Aluminum and Magnesium Division, War Production Board, told in his address of the precarious shortage as late as 1942, and stated that BMI is now turning out the metal in the enormous quantities demanded by the war's various needs and for the first time making stockpiles possible; and that his board has informed our army, navy, England and Russia that magnesium is available for all war uses.

Mr. Reed, out from Washington as speaker for the War Production Board, said: "When you read that 2000 tons of bombs were

dropped on Cologne you can pretty well assume that well over half the weight was magnesium incendiaries and that a goodly share originated in Las Vegas. Incendiary warfare requires large and unpredictable amounts of magnesium and huge production and stockpiles are essential. Nobody cares to predict just how much magnesium will be necessary to set fire to the island of Japan."—Basic Bombardier.

L.V. Review Journal
July 23, 43

Wins Promotion



Bruce W. McNeil, who has held the post of general manager of the construction work on the magnesium plant here, was promoted to vice president in charge of construction of the McNeil Construction company. The announcement was made yesterday by L. G. McNeil, president of the company.

Bruce McNeil Promoted To Post of Vice-President

Announcement was made yesterday by L. G. McNeil, president of the McNeil Construction company, that his son, B. W. McNeil, has been made a vice-president of the company in charge of all construction work. In making the announcement, McNeil stated that the company had set up an organization at the head office for bidding jobs on a competitive basis and that employees could expect an announcement very soon about additional work in southern California on some rather important projects.

The McNeil company has a number of smaller jobs in the southern California district at present as well as the work being carried on in the San Francisco area. However B. W. McNeil in his new capacity as vice-president will retain his residence in Las Vegas and will continue

general supervision of construction work at the magnesium plant until it is completed. Actual general management of the work here has been turned over to W. E. Whittier, who has acted as chief engineer since the inception of the project at Las Vegas. B. W. McNeil, who is married and has two small sons, is a graduate of engineering from the University of Southern California, since which time he has occupied various executive positions in the McNeil company. Previous to his work here as general manager in the construction of the big magnesium plant, McNeil's experience was gained in the company's building of the Sun Valley resort in Idaho; the Long Beach naval housing project, the reconstruction of the lodge and resort at Lake Arrowhead and the building of the 3,000-unit housing project at Linda Vista in San Diego, as well as other buildings in Southern California.

From Where I Sit— By A. E. CAHLAN

You may never have met them, but they're a couple of grand people. They came here nearly two years ago with the vanguard of McNeil Construction Company people, to help build the great magnesium plant. We of the Review-Journal first met them in connection with publication of the McNeil Constructor, bi-weekly paper of the McNeil Employees' Association. They were editor, publisher, and entire staff.

Throughout the months that followed, we became well acquainted with the two—kind of regarded them as part of our own organization. Quiet, efficient, and hard-working, they gave the McNeil employees a splendid paper with a minimum of fuss and trouble. And they always had a smile and a good word to pass on—enjoyed their work tremendously, and, like all members of the group, were certain in their own minds that McNeil Construction Company is the greatest outfit on earth.

Last night they finished their job here. The last issue of McNeil Constructor went to press and their work was over. They served as high as 13,000 people at the peak of construction—knew every problem and every whim of the company and its employees. Their job was to initiate the newcomers into the tradition of the company, and to help weld the group into an efficient, well-knit, hard-hitting construction crew. And in this field they contributed tremendously to the successful completion of the big job.

We hate to see them leave us, because we'll miss them both. But that's the inevitable in the construction business. Starting a job today in a new community, at the peak tomorrow, finishing and moving on to another one the day after. Make a lot of grand friends, only to be faced with the necessity for saying good-bye just as your friendships are beginning to mean something concrete.

It's with a great deal of regret that we say goodbye to the McNeil Constructor, for its discontinuance means that the forces of that company have dwindled away to the point where it can no longer be supported. There'll still be a crew here until October, perhaps, but only a handful compared to the vast numbers of the past two years.

Ted and Jerry Watterson (Mr. and Mrs.) are going on to a new and important job with their company. We of the Review-Journal wish them good luck and happiness 'cause they're a couple of splendid people and we've enjoyed working with them. We know they'll make good where they're going as they have here. And we hope they'll carry with them the friendliness of the desert and many happy memories of the days they've spent in our midst.

And this goes too for the many other McNeil employees who are now pulling stakes and going on to other work. We've liked them all—their spirit, their loyalty to their company, and their fine craftsmanship that has given us one of the nation's greatest industries in so short a time. We hope they've liked us as well, and that they'll be back one of these days to help us build that even greater southern Nevada of which many of us still dream.

Editorials and Features

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Publicity and BMI

After nearly two years of vacuum, so far as favorable publicity is concerned, Basic Magnesium, Inc., is coming into its own on a nation-wide scale in a manner designed to bring to the attention of the entire country the remarkable record made out here on the Nevada desert in a new enterprise so badly needed for the war effort.

During the first year of actual operation, BMI was kicked around from pillar to post and rather thoroughly discredited on a national scale. It was supposed to be without enough of the proper ore, the process wouldn't work, the cost was too high to ever be considered on a competitive basis.

The plant seemed to be the whipping boy of the war-industry beefers, and everywhere you turned, there was a new blast of some kind being sent out in this direction.

It was difficult to interest any of the nationally circulated publications in presenting the true story—and it was admittedly most discouraging to those who were giving everything they had to make it go.

They kept everlastingly at it, however, and regardless of all obstacles thrown in the way from countless sources, finally came through to PROVE BMI with a production considerably in excess of the rated capacity—a production that continued despite any and all controversies and other interruptions which might have been expected to affect the output.

The result has been a record without a peer in industry anywhere in the world. This has changed the picture completely and during the past few weeks many national publications have "discovered" BMI and talk in terms of "miracles" wrought out here on the Nevada desert.

Tomorrow (Sunday) evening at 8:30 P.M., United Airlines will cover the future of magnesium and BMI on a Columbia network program that will be short-waved to the entire Pacific area.

Not long ago Life magazine, one of the most widely circulated of the nation's weekly publications, carried a story with pictures in color, of BMI. In a forthcoming issue of Fortune, BMI will receive considerable space. Popular Mechanics, Western Industry, and a number of other publications will also carry considerable copy concerning the job being done here by this great industrial giant.

Reader's Digest was first to give BMI a break—this came in the days when the industry had but a few friends outside southern Nevada. Only recently the Mining Journal, of Phoenix, Arizona, carried a two page picture story of BMI.

The Arrowhead magazine, official publication of the Union Pacific railroad, December-January issue, devotes the first seven pages to the "World's Largest Producer of the New Miracle Metal." This publication is circulated widely among Union Pacific employees and on all Union Pacific passenger trains.

Standard Oil Company of California, in its Winter Bulletin of 1943-44 leaves company matters to present four pages of pictures and descriptions of "Las Vegas and the Miracle of Magnesium," "Nevada's Light Metal and the Miracle of Magnesium," "From Ore to Ingot." Circulation of this magazine is close to the 100,000 mark and goes all over the west.

Nearly every mining and metallurgical journal in the nation either has already run stories about BMI or will in the near future. To be favorable, they only have to be FAIR.

Add to these widely-circulated stories, the statement made by Phillip D. Wilson, director of the Aluminum and Magnesium division of the War Production Board, and you have the basis for a rather optimistic conception of the future of the light metal industry in this area.

Wilson said: "Magnesium can face 1944 with some measure of confidence" and indicates that WPB is now in a navy yard.

It appears as though this point is gradually being reached, and that NOW, a substantial effort will have to be made to keep the plant in production even after the war. Director Wilson seems to feel that IF the potential uses of magnesium are developed, there'll be no question about any over-supply, but one of expanding the peak war-time production beyond its present capacity.

Basic Breaks World's Record in Magnesium Output During Month

BMI this week broke another world's record to add to its long string of similar performances. Production in January, 1944, broke all plant records for any single month in BMI's history. Sunday, January 30, was the high day with a record production of 111 per cent of rated capacity.

The Clark county plant today is producing more than one-fourth of all the magnesium now being produced in the United States. If the ingots cast at BMI in the month of January were laid end to end they would reach from Las Vegas to Anaconda's great copper plant near Butte, Montana.

The high day production was ten times greater than the average daily production of all United States plants in the year 1940, and daily production would provide a full load of incendiary bombs for 50 Flying Fortresses every day in the calendar year.

With increased production has come decreased cost in production and the BMI organization today is bending every effort to make February production top January and March, April and the other months to come to break the record of the month before.

On January 20, at 11:30 a. m., BMI poured the 100 millionth pound of magnesium, with William Owens handling the ladle. It marked the production of more magnesium than the total world output for the year 1940.

LOS ANGELES, CALIF.
HERALD & EXPOSER, Cir. 250,529
FEBRUARY 7, 1944

Dale Carnegie

Author of "How to Win Friends and Influence People"

Are you looking forward to retiring, after a long and useful career?

In 1942 J. A. McNaughton retired from three corporations and settled down to whittle. But he soon found he didn't feel well; was restless. He didn't have a thing in the world to do but turn over his hand, and that soon became monotonous. He was living in Devonshire, Chatsworth, Calif.

One day he said to himself: "I'm just rusting out. It's better to work out than rust out." So he looked around for a job. He had been an outstanding successful business man; but he was now approaching 70. He said: "People think of men of my age as they do of an old farm horse that has served its purpose—they pull off its shoes and turn it out to pasture. Well, I resolved I wouldn't be turned out to pasture."

His son-in-law was connected with the American Liquid Gas Corporation, and so Mr. Mc-

Naughton talked the matter over with him, told him he wanted to show what he could do. And his son-in-law gave him the encouragement he wanted. He now drives back and forth from his home—a distance of 68 miles—and when he gets to his desk he works eight hours a day, five days a week. His vitality is amazing. He spends most of his time promoting new business, and thinks nothing of traveling thousands of miles by plane and train in these times when traveling isn't a bed of roses. His particular job is talking to war concerns about the advisability of installing liquid gas plants.

These plants consist of pressure storage tanks which hold gas in a liquid state. Through a mixing apparatus the liquid is saturated with air which causes it to become a highly efficient gas, similar to natural gas. Some war plants use these installations in remote areas as their sole source of gas. One

such installation is the Basic Magnesium Plant, near Las Vegas, Nev. Other plants use them as a "standby" installation in case of sabotage which would wreck the public utility gas system, or to be used when there is not enough gas during peak hours.

His plants are striking hard blows at Hitler & Co. He says, "I am doing as much work, and as useful work, as I ever did in my life." And he is happy in the doing of it.

And now comes a very important point: with all the work he is doing, he says he feels better than he did when he was retired and didn't have anything to do but turn over that hand.

How much truth is there in the old saying: "It's better to wear out than rust out." And J. A. McNaughton is a splendid example of that truth.

So if you're hoping to spend your days doing nothing perhaps you'd better think it over, or at least do it gradually.

F. WALL STREET JOURNAL
FEBRUARY 5, 1944

Basic Magnesium Reports Output Record, Lower Costs

LAS VEGAS, Nev.—Basic Magnesium, Inc., operated by Anaconda Copper Mining Co., reports January production of metallic magnesium broke all records for production from any one plant, reaching a daily average of 105% of rated capacity with a high day at 110%. It is claimed that one-quarter of all magnesium now being produced in the United States is from Basic's plant. Daily average for January is stated to have been 30% higher than average monthly world total in 1940. Ingots cast in January, it is calculated, would, if placed end to end, have formed a line from Las Vegas, Nev., to Butte, Mont. To date in February production is reported slightly ahead of January, with a new record expected.

A steadily increasing percentage of output is going into commercial structural alloys, it is stated, principally for fabrication of aircraft and automotive equipment, with a corresponding decrease of total production flowing to purely wartime demand.

Production costs have dropped sharply, with December, 1943, cost per pound less than half of December, 1942, cost per pound and a sharp reduction since December, 1943.

Anaconda acquired controlling interest in BMI on Oct. 27, 1943.

LOS ANGELES, CALIF.
HERALD & EXPOSER, Cir. 250,529
FEBRUARY 7, 1944

Philosophy Of Life

Dow-Jones said used auto price ceilings probably will be announced by the OPA March 1 and will be effective April 1, unless dealers succeed in obtaining further delays. Under the ceilings, as outlined to the industry at a special meeting last week, average January, 1944, used car guide book prices will be the highest dealers can charge, said the financial news agency.

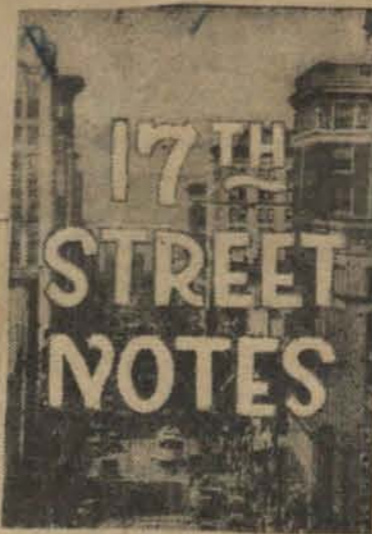
Utility rates are not going to be subjected to any sweeping sudden reduction by state regulatory agencies as a result of the much publicized supreme court decision in the Hope Natural Gas case, said Dow-Jones. On the other hand, the court's opinion apparently will be used by some state bodies to bolster cases for lower rates involving not only electric and gas companies, but possibly transit lines and the whole range of public utilities.

With consumer buying power strong, demand for merchandise sold by chain stores will remain substantial, according to survey published Monday by Standard & Poor's. Sales trends, however, will be mixed.

Because of food controls and supply factors, gains in grocery chain volume in the first half of this year are not expected. Sales of variety chains may show a moderate recession, since merchandise is less abundant. With their supply situation somewhat better, drug chain sales, on the other hand, may continue to exceed the levels of a year earlier. Greater patronage and larger average checks promise to expand dollar volume of the restaurant chains.

Altho the experience of various organizations will vary, most concerns will continue to realize large sales. Despite a tendency of costs to edge upward, if actively well maintained operating profits seem reasonably assured for the first half of this year.

—TODAY'S MARKETS TODAY—



Because cattlemen are getting rid of all fed cattle, since they assert they can make no money feeding under present government regulations of the industry, Denver stockyards had the largest run of fed steers in many years Monday, live-stock men said. A total of 100 loads were received, compared with around 150 in May, 1943, the previous high in the memory of present-day traders. The market was slow to 10 to 15 cents a hundred lower. Experts forecast a shortage of fed cattle between April and June this year as a result of heavy marketing now.

A bullish indicator was discerned in the OPA authorization of a flat 6 per cent increase in ceiling prices for all graded hardwood lumber produced in northeastern states and eastern Canada to compensate for higher production and wage outlays.

Basic Magnesium, Incorporated, world's largest magnesium plant, in January of 1944, broke all world's records for magnesium produced in any one plant, reaching a daily average of 105 per cent of rated capacity with a high day of 111 per cent, the company announced. One-fourth of all the magnesium now being produced in the entire nation is being produced by B. M. I. The daily production average for the month of January was 30 per cent greater than the average monthly world total production for the year of 1940. Anaconda Copper acquired control in October, 1942.

Dow-Jones announced the OPA had extended scope of the sugar rationing program to bring use of imported sugar containing products, such as syrup and candy crystals, under control.

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—TODAY'S MARKETS TODAY—

Basic Magnesium, Inc. Set New Production Record Last Month

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One-fourth of all the magnesium now being produced in the entire nation is being produced by B.M.I. The daily production average for the month of January was 30% greater than the average monthly world total production for the year of 1940.

To date, February's production is slightly ahead of January's record with indications that another world's record may be broken this month.

A steadily increasing percentage of output is going into commercial structural alloys, principally for fabrication of aircraft and automotive equipment, with a corresponding decrease of total production flowing to purely wartime demand for manufacture of incendiary bombs, tracer bullets and shells, flares and other war uses.

Production costs have dropped sharply, with December, 1943 cost per pound less than half of December, 1942 cost per pound, and a sharp reduction since December, 1943.

Anaconda Copper Mining Company acquired controlling interest in B.M.I. on October 27, 1942.

LOS ANGELES, CALIF.
HERALD & EXPOSER, Cir. 250,529
FEBRUARY 5, 1944

Magnesium Las Vegas Production Breaks All Records

All world records for the production of magnesium were broken during January when the Las Vegas factory of Basic Magnesium, Inc. produced 30 per cent more than the average monthly world total production of 1940, it was announced.

During the month the plant averaged 105 per cent of capacity per day, and on one day hit 111 per cent of capacity. Further the company announced, February production is running ahead of January, indicating another record possibility. One fourth of all magnesium now being produced in the United States comes from the Las Vegas plant.

Company officials also announced that production costs have dropped sharply. December, 1943, cost per pound was

AFL Contract at BMI Is Said Valid By Capital Action

Complete validity of the American Federation of Labor's contract with Basic Magnesium, Inc., was established this week when the war labor board in Washington, D. C., refused to take jurisdiction over the "dispute" CIO claims exists at the local plant.

The war labor board held a hearing last week in response to a CIO demand for opportunity to present its case. John P. Frey, president of Metal Trades department, appeared for the AFL and yesterday the board by a vote of 10 to 2, declined to interfere.

This, according to Frey, should end all labor agitation at BMI, where various AFL unions hold contracts for the duration.

BMI Pours Its 100 Million Lb Magnesium

One hundred million pounds of magnesium, enough for 50 million incendiary fires in Berlin or Tokyo, has been produced at the Basic Magnesium plant at Henderson, Nevada, according to the report received here. It was stated that the record was more magnesium than the total output in the United States for 27 years preceding March 1, 1942 and more magnesium of the entire world for the year of 1940.

LAS VEGAS — "Basic Magnesium is just another example of the splendid job American industry has done all over the nation in answering the country's call for vital war materials and metals," Lewis S. Cates, president of Phelps Dodge Copper company, said here after a trip through the big plant with F. O. Case, general manager.

"At the start of the war there were 35 strategic metals that were listed as critically scarce. Today there is a surplus of every one of the 35," Cates said.

ACHIEVEMENT

The Phelps Dodge executive paid tribute to the miraculous achievement of the Anaconda company in bringing the magnesium plant into full production and ironing out the kinks in a new industry for this country and characterized as splendid in the manner in which Case and his associates have handled the pioneering in this field.

He expressed surprise at the growth and development of the entire area since he was here seven years ago, declaring "it's hard to believe this is still Las Vegas."

Cates was accompanied by Harry Lavender, chief auditor for the company, and the two executives left later for Morenci, Ariz., to be present at the start of production in the new Phelps Dodge copper plant there.

Found in the Mail Bag--

Las Vegas, Nevada.
To the Editor:
During the something over five months of residence in Las Vegas, and reading your column "From Where I Sit," may I say to you, sir, you are doing a great job, where a great job very badly needs doing.

I have been told and led to believe that Basic Magnesium, Inc. is and was the number one defense job in the United States. In the past few days the temperature in Las Vegas and surrounding country has been the desert normal. The outbreaks of discomfort, mistreatment, both in and out of your good newspaper are the occasion for this letter, the first and last I ever expect to write to you.

Wholly, and because of your own designation of BMI as the number one defense plant in the United States or words to that effect, I'll say to you here and now, sir, that there are not tens, nor dozens, nor hundreds of men, but thousands of both races, white and black, who are now and who have in months past worked in temperatures of 160, 170, and closely approaching 180 degrees Fahrenheit.

Now, sir, these men are largely unsung and unloved. It is their lot and their luck to live and work producing under the most adverse living conditions that a half-baked bureaucracy which a divided authority can devise.

For your information, sir, to a large extent these are men inured to semi-primitive living conditions. In the last few weeks the living conditions as regards food, sleeping accommodations, etc. have degenerated very rapidly. In the last 56 hours I have observed upon two separate occasions my own bed being infested with bedbugs. That, sir, is a thing which I am neither used to nor intend to get used to. I will be very glad to give you the exact and absolute data as to the time, days and occasions upon which such observations were made, and which I may add have not been corrected and are still in existence.

The construction and operation of this great defense plant has naturally entailed many difficulties. Due to the pressure of other interests on a great many

fronts, newspapers and interest in BMI tends to slacken. There is a great job being done out there, sir, by heroes as meritorious as those on our far-flung battle fronts. What is much more to your interest in point is that there is a great job of reporting to be done out there. Get in and get your feet wet. It most vitally affects peacetime Las Vegas and peacetime Nevada.

Yours very truly,
J. H.

To the editor,

I should like to take this method of thanking the Las Vegas police department for their kindness Saturday night in seeing that four Boy Scouts arrived safely home at Basic Townsite after a week at a Scout camp in California.

If the mothers of these boys had known that they made this long bus trip with no older person with them and were to be dumped unceremoniously in Las Vegas at the end of the trip, with no way to get home, I am sure they would never have gone on the trip.

We have no telephones at Basic, so the boys could not contact their parents. It speaks well for the resourcefulness of one of the Scouts who thought of the police, and the mothers appreciate the kindness of the police who took the time and trouble to bring them home at midnight.

Gratefully,
Mrs. Glenn W. Ebaugh,
238 Kansas Avenue,
Basic.

L. V. REVIEW--JOURNAL
July 31, 1943

BMI Plant Now Is In Full Operation

Basic Magnesium, Inc. went into 100 per cent production at 10 o'clock this morning when the switch on the last cell in plant unit number 10 was turned on.

Officials of the company and a few invited guests gathered in the plant for a short ceremony, which marked the beginning of full and complete operation of the plant. Just 11 months have elapsed since the first unit was put into production. It was August 31, 1942, that the first metal was produced at the plant. Since that time, at the rate of one plant unit per month, the big defense plant has added to its production facilities.

Plant unit number 10 has been in operation for some time, but today marked the beginning of full operation of that plant.

CITY BUILDING

Las Vegas, because of certain natural advantages of climate, scenery, water, power and tributary wealth, coupled with its man-created advantages of transportation and industrial facilities, with proper encouragement and guidance, will some day become a city equal in wealth and importance to such other cities of the inter-mountain region as Ogden, Salt Lake, Phoenix and others of that character.

Without that proper encouragement and wise guidance, she may remain for long years on the borderline between the prosperous country town and the thriving industrial city.

The foresight and long years of effort of some Las Vegas citizens created the Boulder Canyon Dam project and provided at our very doors a vast resource of electrical power. The holocaust of World War put that vast power to work for us, creating for us payrolls, business and wealth in the form of the gigantic plant of Basic Magnesium, Inc. It is primarily a "war baby" called into being as a plant for the sole purpose of aiding in the prosecution of the war. It was envisioned by those who created it as probably a temporary enterprise which would cease to function at the end of the war.

Fortunately the management of this gigantic plant has been placed in the hands of Anaconda Copper Company, an organization which includes much of the best engineering talent and scientific ability of the country. To the development of the plant, the perfection of its processes and the economy of its business operations Anaconda is directing its talent and its ingenuity. Already they have so modified and perfected the processes of producing magnesium metal as to very materially reduce its cost toward economic competition with other plants.

It is becoming evident that the Basic Magnesium plant may continue after the war as one of the great industrial plants of the west. Nevertheless that can be fully assured only if BMI shall receive the support and cooperation of the entire community to the fullest extent.

The officials of BMI are not seeking to take advantage in any manner of the business people of Las Vegas and whatever they ask in the way of cooperation is not because of petty greed or grasping business tactics as some of our worthy citizens seem to imply by their actions.

Whether or not Las Vegas is to go forward to its manifest destiny of greatness within the next few years depends largely upon our own citizens. Basic Magnesium and Las Vegas are inescapably partners in our future and neither can ignore the other and hope for continued success.

If we can assure the operation of Basic Magnesium as a permanent enterprise following the war, our future destiny will have been accomplished because other great enterprises will cluster here where the "magic metal" of the future is produced.

But, if we of Las Vegas shall assume a superior attitude and ignore the needs of our principal enterprise other industries will be slow and loth to entrust their success to our petty selfishness and our city will still have to work its way painfully along the path of the years instead of strutting its way to greatness as we would like to see it do.

Magnesium Plant Is Permanent Industry

Technicians Tell of Steps Being Taken to Increase Use of Magnesium Metal.

That they consider the Basic Magnesium plant a permanent industry which will continue as one of the great industries of the west following the war was indicated by a group of technicians who are associated in the job of advising and assisting in the development of increased uses of both manganese and magnesium following the war.

Among those who were guest speakers introduced by Program Chairman Frank Case, were Clyde Williams, director of the Battelle Memorial Institute and chairman of the war metallurgy committee of the war production board; Col. Glen F. Jenks, also member of the war metallurgy committee of the ordnance department of the United States Army, and Dr. V. M. Krivobok, chief metallurgist of the Lockheed Aircraft Corporation.

Mr. Williams, the first speaker, said, in part:

"You here in Las Vegas are working at the completion of the western frontier. Las Vegas is becoming an industrial city. Working on the metallurgical problems of this region are 26 of the top metallurgists of the United States. Our success in the war has been dependant on the increased production of metals. Without the scientific genius of men such as are associated with B. M. I., success would have been impossible.

"After two and one-half years of war we have been able to excell Germany in production of metals, both as to quantity and quality. Among other things, processes have been developed for treating the low grade manganese ores. The plant constructed by the Hanna Company at the 'Three Kids' manganese property is the only plant of its kind. It is now about ready for steady production. They will make a very fine product which will be converted into ferro-manganese in eastern plants for use in the steel industry. The eyes of the steel world are on Las Vegas.

"The present war has given us the light metals industries of aluminum and magnesium and the airplane industry. It is fortunate that the government decided to put the largest magnesium plant in the world just across the hills from the California aircraft industries.

"The use of magnesium before the war was about 2000 tons per year. Now the B. M. I. plant is turning out many times that. Magnesium is one of the most fascinating of metals, just as this plant is one of the most phenomenal in the world. It is fortunately situated as to power and raw materials and has a most efficient and effective process. There is no doubt that this industry will be a

(Continued on Page 4)

(Continued from Page 1)
permanent one.
"The continuation of B. M. I. after the war may be dependent on several factors. To continue successfully we must develop new uses for magnesium. You here should be happy and grateful that the men at the head of this plant are so farseeing."

Mr. Williams introduced Dr. V. M. Krivobok as one, known throughout the world as a research scientist who, during the last few years has turned his talents to the service of the airplane plants of Los Angeles. Dr. Krivobok said in part:

"When the war came 7000 planes a year were being produced in the United States. When I first came to the Lockheed plant they were turning out one plane per week—now many times that. The demand for increased production brought unbelievable diffi-

culties but we are still expanding our plants. We never forget our efforts to build a better plane."

"In our plant in many places are posted placards 'Save One Ounce'. It is our task to save in weight of our planes in every way without endangering the safety of the plane. In this magnesium is a new product.

"It is now apparent that this organization at B. M. I. will supply the scientific research necessary. Its new industrial laboratory now nearly completed, will be one of the most complete in the country."

Mr. Williams then introduced Col. Jenks, president of the American Welding Society, whose work is of the highest importance in the airplane industry.

"The producers of metals must understand for what his metals will be used," Col. Jenks said. "The war is our present problem. After the war we must work out the competitive factors. The producers must have in their organizations men competent to sit at the table with the users of the metals produced here."

Guest of honor at the luncheon was Major C. J. P. Ball, who following World War I, introduced the magnesium industry into England and whose experience in the production of that metal was the basis for the beginning of the B. M. I. plant at Las Vegas.

Major Ball returned recently from a trip to his home in England and will be a speaker at Rotary in the near future we are promised. His son, Peter Ball, who spent some time with his father at B. M. I. a year ago, is now in the British Royal Artillery.

S. H. CALL, WALL STREET CURIAL,
CHICAGO,
AUGUST 9, 1943

REPORTING on the recent ceremonies at the Nevada plant of Basic Magnesium, Inc., which has just reached full production, the house organ of B. M. I. says that Gordon Reed, director Aluminum & Magnesium Division, War Production Board, told in his address of the precarious magnesium metal shortage as late as 1942, and stated that B. M. I. is now turning out the metal in the enormous quantities demanded by the war's various needs and for the first time making stockpiles possible; and that his board has informed our Army, Navy, England and Russia that magnesium is available for all war uses.

He also is quoted as saying: "When you read that 2,000 tons of bombs were dropped on Cologne you can pretty well assume that well over half the weight was magnesium incendiaries and that a goodly share originated in Las Vegas. Incendiary warfare requires large and unpredictable amounts of magnesium and huge production and stockpiles are essential. Nobody cares to predict just how much magnesium will be necessary to set fire to the island of Japan."

MODERN INDUSTRY

"For All Management Men Concerned With Making & Marketing Better Products At Lower Cost."
New York City

AUG 15 1943

Magnesium production. The \$130-million Basic Magnesium plant in Las Vegas, Nev. is stated to be now producing 3 1/2 times more of the light metal than the total of all other similar plants in the world.

More Magnesium . . . The talk around Washington, we hear, is that there is really a big supply of magnesium available these days. One reason for this is undoubtedly the mammoth magnesium plant now in operation at Las Vegas, Nevada. A yarn about the \$100,000,000 project was carried in the June-July issue of *Link-Belt News* . . . and included pictures and descriptions of some of the company's installations there.

This lightweight metal packs a heavy punch when used in bombs, tracer bullets, planes and other war goods. We're glad we have enough . . . and we'd like to suggest that interested parties start figuring now how a plentiful supply of magnesium will affect their post-war future.

AMERICAN MACHINIST
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New York City

AUG 19 1943



REFRACTORIES



A Department Devoted to the Production of Refractories, Their Performance in Use, and News of the Industry

Silicate Cements in Acid Tanks— And How to Use Them

Acid-Proof Cement Applications Cannot Be Determined
Without Thorough Understanding of Their Reactions—
Incomplete Hardening Offset by Strong Sulfuric Bath

Josef M. Robitschek, D.Sc.

Director of Research, U. S. Stoneware Co., Akron, Ohio

USE of chemical stoneware equipment in acid-proof structures is somewhat limited. Experience has shown the impossibility or impracticability of manufacturing one-piece stoneware vessels and apparatus for capacities greater than 600 to 700 gallons. Also, very large vessels, containers and apparatus made in one piece from ordinary stoneware either cannot be heated at all or must be heated very slowly and carefully.

So chemical stoneware has to be replaced by acid-proof masonry (lining or over-sheathing) where sizes of the acid-proof equipment exceed limits determined by shape and application, or where wood, brick, concrete or metal structures must be protected against chemical action. These acid-proof masonry structures are composed of two parts of different natures—acid-proof ceramic ware or brick, and acid-proof cement.

Bonding Material Cause of Trouble

Desirable properties of acid-proof brick have been generally known for many years; high grade material of this type is widely manufactured in every industrial country. Acid-proof ceramic ware, too, has been successfully exposed for 10 or 20 years to attack by hot acids. While failure of acid-proof structures may, in isolated cases, be traced to the fired ceramic material, by far the greater number of these failures has always been caused by the bonding material.

Although considerable progress has been made in acid-proof cements in the

An acid-proof refractory tank or wall is no more efficient than the cement bonding the brick construction. This first installment of Dr. Robitschek's article explains the theory of using sodium silicate cement as a bonding substance to resist acids (single exception, hydrofluoric acid and some derivatives) and to withstand reasonably high temperatures. Because sodium silicate is the basis of numerous acid-proof refractory cements, this series should prove of value to acid brick manufacturers and users of acid-proof structures.

past few years, the fact remains that a structure's resistance to any destructive action is limited by that of its weakest component part. And the best of acid-proof cements have lower resistance to chemical attack than even medium quality acid brick. Cement joints—between single masonry units or between lining and casing—are the weaker of the two acid-proof constituents. Special care must be exercised in selecting and applying this bonding material.

Silicate Cement Is Best Material

Sodium silicate cements, sulfur base cements and resin cements are the three bonding materials most commonly used in corrosion-proof masonry and linings. Of these three, silicate cement alone may be used at temperatures above 180° F. in contact with acids of any concentration, and with strongly oxidizing agents. Although the other

two cements are used advantageously in many cases, sodium silicate cement still remains the most important bonding material for acid-proof ceramic structures. This is due to its resistance to acids (single exception, hydrofluoric acid and some derivatives), ability to withstand high temperatures, easy application, low price and high bonding power to all clean surfaces.

Different types of sodium silicate cements have evolved from the simple putty which consumers formerly prepared from sand and a sodium silicate solution. But none of these various cements is universally applicable. To avoid failures and to secure maximum service from each, one must have a good knowledge of the different types and the reactions taking place during preparation, setting and hardening. Importance of this knowledge is stressed by the fact that today ceramic linings not only serve in their normal applications, but also replace to a large extent such corrosion-proof critical-proof materials as rubber linings, stainless steel equipment and metal alloys.

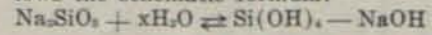
Ordinary Sodium Silicate Cements

A mixture of sodium silicate solution of high SiO_2 : Na_2O ratio and fine-grained sand, or other siliceous materials, has ordinarily been used as cement for acid-proof masonry and linings. Setting of this ordinary siliceous cement is brought about by precipitation of silicic acid from the sodium silicate.

Commercial sodium silicate solutions,

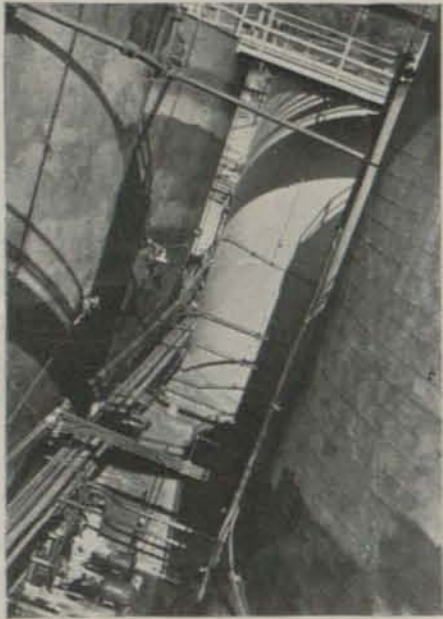
APPLICATION — REFRACTORIES — PRODUCTION

formed by treating a soluble silicate glass with hot water, do not contain the sodium salt of the silicic acid. Instead, there is present free alkali and silicic acid that has been peptized (brought into colloidal solution) by the alkali. If these "solutions" lose water through evaporation, or if their equilibrium is disturbed by a partial neutralization of the alkali due to the action of atmospheric carbon dioxide, silicic acid precipitates from them in the form of a voluminous silica gel of high water content. This reaction follows the schematic formula:

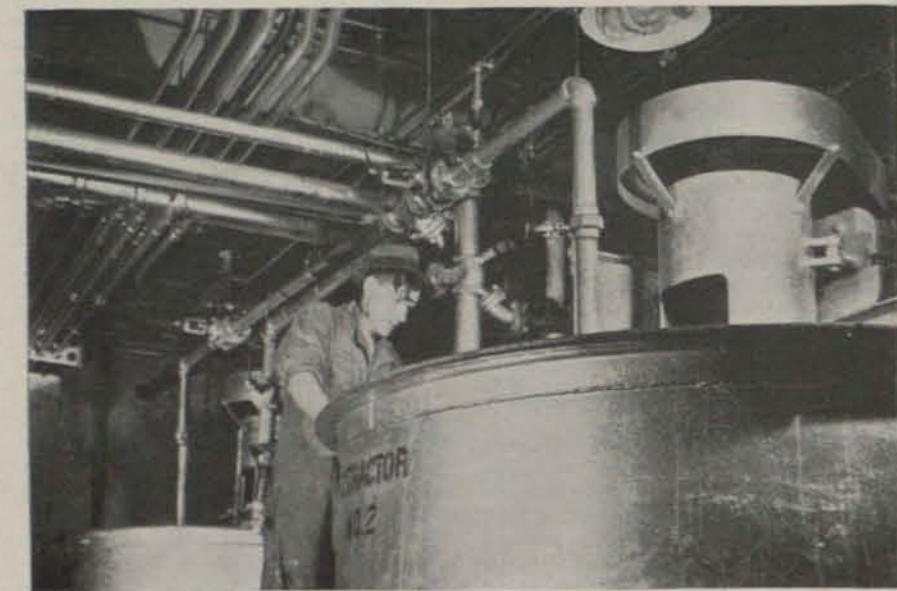


Filler Performance

One molecule of the precipitating silicic acid combines with 330 molecules of water. This absorption of water from



Acid-resisting brick and cements are used in tanks processing raw materials for chlorine manufacture.



In the manufacture of synthetic rubber, many operations require tanks lined with acid-resisting and heat-resisting brick and cements.

the semi-liquid mixture of inert filler and silicate solution causes the mixture to stiffen or "set." The filler takes no part in this reaction. Its presence is merely necessary to convert the adhesive silicate solution into a cement, i. e., to form a skeleton for the stiff paste and to counteract the shrinkage which takes place during dehydration of the voluminous silica gel. Dehydration—brought about by further evaporation of water from set cement—causes mixture of silica gel and filler to harden, losing its pseudo-plastic nature and becoming entirely solid.

From this simple description of reactions occurring in ordinary silicate cement, it is evident that water evaporation must take place to cause setting and hardening of the cement; that the presence of carbon dioxide may accelerate its gelation or "set."

At first glance it may appear easy to comply with both these conditions. In truth, complying with them is so difficult that it is frequently impossible to use ordinary silicate cements in acid-proof masonry or over-sheathings. This difficulty, in many instances, is the primary cause of an entire disintegration of masonry and linings. Cement is almost entirely cut off from the action of atmospheric carbon dioxide when setting between casings and acid brick or tile.

Precipitated Gel Keeps Out Air

Since good acid brick are almost impervious to liquids, water can be removed from the cement only by slow diffusion to the drying surfaces of those joints binding the single masonry units. But carbon dioxide can hardly penetrate the interior of these joints. Silicic acid first begins to precipitate from the sodium silicate solution on the inner surface of the lining directly exposed to action of the surrounding air. Precipitated gel is so voluminous that it immediately forms a skin impervious

to air. Air is then prevented from entering the joint and water cannot diffuse to the surface.

Setting and hardening of ordinary silicate cements take place slowly and only on surfaces exposed to air. Interior of the joints, and cement layers between single courses of tile and between lining and casing remain soft. Acid-proof brick generally have a water absorption of at least 1%. Small quantities of the liquid phase are thus slowly absorbed by the porous ceramic material, resulting in a stiffening of the cement. As long as this stiffening has not taken place, even small pressures are sufficient to squeeze the soft cement out of the joint. This is why vertical parts of structures can only be built slowly. After laying two or three courses of brick or tile, the mason must wait until joints are stiff enough not to yield under weight of the next course. Using only dry, warm brick may partly overcome this difficulty.

Heat Helps Quicken Set

To carry the process of setting and hardening farther into the joint interiors and to impart sufficient mechanical strength, the finished structure must be thoroughly heated. Large equipment, however, is difficult to heat sufficiently to set and harden completely a major part of the cement joints. This is true of large tanks consisting of an outer concrete or brick-work casing and a thick inner acid-proof over-sheathing, especially when located in damp rooms or outdoors. As a rule, equipment lined by using ordinary sodium silicate cement has to be put into use as soon as a certain stability is achieved by mere superficial hardening of the joints. Complete dehydration of the silica precipitated from the sodium silicate can take place only at temperatures above 212° F. Otherwise, the silica remains soluble in water as long as it has not been exposed to this temperature for a sufficient length of time.

Incomplete hardening of the joints, however, is no disadvantage if the structures come in contact only with concentrated strong acids. These acids not only precipitate the silica hydrogel from the silicate solution and its hydrosol, but they dehydrate it thoroughly. So, setting and hardening of outer layers of cement will be completed as soon as the lining comes into contact with the acid. Instantaneous hardening will also occur in the joint interiors if the acid can penetrate the pores or fissures of the outer layers.

Dehydrated silicic acid is insoluble in acid solutions. Thus, cement is converted by this acid treatment into a body of sufficient mechanical strength with almost absolute insolubility in concentrated sulfuric, nitric, hydrochloric or other strong acids.

Need Dehydration to Resist Acids

If an ordinary silicate cement comes in contact with dilute solutions of strong acids, the silica gel will still be

BRICK AND CLAY RECORD
"The leading clay journal of the world"
59 East Van Buren St., Chicago, Ill.

APPLICATION — REFRACTORIES — PRODUCTION

precipitated from the sodium silicate but no dehydration of this gel will occur. On the contrary, presence of aqueous acid solutions will prevent hardening of the cement. A cement which has done no more than set is not strong enough to resist even moderate erosive action; it will wash out of the joints in short time. So, without previous dehydration, structures consisting of acid brick and ordinary silicate cement are not resistant to the action of dilute or weak acids or of acid salts solutions.

Dehydration of silicic acid may be effected (1) by heating the structure above 212° F., maintaining that temperature long enough to evaporate most of the water adsorbed by the gel, or (2) by exposing the cement to the dehydrating action of concentrated sulfuric acid. The first measure is hardly practical even with moderate sized equipment.

Paint Joints with Sulfuric Acid

However, after joint surfaces are hardened, small equipment may be filled with acid and left in contact for several days. In large structures, joints may be repeatedly painted with concentrated sulfuric acid. Although the acid does not penetrate the entire joint, it does completely dehydrate the cement on joint surfaces, making it insoluble in any acid solution.

Prolonged use of the equipment will finally result in certain unavoidable erosion or mechanical damage to the hardened surface. Liquid can then penetrate these parts of the joints where the cement is only a stiff paste of silica gel and filler. This mixture is then easily washed out, causing disintegration of the whole structure or parts of it. Only constant supervision and care will assure reasonable service from these linings. Damaged joints should be repaired immediately; acid treatment has to be repeated periodically.

Ordinary silicate cements cannot be used in structures exposed repeatedly or for long periods to the action of water, steam or neutral solutions. Alkali hydroxide, formed during precipitation of silicic acid from the silicate solution and adsorbed by the precipitating gel, is still present in the completely hardened cement. Even superficial treatment of the joints with strong sulfuric acid does not remove it entirely because the acid cannot penetrate the joints.

During prolonged exposure to water or neutral solutions, however, small quantities of liquid will penetrate the cement either as vapor or by capillary action. Small amounts of a concentrated sodium hydroxide solution will form in the joints. This solution has a strong peptizing effect on the precipitated silicic acid. Since it is conveyed by diffusion to the joint surface, it destroys the interior as well as the outer layers where neutralization had previously taken place through the acid treatment. Even at normal tempera-



Special silicate cements were needed for the construction of the Basic Magnesium plant in Las Vegas, Nev. To avoid rapid setting, the cements were placed in V shaped pans of ice,—115 carloads of ice were used. Firebrick were ground to shape on flat grinding wheels.

used successfully several years ago. It was based on the fact that presence of a silicic acid soluble in alkalis disturbs the equilibrium of concentrated sodium silicate solutions in much the same way as carbon dioxide. Fillers have been put on the market in which inert acid-proof sand or silicates were partly or entirely replaced by more active forms of silicic acid. Cements prepared from these fillers set quickly throughout the whole joint. Speed of the reaction is controllable to some degree by the quantity, grain size and solubility of the active silicic acid replacing inert filling material.

Amorphous silica, soluble in alkali solutions, occurs in nature as opal, chalcedony, agate, and so forth. It is also a by-product of certain chemical manufacturing processes. Example: manufacture of fertilizers from natural phosphate rock, and aluminum salts from clays or kaolins.

Active Fillers Have One Advantage

Active fillers only accelerate precipitation of hydrogel from the sodium silicate solution. They do not affect the hardening of the set cement, Hydrogel, whether precipitated slowly by air action or quickly by the presence of soluble silicic acid, must be dehydrated by drying or by the action of strong acids. After hardening, cement still contains alkali hydroxide adsorbed from the solution by the precipitated silica. Thus the cement remains easily soluble in water or neutral solutions. These active fillers have the lone advantage of not interrupting the mason's work to allow for the slow setting of ordinary silicate cement.

If active silicic acid, the by-product of super-phosphate manufacture, is used as a filler for silicate cements, an interesting phenomenon results. It probably led to the discovery on which present modern silicate cements are based.

Natural phosphates, converted into super-phosphate by a sulfuric acid treatment, contain silica and calcium fluoride. During the acid treatment, these impurities combine to form a silicofluoric acid. To prevent this volatile acid and the simultaneously formed hydrofluoric acid from escaping into the atmosphere, gases leaving the apparatus are washed with water and salt solutions. Part of the silicofluoric acid is decomposed in this washing, resulting in a precipitated reactive silicic acid containing small quantities of sodium silicofluoride. Cements containing this silicic acid as a filler not only set rapidly, but also have a quicker hardening.

In the March issue of BRICK & CLAY RECORD Dr. Robitschek will describe accelerated silicate cements—their application and some of their special uses.

QUICK-SETTING SILICATE CEMENTS

One disadvantage of ordinary sodium silicate cement—slow setting under action of air—could be eliminated if the silicic acid could be precipitated from the sodium silicate solution throughout the whole joint by disturbing the solution's equilibrium in ways other than evaporation and neutralization by carbon dioxide.

Sodium silicate solutions react with many different substances. So, it is not difficult to accelerate the set of silicate cement by adding acids or acid salts to neutralize the alkali. Thus is caused the precipitation of silicic acid. Or, metallic salts may be introduced to react with the sodium silicate under formation of insoluble metasilicates.

Chemical Setting Is Unsatisfactory

Agents of different natures—sodium bi-sulfate, chlorides, nitrates, phosphates or sulfates of weak bases, calcium sulfate, calcium carbonate, lead carbonate, esters of fatty acids—have been recommended as accelerators in silicate cements. But setting caused by a chemical reaction is accompanied by considerable loss of strength in the cement. This is why none of the many "quick-setting" cements obtained by such additions to the filler has found wide usage.

A method to speed up setting was

Suspended Wall Construction Takes on New Jobs

Vice-President of Bigelow-Liptak Corporation
Comments on Suspended Wall Construction—
Tells What It Is . . . and How It Works

BECAUSE refractories are the chief material used in suspended wall and arch construction, these two industries are closely associated. In fact, since the days of the now abolished NRA, the suspended wall and arch industry has been considered part of the refractory industry.

History of suspended wall and arch construction goes back to the early twenties. At that time structural adequacy of enclosures for furnace hot zones was beginning to receive consideration parallel with the development of the refractories themselves.

Applications of Suspended Walls

Early applications of suspended construction were limited to the high temperature zones of boilers and other industrial furnaces. These suspended wall applications came about naturally enough. Failures had grown prevalent in previously used construction due to slag action, fusion, spalling, expansion

movements and load deformation. Maintenance costs were high. Since a suspended wall carries no superimposed load, its use became highly desirable in hot furnace areas.

Remainder of the boiler enclosure was not then considered a necessary, or even desirable, application for suspended construction. This was partly true because the accent had been on air cooled walls.

Air cooling, of course, presupposes a certain amount of thermal loss due to radiation and conduction. Such possible heat losses would be negligible in high temperature furnace areas where refractory survival might be the primary consideration. Yet the opposite condition would prevail in convection areas where compensating heat input would not be available.

Encasement for Low Heat Zones

Gradually, however, due to high performance requirements, low temperature zones of these units also came to require the more adequate encasement provided by suspended wall construction. Thus maintenance and conduction losses were minimized and air infiltration was prevented. It had been demonstrated that refractories, even when subjected to relatively low temperatures, expand to a major degree. At 1200° F., for instance, high heat duty firebrick will expand 60% of the total expansion. Cracks will develop in solid masonry walls, admitting outside air to the tube areas.

Suspended walls fall into two broad categories—air-cooled and insulated. Both these types of wall look very much alike. They employ substantially the same tile and castings. But their thermodynamics are entirely different.

Originally designed as air-cooled walls, the suspended wall design had the primary purposes of relieving cumulative loading of refractories and affording simple, effective means of making localized repairs. Yet, another important design objective was to prolong the life of refractories by lowering their hot face surface temperature as well as their mean temperature, thereby giving them their greatest opportunity for survival.

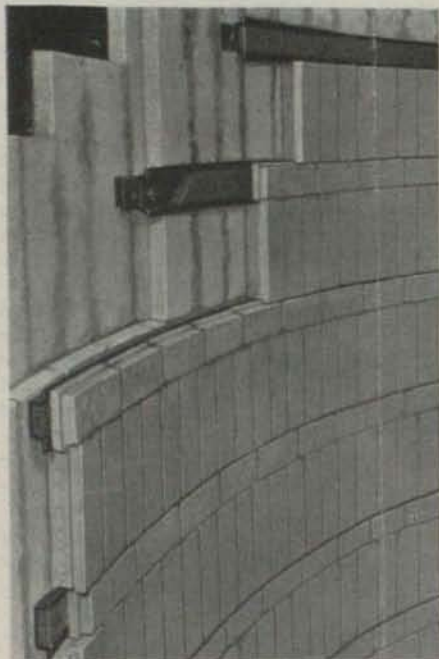
Efficiency of insulated suspended walls had now been proved as enclosures for cooler areas of various

types of industrial furnaces and for the entire enclosures of all types of low temperature furnaces. It had also been demonstrated that refractory wear-and-tear in such zones was hardly existent.

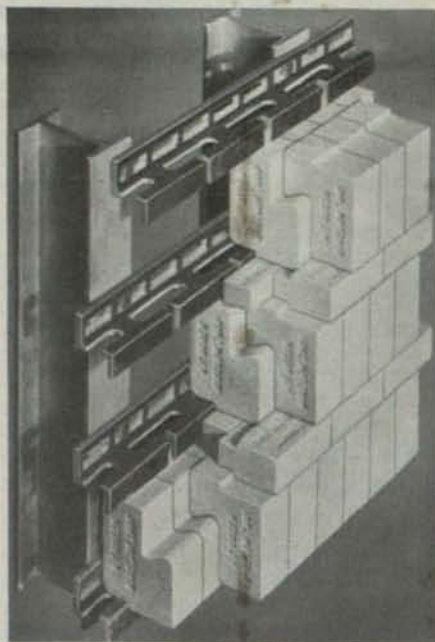
Development of Thin Suspended Wall

And so the next logical step for the industry was to develop thin suspended wall and arch construction. This was entirely feasible with certain types of suspension. But the reduction in refractory thickness imposed an added designing burden from the standpoint of structural integrity with its complementary twins—air tightness and sealed insulation.

What is thin suspended refractory wall construction? What does it do? In the words of H. S. Ford, vice-president of Bigelow-Liptak Corp., thin suspended wall construction is a fore-



Interior of catalyst regenerator during construction showing Bigelow 3-in. refractory unit-suspended wall with supporting brackets bolted to small clips which are welded to vessel shell. Note sealed insulation.



Typical panel of Bigelow 9-in. heavy duty unit-suspended refractory wall showing brackets bolted to steel columns. Each row of refractory blocks is supported directly on its bracket and retained at top by the next bracket above. Removal of the intermediate filler tile permits the removal and placement of individual wall blocks without disturbance to the others.

BMI Permanency Problem Studied By Truman Group

(Continued from Page One)
stances, then we might be able to get the answer as to the permanency of the plants on the west coast.

"The ability of the magnesium industry to compete with other metals in the field, of course, probably will determine the permanency."

To Protect Investment

In reply to a question regarding whether the government investment will be protected after the war, the senator declared that his committee was interested most in seeing that all governmental investments should be protected, as well as to see that the war job was done.

He said that all monies invested in the new war industries in America were invested with an eye toward the salvage value after the conflict is completed.

"The best salvage job that could be done, naturally, would be to continue operations after the war. Then none of the investment is lost. However, the operation after the war depends on many things, the answer to which cannot be arrived at right now."

Senator Truman revealed that the committee has taken up plans for the establishment of fabrication plants in the west because of the fact that, at the present time, the magnesium plants are far ahead of their production schedule and they are stockpiling the material because of the lack of the fabricating plants.

Not Interested

He declared that the committee was not interested in jurisdictional labor disputes, that the main idea was to see that the war industries did their job rapidly and efficiently.

As one member of the committee put it, during a recent dispute in this area, the senator said, "this plant has problems enough on its hands without adding that of labor disputes."

The future of magnesium in the light metal field depends on fabrication of the metal, and this problem is being worked out as rapidly as possible, it was said here today by Senator Harry Truman, democrat of Missouri, who, with other members of the Truman committee, visited the BMI plant yesterday and today.

Asked as to the permanency of the local magnesium plant, Truman declared that his committee was gathering data and information regarding the BMI plant and others on the west coast, looking toward some solution of the post war operation of these establishments.

Demand Needed

"Future development of magnesium depends entirely on the demand for the metal after the war, and the ability of American industry to produce the metal as efficiently and cheaply as other light metals with which it will compete," Senator Truman said. "We have no idea, yet, just how great the demand for the metal is going to be after the war. Motor cars, freight cars, airplanes and a hundred other peace time uses probably will follow, but industry, at present, is so busy completing a war job that it has had little time to debate the use to which this new metal will be put.

"The trouble right now is with fabrication of magnesium. If that problem can be licked, and it is being worked out as rapidly as possible under the circumstances."

(Continued on Page Four)

PACIFIC BUILDER & ENGINEER
"Construction News Journal of the Pacific Northwest."
Since 1902
Seattle, Washington

Another "World's Largest"

The world's largest single producer of magnesium is the plant of Basic Magnesium, Inc. now operated by the Anaconda Copper Mining Company near Las Vegas, Nevada. It is operating at 85% capacity.

Ore is transplanted to the plant by a 1000 mile rail haul—which may cause a new railroad to be built. Duties of Harold G. Dean.

ENGINEERING AND MINING JOURNAL

"For nearly three-quarters of a century standing authority of the metal and non-metal industry, smelting and refining industries."
McGraw-Hill, 330 W. 42nd St., New York, N. Y.

NEVADA

Basic Magnesium, Inc., Reaches Full Capacity

Copper Canyon to double 1942 production—Hoover examines Piche and Bristol claims—Scheelite concentrator built at Toy

► Production of copper at the Copper Canyon mine, in Lander County, operated with a 350-ton flotation mill by the International Smelting & Refining Co., will, in 1943, be more than double that of last year, according to J. J. Lillie, manager. Mill feed is now around 350 tons per day and will be increased to 400 tons. Development on the 500-ft. level of the new Julie shaft has increased substantially the visible reserve. Several of the company's old mines in the Copper Basin, five miles to the north, are being worked by lessees.

► Iron ore, both hematite and magnetite, is being shipped from several Nevada deposits to points on San Francisco bay

L.V. REVIEW-JOURNAL
August 19, 1943

Training Shops at BMI Plant Hinted By Federal Heads

WMC State Chieftain Reveals Plans for New Program

RENO, Aug. 19 (Special)—The possibility that shops will be set up at Basic Magnesium, Inc., for the training of people in various skills and trades, was revealed this week at a meeting of training agency directors and educational personnel held in Reno.

The meeting was called in Reno by state manpower director for the Nevada area, William Royle. It is proposed at the BMI shops to train people as carpenters, machinists, sheet metal workers and automotive trades.

Formulate Plans

Plans are now being formulated to get machinery for the carrying out of these training projects. BMI personnel officials were confident that such installations would be a direct aid to them particularly from the standpoint of training workmen for skilled jobs and that it would definitely aid their manpower problems.

Don Cameron, state supervisor, Phillip Hasty, field representative, and Melville D. Hancock, assistant state director, reported on their visits to the training personnel at Sierra ordnance, Reno army air base and the naval ammunition depots. The need for job instructor training courses at the Sierra ordnance was expressed by the army personnel officials. Aylwin Probert, training within industry representative, stated that he would make immediate contacts to pro-

for use as ballast in navy and merchant vessels. It is crushed to 1 1/2-in. size before shipment in bulk and, mixed with cement, is made into 1-ft. cubes. Representatives of Pacific Coast plants have been in Nevada seeking to contract for delivery of 1,500 to 2,000 tons per month of ore meeting weight requirements.

► With completion early in July of its tenth and last metal production unit, the colossal plant of Basic Magnesium, Inc., in Clark County, operated for the WPB by the Anaconda Copper Mining Co., was reported producing metallic magnesium in excess of its rated capacity. First unit began production Aug. 30, 1942. Francis O. Case is manager.

► At a recent meeting at Ely of the Nevada section of the A.I.M.E., Walter S. Larsh, assistant manager for the Nevada Mines Division of Kennecott Copper Corp., told the members that a large daily tonnage of copper is being produced in leaching old waste dumps containing overburden stripped from the open-pit mine at Ruth. This operation has produced 12,000,000 lb of copper from two of the seven dumps available, and water will be piped to other dumps. Water is delivered to each dump at around 1000 g.p.m. and copper recovery has been between 4 and 5 lb. per ton of ore. The operation was suggested in 1940 by W. S. Boyd, vice president of Kennecott, while on a visit to the Ruth mines and office at McGill. J. C. Kinnear is general manager, with office at McGill.

► With completion of an access road connecting with the rail point at Inlay, Pershing County, production has been resumed at the Greenan-Kerr tin-copper mine at Majuba Hill, and several carloads of copper ore have been shipped to the A.S. & R. smelter at Garfield, Utah. Tin ore is being trucked to a custom flotation mill at Toy, west of Lovelock, where several hundred tons of the cassiterite will be concentrated. James O. Greenan, 206 N. Virginia St., Reno, is in direct charge.

WALL ST. JOURNAL
New York, N. Y.

World's Largest Magnesium Plant Operating at Capacity

From THE PACIFIC COAST WALL STREET JOURNAL
SAN FRANCISCO—Basic Magnesium, Inc., Las Vegas, Nev., operated by Anaconda for the Defense Plant Corp., and now the world's largest magnesium plant, attained full operation at the outset of this month with the turning of Boulder Dam power into the final electrolytic cell in No. 10 unit of the vast works. As of that date it was reported that all cells but 12 in the entire plant were operating simultaneously, a record not expected to be repeated because of regular shutdowns for maintenance and repair that will be necessary. The final cell heating came exactly 11 months after the first power was turned into a unit of the plant, and was made the occasion of a plant ceremony.

vide instruction for training courses.

Need Cited

A definite need for clerical training was expressed by the naval ammunition officials. Mildred Bray expressed the possibility of utilizing the Hawthorne public schools for the carrying out of this program. Contacts in the near future will be made by Lieutenant J. P. Puffinbarger, Cameron and Probert with the idea of a possible introduction of T. W. I. courses where needed. Problems confronting the various agencies and the application of their programs were discussed with particular emphasis being placed upon the problem of coordinating training programs.

PRODUCTION OF MAGNESIUM NOW STABILIZED

Plant Operating All Of Electrolytic Equipment

Signalizing the final step in progress toward stabilized capacity production of one of the most urgently needed of war metals, the Basic Bombardeer, publication of the Basic Magnesium Inc. at the main plant in Clark county, said this week that another all-time record went down in the books of industrial history at BMI Saturday, July 31, when the last switch was thrown to put in operation the final electrolytic cell in the world's largest magnesium plant.

When juice from Boulder Dam started flowing through the silver bus bar on the final circuit in No. 10 unit, all cells but 12 in the plant were "cooking."

Probably never again will such a large number be in operation at the same time, as steady production necessitates cut-outs for maintenance and repairs.

A large number of executives was present when Basic crews swung the last circuit into action. It was noteworthy that the final cell went into operation exactly eleven months from that exciting day on August 31, 1942, when the first circuit warmed to the energy flowing from anode to cathode.

From that day to July 31, 1943, construction crews, gaining speed as they moved down the line of units, hung up record after record in the completion of installations. Now, with the last cell carrying white-hot metal on the surface of the electrolyte, the big plant will be well out in front in world production of magnesium.

Many of the men who attended the throwing of the first switch were also present at the throwing of the last. There was a justifiable pride—which they tried not to reveal—pride of accomplishment through a long, tough pull.

The last cell is making magnesium. Its product, like that of its hundreds of facsimiles, will soon, as castings and forgings, be reducing the weight of war planes; as tracer bullets, be lighting the fire line for machine-gun bursts at Focke-Wulfs and Zeros; and as incendiary bombs be raining fire on the Hitler-Hirohito hierarchies.

July 31 was, indeed, a big day at BMI. But it was a big day only because it had such deep meaning to democracy.

Seattle (Wn) Times
August 26, 1943

The United States government's \$130,000,000 Basic Magnesium, Inc. plant at Las Vegas, Nev., has gone into full production and spokesmen said its output of vital war material will be three and one-half times greater than that of all the world's other similar factories combined.

ELECTRICAL WEST
SEPTEMBER 1943

Superlatives are commonplace to the Far West. Here is another one: the largest magnesium producing plant in the world is Basic Magnesium in Nevada. It achieved that distinction early in August when all but 12 of the furnaces went on the line. Incidentally it simultaneously became one of the largest single electrical customers in the world at the same time.

MINNEAPOLIS, MINN., STAR & STATE
SEPTEMBER 1, 1943

Production of Magnesium Now Steady

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EXECUTIVES PRESENT

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L.V. REVIEW-JOURNAL
Sept. 5, 1943

Henderson Postoffice Building Under Way

Construction of Henderson postoffice building, Townsite center, was begun the past week by O. J. Scherer Company for DPC and is to be completed in about 75 days. The main structure will be 97x48 feet, concrete-block walls and concrete roof—one story with high ceiling. The same contractor also started work on the small store building, opposite Victory Theater, to be of similar material and fire-proof, 31x182 feet. This will house express and telegraph offices, laundry and cleaners, dentist, shoe repair shop and possibly other necessities. Walter D. Merrigan is general superintendent of both of these building jobs.

AUG. 29, 1943
JOPLIN, MO. GLOBE

BASIC MAGNESIUM IS OPERATING AT CAPACITY

San Francisco—Basic Magnesium, Inc., Las Vegas, Nev., operated by Anaconda for the Defense Plant Corporation, and now the world's largest magnesium plant, attained full operation at the outset of this month with the turning of Boulder dam power into the final electrolytic cell in No. 10 unit of the vast works.

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BMI Plant Will Survive After the War, Expert Says

Dr. Clyde Williams Discusses Metal With Rotarians

Declaring "you are fortunate that you have the greatest magnesium plant in the world here, just across the hills from the country's greatest airplane factories" Dr. Clyde Williams, chairman of the war metallurgical commission speaking before the Las Vegas Rotary Club today predicted that the Basic Magnesium plant here would be one of the industries to survive the difficulties of war over-expansion after the conflict has ceased.

"As the last war gave us the chemical industry which had formerly been the exclusive property of Germany, so this war has given us the great light metals industry and the airplane industry," he continued, pointing out that the war had given us the chemical industry which had formerly been the exclusive property of Germany, so this war has given us the great light metals industry and the airplane industry.

The nearest approach to a formal announcement of foreign aid to Eisenhowwer's offer, he said, was a statement of solidarity with the German people, the Government of Italy will fight on at the side of the United States and the British Commonwealth, and the American people will continue to fight for the world's peace.

Dr. Williams' committee members were presented to the Rotary Club by F. O. Case, general manager of BMI.

clared that the manganese plant located at the Three Kids mine was unique in the western hemisphere, in that it will work the metal from low-grade ores.

"While this plant will shortly start producing in commercial quantities, it is still in the status of a pilot plant because if it is successful there will be scores of others built. The eyes of the steel world are focused on Las Vegas and the manganese development, which is a tribute to the Hanna Company and the government engineers who have worked with them to bring this plant into existence."

Lauds Officials

Dr. Williams in the opening remarks of his address lauded officials of Basic Magnesium, Inc. and its staff "for the splendid achievement" in the Las Vegas plant, and pointed out that here was an illustration of American enterprise.

"Germany had 15 years to prepare itself industrially for this war. In a year and a half we have excelled her record both in quality and quantity of weapons and materials produced," he said.

Dr. Williams and his committee members were presented to the Rotary Club by F. O. Case, general manager of BMI.

WESTERN INDUSTRY

"A magazine directed to the men of management in all manufacturing industries in the industrial West."

San Francisco, California
AUG 1943

U. S. Maritime Commission asks for \$2,000,000 appropriation to improve food conditions, San Francisco Bay Area shipyards. . . 300 miners, Kaiser Company's Sunnyside Mine, strike for change in superintendents. . . Wage increases from 2 1/2c to 20c an hour approved by 10th RWLB for employees, Basic Magnesium, Inc., Las Vegas, Nev., retroactive to March 1, 1943. . . 25,000 women expected to leave war jobs to stay home during summer to care for children out of school. . . Northwest wage-earner still 5 to 10 per cent ahead of high cost of living, according to Dr. G. B. Noble, chairman, Northwest RWLB.

WESTERN INDUSTRY

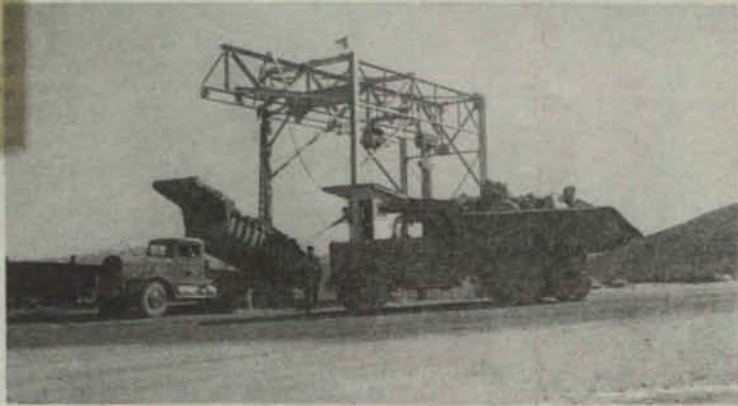
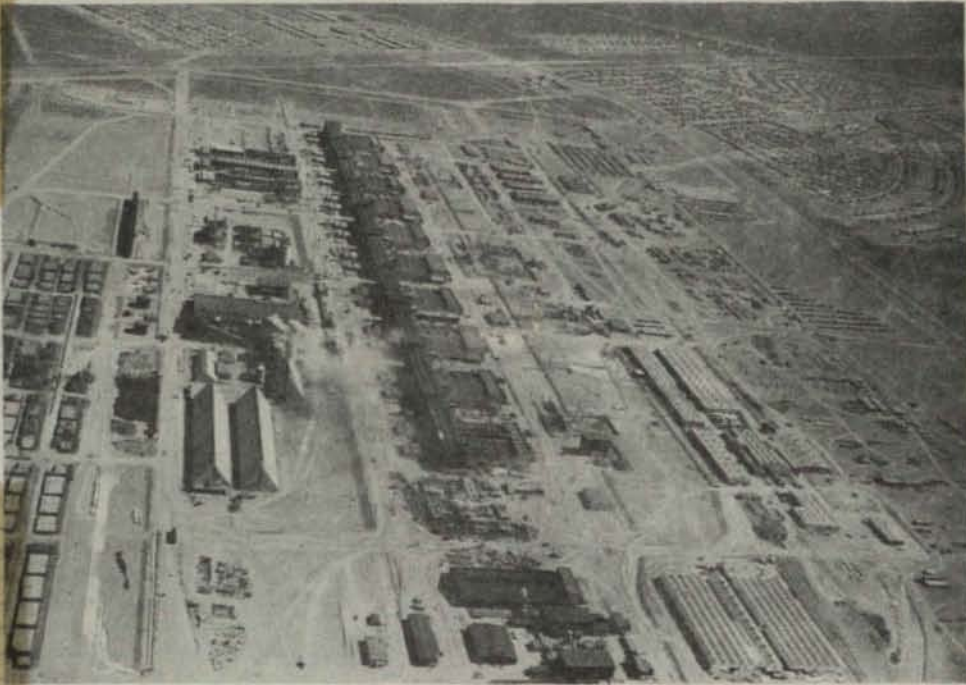
"A magazine directed to the men of management in all manufacturing industries in the industrial West."

San Francisco, California
AUG 1943

Fritz Ziebarth, head of the Long Beach construction firm bearing his name, has taken over operation of the Morrow Aircraft Corporation at Rialto, Calif., where plane assemblies are made for aircraft manufacturers in the East as well as West. In charge of the Morrow operation for Ziebarth is E. M. Findlay. Ziebarth has built practically every known type of heavy construction. Recently at Basic Magnesium, Inc., Las Vegas, Nevada, he supervised completion of the world's largest electrical installation in record time.

THE STORY OF BASIC MAGNESIUM, INC. IN PICTURES

Plantsite of the world's largest magnesium plant, Basic Magnesium, Inc., near Las Vegas, Nevada. The entire project was constructed in less than two years, but required more than 28 million man-hours of labor. Basic Magnesium claims to be the largest refractory brick job in the world, the largest sheet metal job ever undertaken, the largest plumbing installation in the history of the industry, and the largest electrical installation in the world. Basic Magnesium is said to have required an investment of \$150,000,000, funds being provided by Defense Plant Corporation. In October 1942, Anaconda Copper Mining Company purchased the controlling interest in BMI and took over the management of the company. Under the direction of F. O. Case, general manager, and H. G. Satterthwaite, general superintendent, the project was rushed to completion. Already production is well above rated capacity.



(Above)—Crude magnesite for the project is mined at Gabbs, Nevada. Here are two of the 20-ton ore trucks doing business at the primary cone crusher which takes an entire truckload at one gulp. From the primary crusher the ore is carried to the mill by conveyors. (Below)—Magnesite concentrates, calcined magnesite, coal, and peat moss are mixed in a dry state, then magnesium chloride solution is added. From this mixture cakes of magnesium are extruded, cut in slabs, and passed through gigantic drying kilns. Here are the cakes of raw material after they have passed through the kilns.

(Above)—This is the mill at Gabbs, the structure at the right housing flotation equipment and primary driers. In the seven-story building in the center, a battery of roasters, building high, calcine the magnesium oxide. The "silos" at the left store the processed oxide prior to shipment to Las Vegas. The Gabbs plant produces 400 tons of calcined product daily. (Below)—To make magnesium BMI must first produce chlorine. This is done by the electrolysis of brine. Basic's chlorine plant comprises 900 Hooker-type cells, a portion of which are shown in the picture. Caustic soda is a by-product.



STOCKS AND PRODUCTION OF SLAB ZINC REACH NEW HIGHS

WITH the lifting of censorship on metal production figures, the American Zinc Institute has resumed its reports to industry. The current release brings the records up-to-date since it contains not only the latest, but also the past figures issued during the censorship, as well as yearly averages starting with 1929.

According to the table issued, stocks of slab zinc of all grades at the end of November 1943 were the greatest reported at any time and totaled 159,853 tons. This is in marked contrast to the situation at the beginning of 1941 and again in June of 1942 when total stocks were 17,582 tons and 18,447 tons, respectively. The tabulation of unfilled orders also shows the altered position of the zinc supplies with only 42,151 tons of unfilled orders at the end of November, compared with a high of 125,132 tons at the end of 1940 and 110,552 tons in January 1942.

Commencing with 1940, the accompanying table includes the production from

foreign ores. Thus the report reflects the total output of slab zinc of all grades, as reported by all producers represented in the membership of the American Zinc Institute.

FIGURES ON COPPER OUTPUT AND CONSUMPTION RELEASED

ESTIMATES based on statistics released by the United States Copper Association indicate that the copper consumption in 1943 will treble that of 1938 while domestic production of refined copper will almost double the output of that year. Refined production for the first 11 months of 1943 amounted to 1,102,227 tons (of 2,000 pounds each), and for the entire year, with December production estimated, the output will top 1,200,000 tons by a comfortable margin.

In 1938, refined production was reported at 638,076 tons. In 1940 it crossed the million-ton mark, reaching 1,033,710 tons. In 1941 a slight increase to 1,065,667 was made. The rate of increase was accelerated in 1942 to attain a total output of 1,135,708 tons.

The highest monthly rate in 1943 was recorded in July when production totaled 105,589 tons. During August, September and October, three successive declines occurred, bringing the October total down to 97,274 tons. The trend was reversed in November when a production of 102,136 tons was reported.

Publication of these production figures has been made possible through recent action by WPB and the Office of Censorship in lifting a ban which had been in effect since the start of the war. The action was taken since knowledge of these figures no longer "offers comfort to the enemy," but will be of assistance to industry in making plans for the future.

The Copper Associates also has released figures on net domestic consumption which, of course, is running considerably in excess of production, the difference being made up through imports. For the first 10 months of 1943, consumption totaled 1,437,769 tons for a monthly average of 143,777 tons. The annual total is estimated at 1,700,000 tons. These figures compare with a 1938 total consumption of 526,743 tons, and a 1942 rate of 1,517,983 tons.

Comparison of production and consumption totals, states the organization, gives only an incomplete picture of the current situation since no complete import and inventory figures are as yet available. Industry stocks, including those in hands of consumers, were estimated at 410,000 tons. However, it is pointed out, no true inventory picture can be given without knowledge of copper in government stockpiles and stocks in fabricators' hands, particularly in semi-finished forms.

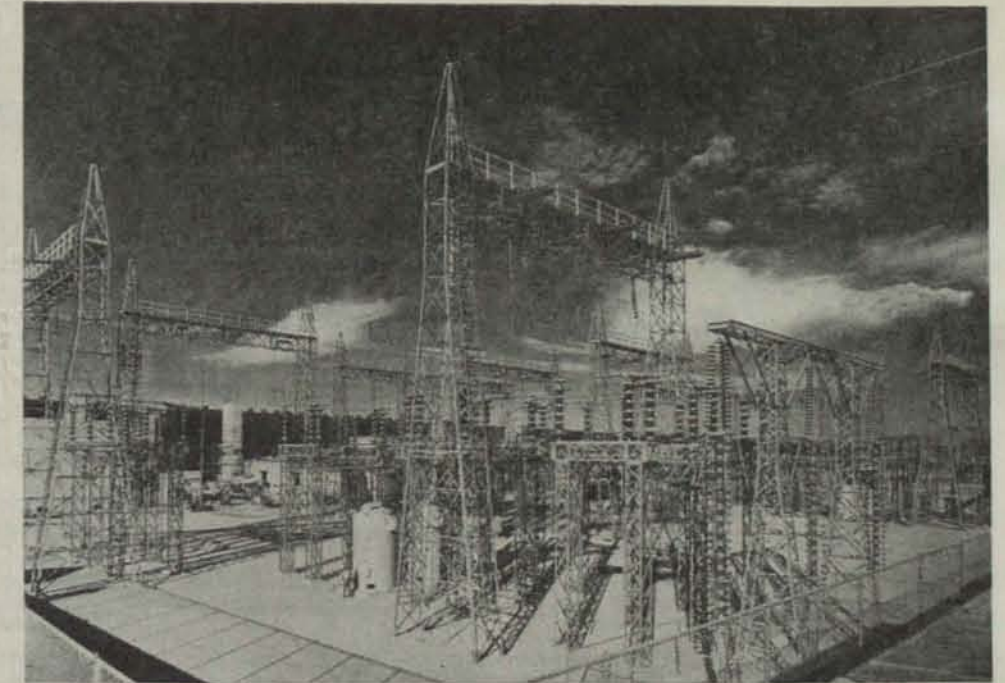
ARMY DEMANDS MAINTENANCE OF SIX-MONTH COPPER RESERVE

WASHINGTON officials report that the army has insisted that a six-month stockpile of copper must be maintained as a safeguard against adverse developments in the submarine warfare. Any substantial increase in the submarine menace, it is stated, might jeopardize the supply routes over which copper requirements are shipped from South America. It is pointed out that the six-month minimum requirement specified by the army represents a considerable reduction from the two years' supply originally demanded by army officials.

The present stockpile, according to WPB officials, amounts to only one month's supply, and if consumption continues at the present rate it will take until the end of the year to build up the desired six-month emergency reserve. Therefore, it is deemed likely that allocation of copper for civilian use will continue to be scanty throughout the year, despite the general easing up of copper, steel, aluminum, and other metals.

Although the cut-backs in small arms ammunition programs, and in other lines of war production in which copper is used, have served to ease the copper situation considerably, the reductions have been largely offset by stockpile requirements of the army and by the expanded demand for copper wire.

Waters of the Colorado River, harnessed by Boulder Dam, furnish the electric energy for Basic Magnesium, Inc. Two transmission lines with a capacity of 230,000 volts each extend from the dam to the plant, 15 miles away. This forest of steel is the electrical "switchboard" of the plant. In all, more than 100 miles of copper cable weighing approximately 520 tons were strung; 178 steel towers erected; 70 substations constructed and massive 110-ton transformers installed. The main electrical distribution tunnel is almost a mile long and 14 feet wide. It houses the electrical cables which shunt off in substations to the various production units. Insurance against work stoppage because of power failures was the construction of two transmission lines, one of which is maintained as a stand-by. First electric power on the project was turned on May 17, 1942, when the plant and townsite water system went into operation, pumping water from the Lake Mead intake station to the two 15,000,000 gallon reservoirs. More than \$23,000,000 worth of U. S. Treasury silver was drafted for Basic Magnesium, Inc., to replace copper as electric bus bars.



TOTAL SLAB ZINC SMELTER OUTPUT (ALL GRADES) 1929-1943
(Tons of 2,000 Pounds)

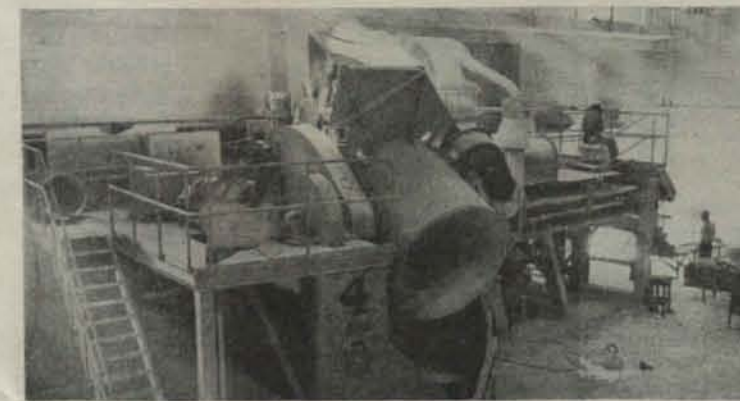
Year	Stock at Beginning	Production	SHIPMENTS			Unfilled Orders End of Period	Daily Av. Prod.
			Domestic	Export & Drawback	Total		
1929	46,430	631,601	596,249	6,352	602,601	18,585	1,730
1930	75,430	504,463	436,079	196	436,275	26,651	1,355
1931	143,618	300,738	314,473	41	314,514	18,273	822
1932	129,842	213,531	218,347	170	218,517	8,478	583
1933	124,856	324,705	343,762	239	344,001	15,978	890
1934	105,560	366,933	352,515	148	352,663	30,786	1,004
1935	118,005	431,499	465,687	59	465,746	51,186	1,182
1936	83,758	523,166	561,969	.....	561,969	78,626	1,429
1937	44,955	589,619	569,241	.....	569,241	48,339	1,615
1938	65,333	456,990	395,554	20	395,554	40,829	1,252
1939	126,769	538,198	598,972	.....	598,972	53,751	1,475
1940	74,262	706,100	674,615	88,165	762,780	125,132	1,929
1941	17,582	863,955	751,276	106,195	857,471	87,666	2,367
1942							
Jan.	24,066	79,417	67,382	12,166	79,548	110,552	2,562
Feb.	23,935	73,579	60,070	14,818	74,888	109,260	2,628
Mar.	22,626	79,187	61,612	18,499	80,111	103,297	2,554
Apr.	21,702	77,170	63,955	12,358	76,313	98,885	2,572
May	22,559	79,545	67,311	16,346	83,657	84,809	2,566
June	18,447	75,124	56,892	9,125	66,017	80,104	2,504
July	27,554	76,441	59,250	12,159	71,409	65,518	2,466
Aug.	32,586	77,002	57,822	15,114	72,936	58,972	2,484
Sept.	36,652	74,285	51,461	9,429	60,890	49,289	2,476
Oct.	50,047	77,990	61,263	11,369	72,632	46,082	2,516
Nov.	55,405	77,171	57,481	9,846	67,327	45,989	2,572
Dec.	65,249	82,859	69,419	10,421	79,840	52,752	2,673
Total	929,770	733,918	151,650	885,568			
Monthly average	77,481	61,160	12,637	73,797	Daily Average	2,547	
1943							
Jan.	89,458	83,870	66,925	10,296	77,221	69,426	2,705
Feb.	96,107	76,667	66,552	8,210	74,762	66,920	2,738
Mar.	98,012	83,787	66,111	9,922	76,033	62,879	2,703
Apr.	105,766	81,057	73,131	5,650	78,781	60,260	2,702
May	108,042	82,399	75,225	4,201	79,426	60,212	2,658
June	111,015	78,865	68,271	5,920	74,191	57,879	2,629
July	115,689	80,249	67,549	3,229	70,778	51,819	2,589
Aug.	125,160	79,736	68,953	2,857	71,810	49,617	2,572
Sept.	133,086	79,361	68,180	980	69,160	49,147	2,645
Oct.	143,287	83,066	69,845	2,101	71,946	41,532	2,680
Nov.	154,407	80,579	73,364	1,769	75,133	42,151	2,686



(Above)—This picture shows one of the chlorinators being charged. The pellets of raw material fall into great electric furnaces where chlorine gas is introduced and the magnesium oxide is transformed into magnesium chloride, then transported to the electrolytic cells, 880 of them, where metallic magnesium is recovered by means of electro-chemical action. (Below)—This ingot pouring machine receives the crucibles full of hot metal, tips automatically, and keeps the outpoured magnesium alloy flowing steady into moving molds. At the end they drop into bins—a finished product, ready for manufacture into implements of war.



(Above)—Various alloys are made at the BMI refineries—for incendiary bombs, sheet magnesium, airplane parts, tracer bullets, and flares. This crucible, freighted with two tons of white-hot magnesium alloy, has just been lifted from the gas furnace and is being lowered into a cooler before being transported to the ingot pouring machine. (Below)—F. O. Case, general manager of BMI, presents an incendiary bomb made of Basic metal to Major Robert Morgan, pilot of the famed Memphis Belle, the flying fortress which made 25 trips over Germany. Major Morgan told BMI workers: "O. K. You made it and we'll deliver it."



Why Has War Production Dropped?

RECENT articles stressing the let-down in production of war materials throughout the United States appear to place the cause of this production decline on overconfidence. If one wished to arrive at the true reason for our production drop, and were not afraid to face the facts as disclosed by a careful analysis of the situation, he would find that our production failures are due entirely to three factors:

1. Red tape and failure of government officials to differentiate between a war worker and a non-essential.

2. The harassing of industry by bureaus and investigators.

3. Disruption of transportation for war workers and war production necessities.

A good example of how the first factor caused a production decline in mining is the following case. A miner, hauling much-needed manganese from a small operation, blew out a tire. He left his loaded truck standing and went to the board for a replacement. He was informed smilingly that the quota was out and he would have to wait his turn. The miner looked astonished and then remarked to a bystander: "I guess the country doesn't need manganese as badly as I thought. I can't leave my loaded truck on the highway and make expenses, so I'll have to dump the ore. I believe I'll close down the mine."

The above case is only one of many. It does not apply only to tires, but to any product necessary for the economical and efficient operation of a mine, industrial plant, plane factory, or shipyard. Even when all requirements for priorities have been fulfilled at an enormous time and money waste, no emergency plan has been developed to help the operator on war necessities.

The second factor interfering with war production is the constant harassing of industry by bureaus and investigators. Since this article is prepared especially for mining men, the references naturally will pertain to the mining industry. However, almost every industry engaged in actual war work has from one to a dozen incompetent investigators checking into its processes and operations. Practically all of the large operators are afraid of public opinion or government regulations, so dare not object to the continued interference to which they are subjected.

One large operator stated that there was no way of telling how much a sabotage agent had cost his operation in money, time, and efficiency. This agent had taken hours of the president's time, employees' time, and thoroughly disrupted the entire organization with his continual persecution. When he had finished, the plant was in worse shape for accidents and possible de-

The blame for lessened war production should be placed where it belongs, not on overconfidence, but on mismanagement in many phases of our war effort and on our failure to differentiate between what is essential and what is non-essential.

lays than before. The company dared not say anything, but had to take its whipping with a smile.

Another disturbance created by bureau red tape is the quantity of questionnaires which must be filed monthly with Washington. If the company fails to do this, it is threatened with disloyalty, with loss of its priority, or other dire consequences. Many of the inspectors cause no friction, although most of them are unfamiliar with the operation they are inspecting. The filing of forms, waste of time discussing various phases of work unfamiliar to the inspector—and thus we have loss of time for already overworked personnel and nice sabotage for efficient operation.

THE third factor disturbing industrial output is probably the most serious. A war worker or employe of a war industry must spend the same time to acquire gas cards and other needed supplies as a non-essential worker or loafer. After a busy day the war worker must line up and wait his turn for gas cards along with the pleasure rider. He must go through the wait and delay for a tire, a tool, or other implement essential for efficient and cooperative operation.

Most small mines are situated many miles from towns and main roads. Machinery, food, supplies, repairs, and fuel must be transported to the job for distances varying from 10 to 40 miles, over rough mining roads. In most of the mining areas, buses have been taken from the highways, trucks have been utilized for other freight hauls, and private cars have been curtailed by gas rationing. The miner, therefore, must buy the necessary automobiles, or find some other means of transportation which usually is more costly than it has been in the past. But, when the miner tries to buy a truck or car, he finds he is again handicapped by priorities and red tape. He must wait the usual time that any nonessential worker has to wait, and he must conform to the same routine. It is necessary that he go through numerous boards before he can get the needed transportation. Some boards are intelligent in their handling of the problems, but that statement might be questioned if applied to other boards.

During all this delay, critical copper ore, manganese, lead, zinc, and tin ore stay in the ground where they were discovered.

And our soldiers at the front lack the equipment with which to do the job for which they are giving their lives.

A miner stood on the street watching a Packard car go by. It was filled with children and driven by a woman. He remarked, "See those new tires? They are war tires, but I am waiting for tires for a truck I need to haul supplies to camp."

The mismanagement of food supplies for the small miner must be included in the factors retarding the war effort. The small miner gets to town only once a week, or every two weeks; some less frequently. On these trips he must buy enough food to take care of his workers for the period they are in camp. Food rationing has made this so difficult that additional trips have to be made, thus increasing the cost of the operation about 25 per cent and adding another transportation problem.

If the three main factors, red tape, bureau officialism, and faulty transportation, were eliminated from their dominating position in industry, and the individuals participating in industry baiting were put to work as active workers, all production would have a most decided increase, possibly an astonishing volume of increase. This would happen in spite of optimism and overconfidence, both of which are assets instead of liabilities, provided we do not discount the other fellow.

IDAHO BUREAU OFFERS HELP IN FINDING WAR MINERALS

THE Idaho Bureau of Mines and Geology is offering 17 pamphlets containing essential information for prospectors and others interested in the search for war minerals. Joseph Newton, professor of the Idaho School of Mines and metallurgist of the bureau, has prepared 14 of the pamphlets; Lewis S. Prater, assistant metallurgist, wrote two; and A. W. Fahrenwald, dean of the school of mines and director of the bureau, contributed one.

Each leaflet contains a description of the mineral or mineral product, its use, and helpful advice for its discovery. They may be obtained by writing to the director, Idaho Bureau of Mines and Geology, University of Idaho, Moscow, for the sum of 10 cents each.

The complete series is as follows:

1. Beryllium and beryl; 2. tungsten and its ores; 3. tin; 4. mica; 5. crystalline quartz; 6. iron ores; 7. sponge iron; 8. magnesium and magnesite; 9. fluorite or fluorspar; 10. antimony; 11. black sands; 12. mercury (quicksilver); 13. phosphates; 14. refractories and insulating materials; 15. abrasives; 16. some general information (discusses importance of mineral industry, mining literature, mineral identification, assaying, marketing minerals, and other topics); 17. aluminum, alumina, bauxite, and clay.

*Globe, Arizona

Magnitude of BMI Plant Is Told In Testimony Before Air Board

The magnitude of Basic Magnesium, Inc.'s big plant here was described in detail before the civil aeronautics board in Washington, D. C., recently by Guernsey Frazer, administrative assistant to the general manager.

The C. A. B. hearing was held to consider the establishment of a new commercial air route from Los Angeles to Denver by way of Las Vegas and Grand Junction, Colorado, and Frazer appeared as a witness called by the examiner.

His statement follows in full: Our experience since the construction of this plant has been that air transportation is required in all directions from Las Vegas, Nevada, for the immediate needs of this highly important industrial area. We feel that future travel requirements of this area will be substantial.

While at present the entire output of Basic Magnesium, Inc., is supplied to the war effort as critical material, the important future peacetime use of magnesium in the age of light weight metals is conceded to be unlimited.

The growing importance of magnesium as an industrial metal is based on the fact that it is the lightest of all metals. On a cubic foot basis it weighs only 112 pounds compared with a weight of 169 pounds for aluminum. In addition to the great advantage of its light weight it is readily fabricated and is easily handled. Another very important factor which contributes to the increasing market for this metal is its relatively low cost, which has steadily decreased until the price is now only 20 and one half cents per pound compared with \$5 per pound in 1917.

Basic Magnesium, Inc., anticipates the cost of production in the future will be substantially lower. Thus it seems certain that the combination of light weight, low cost and great strength will account for a large demand in the post-war period for this metal from all types of manufacturers. Particularly in the aviation, automotive, electrical and railroad equipment industries as well as the building trades and countless other fields will this new metal be used.

While magnesium has been known for over 180 years, its use in this country for industrial purposes was extremely limited until the demands of the present war forced the construction of additional production facilities in August, 1941, and the first metal was produced on August 31, 1942. The overall investment in the plant and its facilities is in excess of \$140 million, and it is now the world's largest producer of magnesium. It has a rated capacity of 112 million pounds per year and it is now producing in excess of rated capacity. In 1943 BMI produced more magnesium than was produced by the entire country in the preceding 27 years. As of December 31, 1943, 5335 persons were employed by the company, of whom 4887 were located at Las Vegas. BMI is the largest single employer of labor in the state of Nevada and accounts for about 60 per cent of the employment in the mining industry in the state.

The immediate industrial area of the BMI plant covers approximately 2500 acres and includes 134 buildings. Adjacent to the plant site is the town of Henderson which is now the third largest community in Nevada with an estimated population of 8500. This community has 1824 dwellings, two churches, a post office, high school, 3 grammar schools, a hospital and a commercial district. The total investment in this residential area is approximately \$6 million.

Two factors dictated the location of the BMI plant at Las Vegas, Nevada. First, was the availability of a low cost and

dependable power supply from nearby Boulder dam and, secondly, the unlimited water supply from Lake Mead. These factors should, in the future, give BMI an advantage in production costs which competitively insures its postwar position in the industry.

BMI consumes approximately 25 per cent of the power output at Boulder dam with a present monthly consumption of approximately 140,000,000 kilowatt hours at a rate of less than 1.5 mills per kilowatt hour. This compares with a rate of 3.75 mills per kilowatt hour recently made by the Bureau of Power and Light of the city of Los Angeles to the Aluminum Company of America. Another important factor in the selection of Las Vegas was a cheap water supply. These low power and water rates should attract other industries to this area since costs will assume increasing importance in the post-war period. The best transportation is necessary to the full utilization of these potentialities.

BMI is already widely known as a magnesium producer and as I have previously indicated there will be a wide postwar market for this important metal. On the other hand, it is now producing a substantial volume of by-products which will eventually find many additional uses in the normal peacetime economy of the nation.

For example, despite the fact that the plant did not go into full production until July of 1943, we shipped in excess of 75,000,000 pounds of metal, 27 million pounds of caustic soda, 1.6 million pounds of flux, 3 million 700 thousand pounds of liquid chlorine and 435 thousand pounds of anhydrous magnesium chloride as well as other by-products. The chlorine plant of BMI is one of the largest in the nation. A combination of these and other by-products with the abundant and cheap electric power and water which is available at the site of the BMI plant demonstrates its close affiliation with the growing chemical industry and illustrates how it could attract other industries to the area in the future.

It is natural that an operation of the scope and size of that conducted at the BMI plant should account for a substantial volume of travel to and from all parts of the country. The community of interest of the industrial activity of the BMI plant at Las Vegas, Nevada, or the travel to and from the plant in the year 1943 by the various representatives of these firms, and other visitors, it is significant that approximately 25,775 passes were issued to visitors entering the plant in that year. The greater portion of these visitors came from outside the state of Nevada and this included 624 government officials of whom I would estimate at least 50 per cent came from points east of the Mississippi river.

Added evidence of BMI's community of interest with the large population centers throughout the country is to be found in the records of telephone and telegraph companies at the plant during 1943. The total long dis-

tance calls made from BMI were 24,486. These included 946 calls to Washington, D. C., 287 to the Chicago area and 401 to New York City. In the case of telegraphic communication, a total of 6,096 wires were sent to the states of Illinois, Colorado, Iowa, New York and the District of Columbia in eleven months of 1943.

As I have previously indicated, there is sound reason to expect that the industrial activity which has been stimulated by the war in the Las Vegas area will be maintained as a permanent contribution to the economic life of the area and that its relation to the industrial east will continue to grow in the future. This expectation is borne out by the announced plans of the federal government for the construction of two huge dams in this vicinity on the Colorado river. When this development is added to the importance of Basic Magnesium in post-war industry, the need for increased air transportation to the east and west will be as great, if not greater, than at present.

Note: At the request of the examiner the following information pertaining to flow of freight traffic for a typical month was submitted. All figures approximate. Freight flow September, 1943, in pounds:

Arkansas	614,500
West Virginia	110,000
Texas	1,883,848
Louisiana	1,649,856
Connecticut	400,032
New York	461,650
Illinois	400,072
California	4,148,780
Wisconsin	200,000
Indiana	577,808
Massachusetts	1,400,000

Approximate total, lbs. 12,826,126

Producers of Mercury, Tungsten Get New Hope; Says BMI Not to Close

Metals Reserve Terminates Status of 'Qualified' Mines in New Circular; Case Claims Basic Has 9 Months Work

Hope is held out this week to the tungsten and mercury producers of Nevada, according to the view that is being taken of the Metals Reserve company's action terminating the "qualified" status of mercury and tungsten producers, which is reported to have been misconstrued in some quarters and the current situation has been clarified in the supplementary circulars from the Washington office of the federal agency.

That there is little likelihood of the closing of the Basic Magnesium plant at Las Vegas despite reports to the contrary appear in the statement issued this week which says the orders on hand will keep the plant running for the next nine months.

NEW CIRCULAR

The Metals Reserve circular from Washington regarding mercury and tungsten is as follows:

"After December 31, 1943, no applications from producers of domestic tungsten ores and concentrates or of mercury, requesting confirmation as 'qualified' producers will be considered by Metals Reserve company under the program described in the May 11, 1943 circular of Metals Reserve company.

"The effect of this action, which is taken in accordance with a recommendation of the war production board, is to establish December 31, 1943, as the final date on which applications for eligibility as 'qualified' producers under the domestic tungsten program will be considered."

Accompanying this notice is a statement directed to producers of mercury and reading as follows:

"You have heretofore been confirmed as a 'qualified' producer under the domestic mercury program described in the Metals Reserve company circular dated May 11, 1943, entitled 'Information Concerning Purchase of Domestic Mercury.'"

CASH SETTLEMENT

"Condition numbered eight of that circular reserves to Metals Reserve company the right to terminate the domestic mercury program therein described at any time on or after December 31, 1943 upon certain conditions, such termination to be effective 30 days from the date of the giving of notice of termination.

"In accordance with the recommendation of the war production board, you are hereby notified that Metals Reserve company is terminating the program in question, effective as of the close of business January 31, 1944.

"You are also hereby advised that Metals Reserve company has elected to effect a cash settlement with respect to your production of mercury in the business district of Carver Park.

"It seems unlikely that federal government agencies would approve such expenditures if planning to shut down this plant."

THIRD LARGEST TOWN

The new postoffice of Henderson, the third largest town in population in the state, was opened January 10 according to advises received here.

The town of Henderson was named in honor of Charles B. Henderson, former United States

senator and one of Nevada's outstanding citizens. It is the community built by the Defense-Plant corporation to house employes and families of Basic Magnesium, Inc.

"The BMI plant today is producing magnesium in excess of its rated capacity and is the largest single consumer of Boulder dam power and Lake Mead water, government projects that are playing an outstanding part in the development of the west."

Future of BMI

By Chris Talball
Recent announcement from the War Production Board that \$73,530.50 has been approved for training shop equipment at BMI was significant in these days of conflicting rumors concerning the fate of Nevada's largest industry—magnesium production.

No better indication could be given by our Mappers of Strategy to assure this state of the prospects for permanency of the sprawling desert plant at Henderson, the town born of war's traveling and destined to add another star-studded page in Nevada history.

Amount of the money approved is small compared with the \$150,000,000 already spent to supply our war machine with incendiary bombs, tracer bullets, flares, airplane castings and parts. But it is a potent approval as far the trend of the nation's thought is concerned.

Larger population centers have night schools and special classes for war production workers desiring to learn or to train for better jobs. Not so Nevada.

In fact many years effort to establish vocational training courses and to get adequate equipment in this area have not been successful.

So when NYA officials approached BMI people with their proposition it was accepted quickly.

Equipment sufficient to establish shops in machine and metal work, electricity, plumbing and pipe fitting, carpentry, and automotive repairs were in possession of the NYA people on the Pacific coast.

This equipment was boxed and placed on freight docks from Seattle to San Diego for shipment to Nevada.

And then Congress killed the National Youth Administration.

BMI immediately joined forces with the Railroad Pass School district and began a strenuous effort to have the machinery shipped, but the Army and Navy froze it on the grounds it was more essential to the armed forces.

Nevada's state board for vocational education entered the fray and assisted the local people. The result is that after eight months the War Production Board finally approved the \$73,530.50 necessary

to buy the equipment outright. All that now remains is to obtain the priorities required and the job will be finished.

The result, Nevada's southern area will have one of the finest vocational schools in the country, providing training for high school students, BMI workers, and for prospective employes of the big magnesium plant.

The approval includes: automotive repair shop—\$4,308; carpenter shop—\$6,125; welding shop—\$7,786.07; sheet metal shop—\$3,884.01; plumbing and pipe fitting shop—\$879.90; electrical repair shop—\$4,019.86; and last but not least machine shop—\$46,527.60.

Thursday night's meeting of the BMI Foremen's Club at which Dr. Charles Copeland Smith of St. Charles, Ill., presented the local group their charter in the National Association of Foremen marked the latest progressive step in Nevada's newest industry. It is the first such club in the state.

The BMI group is not to be confused with the Foreman's Association of America which has figured so largely in recent labor disturbances in the East. The FAA was at first chartered as a Union by the CIO and the charter was later withdrawn when the War Labor Board ruled foremen cannot organize a collective bargaining agency.

As a matter of fact the NAF to which the BMI group is affiliated forbids their charter members from participating in collective bargaining in any form.

been connected with BMI for two years will attend. Those who worked for McNeil Construction company and sub-contractors but since have been employed by BMI, making a total of two years on the job, are eligible to attend. Tickets are available at the reception desk in the administration building at BMI.

PRISON SHIP SUNK

LONDON, Jan. 27 (AP)—The sinking of a Japanese transport carrying British prisoners of war from Java on November 29, 1943, was disclosed today in a war office announcement that a list of victims had been received from the Japanese government, which did not give the number of casualties.

Bill Tate, veteran of the African campaign, who suffered a broken back when a reconnaissance car in which he was riding was bombed, will be one of the honored guests at the party. Tate, who served in the medical corps, now is employed in the water treatment plant at BMI.

This is the first local affair at which all employes who have

been connected with BMI for two years will attend. Those who worked for McNeil Construction company and sub-contractors but since have been employed by BMI, making a total of two years on the job, are eligible to attend. Tickets are available at the reception desk in the administration building at BMI.

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Plant to Shut Down?

Commenting on newspaper reports to the effect that light metals plants in the west would soon shut down, F. O. Case, BMI general manager, declared Monday in a plant-wide bulletin that "the outlook for continued production here at BMI is much brighter than it was a month ago." He added: "Orders on hand are sufficient to keep this plant in full operation the next nine months."

The bulletin also pointed out that within the last 30 days DPC approved new expenditures for construction and changes here totaling \$217,000.—Basic Bombardier.

Eells To Attend Old Timers Party

Howard P. Eells of Cleveland, Ohio, first president of Basic Magnesium, Inc., will arrive in Las Vegas on February 2 to attend the "BMI old timers party" which is planned to be held at El Rancho Vegas on the night of February 3, it was announced today by Walt Hoover, chairman of the party committee. Eells expects to spend several days before returning to the east.

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This is the first local affair at which all employes who have

Sheriff's Office And BMI To Get Short-Wave Radio

Final steps have been taken to provide short-wave radio equipment for automobiles of the Clark county sheriff's office and the Basic Magnesium, Inc., plant, a plan under consideration for several months, it was revealed yesterday by Chairman James H. Down, Sr., of the Clark county board of commissioners.

The county board obtained a permit from the federal communications commission for the installation of the equipment and has entered into a lease with the Defense Plants Corporation, which will install the equipment and maintain it for the duration of the war, plus six months.

Five cars from the sheriff's office are to be equipped with the two-way radios, in addition to the central station and motorized equipment in use for general police work at the BMI plant. The radios will be effective for a radius of 250 miles and will enable headquarters to contact the officers in the vehicles at any point in Clark county. This will speed up the activities of the patrols and aid materially in preventing the escape of criminals, Down pointed out.

Basic Magnesium's Race Discrimination Menaces Production

LAS VEGAS, Nev., Sept. 9—Sensational testimony demonstrating collusive attempts by the management of Basic Magnesium, Inc., and the AFL to deprive the CIO of its legal rights as the collective bargaining agent and to cause chaos in the plant was given by officials of Local 629, MMSW, before the Truman U. S. Senate Committee here.

The AFL was also invited to participate in the hearing but declined, according to Senator Harry Truman, who presided.

With all employment of Negroes suddenly halted and the plant losing manpower because of quits running as high as 250 per day, the public investment of more than \$150,000,000 in the huge magnesium plant is being seriously imperiled, CIO members testified. The entire plant is tense with threats of race rioting, it was declared.

Charges of discrimination have been filed against BMI with the Fair Employment Practices Committee.

CIO Attorney A. J. Isserman described the legal steps by which the CIO became the legal collective bargaining agency. Then Estoly E. Ward, executive officer of Local 629, told how the company had refused to bargain after certification, how it had fired men for belonging to the CIO and even for living with CIO members.

"The company's claim that it is an innocent party in the middle of a jurisdictional dispute is false, and always has been false," said Ward. "The company is using AFL organizations and its contract with the AFL as a convenient stooge with which to defeat honest unionism."

1,500 GRIEVANCES

Lack of bargaining rights and grievance procedure have caused approximately 1,500 unsolved grievances to pile up, Ward testified. The absence of labor-management committees and the lack of seniority rights provide an open field for favoritism, waste, and poor production, he asserted.

He told how workers who give physical examinations to new hires had been instructed to reject Negroes wherever possible, whereas white alcoholics from big-city skidrows are being recruited by the bus'oad.

Ward related how, when the company finally issued its order barring all new employment of Negroes, Paul Burns, local director of U. S. Employment Service, stated that the company had been unable to furnish him with anything but "silly" reasons for the order.

DRUNKS O.K.

"This means that the company, while rejecting capable and reliable men, has revived its former methods of recruiting drunks and jailbirds from Los Angeles and other vicinities under sentences of '60 days or BMI,'" Ward declared.

An urgent demand that every step be taken by the Government to secure the continued operation of Basic Magnesium plant after the war was voiced by the CIO this week in testimony before the Truman Committee.

"Our national Government, the people of southern Nevada, and the BMI workers all have a stake in the continued operation of BMI after the war is over," declared E. A. Phaneuf, vice president of Basic Union No. 629.

NO WAR BABY

"We of the CIO feel that magnesium has an important place in post-war development and that BMI, with the water, the power and the ore all strategically located, must play a big role in that development. There has been talk that BMI is a war baby."

"The CIO feels that every effort should be made to end this talk and to assure the people that this great and valuable plant will continue to be the heart of industrial development in southern Nevada."

"There is friction in the depart-

ments and between the departments, caused by bad management," Ward said. "It would almost seem that there was a deliberate intent on the part of the management to aggravate workers into leaving."

PULL COUNTS

"In every phase of a BMI worker's life, in getting his job, in securing transfers and promotions, in obtaining housing, it is not what he can do but who he knows that spells success or failure for him."

"The company refuses to grant seniority rights to the men, relying on the AFL contract, which abrogates seniority in all cases of promotion. Rank favoritism causes great dissatisfaction, and gives the men the feeling that there is no incentive to perform good work."

Ward testified that F. O. Case, general manager of the plant, upheld segregation of workers of different races, in a telephone conversation with him. He described the CIO's attempts to get management to stop the circulation of a petition asking for segregation of Negroes and which the CIO had blasted as an incitement to race rioting.

Lawrence Strickland, Negr member of Local 629 and a union trustee, declared that AFL, who stewards with management backing are artificially stimulating race friction. Where this influence is absent, Negro and white workers get along without trouble.

BAD SETUP

Aside from the threat of race disturbances, other bad condition at the plant are exorbitant rent and insufficient housing; improper allocation of housing; bad treatment by the management of its medical staff at the BMI hospitals and insufficient staff at the hospital, lack of recreation, transportation and communication facilities.

Documentary evidence was introduced showing that rentals charged BMI workers for government housing are higher than in better defense housing, more conveniently located, in other war production centers.

Phaneuf told the committee that plant canteens sold spoiled and mouldy food to the workers. The county health department had confiscated some of the food at the CIO's request, he said.

In addition to Senator Truman, those conducting the hearing were Senator Mon C. Wallgren of Washington, Chief Counsel Hugh Fulton and the committee's investigator.

INTRODUCTION* to

Basic Magnesium—the Plant and the Job

MAGNESIUM is the miracle metal of World War II. It is the metal which enables men to fly higher and faster, to shoot with more deadly accuracy, and to sow flame and desolation on the enemy. It is the metal which brought about the miracle of Basic Magnesium, Incorporated.

Not so many years ago, men considered magnesium only as a base for various medicines. Later they learned that its ores made excellent brick and tile. Still later this versatile element was used in flares and flashlight powders. Today, magnesium, the eighth most abundant metal of the earth, is one of the essential elements for modern warfare.

This silvery, lustrous element is only three-fifths the weight of aluminum but its alloys are as strong as aluminum; it can withstand much greater vibration than aluminum without failing. Consequently, it is most valuable in construction of airplanes, landing gears, and even artillery wheels, in addition to fire bombs and tracer bullets. Transportation on land, sea, and in the air has been revolutionized.

Although nearly a century and a half have passed since magnesium was identified as one of the metallic elements of the earth's crust, comparatively little was either known or done with the metal until recent years. At the conclusion of World War I, the moderate impetus which had been given to production of magnesium practically stopped except in Germany. The Germans continued experimentation with the metal and by 1937 had become the world's leading producer of magnesium. In the United States, the metal was being produced, but chiefly as a by-product from certain brine wells in Michigan and other parts of the country.

In 1937, the Germans constructed an electrolytic plant for the British near Manchester, England, and the British began to be a significant factor in magnesium production. Thus, the British were supplied by their arch enemies with the technique which may prove to be a deciding factor in World War II.

Before the war began it was known that Nevada had immense deposits of magnesium ores—enough, it was estimated, to supply the world for 150 years. Nevada also had other advantages—the power and water necessary to wrest the magnesium from its ores, made available through the harnessing of the Colorado River by Boulder Dam.

THE project was conceived early in 1941 through the efforts of Basic Refractories Company, Cleveland, Ohio. That company owned a number of mining claims

*Abstracted from "Welcome to BMI" published by Basic Magnesium, Inc., Las Vegas, Nevada.

So that its employes may have a better understanding of the magnitude and importance of their plant and their jobs, Basic Magnesium, Inc., has published a booklet giving the basic facts about the project, the largest magnesium plant in the world.

in Gabbs Valley, near Luning, Nevada, approximately 330 miles north of the Basic Magnesium Townsite. Deposits were large bodies of dolomite, magnesite, and brucite, and their use prior to the war was almost entirely for the manufacture of refractory brick and tile.

It was decided that the electrolytic method of reducing anhydrous magnesium chloride offered the best possibilities, and to that end an agreement was made with a British company, Magnesium Elektron, Limited, near Manchester, England, for the American rights to the process being used by the British.

In October 1942, Basic Refractories sold its interest to the Anaconda Copper Mining Company which thus made its first entry into the light metal field. Under the direction of Anaconda the tempo of construction was speeded and production was



geared to the war effort. Improvements were made, the organization was streamlined, and metal unit after unit was brought rapidly into production.

On May 14, 1943, the last brick was laid in the tenth and final unit, completing a job begun in September 1941.

Estimated production at Basic Magnesium is 112 million pounds, or 56,000 tons of magnesium a year. Significance of this figure is seen when one considers that this company alone will produce nearly twice the amount of magnesium produced in the entire world in 1939 when the Germans first marched their legions into Poland. In that year, world production of magnesium was 68,355,000 pounds.

BMI, as the plant is known throughout the country, probably is one of the most phenomenal projects the world has seen; where bricks are laid with a precision which would make a watchmaker proud; where pipe lines are made of silver, lead, zinc, rubber, copper, glass; where enough water and electricity are used each day to supply a city of 1,800,000 inhabitants; where the magnitude of the great desert basin itself dwarfs the plant into relative insignificance; where practically every craftsman has been required to call back into use every trick and skill he ever knew.

To supply the plant with water, a pipe line was constructed from Lake Mead, 15 miles away, lifting the water approximately 800 feet from the surface of the lake to two 15,000,000-gallon reservoirs above and behind the plant. The pump house was constructed on the end of a cantilever bridge which required more than 1,000 tons of steel. The bridge anchor arm is more than 150 feet long and the cantilever arm is 230 feet long. In order to provide for the high and low water levels of the lake, pump shafts were extended down 190 feet from the end of the bridge. Approximately 700,000 pounds of dynamite were used in excavating the trench for the water line. The trench averages 10 feet in depth, 6 feet in width at the top, and 5 feet in width at the bottom.

Two transmission lines bring 200,000 kilowatts of electric power from Boulder Dam to the plant. The electric equipment cost \$12,500,000, and required more than 6,000,000 pounds of copper—including the largest bus-bar installations in the world.

Anderson's Camp, where most of the construction crew and the single men operating the plant are housed in dormitories and tents, has a mess hall capable of seating 2,500 men at one time. Construction engineers all over the world considered Boulder Dam one of the most amazing feats of engineering and construction in the world, and yet at its peak the Boulder Dam job employed only 5,250 men as compared with 13,618 men on the Basic job at its peak.

During the construction period every conceivable type of shelter was used, from shacks built of cardboard and scrap lumber, to modern stone houses electrically heated and cooled. Tents, trailers, barracks, dotted the desert reaches near the plant. And when the construction and operating crews swung into Las Vegas on payday nights, mingling with the soldiers from McCarran Field Gunnery School and from the Boulder Dam guard details, there was a sight the like of which may never again be seen. The average weekly payroll in this western desert camp regularly exceeds a half-million dollars.

Basic Magnesium is not what is known as a brick, sheet metal, electrical, or plumbing "job," yet it has established a world record in all four of these categories.

THE process used by BMI is not new, except for certain American refinements. Essentially the process involves changing magnesium oxide into magnesium chloride and then breaking down the magnesium chloride compound into metallic magnesium and chlorine gas.

Magnesite is magnesium carbonate and the process as applied by BMI consists of mining the ore at Gabbs Valley, heating it to drive off the carbon dioxide gas, mixing the resultant magnesium oxide with peat moss, coal dust, common salt, potassium chloride and calcium chloride. The various dry components are cemented with a solution of magnesium chloride to form pellets or briquettes.

After the pellets or briquettes have been through kilns in which they are burned to produce porosity, they are placed in an electric furnace called a chlorinator. In this chlorinator they are melted and simultaneously subjected to a stream of pure chlorine gas which changes the magnesium oxide to magnesium chloride.

The molten magnesium chloride is tapped off at the bottom of the chlorinator and transferred into electrolytic cells where a direct current is passed through the mixture breaking down the magnesium chloride compound into metallic magnesium and pure chlorine gas. The cells are so designed that the metallic magnesium can be ladled off and sent to a refinery where remaining impurities are removed. Under ordinary operating conditions the magnesium ladled from the surface of the melt is more than 98 per cent pure. In the refinery it is purified to 99.7 per cent or better.

The refinery also is the place where different alloys are made. At the present time Basic Magnesium production is going chiefly into the type of magnesium metal used in incendiary bombs.

Chlorine gas, which is sent through the chlorinators, is manufactured in a separate plant, construction of which was supervised by the Hooker Electro-Chemical Company of Niagara Falls. Electrolysis of common salt brine is the method used. The by-product of this operation is caustic soda chemically known as sodium hydroxide which in itself is one of the most widely used chemicals in the world.

Caustic soda and sulphuric acid are cornerstones of the chemical industry and go



into a wide variety of products ranging from explosives to glass. The chlorine plant at BMI is one of the three largest in the world, producing 225 tons of chlorine each day and 250 tons of caustic soda. Approximately 370 tons of salt a day are dissolved into 300,000 gallons of brine to make the raw material from which the chlorine and the caustic soda result.

When December 7, 1941, plunged the United States into war, an immediate and acute shortage of copper resulted. As far as industry is concerned, copper's chief use is conducting electric energy. To the munitions people, copper is vital in the production of shell casings, etc. It is understandable that overnight the allocation of copper became one of our major war problems. There was not enough copper to equip Basic Magnesium. However, silver is even a better conductor of electricity than copper, and at West Point, New York, the United States Treasury was holding 47,000 tons of silver, much of it mined in Nevada, against which no coinage certificate had been issued.

Nearly half of this silver was loaned to Basic Magnesium, Inc., by the treasury. It was fashioned into bus bars and other electrical fittings and shipped to the Nevada desert. It arrived in great silvery planks, some of them 12 feet long—\$23,313,300 worth—under the direction of armed treasury guards.

BASIC TOWNSITE, where company employees are housed, is the third largest city in Nevada. It is a complete modern village of 1,000 homes, a market, grade and high school, recreation center, and hospital. In the townsite are 44 double apartments for either single women or couples. Twenty-six additional apartments are located at Boulder City. North of the Townsite on the opposite side of the Las Vegas-Boulder City highway, are 500 additional homes and 212 dormitory rooms. These rooms will house 320 single men. In addition accommodations are available for single men at Anderson's camp. Northeast of Anderson's Camp is a modern village for Negro workers. This village includes 324 family units and 175 dormitory rooms for single men.

It is difficult to convey the actual size of this desert giant. If it were set down

in a cover and 1 plants reach Storage the fl from the ground. The entire plant, housing and service facilities cover an area of more than four square miles. It staggers the imagination that all this work was begun on September 15, 1941, and that 14½ months later the first silvery magnesium was poured.

Prior to September 15, 1941, the present plantsite was a gently sloping prairie dotted with sagebrush and cactus, and inhabited only by rattlesnakes, tarantulas, and vinagaroons. A thousand modern dwellings were built in the space of weeks. Lawns were seeded and landscaped, and a modern sewerage system and disposal plant, worthy of the finest city, was installed.

Before the war, the British plant near Manchester, England, was said to be one of the largest in the world. Basic Magnesium is two and one-half times larger. It consists of 10 metal reduction plants, two chlorine plants, three refineries, and a large preparation plant where the raw materials are made into pellets. Total cost of the plant is approximately \$140,000,000.

ABANDONED MINES CHECKED FOR SCRAP IRON AND STEEL

An examination of all abandoned mines in the western states is being urged in an effort to obtain additional scrap iron and steel. The drive in California is being conducted by the Special Projects Section of the War Production Board under the direction of Don S. Neher.

California has been called upon to turn in one-third more scrap metal in the second half of 1943 than it did during the first six-month period. The quota for the last half of 1943 has been set at 517,000 tons. Southern California's scrap metal supply has been depleted greatly by the Kaiser Company's new steel plant at Fontana, and it is estimated that the plant will need approximately 25,000 tons of scrap monthly.

ANACONDA MAKES PRELIMINARY REPORT ON FIRST SIX MONTHS

In a preliminary report for the six months ended June 30, 1943, the Anaconda Copper Mining Company, 25 Broadway, New York, and subsidiaries show a net income of \$17,854,952, or \$2.06 a common share, compared with \$18,204,033, or \$2.10 a share in the corresponding 1942 period. Total income for the six months was \$40,456,310, compared with \$55,546,070 in the same period last year.

The company has set aside for U. S. and foreign income and profits taxes, including \$2,200,000 for excess profits levies, the sum of \$16,250,000 after a \$220,000 provision for postwar refund of excess profits taxes. This compares with a provision of \$27,057,552 for all U. S. and foreign income taxes and excess profits taxes for the first half of 1942.

THE MINING JOURNAL for SEPTEMBER 15, 1943

Basic Plant Given 12 Million Value

CARSON CITY, Sept. 16 (UP)—The value of the Defense Plant Corporation of Basic Magnesium, Inc., in Clark county has been fixed at \$12,649,608 by the Nevada tax commission, it was announced today.

The valuation represented a reduction from the previously assessed valuation of \$14,499,608 and covers real estate only of the plant corporation.

No action was taken by the commission on property owned by BMI or the Defense Plant Corporation in Nye and Mineral counties.

SALT LAKE CITY, UTAH, TRIBUNE
8:52P; Sunday 9/16/43
SEPTEMBER 17, 1943

Nevada Cuts Tax Value Of Magnesium Plant

CARSON CITY, Nev. (UP)—The value of the Defense Plant Corporation—Basic Magnesium, Inc.—property in Clark county has been fixed at \$12,649,608 by the Nevada tax commission, it was announced Thursday.

The valuation represented a reduction from the previous valuation of \$14,499,608, and covers real estate only of the plant corporation.

No action was taken by the commission on property owned by BMI or the Defense Plant Corporation in Nye and Mineral counties.

S. F. CAL. COMMERCIAL NEWS
Ch. 1,200
SEPTEMBER 17, 1943

Las Vegas Magnesium Plant Value Is Set 46.8 At \$12,749,608

CARSON CITY, Sept. 16 (UP)—The value of the Defense Plant Corp. of Basic Magnesium, Inc., in Clark County has been fixed at \$12,749,608 by the Nevada Tax Commission. It was announced today.

The valuation represented a reduction from the previously assessed valuation of \$14,499,608 and covers real estate only of the plant corporation.

No action was taken by the commission on property owned by BMI or the Defense Plant Corp., in Nye and Mineral Counties.

RENO, NEV., JOURNAL
8:52A
SEPTEMBER 17, 1943

Reduce Valuation Of Defense Plant

The state tax commission reduced the assessed valuation of the Defense Plant Corporation of Basic Magnesium, Inc., by almost two million dollars at a meeting held in Carson City September 14. The valuation was made on real estate of the plant corporation, which permits itself to be assessed on realty. The reduction affected only the property held in Clark county.

Present at the meeting were George Allard, statistician for the tax commission; Gov. Carville, Henry Rives, C. B. Sexton, D. W. Park, J. W. Woodward, F. O. Stickney and Howard Doyle.

OBSERVATIONS

By CHARLES P. SQUIRES

ABOUT MAGNESIUM

For little more than one year we have watched the heroic efforts of Basic Magnesium, Inc., its officials, construction organizations, and employees in every line of work, in heroic efforts to complete the great plant and produce magnesium in an sufficient quantity to meet the demands of the war efforts of the Allied Nations.

It was August 31, 1942, when a group of Las Vegas people witnessed the taping of the first chlorination furnace and the fiery stream of molten magnesium pouring into the big caldron which carried it to the cells where it was reduced to magnesium metal.

The date marked the first step in production which from that day on continued to increase in volume. Thousands of tons of this vital metal during past months have been pouring from the plant, increasing in amount with the completion of each successive unit until the almost insatiable war demands were met.

On the Russian front; in the Mediterranean area; in the South Pacific, in the Aleutians, in China and India and Burma; on the industrial cities of Japan and most important of all, on Berlin and all the great industrial cities of Europe which had been turning out the material of warfare for the Axis, magnesium explosive bombs and incendiaries and lighting flares and flash lights from Basic Magnesium, Inc., in Las Vegas have been doing a decisive work in the shaping of victory for the Allied Nations.

The cry had been for more and more of the "magic metal" and it seemed that there would never be enough. Basic Magnesium labored strenuously day and night. The estimated output of the plant was far exceeded in actual production.

Now, we are told, the demand has been filled. Naturally we wondered what that meant for Las Vegas and the great plant of Basic Magnesium. The answer was clear, simple and convincing. For months the scientists and metallurgists have been deep in the study of how best to adapt post-war industries to the increased use of magnesium metal and its various alloys. They have studied and experimented in the various uses of the metal and how to fabricate it for use in thousands of articles of every-day use. They are solving the problems of casting, rolling, pressing, welding, and all the processes necessary to place magnesium among the indispensable elements of the new industrial world which will be born with the end of the war.

More important still, is the fact that those who know most about magnesium and its adaptability to modern industries, tell us that the enterprise and skill of scientists are successfully solving the problems and that, instead of the war demand being the major means of utilizing magnesium, the greatest use for it will come in the demands of everyday, peaceful existence following the war.

Basic Magnesium takes its place definitely as a major and permanent industry in the scheme of the new civilization ahead of us.



OUR FUTURE?

Speaking of pessimists and optimists, there are some of the first named class who think they have the situation sized up and see a depression coming to Las Vegas with the ending of the war.

On the other hand the optimists have quite another view. They see that Basic Magnesium and Manganese Ore are settling down to normal operations which will permanently employ between six thousand and seven thousand men. They realize that, as soon as priorities and restrictions are removed Las Vegas and neighboring communities will enjoy a vast amount of building construction to provide business blocks and living quarters for several thousand who are still compelled to live in unsanitary and unpleasant surroundings. They realize that the present make-shift accommodations will give way to well ordered homes and the creation of a more substantial and permanent city.

It is foreseen also that industries now monopolized by war contracts will, following the war, establish themselves in this region where there is an ideal combination of power, water, climate and the essentials of fabricating a thousand things which will be needed by the whole world during the years of reconstruction, while our tourist industry will be far greater than ever before.

Instead of fear of depression, the people of Las Vegas should be filled with encouragement at what the future promises. We should realize that the war, in spite of all its misery and destruction, has created conditions which assure the future growth and the future greatness of this entire region.

L.V. Review Journal
9/23/43

BMI Pamphlet Tells of Its Work

A new pamphlet entitled "Welcome to BMI" has been published for circulation regarding the Basic Magnesium, Inc. plant and is being distributed particularly to prospective workers from other states.

It describes the BMI plant as having been "built by determined men, operated by determined men, a big harsh job in a harsh land, with no place for lace 'panties,' brittle men or prima donnas. This is a place where people take scorching heat, lashing sand storms—this is the place where Japs and Germans will be defeated."

Entitled "Miracle in the Desert," the featured article in the pamphlet opens with this statement: "Magnesium is the miracle metal of World War II. It is the metal which enables men to fly higher and faster, to shoot with more deadly accuracy, and to slow flame and desolation on the enemy. It is the metal which brought about the miracle of BMI."

The dramatic story of the new industry in the desert is told in graphic style. Statistics on the plant are given, and the most frequent questions asked are listed with answers.

The booklet is designed to inform newcomers on the importance of the BMI plant as a war industry and to prepare them for living conditions in this area.

L. A. Evening Harold Express 9-28-43

Mighty Achievement

One of many gigantic construction feats performed by the McNeil Construction Company was the completion of Basic Magnesium's \$150,000,000 plant in record time. The speed

and efficiency with which this task was handled will go down in years to come as one of the "miracles" performed by American industry in meeting the demands of the war effort.

L.V. Review Journal
9/23/43

Consultant at BMI to Leave

Jack Charles of London, England, who has been one of the British consultants in the chemical and metallurgical process at the Basic Magnesium, Inc. plant, plans to leave Saturday to start his homeward trip, after completing his duty here.

He will be accompanied by his family. They will travel to Chicago and New York City for stops before crossing the Atlantic.

Carson Meeting Talks Of BMI

CARSON CITY, Jan. 22 (Special)—A plan to insure post-war operation of Basic Magnesium was considered by the advisory mining board in Carson Tuesday. A decision has not been reached yet, and details will be announced later.

The board was newly commissioned in the 1943 Nevada legislature and consist of E. P. Carville, chairman; William Donovan, Silver City; P. A. Keele, Las Vegas; E. J. Schrader, Reno; J. C. Kinnear, Ely; H. A. Johnson, Tonopah; Paul Gemmill, Pioche, who was absent. Fred E. Gray, member from Silver Peak, submitted his resignation to the board. Present at the meeting but not on the board were Prof. Jay C. Carpenter, Mackay school of mines, and Henry Reeves, secretary of Nevada mine operators.

Future of BMI

Imagine a world in which—Automobiles will travel 100 miles on a gallon of gasoline. Tires will give 100,000 miles of service.

Kitchen stoves can be carried about like orange crates. Two or three men can lift an automobile out of a ditch. Fantastic? Not at all!

All the above are not only possible but extremely probable because the decade following the war will see the most amazing industrial developments of the 20th century.

Magnesium, of course, is the key to this development—and BMI as the world's largest producer of magnesium will be a dominant figure in the post-war period.

Back in 1933 Dr. William J. Hale predicted civilization was passing rapidly out of the "Iron Age" and into the "Megal Age"—an era in which the alloys of magnesium and aluminum would be the basis for our industrial development.

Hale's prediction came before the outbreak of the present conflict which has vaulted the two light metals into first place in the world of metals.

Today the price of magnesium is 20½ cents a pound—once it was \$86 a pound. Today the price of aluminum is 15 cents a pound. In 1939 the two metals were 37½ cents and 20 cents a pound respectively.

However, on the basis of unit volume magnesium already is the second cheapest metal in the world. Comparing blocks of metal of the same size it is interesting that the costs are: steel, 2c; magnesium, 4.5c; aluminum, 5.45c; zinc, 7.3c; copper, 13.1c.

Coming back to the realm of possibility, we may be bathing in magnesium bathtubs, cooking in magnesium utensils, eating with magnesium table ware, writing on magnesium typewriters, flying in magnesium airplanes.

We probably will have magnesium furniture which the average housewife can move with one hand in pursuit of her housewifely duties.

On the designing boards of one large aircraft plant are the plans of a huge post-war cargo plane operating for more than 100 years at the most conservative estimate.

There are millions and millions of tons of magnesium ores in this state.

We may have to tear out Boulder dam and build a bigger one to get enough electricity to keep the plant going.

One thing is certain—there are enough possibilities in post-war America for magnesium metal to make this area the Pittsburgh of the West, without the smoke and soot.

KNUDSEN NOT OPTIMISTIC ON MAGNESIUM

Basic Magnesium, Inc., and its cohorts yesterday were still optimistic about the future of the great war plant at Henderson, but Lieut. Gen. William S. Knudsen, boss of the Government's supply, was busily throwing water on the whole rosy picture.

In Los Angeles, where he had been attending and speaking at a council on the war, together with Admiral William F. Halsey, Undersecretary of War Patterson and others, General Knudsen, in peacetime head of General Motors, was quoted as "sounding a virtual death sentence on West Coast aluminum and magnesium industries."

General Knudsen said: "We have enough aluminum and magnesium—and I mean we don't need any more!" At the same time, a B.M.I.-advised article in the Union Pacific's trade magazine out of Los Angeles, The Arrowhead, was in the mails and painting a glowing picture of optimism. "Although the Basic Magnesium project cost \$150,000,000," said the magazine, "it is not in any sense a 'war baby'." "Already the use of magnesium looms large in the future of metallurgy. It is now envisioned that"

Knudsen Pessimistic on Magnesium Future

trim, petite stenographers will be pushing office desks and typewriters around as easily as they now push a vacuum cleaner.

"Sewing machines and washing machines made of magnesium will be not only light in weight but strong and durable as well and metallurgists are now talking of grand pianos which can be heaved around by one man.

"Hollow metal furniture was fast becoming a fad when the war plunged us into the emergency fields. That very thrust has brought this new light metal to the front and America is destined to take the lead in popularizing magnesium metal for every purpose.

"That will include metal doors and window frames, refrigerators and kitchen ware, radio frames, office equipment, bathtubs and almost every conceivable article or commodity which has formerly been built from the heavier metals.

"With the building of the mammoth Basic Magnesium project, Southern Nevada and Las Vegas now seems to be coming into its own as a manufacturing and industrial area.

"With an abundance of cheap electrical power from Boulder Dam and a wealth of rich minerals and non-metallic ores available, other projects, large and small, will probably follow in the footsteps of B.M.I. and take advantage of Nevada's resources, location and climate."

Basic Magnesium officials here have been quoted as saying there are enough orders on hand now to assure the plant's operations "for the next nine months at least."

BMI Manager Refutes Reports That Plant May Close Down

Calling attention to the fact that "orders now on hand are sufficient to keep this plant in full production for the next nine months" and to new expenditures authorized within the last 30 days by Defense Plants Corporation, F. O. Case, general manager for Basic Magnesium Incorporated issued a bulletin to company employees indicating there is little likelihood of the plant's closing, despite statements to the contrary.

government agencies would approve such expenditures if planning to shut down this plant."

NEW BMI BADGES
Starting today and continuing through the month of January, all employees at the Basic Magnesium, Inc., plant will be re-photographed and new badges will be issued, it was announced today by F. O. Case, general manager. The program is planned to insure that all employees have proper credentials.

and employ 2,000,000 persons.

B.M.I., Charleston Publicized in Two Magazines

More publicity for the Las Vegas area has just appeared in several magazines.

A photograph of the Charleston mountains here appears in color on the cover of the Union Pacific Railroad's Arrowhead Magazine, while a lengthy article on the Basic Magnesium plant appears in the magazine.

Life magazine also carries an article about B. M. I. in a current issue.

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Refutes Rumor BMI To Close

Case Cites Huge
Material Orders

Calling attention to the fact that "orders now on hand are sufficient to keep this plant in full production for the next nine months" and to new expenditures authorized within the last thirty days by Defense Plants Corporation, F. O. Case, general manager for Basic Magnesium Incorporated, issued a bulletin to company employees indicating there is little likelihood of the plant's closing, despite statements to the contrary, says the Review-Journal.

The text of the bulletin follows: "Statements appearing in the public press last week to the effect that light metals plants in the west are soon to be shut down apparently refer in particular to plants using processes other than the one used at BMI.

"The outlook for continued production here at BMI is much brighter than it was a month ago. Orders now on hand are sufficient to keep this plant in full production for the next nine months.

"Furthermore, within the last thirty days Defense Plants corporation has authorized new expenditures for construction and changes aggregating \$217,000. These include \$108,000 for hot metal transportation, \$60,000 for an addition to the hospital, and \$49,000 for the business district in Carver Park.

"It seems unlikely that federal government agencies would approve such expenditures if planning to shut down this plant."



BRUCITE IN MILLIONS OF TONS

Power shovel bites into refractory mineral at Gabbs Valley.

Declared by geologists and metallurgists to be the largest and highest in purity of any known deposits of brucite, the Gabbs valley deposits, showing over large areas on the surface, were located in the early twenties by the late Harry E. Springer, then operating gold properties in the Douglas district near Mina.

It was not until the late thirties that the material attracted any interest, when a large number of claims was taken under lease and option by the Basic Ores inc., now the Basic Refractories inc., of Cleveland, Ohio.

Shipments that have grown constantly in volume have been made to the company's plant at Maple Grove, Ohio, for making fire brick and lining furnaces, with present output reported to be around 300 tons per day.

Following the start of this enterprise, attention was directed to the far larger deposits of magnesite, adjoining the brucite and at some points intermixed with the latter.

Surface work was said later to have established over 40,000,000 tons of high-quality magnesite in this deposit, which was acquired by and is now supplying the needs of the great Basic Magnesium, inc., for its metal plant in Clark county, world's largest producer of the light metal.

Basic Has Orders Enough for 9 Months Operation Manager Case 'Bulletins'

The outlook for continued production of magnesium at B.M.I. is much brighter than it was a month ago, F. O. Case, B.M.I. general manager, stated recently in a plant-wide bulletin, in commenting on newspaper reports that the light metals plants in the West would soon shut down.

"Orders on hand are sufficient to keep this plant in full operation the next nine months," the "Basic Bombardier" quotes him.

Case's bulletin also pointed out that within the last 30 days Defense Plant Corporation approved new expenditures for construction and changes at Basic totaling \$217,000, as follows:
Hot metal transport.....\$108,000
Hospital addition..... 60,000
Carver Park stores..... 49,000

Mining Board Discusses BMI

CARSON, Jan. 19.—A plan to insure post-war operation of Basic Magnesium was considered by the advisory mining board in Carson Tuesday. A decision has not been reached yet, and details will be announced later.

The board was newly commissioned in the 1943 Nevada legislature and consists of E. P. Carville, chairman; William Donovan, Silver City; P. A. Keele, Las Vegas; E. J. Schrader, Reno; J. C. Kinnear, Ely; H. A. Johnson, Tonopah; Paul Gemmill, Pioche, who was absent. Fred E. Gray, member from Silver Peak, submitted his resignation to the board. Present at the meeting but not on the board were Prof. Jay C. Carpenter, Mackay school of mines, and Henry Reeves, secretary of Nevada mine operators.

Appoint Margaret Bushard To USO Desert Staff

Miss Margaret Bushard, former director of USO activities in southern Nevada, has been appointed to the USO Desert staff, according to an announcement by Harry H. Hall, head of the desert area office.

Her main task will be to organize a standard women's and girls' program throughout the 20 desert USO clubs, it was said.

She has been affiliated with the national USO for the last 18 months, during which time she developed a number of outstanding program ideas for industrial workers. As director at Las Vegas, she established a residence club for girls; set up a recreation program in cooperation with the public relations office of the Basic Magnesium, Inc., war plant; instigated the opening of an extension USO club in Las Vegas.

Before becoming connected with USO, she was physical education director at Immaculate Heart college and high school in Hollywood. Her headquarters will be in Indio and her territory will extend into Arizona, Nevada and the California desert.

BMI Folks to Hold Old Timers Party

A party is being planned for "BMI oldtimers" which will be held at El Rancho Vegas on the evening of February 3.

To be eligible to attend one must have worked for the B.M.I. for two years. Those who worked for the McNeil Construction company and are now in the employ of B.M.I. are also eligible if their total time amounts to two years.

Howard P. Ellis of Cleveland, Ohio, the first president of Basic Magnesium, Inc., will arrive in Las Vegas, February 2 and will attend the party as an honored guest.

Another guest of honor will be Bill Tate a veteran of the African campaign, who is now employed in the water treatment plant at B.M.I. He served in the medical corps and suffered a broken back when a reconnaissance car in which he was riding was bombed.

Walt Hoover is chairman of the Committee of Arrangements. Tickets may be had at the reception desk in the administration building.

9/15/43 TNG JR'L

Production of Magnesium Now Steady

Signalizing the final step in progress toward stabilized capacity production of one of the most urgently needed of war metals, the Basic Bombardeer, publication of the Basic Magnesium, Inc., at the main plant in Clark county, said this week that another all-time record went down in the books of industrial history at BMI Saturday, July 31, when the last switch was thrown to put in operation the final electrolytic cell in the world's largest magnesium plant.

When juice from Boulder dam started flowing through the silver bus bar on the final circuit in number 10 unit, all cells but 12 in the plant were "cooking."

Probably never again will such a large number be in operation at the same time, as steady production necessitates cut-outs for maintenance and repairs.

A large number of executives was present when Basic crews swung the last circuit into action. It was noteworthy that the final cell went into operation exactly 11 months from that exciting day on August 31, 1942, when the first circuit warmed to the energy flowing from anode to cathode.

From that day to July 31, 1943, construction crews, gaining speed as they moved down the line of units, hung up record after record in the completion of installations. Now, with the last cell carrying white-hot metal on the surface of the electrolyte, the big plant will be well out in front in world production of magnesium.

Coffeyville Ks. Jrl
9-15-43 468

C. H. Buckles Returns To Las Vegas as Guard At Magnesium Plant

Back at his job as a guard at Basic Magnesium, Inc., 75 million dollar enterprise near Las Vegas, Nev., went C. H. Buckles, formerly of Dearing, who spent his vacation here the past two weeks.

This plant, government financed, produces 100,000,000 pounds of magnesium annually, and is the largest project of its kind in the world, it is said. Mr. Buckles displayed a half-bar of this silvery, feather-weight metal, used in solid form in airplanes and in powder form in incendiary bombs and tracer bullets.

The process used at BMI was brought from England two years ago and came originally from Germany, where it was highly developed. The process was sold to British manufacturers in 1935 by Germans who believed that English friendship was necessary to the welfare of their country.

While in construction, the BMI plant used certain materials in larger quantities than were ever before used on one job, 8,500,000 pounds of bus-bar copper, 50,000 tons of structural steel and 30,000,000 feet of lumber being necessary.

Everything from platinum to bolts of muslin went into the plant. The largest electrical transformer ever built is used for the electric power which comes across the desert from Boulder dam. The plant uses enough electricity for a city of 1,000,000 population.

Ore, chiefly magnesium carbonate, is burned at the mines in the Sierra mountains, to magnesium oxide and is shipped in this white powder form to Las Vegas, where it is mixed with coal and peat moss into pellets about the size of tennis balls. It is then poured into furnaces into which is pumped shipped in.

Officials of the plant plan for the gigantic structure to be a permanent one. Besides its war-time uses, magnesium is being found to have an increasing number of uses in the production of civilian products, although that will come later.

INTRODUCTION* to

Basic Magnesium—the Plant and the Job

MAGNESIUM is the miracle metal of World War II. It is the metal which enables men to fly higher and faster, to shoot with more deadly accuracy, and to sow flame and desolation on the enemy. It is the metal which brought about the miracle of Basic Magnesium, Incorporated.

Not so many years ago, men considered magnesium only as a base for various medicines. Later they learned that its ores made excellent brick and tile. Still later this versatile element was used in flares and flashlight powders. Today, magnesium, the eighth most abundant metal of the earth, is one of the essential elements for modern warfare.

This silvery, lustrous element is only three-fifths the weight of aluminum but its alloys are as strong as aluminum; it can withstand much greater vibration than aluminum without failing. Consequently, it is most valuable in construction of airplanes, landing gears, and even artillery wheels, in addition to fire bombs and tracer bullets. Transportation on land, sea, and in the air has been revolutionized.

Although nearly a century and a half have passed since magnesium was identified as one of the metallic elements of the earth's crust, comparatively little was either known or done with the metal until recent years. At the conclusion of World War I, the moderate impetus which had been given to production of magnesium practically stopped except in Germany. The Germans continued experimentation with the metal and by 1937 had become the world's leading producer of magnesium. In the United States, the metal was being produced, but chiefly as a by-product from certain brine wells in Michigan and other parts of the country.

In 1937, the Germans constructed an electrolytic plant for the British near Manchester, England, and the British began to be a significant factor in magnesium production. Thus, the British were supplied by their arch enemies with the technique which may prove to be a deciding factor in World War II.

Before the war began it was known that Nevada had immense deposits of magnesium ores—enough, it was estimated, to supply the world for 150 years. Nevada also had other advantages—the power and water necessary to wrest the magnesium from its ores, made available through the harnessing of the Colorado River by Boulder Dam.

THE project was conceived early in 1941 through the efforts of Basic Refractories Company, Cleveland, Ohio. That company owned a number of mining claims

*Abstracted from "Welcome to BMI" published by Basic Magnesium, Inc., Las Vegas, Nevada.

THE MINING JOURNAL for SEPTEMBER 15, 1943

So that its employes may have a better understanding of the magnitude and importance of their plant and their jobs, Basic Magnesium, Inc., has published a booklet giving the basic facts about the project, the largest magnesium plant in the world.

in Gabbs Valley, near Luning, Nevada, approximately 330 miles north of the Basic Magnesium Townsite. Deposits were large bodies of dolomite, magnesite, and brucite, and their use prior to the war was almost entirely for the manufacture of refractory brick and tile.

It was decided that the electrolytic method of reducing anhydrous magnesium chloride offered the best possibilities, and to that end an agreement was made with a British company, Magnesium Elektron, Limited, near Manchester, England, for the American rights to the process being used by the British.

In October 1942, Basic Refractories sold its interest to the Anaconda Copper Mining Company which thus made its first entry into the light metal field. Under the direction of Anaconda the tempo of construction was speeded and production was



geared to the war effort. Improvements were made, the organization was streamlined, and metal unit after unit was brought rapidly into production.

On May 14, 1943, the last brick was laid in the tenth and final unit, completing a job begun in September 1941.

Estimated production at Basic Magnesium is 112 million pounds, or 56,000 tons of magnesium a year. Significance of this figure is seen when one considers that this company alone will produce nearly twice the amount of magnesium produced in the entire world in 1939 when the Germans first marched their legions into Poland. In that year, world production of magnesium was 68,355,000 pounds.

BMI, as the plant is known throughout the country, probably is one of the most phenomenal projects the world has seen; where bricks are laid with a precision which would make a watchmaker proud; where pipe lines are made of silver, lead, zinc, rubber, copper, glass; where enough water and electricity are used each day to supply a city of 1,800,000 inhabitants; where the magnitude of the great desert basin itself dwarfs the plant into relative insignificance; where practically every craftsman has been required to call back into use every trick and skill he ever knew.

To supply the plant with water, a pipe line was constructed from Lake Mead, 15 miles away, lifting the water approximately 800 feet from the surface of the lake to two 15,000,000-gallon reservoirs above and behind the plant. The pump house was constructed on the end of a cantilever bridge which required more than 1,000 tons of steel. The bridge anchor arm is more than 150 feet long and the cantilever arm is 230 feet long. In order to provide for the high and low water levels of the lake, pump shafts were extended down 190 feet from the end of the bridge. Approximately 700,000 pounds of dynamite were used in excavating the trench for the water line. The trench averages 10 feet in depth, 6 feet in width at the top, and 5 feet in width at the bottom.

Two transmission lines bring 200,000 kilowatts of electric power from Boulder Dam to the plant. The electric equipment cost \$12,500,000, and required more than 6,000,000 pounds of copper—including the largest bus-bar installations in the world.

Anderson's Camp, where most of the construction crew and the single men operating the plant are housed in dormitories and tents, has a mess hall capable of seating 2,500 men at one time. Construction engineers all over the world considered Boulder Dam one of the most amazing feats of engineering and construction in the world, and yet at its peak the Boulder Dam job employed only 5,250 men as compared with 13,618 men on the Basic job at its peak.

BMI Group Has Dinner Party

A group of employees from the auditing department of the Basic Magnesium, Inc., plant met in the Ramona Room of the Hotel Last Frontier last Friday evening for a party. Dinner was served, and dancing provided entertainment for the remainder of the evening. There were 36 in the party, and four of the men expect to leave shortly for service in the armed forces.

LAS VEGAS, NEV., REVIEW-JOURNAL
SEPTEMBER 20, 1943

Magnesium Now Is Displayed In State Museum

CARSON CITY, Sept. 20 (Special)—A magnesium process display board illustrating in graphic manner the step-by-step procedure used at Basic Magnesium, Inc., in the production of metallic magnesium from crude magnesite ore is now on exhibit in the mineral room at the Nevada state museum, as a result of the efforts of its curator, Mrs. Train.

This carefully prepared chart, gift of F. O. Case, general manager of BMI, measures two and a half feet by four feet in size, and shows by means of glass vials filled with various concentrates, chlorides and acids what happens to the magnesite ore mined at Gabbs Valley after it receives treatment at the Las Vegas plant.

The visitor can follow on the chart diagram the different acids used in securing the resulting crude magnesium metal. Cast in the shape of a round "cheese" nine inches high and 12 inches in diameter, this unrefined "cheese" is remelted with suitable fluxes and cast into slender, light, shining bars.

Before the war, magnesium was considered the Cinderella of light metals. Aluminum, in spite of being half again as heavy, was the popular favorite of industry. Statistics show one cubic foot of magnesium metal weighs 60 pounds less than a cubic foot of aluminum. Aircraft designers, faced with the necessity of cutting every fraction of a pound possible from fighters and bombers, became aware of the great possibilities of the Cinderella magnesium metal for lightweight castings in planes. With the discovery of a way to weld it successfully, this lighter-than-aluminum metal came into its own. Great quantities of it are likewise used for incendiary bombs.

Accompanying the chart is a full-sized "cheese" which, according to Case, was cast from the initial run made at the Las Vegas plant August 31, 1942—of significance to Nevadans because it was a part of the first batch of metallic magnesium produced in this state.

The ingot, or refined bar, of magnesium was poured on May 25, 1943, and is likewise of interest, for it marked the date when BMI became the world's largest producer of magnesium metal.

When it is considered that until August, 1941, there had been no commercial production of magnesium in the United States except by the Dow Chemical plants in Michigan and Texas, this response to the war effort in southern Nevada seems cloaked in magic, it was pointed out.

LOS ANGELES, CALIF.
HERALD EXPRESS, Clc. 243,924
SEPTEMBER 20, 1943

Mighty Achievement

One of many gigantic construction feats performed by the McNeil Construction Company was the completion of Basic Magnesium's \$150,000,000 plant in record time. The speed and efficiency with which this task was handled will go down in years to come as one of the "miracles" performed by American industry in meeting the demands of the war effort.

SAN BERNARDINO, CALIF.
TELEGRAM, Clc. 5-292
SEPTEMBER 17, 1943

Tax Valuation Put On Magnesium Plant

CARSON CITY, Sept. 17 (UP)—The value of the Defense Plant Corp. of Basic Magnesium, Inc., in Clark county has been fixed at \$12,749,608 by the Nevada tax commission, it was announced today.

The valuation represented a reduction from the previously assessed valuation of \$14,499,608 and covers real estate only of the plant corporation.

No action was taken by the commission on property owned by B.M.I. or the Defense Plant Corp., in Nye and Mineral counties.

LAS VEGAS, NEV., AGE
SEPTEMBER 17, 1943

Uses of Magnesium Studied at Basic

Mr. Charles H. Mahoney, chief metallurgist for Basic Magnesium, Inc., was introduced by Program Chairman Frank Case as speaker of the day at Thursday's meeting of Las Vegas Rotary Club at Hotel Last Frontier.

In his introduction Mr. Case remarked that "up to a few months ago our problem was the production of enough magnesium to meet the needs of the war effort. Now the situation is changed and we must find other uses for magnesium than as tracer bullets, bombs and such."

Mr. Mahoney, who is devoting his organization to the task of developing new uses for magnesium metal and its alloys, said, in part:

"Mr. Case has already made the point that we must give consideration to the wider use of magnesium metal. A year ago enough of the metal to meet demands was not available. Now we are producing more of the metal than we have uses for."

"In the early 20's it was thought magnesium could be readily fabricated, but it has lagged in its uses. In Europe the situation is somewhat different from here. They are using more magnesium in aircraft and automobile parts. In Germany at the beginning of the war the production of magnesium was fifty million pounds a year; in England twenty-five million and in the United States about twelve and one-half million and most of our magnesium was used in pyrotechnics—flash lights, fireworks and such. England did a good job but was limited by the shortness of the supply of magnesium."

"The application of magnesium metal and its alloys to constructing use is not as simple as the fabrication of other metals. It is out of the question to consider the substitution of magnesium for other metals on the basis of weight and strength alone."

"The largest use of magnesium metal and its alloys is in the cast field. Magnesium is readily corroded under some conditions such as contact with salt water. One of the most interesting phases of the problem is the fact that magnesium has to stay. We are getting it down to a cost factor comparable in some cases with aluminum. But we must develop new uses for it based on industrial requirements."

Max Kelch of radio station KENO gave an up-to-the-minute account of the battle in Italy and the actions in other parts of the world.

The Rotarians, under the leadership of President Fred O'Donnell purchased a considerable number of tickets for the show, "This Is the Army," which is to be presented for the benefit of the army emergency relief fund.

MINING JOURNAL
PHOENIX ARIZ.
9/15/43

NEVADA MINE EMPLOYMENT HIGHER—BUT STILL TOO LOW

NEVADA reports that on July 1 of this year 10,864 men were employed in mines in the state, while in 1942 mine employment totaled 7,885. However, the state's thirst for manpower continues in spite of the increase of miners amounting to nearly 3,000 men. New mines are being opened, old ones returned to production, and operations at existing mines are being constantly expanded. Three of the largest mine employers in the state are Basic Magnesium, Inc., with a payroll of 5,600 men at the Las Vegas plant, 256 men in the Gabbs oxide plant, and 96 in the quarry; Consolidated Coppermines Corporation, with 840 men; and the Nevada Mines Division of the Kennecott Copper Corporation, employing 413.

MINING JOURNAL for SEPTEMBER 15, 1943

L. V. Age
9-17-43

OBSERVATIONS

By CHARLES P. SQUIRES

ABOUT MAGNESIUM

For little more than one year we have watched the heroic efforts of Basic Magnesium, Inc., its officials, construction organizations,



and employes in every line of work, in heroic efforts to complete the great plant and produce magnesium in an sufficient quantity to meet the demands of the war efforts of the Allied Nations.

It was August 31, 1942, when a group of Las Vegas people witnessed the tapping of the first chlorination furnace and the fiery stream of molten magnesium pouring into the big caldron which carried it to the cells where it was reduced to magnesium metal.

The date marked the first step in production which from that day on continued to increase in volume. Thousands of tons of this vital metal during past months have been pouring from the plant, increasing in amount with the completion of each successive unit until the almost insatiable war demands were met.

On the Russian front; in the Mediterranean area; in the South Pacific, in the Aleutians, in China and India and Burma; on the industrial cities of Japan and most important of all, on Berlin and all the great industrial cities of Europe which had been turning out the materiel of warfare for the Axis, magnesium explosive bombs and incendiaries and lighting flares and flash lights from Basic Magnesium, Inc., in Las Vegas have been doing a decisive work in the shaping of victory for the Allied Nations.

The cry had been for more and more of the "magic metal" and it seemed that there would never be enough. Basic Magnesium labored strenuously day and night. The estimated output of the plant was far exceeded in actual production.

Now, we are told, the demand has been filled. Naturally we wondered what that meant for Las Vegas and the great plant of Basic Magnesium. The answer was clear, simple and convincing. We are successfully solving the problems and that, instead of the war demands being the major means of utilizing magnesium, the greatest use for it will come in the demands of everyday, peaceful existence following the war.

Basic Magnesium takes its place definitely as a major and permanent industry in the scheme of the new civilization ahead of us.

L. V. R. Journal
9-15-43

Civilian Defense Meeting Planned

The first of a series of civilian defense council meetings will be held at the Basic Magnesium high school tomorrow evening for civilian war services. Representatives from Basic and Boulder City will attend.

A general meeting of all branches of the defense council will be held in Las Vegas Friday evening at 7 o'clock in the district court room in the Clark county court house. Leading civilian defense members who will be present are:

Hugh Shamberger, of Carson City, state director for the office of civilian defense; Pierce Davies, San Francisco, regional director of the office of defense, health and welfare; James Lash, assistant regional director of war services; Richard Wilson, chief regional director of plant and facilities section, OCD; Barney Murray, assistant regional director of plant and facilities section, OCD; Raby J. Newton, of Carson City, state director of plant and facilities section, OCD; and Arthur N. Suverkrup, of Reno, United Press staff correspondent.

At 8 o'clock Friday evening Pierce Davies will speak at the Las Vegas grammar school before the Clark county child care committee on child welfare.

LAS VEGAS, NEV., REVIEW-JOURNAL
SEPTEMBER 22, 1943

BMI Pamphlet Tells of Its Work

A new pamphlet entitled "Welcome to BMI" has been published for circulation regarding the Basic Magnesium, Inc., plant and is being distributed particularly to prospective workers from other states.

It describes the BMI plant as having been "built by determined men, operated by determined men, a big harsh job in a harsh land, with no place for lace 'panties,' brittle men or prima donnas. This is a place where people take scorching heat, lashing sand storms—this is the place where Japs and Germans will be defeated."

Entitled "Miracle in the Des-

L. V. R. Journal
9-23-43

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Entitled "Miracle in the Des-

L. V. R. Journal
9-28-43

Soldiers Visit Magnesium Plant

Members of the anti-incendiary squad of the Las Vegas army air field saw for themselves industry's contribution to the national war effort Monday, when they toured the Basic Magnesium, Inc., plant and watched the "miracle of the desert" in action. Under supervision of Second Lieutenant John B. Hughes of the air field chemical warfare office, the anti-incendiary squad saw magnesium ore processed to the final product of incendiary bomb material.

Members of the squad are: Sergeant Edward Scott, Corporals James C. Baccus, William Pesonen, Howard Burleigh, Max Sicher, L. R. Williams, and Robert Brizzolara, and Privates Sterling S. Cairns and Edward Aughtry.

MINING JOURNAL
PHOENIX ARIZ.
9/30/43

Robert T. Campbell is at Camp Peary near Williamsburg, Virginia, at the U. S. Naval Construction Training Center. For the past several years he had been with Basic Magnesium, Inc., in southern Nevada.

MINING JOURNAL
PHOENIX ARIZ.
9/30/43

SAN FRANCISCO, California.
Alexander R. Kingard is being employed as chief mine engineer at the tungsten operations of Cia. Minera del Gran Oeste in Baja California, Mexico. Previous to his new appointment he had been connected with the McNeil Construction Company as construction engineer on the Basic Magnesium project, Las Vegas, Nevada. Kingard receives mail at 3602 Indiana, San Diego, California.

CITY EDITOR, REPORTED KILLED IN
L.A. TIMES DYNAMITING, NOW ON
STAFF AT BASIC MAGNESIUM

John L. Von Blon years ago was city editor of the Los Angeles Times.

One night he slipped away from his desk earlier than usual because of a sick headache. Fifteen minutes later the Times plant was rocked by a dynamite blast which killed many and injured many more.

Mr. Von Blon was not immediately located, and was believed by his associates to have perished in the dynamiting. His name appeared in the death list.

The next day when apprised of the news, he reported at the Times and informed associates that he was not dead.

For 18 years Mr. Von Blon served the Times as city editor. Now he is member of the office staff of Basic Magnesium, Inc., the company's trade paper, Basic Bombardier, revealed yesterday.

LAS VEGAS NEWS REVIEW/JOURNAL

JANUARY 8, 1944

Basic Magnesium Plant Lauded
By Phelps-Dodge Firm Official

Basic Magnesium is just another example of the splendid job American industry has done all over the nation in answering the country's call for vital war materials and metals, Lewis S. Cates, president of Phelps-Dodge Copper company said yesterday after a trip through the big plant with F. O. Case, general manager.

"At the start of the war there were 35 strategic metals that were listed as critically scarce, today there is a surplus of every one of the 35," Cates said.

The Phelps-Dodge executive paid tribute to the "miraculous achievement" of Anaconda in bringing the magnesium plant into full production and "ironing out the kinks in a new industry for this country" and characterized as "splendid" the manner in which Case and his associates have handled the pioneering in this field.

He expressed surprise at the growth and development of the entire area since he was here seven years ago, declaring: "It's hard to believe this is still Las Vegas."

Cates was accompanied by Harry Lavender, chief auditor for the company, and the two

L.V.R. Journal
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Thinking
Out LoudMining Lining For the
Furnaces Of Victory

By EDW. C. UREN

Editor's Note: The following article is taken from the December issue of the magazine "Em Kavan" issued by the Morrison Knudsen contracting firm of Boise, Idaho, whose huge operations carry them from the Alaska Highway to building railroads in Brazil. One small part of their field is keeping the tracks of the Southern Pacific over the hill in condition. In this work several local men are taking a part by commuting between here and Colfax, which is now headquarters for this work.

In west-central Nevada, some thirty miles from the south end of Walker Lake, M-K is mining the world's only known deposit of brucite, under a contract with Basic Refractories, of Cleveland, Ohio.

Brucite is a little known mineral named for a New York mineralogist, A. Bruce, presumably its first scientific discoverer. It is a native magnesium hydroxide, which is calcined and used for its great heat resistance to line the open hearth furnaces for steel mills.

And Gabbs, Nevada, has taken its place among the mining towns of a historic mining state. Driving across the broad, barren and unfilled stretches of the Nevada desert you wonder what could possibly be the salvation of these desolate waste lands. But entering the little railroad village of Luning, you see the gondolas on sidings being loaded with whitish substances from chutes, conveyers and dump trucks. Gabbs is 32 miles away, up a good mountain road. Surprising it is to find a community of perhaps 1300 souls in recently built but comfortable homes. A half mile higher up on the mountain slope is a huge plant building, owned by This operation starts with diamond drilling for samples. Excavation then follows the assay reports of the richest parts of the broad mineral vein. The ore is loaded on dump trucks and delivered to a nearby crusher.

Here M.K.s' work stops, but the ore goes on. Basic Refractories own crusher dumps it into a double ore bin of 250 ton capacity each, from which it is trucked to Luning in 30 ton dump trucks and loaded for shipment to the company's plant at Maple Grove, Ohio. There it is calcined in ten rotary kilns, producing magnesium oxide as a refractory for steel companies in all parts of the country.

An impressive sight is this open pit mining operation, with a mountain side laid back into benches that look like a giant's white stairs when viewed from across canyon. On the first wide bench three diamond drills are chattering away on one side, while on the other a bull dozer is pushing pay dirt, which has been loosened by blasting, over a cliff. A hundred feet below, a big Northwest shovel picks it up and loads it into the trucks.

In addition to the high grade ore, M-K also selects the second grade and stocks it for future shipment. About 30,000 tons monthly are being excavated and 6500 tons of high grade ore are being shipped.

Basic Refractories has been working the deposit since 1935

Aluminum Oversupply Up;
Magnesium's Advantages
as Substitute, B.M.I. Hope

Las Vegans interested in the postwar continuance of Basic Magnesium's huge war plant here last night were still wondering just what the reported oversupply of aluminum, plus a new War Manpower Commission suggestion yesterday, all meant.

Last week the War Production Board ordered the closing of four aluminum production lines in the United States, all in the East, the first of a proposed series of curtailments due to the mounting stockpile of aluminum.

Yesterday the manpower commission had suggested the United States work out an agreement with Canada and England by which aluminum production would be reduced there before it is further curtailed in the United States.

Manpower officials disclosed that Lawrence A. Appley, WMC executive director, told the WPB that our Allies are in worse shape for manpower than we are, and might get proportionately more benefit than the United States by releasing workers from their aluminum plants.

Appley wrote that it would seem expedient to supply British needs through lend-lease rather than to have Britain continue to use manpower

critically needed elsewhere in England."

He acknowledged that the United States is committed to buy a stated tonnage of aluminum from Canada in 1944.

Magnesium, utilized now in incendiaries and other war material, had been seen as a general postwar substitute for aluminum, but with more aluminum now on hand apparently than is needed, the problem arose yesterday of how much of the substitute for aluminum would be needed when the war is over, or even before.

One of the answers seemed to lie in the arguments advanced in the earlier days of B. M. I. here that magnesium is better for many peacetime uses than is aluminum.

"Magnesium is the miracle metal of World War II," B. M. I. had claimed in its advertising of the largest magnesium factory in the world. "It is the metal which enables men to fly higher and faster, to shoot with more deadly accuracy, and to sow flame and desolation on the enemy.

"Time was, not many years ago, when men considered magnesium only as a base for various medicines. Later they learned its ores made excellent brick and tile. Still later this versatile element was used in flares and flashlight powders. Today magnesium, the eighth most abundant metal of the earth, is one of the building blocks of modern warfare.

"This silvery, lustrous element is only three-fifths the weight of aluminum, but its alloys are as strong as aluminum.

"Science has learned an important fact about the metal: It can withstand much greater vibration than aluminum without failing. Consequently, it is most valuable in construction of airplanes, landing gears, and even artillery wheels, in addi-

tion to the bombs and tracer bullets.

tion to the bombs and tracer bullets.

"Transportation on land, sea, and in the air has been revolutionized. And in the postwar era what men will do with magnesium can be only imagined."

Production of magnesium at B. M. I. totals 65,000 tons yearly, more than twice the amount produced elsewhere in the world.

L. V. Tribune
1-8-44B. M. I. Continues Experiments
to Supply Stratosphere Planes
Despite Huge Aluminum Stockpile

Basic Magnesium yesterday appeared to be little worried about the mounting stockpile in the nation of aluminum and the fear that if there is already too much aluminum in the country there may soon be a similar little use for magnesium, aluminum's substitute.

The Government had ordered closing of several Eastern aluminum plants, with the threat of closing 20 more, because there was too much aluminum to take care of the nation's present needs, and the Government had also suggested to Britain and Canada that its aluminum plants be closed and workers sent into other needed fields.

Potential needs of magnesium for stratosphere flying planes and for other modern developments for other modern developments still are being studied in Basic's laboratories, Harold Kingsley of B. M. I. said.

A laboratory second to none among metallurgical laboratories in the country is busy testing various uses and production factors and methods, with the view to assuring the economical and practicable production of the metal in the competition of the postwar period, Mr. Kingsley said.

Magnesium is stronger when cold, hence offers great possibilities for use in manufacture of stratosphere liners to operate at, say, temperatures down to 40 to 60 degrees below zero, he said.

Welding with the helium process is another phase of research pointing to greater potentialities for magnesium.

The resonance of the metal is another factor he mentioned, which makes it a good material for construction of musical instruments.

"Imagine how easy it would be to support the weight of a French horn made of magnesium," Mr. Kingsley said.

Magnesium also is transpar-

ent, enough so that it is possible to penetrate a slab two feet thick with X-ray.

Production at Basic has gone through two stages, he said, and is now in the third era, the period of cost reduction, with developing of many short cuts by means of which cost is going to be materially reduced.

Magnesium a few years ago cost \$5 a pound to produce, later \$1 a pound, and now about 22 cents a pound, he stated.

Also, the process by which the English produced a maximum of 15 tons of the metal have been improved upon so 25 tons can now be produced per day.

Basic has 80 chlorinators. The railroad now moves about 2500 carloads of materials and product a month to and from Basic, and about half of this is outgoing freight.

Bigger trucks are being developed for transportation, also trucks for hot metal transportation, saving the cost of reheat-

ing, he said.

SALT LAKE CITY, UTAH NEWS
1944
JANUARY 20, 1944

VIORATION, Mr. King said.

THE HUGE PLANT of Basic Magnesium, Inc., at Las Vegas, is producing about 10,000,000 pounds of magnesium per month, reported Dan M. Kelly, vice president of the Anaconda Copper Company, a visitor here. Mr. Kelly has just completed an inspection trip to the magnesium plant and stopped in Salt Lake en route to Butte, Mont.

L.V.R. Journal
1-20-44Hundred Millionth
Pound of Metal Is
Poured Out at BMI

The one hundred millionth pound of magnesium was poured at 11:30 o'clock this morning from cell number 822 in unit eight at the Basic Magnesium, Inc., plant.

The history making magnesium was poured under direction of Emmett Klebba, foreman, by William Owens of Carver Park, who has been employed at the plant for a year.

The magnesium produced at the plant, since the first metal was poured on August 30, 1942, is sufficient to have produced 50,000,000 incendiary bombs.

LAS VEGAS NEWS REVIEW/JOURNAL
1944
JANUARY 21, 1944Hundred Millionth
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THE WALL STREET JOURNAL
1944
JANUARY 21, 1944

BASIC MAGNESIUM, INC. of Las Vegas, Nev., world's largest magnesium metal plant, does not appear slated for any early closing, reports of possible curtailment notwithstanding. F. O. Case, general manager, has circulated a plant bulletin announcing to workers that "the outlook for continued production here at B. M. I. is much brighter than it was a month ago." He said "orders on hand are sufficient to keep the plant in full operation for the next nine months."

Defense Plant Corp. has just approved \$217,000 for additional plant changes, including new two-ton molten metal carriers which will obviate the present method of reheating "cheeses" at the refinery. Priority for delivery has been established and the change which will make the magnesium operation a continuous molten metal process is expected to be completed in a few weeks.

The new carriers, 12 of which will cost \$107,000, are equivalent to large thermos bottles mounted on trucks capable of retaining metal molten for some hours. The step will speed production and reduce costs.

and total production has been about a quarter of a million tons. However they have other mineral claims in this neighborhood in which 62 variously owned mining claims of 20 acres each exist within gunshot of one another. All were discovered by two prospectors named Albert Brown and Harry Springer. A few hundred feet away another prospector found a small, but rich deposit of tungsten—a mysterious "pocket" that yielded two carloads valued at \$60,000, and petered out. Eastern tungsten interests bought the claim and prospected further, but no more ore was found, so they leased the claim to the Sierra Magnesite Co. Magnesite is plentiful throughout the area, and dolomite, another magnesium mineral, is abundant but less valuable.

In charge of the project for Basic Refractories is Charles A. Schwab, a tall, clean-cut engineer and geologist who has been here since 1939. Their company formerly owned the controlling interest in Basic Magnesium, which has the big plant nearby, but recently sold it to the Anaconda Copper Company.

Back in Civil War days Nevada mines produced the monetary metals that helped the nation stave off financial collapse. Now those barren looking hills are yielding industrial metals that will help both to win this war and to rebuild the world.

REFRACTORIES



This is the stock yard for the many shaped firebrick which were used in the magnesium plant. A roll conveyor, shown in the foreground, carried brick on wood pallets by means of gravity.

How Refractories Are Used in Gigantic Installation at Basic Magnesium, Inc.

High Heat and Acid Resisting Refractories Selected for 80 Wash Towers and 80 Chlorinators—880 Bathtub Cells Each Required 4 Layers of Firebrick—Shapes Ground to Exact Size Before Laying

F. A. McCann

The McNeil Construction Co. was chosen by the Defense Plant Corporation to erect the world's largest refractory installation, officially known as Plancor 201. Basic Magnesium, Inc., was selected to operate the project after construction. It was built from plans furnished by Basic Magnesium, Inc., and based on the plant design of Magnesium Elektron Ltd. in England. English consultants advised on the construction of the plant. Mr. William Mawdsley coming from England to assist in the refractory installation. Basic Magnesium, Inc., is now controlled and largely owned by the Anaconda Copper Co.

The refractories installation was done by the McNeil Masonry Department headed by E. C. Clecton as General Superintendent. The department

was organized in November, 1941, rose to a peak in December, 1942 with over 1,800 masons and laborers. The colorful life described in the popular magazines did not leave this department untouched. Temperatures of 120° affect everyone, and much of the work was done under extremely adverse conditions.

THE problems encountered in the refractories field at Basic Magnesium, Inc. were very interesting, involving many materials, new methods and equipment; they were always on a scale of magnitude never before encountered. An explanation of the process used in extracting magnesium from the ore at

this plant will help convey an understanding of the service conditions imposed on the refractories, and the reasons for the unique methods used in their installation.

How Magnesium Is Extracted

Magnesite ore, mined at Lunning in the northern part of Nevada is ground and roasted in Herreschoff Furnaces. This magnesite property was formerly owned by Basic Refractories of Cleveland, whose president, Howard Eells, was the man who originally founded Basic Magnesium, Inc. The treated ore is shipped to the Basic Magnesium plant, located halfway between Las Vegas and Boulder City, Nev. This site was chosen because of its proximity

Magnesium Is the Miracle Metal That Lets Men Fly

Magnesium is the miracle metal of World War II. It is the metal which enables men to fly higher and faster, to shoot with more deadly accuracy, and to sow flame and desolation on the enemy. It is the metal which brought about the miracle of Basic Magnesium, Incorporated.

The following account is taken from the booklet "Welcome to B. M. I. published by the Basic Magnesium, Inc., Las Vegas, Nevada. The booklet has been distributed to the employees in the third largest city in the state.

Before the war, the British plant, near Manchester, was said to be one of the largest in the world. The Basic Magnesium plant is two and one-half times larger. It consists of 10 metal reduction plants, two chlorine plants, three refineries and a large preparation plant where the raw metals are made into pellets. Total cost of the plant is approximately \$140,000,000.

BASE FOR MEDICINES

Not so many years ago, men considered magnesium only as a base for various medicines. Later they learned that its ores made excellent brick and tile. Still later this versatile element was used in flares and flash-light powders. Today, magnesium, the eighth most abundant metal of the earth, is one of the essential elements for modern warfare.

This silvery, lustrous element is only three-fifths the weight of aluminum but its alloys are as strong as aluminum; it can withstand much greater vibration than aluminum without failing. Consequently, it is most valuable in construction of airplanes, landing gears, and even artillery wheels, in addition to fire bombs and tracer bullets. Transportation on land, sea, and in the air has been revolutionized.

AFTER WORLD WAR

Although nearly a century and a half have passed since magnesium was identified as one of the metallic elements of the earth's crust, comparatively little was either known or done with the metal until recent years. At the conclusion of World War I, the moderate impetus which had been given to production of magnesium practically stopped—except in Germany. The Germans continued experimentation with the metal and by 1937 had become the world's leading producer of magnesium. In the United States, the metal was being produced, but chiefly as a by-product from certain brine wells in Michigan and other parts of the country.

NAZIS BUILT BRITISH WORKS

In 1937, the German constructed an electrolytic plant for the British near Manchester, England, and the British began to be a significant factor in magnesium production. Thus, the British were supplied by their arch enemies with the technique which may prove to be a deciding factor in World War II.

Before the war began it was known that Nevada had immense deposits of magnesium ores—enough, it was estimated, to supply the world for 150 years. Nevada also had other advantages—the power and water necessary to wrest the magnesium from its ores, made available through the harnessing of the Colorado River by Boulder Dam.

The project was conceived early in 1941 through the efforts

of Basic Refractories company, Cleveland, Ohio. That company owned a number of mining claims in Gabbs Valley, near Luning, Nevada, approximately 330 miles north of the Basic Magnesium Townsite.

Estimated production at Basic Magnesium is 112 million pounds, or 56,000 tons of magnesium a year. Significance of this figure is seen when one considers that this company alone will produce nearly twice the amount of magnesium produced in the entire world in 1939 when the Germans first marched their legions into Poland. In that year, world production of magnesium was 68,355,000 pounds.

BMI, as the plant is known throughout the country, probably is one of the most phenomenal projects the world has seen; where bricks are laid with a precision which would make a watchmaker proud; where pipe lines are made of silver, lead, zinc, rubber, copper, glass; where enough water and electricity are used each day to supply a city of 1,800,000 inhabitants; where the magnitude of the great des-

ert basin itself dwarfs the plant into relative insignificance; where practically every craftsman has been required to call back into use every trick and skill he ever knew.

to plentiful and cheap power and water, supplied by nearby Boulder Dam and Lake Mead. The ore is there mixed with carbonaceous matter and magnesium chloride. The mixture is then formed into egg sized lumps and calcined lightly.

These lumps are dropped into the top of brick lined chlorinators which are kept red hot by carbon electrodes. Chlorine gas introduced at the bottom reacts with the charge forming magnesium chloride which is highly fluid at that temperature. This liquid is tapped off and poured into brick lined electrolytic cells where the magnesium chloride is broken down into magnesium and chlorine by a strong electrical current that is passed through the molten salt—a current of approximately 20,000 amperes.

This current causes the magnesium to separate from the chlorine and come to the surface of the molten material much the same as cream comes to the surface of milk. Recovery of the metal is done by simply ladling it out of the cell by hand. Meanwhile, the chlorine which has been separated passes out of the cell through a pipe and is directed back into the chlorination operation.

Refractories Take Harsh Treatment

During the chlorination operation considerable hydrochloric acid gas is formed, which, with the highly penetrating magnesium chloride added to fluctuating and intense temperatures, make unusually severe demands on the refractory lining. Acid brick lined wash towers are required for the recovery of the hydrochloric acid and chlorine.

The clay products used can be roughly divided into three classifications:

(1)—Ability to resist acids primary duty. For this purpose brick with

low absorption and high acid resistance were selected.

(2)—Ability to resist acids, molten salt (M₂Cl₂) high temperatures and spalling. Refractories were especially developed by several manufacturers for this specific purpose.

(3)—Regular high heat and super-duty refractories.

Joints Are Precision Ground

The first two classes, involving acid resistance, were all precision ground to size. Grinding to size to obtain a minimum mortar joint was imperative to reduce the possibilities of acid penetration through the joints. Throughout the job 1/32-in. or less joint was maintained on all acid resisting brick work. All material when received was inspected before grinding. After grinding it was reinspected before being sent to the job. About 800 car loads of refractory brick could be stored in the two storage sheds attached to the grinding room.

Several types of grinding equipment were used as follows: 12 Double Spindle—Besly—23" grinders; 24 Single Spindle Grinders 23" to 30", Gardners and Beslys; 2 Bed Grinders—53"—Besly; 6 Bed Grinders—12"—Gardner & Besly; 24 Standard Pedestal Grinders; 75 Clipper Saws; 30 Pneumatic Grinders.

Need Several Cuts to Shape Size

The double spindle grinders were used whenever the shape to be ground had two opposite sides that were parallel. The shape was first clamped onto a fixture that was oscillated by hydraulic pressure between two revolving abrasive rings. Several cuts were used to bring the shape to the desired size; a touch to an adjusting screw regulated the size of cut. Extremely close tolerances were employed, and parallelism was assured by the rugged construction



Construction view of Harrop ceramic dryer conveyor (Link-Belt) for handling green brick on edge through kiln for dehydration. Harrop kilns and dryers were used extensively in this construction.

of the machines which were able to withstand heavy thrusts without "give."

Many types of abrasives were tried out and in general a soft free cutting wheel gave the best results, both from speed and coolness of cutting. This latter characteristic was very important, as an abrasive that tended to cause heating did so to such an extent that strains conducive to spalling were set up within the refractory shape. When too hot the resinous bond used in the abrasive also put a glaze on the brick which retarded further cutting action.

Single Spindle Does Bulk of Work

Surfaces having no opposite parallel faces predominated so the bulk of the work was done on single spindle grinders. The shape was clamped at the desired angle to a fixture which was oscillated against the abrasive disc. The machines were set up for both manual and power driven oscillation.

Many of the most important shapes had surfaces that could only be ground by small pneumatic grinders. These consisted of complicated interlocking shapes used to form various openings in the chlorinators. These shapes were hand fitted around plaster forms shaped to the desired contours. The Clipper Saws were used in the grinding department for all straight cuts and all over the job for final closure cuts.

Some idea of the size of the grinding equipment will be gained if it is realized that the purchases of the machines totaled over \$160,000. The labor cost of warehousing and grinding before sending to the job was \$850,000.

Rotary Kilns Complete Calcining

The portion of the plant known as the preparation area is used for making and calcining the lumps or ore mixture. It consists of two sections, one in which the lumps or pellets are manufactured as such. These pellets

are dried in preheaters lined with fire brick, then fall into one of four rotary kilns, 100 ft. long, where the calcining is completed. Heating the ore mixture develops hydrochloric acid fumes which are washed in a series of acid wash towers.

The second section was designed by the Harrop Ceramic Service, represented on the job by Mr. M. S. Bailey. It consists of 6 units, each with extrusion machinery, dryer, tunnel kiln and wash tower. It first blends the ore, magnesium chloride and carbonaceous matter in Hawk pug mills, followed by extrusion into blanks through Hawk auger machines and wire cutting by a machine of the same manufacture.

The blanks, about 2x10x10-in., are conveyed through a dryer and loaded on small kiln cars. Special type Harrop kilns, 220 ft. long, are used for calcining. The creation of acid fumes during the heating period necessitates their removal and washing in specially constructed towers of Harrop design.

Train Muffle Kilns Serve Two Sides

The kilns are the twin muffle type, the middle muffle serving two sides. The sides of the heating zone consist of several separate longitudinal flues which act as muffles to transmit heat to the product. Each muffle section has a separate burner which is located on top of the kiln, the fire travels downward until it reaches the level of the longitudinal muffle it is heating.

The combustion products then make a right angled turn and travel the length of the heating zone, where they are exhausted through a stack. These flues and burners are arranged so that the bottom flue is the longest, thus helping to heat an ordinarily cool portion of the kiln car. Kiln and transfer cars were made by International Clay Machinery Co., Dayton, Ohio.

The temperature in the preheating section is increased by the use of auxiliary furnaces, as the temperature gradient can be very sharp without injury to the product. After firing, the temperature of the blanks is dropped quickly by the use of air and water cooled sheet metal panels. After calcining, the blanks are broken up into the desired size for the chlorination process.

Wash Towers of Brick and Proflex

The wash towers are 10½ ft. square and 38 ft. high, constructed of acid resisting brick with a layer of Proflex, an asphalt composition, fused between the inner and outer walls. All brick in the inner wall were laid in Carbo Korez, a resinous type mortar highly resistant to acids and water.

Expressed in nine-in. equivalent 548,000 acid resisting and 884,000 fire brick were used in constructing the preparation area. The ceramic materials were supplied by a large number of manufacturers, those supplying the main items were: Tunnel Kilns—A. P. Green Fire Brick Co., Armstrong Cork Co. Wash Towers—General Refrac-



Easley grinders cut brick into 260 different shapes required for plant construction.

tories, Los Angeles Brick Co., Hanley Brick Co. (through Stebbins Engineering Co.). Rotary Kilns—Vitrefrax Corporation. Preheaters—Pacific Clay Products, Gladding McBean & Co.

The next phase of the operation is that of chlorinating the pellets manufactured in the preparation area. The chlorinators,—there are 80 of them, are huge steel cylinders lined with acid resisting fire brick capable of withstanding high and fluctuating temperatures.

Use Potassium Silicate Feldspar

The inside lining consists of layers of brick totaling 20 in. in thickness. These brick shapes had to be free from laminations and ground to a size tolerance of 1/64-in. In each chlorinator were 12,000 pcs. with 260 different shapes ranging in size from 6 to 110 lb. The mortar used was a mixture of potassium silicate and feldspar.

The extreme accuracy demanded in this installation is occasioned by the severe conditions prevailing during operation. Temperatures in localized spots may rise to over 3000° F., hydrochloric acid gas, carbon monoxide, magnesium chloride and chlorine all are present. As the chlorination reaction occurs under pressure, it can readily be seen that the slightest flaw in the brick work will subject the steel shell to corrosive conditions that would result in quick failure.

There are also 80 wash towers, designed by the Stebbins Engineering

Co., used in connection with the chlorinators, to absorb the acid and chlorine gases given off by the chlorination process. The construction of these also required extremely close joints and the masonry was complicated by the great number of shapes required. A special acid proof cement was used throughout the chlorinator wash-towers.

There were 2,400,000 nine-in. equivalent installed in the chlorinators and chlorinator wash towers supplied by the following manufacturers:

Chlorinators—Gladding McBean & Co., Harbison Walker Refractories Co., General Refractories; Keagler Brick Co.

Chlorinator Wash Towers—Harbison Walker (through Stebbins Engineering Co.).

Four Layers of Brick Line Cells

After the magnesium chloride has been tapped into large iron ladles, it is poured into the electrolysis cells for separation of the metal. There are 880 of these cells each shaped like a huge bathtub heavily insulated with natural diatomaceous earth brick. The inside of each of these was carefully lined with four layers of 124 different shapes of acid resisting refractory brick. Most of the shapes used in this construction weighed about 75 lb. and were designed so that when the courses were laid up, the vertical joints conformed to the angles of a jack arch. This contributes materially to the strength of the cell.

To resist the penetration of the ex-

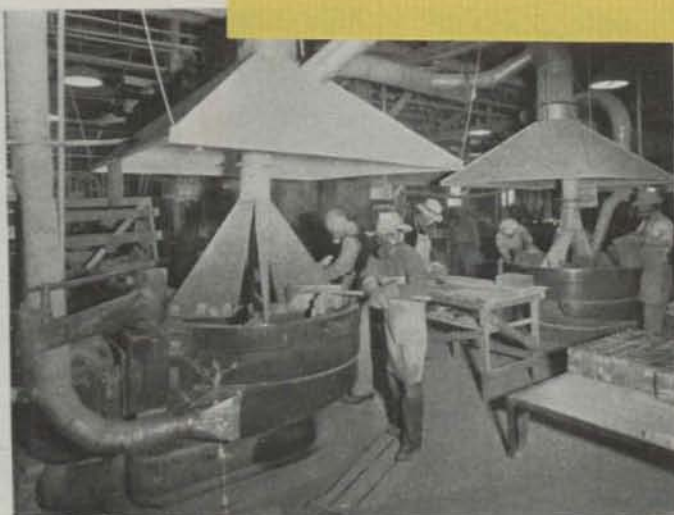


A few minutes after this picture was taken a fleet of bulldozers began clearing the landscape. From that moment things have hummed at the mammoth Basic Magnesium plant now operating at Las Vegas, Nev.

B&W 1



This temporary shed was constructed to stock the firebrick shapes. Large aisle in the shed made it possible to use trucks for the delivery of brick to the stock pile.



The firebrick were ground to shape on flat grinding wheels. Important operation was the accurate cutting of brick to specified dimension of 1/64-in.

tremely fluid magnesium chloride, all shapes were accurately ground to exact size before laying in a feldspar-potassium silicate mortar. 14,630,000 nine-in. equivalent were used in the cell construction. They were supplied by: Gladding, McBean & Co.; Keagler Brick Co.; Harbison Walker; General Refractories; Johns-Manville. (Insulation)

Try Different Refractories For Burner Blocks

The magnesium refining and alloying is done in three buildings with a total of 37 furnaces. Two temporary refineries with 18 furnaces were also built at the beginning of metal production. These will be torn down when the larger refineries with automatic temperature controls and ingot casting machines are completed. Propane is used as the fuel, being premixed with the proper ratio of air before entering the burners. The magnesium refining occurs in large iron ladles which are lowered into the furnaces by overhead cranes. Temperatures employed are not high except at points of combustion. The burner blocks are designed to permit combustion with a very short flame and heat the ladles largely by the radiation of the incandescent burner face. Several types of refractories are being tried out for these burner blocks, fireclay, mullite, aluminum oxide and zircon.

408,000 refractory brick were used in the refineries coming largely from: Walsh Refractories; Gladding McBean & Co.; Mullite Refractories; Chas. Taylor Sons Co., General Refractories; Carborundum Co.

Other masonry installations on the project include three B & W boilers, incinerators, many acid tanks and drains. The total nine-in. equivalent laid to date is: 18,308,000 acid resisting refractories; 1,501,000 fire clay refractories.

The sodium and potassium silicate used was handled in an interesting man-

ner. The sodium silicate was diluted to the proper working consistency by the manufacturer in Los Angeles. The extra freight charges were more than made up by the savings in labor required for diluting on the job. The quantity of sodium silicate used was 1,013,800 lb. The potassium silicate was originally shipped from the east coast with as high a degree Baume as possible and diluted on the job. The quantity to be used, however, justified the setting up of a special plant for its manufacture from potassium silicate glass. A revolving autoclave which could be steamheated was set up together with a portable boiler and other necessary equipment. This plant made up 2,000,000 lb. of potassium silicate solution during the period of construction.

Retard Set of Cement With Ice

Due to the heat and extreme dryness of the climate (the humidity averages around 4% in the summertime) the silicate and resinous cements used had a tendency to set up too rapidly. To avoid this, these cements were mixed just as needed and placed in a V shaped pan which fitted into another pan filled with ice. Only in this manner could the set be retarded sufficiently to permit a working period of about 20 minutes. 115 carloads of ice were thus used on the job.

There are many interesting items not directly connected with refractories which will possibly help convey a better comprehension of the magnitude of the total job. Over 16,000 carloads of freight have been received. The cost of the 40-in. pipe 14 miles long used for bringing in the 30 million gallons of water required daily was over \$7 million. The two electric lines for power cost \$17 million.

Construction Employs 41,000 Men

Toward the end of the job it was decided to use silver instead of copper for bus bars. 800 tons of silver were thus

used. Over 41,000 men have been hired by the McNeil Construction Co., during the construction period. The plant supplying chlorine for the process is the biggest yet constructed. 85 carloads of acid-proof quarry tile from the Murray Tile Co., were used in floors throughout the buildings. The thousands of houses built are a story in themselves.

All this has occurred on land that for miles around was previously desert. The payoff is that magnesium in vast quantities is now pouring from the plant. The majority of it is being utilized for needed incendiary bombs, tracer bullets and aircraft castings.

Firebrick Shipping Rates To Be Revised

In a recent ICC report, firebrick shipping rates, in carloads, from Cincinnati, Ohio, and Louisville, Ky., to upper Michigan, Minnesota and Wisconsin were declared "not unreasonable," but prescribed nonprejudicial rates on such traffic from St. Louis. In the complaint of the Ohio-Kentucky Associated Industries No. 25473, sub. No. 1, it was alleged that the rates were unreasonable and prejudicial. Relationship between their rates and those maintained from St. Louis gave firebrick manufacturers in Indiana and Illinois undue preference, it was claimed. The rail carriers were ordered to prescribe new rates by November 14, 1943.

Fire Damages Laboratory At Corhart Refractories

Fire resulting from an overheated oven at the Corhart Refractories Co., Louisville, Ky., August 29, caused damage estimated at \$8,000, F. S. Thompson, president of the company, said. He said the fire was confined to a chemical laboratory and much of the damage was caused by smoke and water.

MINING JR'L
PHOENIX ARIZ.
9/30/43

Fred Creith has gone to Las Vegas, Nevada, where he is employed by Basic Magnesium, Inc. Until recently he operated in the Red Mountain district of Kern County, California.

MINING AND METALLURGY

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New York City

SEP 1943

Charles L. Knaus has returned to his former job in the engineering department of the United Air Lines, Cheyenne, Wyo. He worked for a while for Basic Magnesium, Inc., Las Vegas.

ENGINEERING AND MINING JOURNAL

"For nearly three-quarters of a century the outstanding authority of the metal and non-metallic, milling, smelting and refining industries."

McGraw-Hill, 330 W. 42nd St., New York City

SEP 1943

The world's largest producer of magnesium metal, Basic Magnesium, Inc., is also ~~one of~~ the country's biggest targets for rumor, gossip, and general speculation. In so far as censorship permits, *Engineering and Mining Journal* will present next month the truth about the technical side, at least, of this vast undertaking. Accounting in itself for about 30 percent of U. S. magnesium production, BMI sprawls out over a couple of square miles of Nevada desert as though supremely conscious of its own importance. War, of course, guarantees the present importance of BMI, but in the peaceful (we hope) future, who knows? Certainly our government will not discard lightly our investment in Basic of \$120,000,000, and the plant may come to be as important in peace as in war.

B. M. I. a Great Asset to California, Too, Newspaper Writer Relates in Listing Basic Buying From Los Angeles

Basic Magnesium's huge plant is not alone a great asset to Las Vegas and all of Clark County but to Los Angeles as well. Realization of B.M.I.'s importance to the Coast is developed by Carl S. Kelty, financial editor of the Los Angeles Examiner.

"In the nearer perspective of large war industries closer to home," Mr. Kelty wrote yesterday, "the relative importance of Basic Magnesium's plant at Las Vegas to the Los Angeles economy has been widely overlooked. In 1942 alone Basic Magnesium purchased from suppliers in Los Angeles County \$29,336,361 worth of merchandise, including equipment and supplies, and this did not take in purchases less than \$10,000 in amount. "The purchases have continued all through 1943, but the total has not yet been ascertained.

"In addition a large part of the labor supply for the plant has come from Los Angeles.

"Basic Magnesium represents an investment of \$150,000,000 and is designed to produce several times as much magnesium as the entire world produced previous to the war.

"The McNeil Construction Company poured the first mass concrete for the job just about two years ago, and 10 months later the plant produced its first magnesium.

"The 10 units complete were finished six months ago, and over 10,000 men were employed on the construction job. All the fully integrated units are now turning out maximum quantities of magnesium.

"At present the Basic Magnesium plant is employed exclusively in production for war. Magnesium is being poured into incendiary bombs and into metal for industry.

"Because of its extreme lightness magnesium is employed largely in castings for plane parts and other war equipment where light-

ness combined with strength is important.

"After the war a wide extension of industrial uses of magnesium is planned. Designs have already been made for employing the metal in streamlined railway cars where the load factor is important.

"The possible uses in automobiles, in radios, clocks and all kinds of gadgets, are said to be unlimited.

"The processes employed by Basic Magnesium are too technical for description. Costs will be important after the war, and the costs at Las Vegas are said to be competitive with those in the other important process by which magnesium is extracted from ocean water."

L.V.R. Journal
12-29-43

Charge Aluminum Firm With Wanting To Scrap BMI Plant

The charge that the aluminum interests in the United States "want to scrap a big magnesium plant in his state of Nevada" is being made in Washington by Senator Pat McCarran according to Ray Tucker, author of the capital column "National Whirligig."

Commenting further, Tucker says: "Western senators who fought for construction of Victory plants near natural resources in their commonwealths are again on the warpath. The suspect that certain bigwigs who are alleged to dictate the policies of the war production board and of the army and navy will show favoritism toward eastern corporations in the industrial reshuffle that will follow the armistice."

Other western plants under fire of the big interests, Tucker quotes McCarran as contending "are the steel and iron ore concerns in Utah, California and bordering communities, Pennsylvania and Alabama manufacturers are determined to curb such competition."

The Tucker comment continues:

"A strong house-senate bloc has been organized to check, in the words of Mr. McCarran, "this sinister move."

"He introduced a resolution providing for an investigation of the effect upon interstate commerce of the decentralization of heavy industry in the United States." It was the first shot in the westerners' fight.

"The proposal was reported upon favorably by the Interstate Commerce Committee, which is controlled by men from the wide-open spaces, with a recommendation for a \$10,000 expense fund.

"Senator Scott W. Lucas of Illinois, who heads the committee that must approve such expenditures, promised to O. K. the request as soon as his amendment on the fathers' draft had been disproved of by congress.

"This conflict suggests that re-conversion and reorientation of the nation's industries will bear political as well as economic implications. Every region will attempt to keep in operation its factories, shipyards and other war activities; prewar manufacturing centers will want the newcomers put out of business."

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Basic Magnesium 'More Than War Baby': Reno Newspaper

Nevada's great dream industry come-true, Basic Magnesium, Incorporated, is more than a "war baby"; it will be operated after the war, says Cornelius F. Kelley, chairman of the board of Anaconda Copper Company, chief owner and operator of the gargantuan enterprise.

His statement about the future of B. M. I., as it is called by war workers and Nevada desert rats alike, is one of the features of a special edition of the Reno Evening Gazette commemorating the establishment, building and operation of the industry.

Magnesium is used for bombs and bullets, in aircraft manufacture and many other uses, with assistance of the Defense Plant Corporation and other government agencies, huge operations to extract and process it from its sources on the Nevada desert, near Las Vegas, were started in 1941. A new industrial and residential city, called Henderson, was built on the desert, with workers also at Gabbs, Nev., and Las Vegas. Henderson is now

the third largest city in Nevada, exceeded in population only by Reno and Las Vegas.

Interesting commentary on the development of Southern California as the industrial supply center for the whole West is the array of commercial announcements by firms participating in the building of Basic Magnesium in the Gazette's edition. Most of the firms have headquarters in Los Angeles. The principal building contractor was McNeil Construction Company. Supplying important operating equipment was Southwest Welding and Manufacturing Company of Alhambra. "A quarter-century ago," commented a business man, "the list of participating contractors and suppliers would have been chiefly from San Francisco."

The Gazette tells in pictures and text of the rise of Basic Magnesium, including the homes, schools, churches and stores newly built on the desert.

L.V.R. Journal
12-16-43

Absentee rate at Basic Magnesium has shown a steady decrease since June of this year—has been cut almost in half. June figures were 8.7% and November only 4.8%.

L.V.R. Journal
12-21-43

Clark County Shows Gain Over 1942 in Proceeds From Mines

CARSON CITY, Dec. 21 (UP)—Clark county nearly doubled the value of its net proceeds from mines in the last year, according to records in the office of George Allard, chief statistician of the Nevada tax commission. The increase was from \$425,000 to \$935,803.

Clark county also led in the country improvements in the state. Figures submitted by county officials increased the value of country improvements from \$4,438,670 to \$17,741,456. Allard explained that the huge increase in this classification in Clark county resulted from placing the Basic Magnesium, Inc. plant on the tax rolls under the classification of country improvements.

Washoe county, as usual had the highest valuation on personal property, both city and country, with Clark county ranking second. The Washoe county figures were listed as \$1,958,125, an increase of slightly more than \$100,000 over 1942, with Clark county having \$907,299 boosted from 1942's total of \$749,055.

Despite the 100 per cent increase in the net proceeds of mines in Pershing county, Nevada as a whole experienced a decided slump in that classification. The comparative figures were given as \$10,613,536 this year and \$10,957,648 in 1942.

This decrease was directly traceable, it was indicated, to the federal government's order forcing the closing of gold and silver mines throughout Nevada in an effort to force such miners into the production of strategic miner-

L.V.R. Journal
1-3-44

Copper Executive Will Visit BMI

Louis S. Cates, of New York City, president of Phelps-Dodge company, one of the nation's largest copper producers, will arrive in Las Vegas tonight to spend the day tomorrow on a tour of the Basic Magnesium

B. M. I. a Great Asset to California, Too, Newspaper Writer Relates in Listing Basic Buying From Los Angeles

Basic Magnesium's huge plant is not alone a great asset to Las Vegas and all of Clark County but to Los Angeles as well. Realization of B.M.I.'s importance to the Coast is developed by Carl S. Kelty, financial editor of the Los Angeles Examiner.

"In the nearer perspective of large war industries closer to home," Mr. Kelty wrote yesterday, "the relative importance of Basic Magnesium's plant at Las Vegas to the Los Angeles economy has been widely overlooked. In 1942 alone Basic Magnesium purchased from suppliers in Los Angeles County \$29,336,361 worth of merchandise, including equipment and supplies, and this did not take in purchases less than \$10,000 in amount. "The purchases have continued all through 1943, but the total has not yet been ascertained.

"In addition a large part of the labor supply for the plant has come from Los Angeles.

"Basic Magnesium represents an investment of \$150,000,000 and is designed to produce several times as much magnesium as the entire world produced previous to the war.

"The McNeil Construction Company poured the first mass concrete for the job just about two years ago, and 10 months later the plant produced its first magnesium.

"The 10 units complete were finished six months ago, and over 10,000 men were employed on the construction job. All the fully integrated units are now turning out maximum quantities of magnesium.

"At present the Basic Magnesium plant is employed exclusively in production for war. Magnesium is being poured into incendiary bombs and into metal for industry.

"Because of its extreme lightness magnesium is employed largely in castings for plane parts and other war equipment where light-

Professor Carpenter Speaks to Rotarians

Mining Industry Of State Is Topic

Prof. Jay A. Carpenter, director of the Nevada Bureau of Mines and faculty member of the University of Nevada, was the interesting guest speaker at the regular meeting of the Rotary club in Carson City yesterday.

Choosing as his subject, "Nevada's Mineral Industry and Its Problems," Professor Carpenter told of the history of mining in this state from the discovery of the Comstock in the late 1850's to the present boom now being experienced throughout the state. He emphasized that when the mining industry in Nevada flourishes so does the state.

He said that Carson City before 1900 played an important part in the mining activities for at that time this city was the center of the boom.

Professor Carpenter stated that this state's chief industry flourished until after the first world war, then dropped and now during the second war is rising once more to great value particularly in light metals such as is now being produced in great quantities at Basic Magnesium, Inc., at Las Vegas and Gabbs Valley.

Although the states mining production in 1940 was \$43,000,000 he said, it is estimated that in 1943 figures will reach \$50,000,000, the greatest in the history of Nevada.

The head of the state bureau of mines gave a brief summary of the BMI project adding that the entrance of the Anaconda Copper company as manager of the project has been a great step forward. He said the Anaconda company is now running the plant, which was established according to the English production system, with a staff composed of expert mining men capable of securing the most in efficiency.

He added that BMI now is employing 56 per cent of all men engaged in the mining industry in Nevada and that BMI has played a great part in the population increases of the state which now is said to be approximately 140,000,-

Professor Carpenter Speaks to Rotarians

Mining Industry Of State Is Topic

Continued from Page One)

000.

In conclusion he discussed the possible future of this industry and expressed his concern of its continuance after war ends. BMI will be able to make certain changes in the plant, it was said, in order to remain a substantial industry in post-war times, only with the approval of the Defense Plant corporation and the granting of funds for modifications.

Governor E. P. Carville spoke briefly to the members and guests on the importance of Bill of Rights week appealing to all Rotarians to think about and employ the articles set forth. He added that these rights should be sacred to all especially during the present time when they are fundamentally victory's aim.

E. C. D. Marriage, chairman of Boy Scout troop No. 33, announced the selling of Christmas trees for the benefit of the troop is underway at the armory building in this city. Selling time has been established between 4 and 6 p.m. each day.

It was announced that the annual Christmas meeting and party with Rotary-Anns present will be held at Stewart, Tuesday evening, December 21, in the club lounge.

Rev. J. L. Harvey spoke briefly during the business meeting on the 13 prison inmates who volunteered for induction expressing praise due Warden Richard Sheehy for his splendid work in assisting these inmates into the service.

A war savings bond was awarded Joel Snyder.

President C. B. Austin presided and the excellent guest speaker was introduced by the program chairman of the day, George A. Martin.

Guests included Professor Carpenter, Stanley G. Palmer of the University of Nevada school of engineering in Reno; Robert Farrar of Reno; Lon Wright and Jack McCarthy, both of Carson.

Basic Magnesium, Incorporated

Las Vegas,
Nevada.

World's Largest Magnesium Plant

Miracle Metal Makes War History

Basic Magnesium Plant Amazing Development

By JOHN DENNIS KEYES

Death and desolation rained on German and Italian cities—the ruin of Hamburg and Cologne—and the air power which overwhelmed Sicily—all had a one-way ticket from the west coast.

Bombers and fighters from the west coast, lightened by the miracle metal of World War II, and carrying that same metal in their bomb bays fresh from the arid mountains of Ne-



F. O. Case is the general manager of Basic Magnesium, Inc., located in Las Vegas, Nev.

vada, flew halfway around the world to shake the foundations of Hitler's citadel and to set up an echoing fear in Tokio.

Hitler had never heard of basic magnesium when he confidently marched his legions into Poland Sept. 1, 1939. He had no way of knowing the terrible ruin of his cities would

come from wind-swept Nevada deserts in planes not yet designed. And small wonder—for at that time basic magnesium did not exist in our most fantastic dreams.

And perhaps Tojo's sneak punch at Pearl Harbor would never had happened if he had looked in the crystal ball and discovered the industrial giant now sprawling across desert sands only 300 miles from Los Angeles.

HUGE PLANT

If the Basic Magnesium plant were laid down on the city of Los Angeles it would cover an area extending from Temple street to Venice boulevard, and from Los Angeles street to a block west of Figueroa. It is the largest brick, sheet metal, electrical and plumbing job the world has ever seen.

Water from Lake Mead, used in the plant, would supply each man, woman and child in Los Angeles with 17 gallons a day. Electrical power flowing through the plant would light every home in Los Angeles county.

It staggers the imagination that all this work was begun less than two years ago and the first magnesium metal was produced 11½ months later. It was an "impossible" task accomplished in an arid desert basin, where men

worked in temperatures ranging beyond 140 degrees.

Magnesium is the miracle metal of this war. Only three-fifths the weight of aluminum, it can be fashioned into motor parts, airplane fuselages and landing gears, artillery wheels; it is the metal from which tracer bullets and incendiary bombs are made.

SPEED PRODUCTION

Basic Magnesium was conceived early in 1941 through the efforts of Basic Refractories Company, Cleveland, Ohio. This company owned a number of mining claims in Gabbs Valley, near Luning, Nev., approximately 330 miles north of the Basic Magnesium townsite. The Gabbs Valley magnesite

deposit, one of the world's richest and largest, apparently created for this emergency, needed only the proper development and process to bring about its full development to supply this nation with an essential war material.

In October, 1942, Basic Refractories sold its interest to the Anaconda Copper Mining Co., which is making its first entry into the light metal field. Under the direction of Anaconda, the tempo of construction was speeded and production was geared to the war effort.

The estimated production of BMI is 112,000,000 pounds or 56,000 tons of magnesium a year. Significance of this fig-

ure is seen when one considers that BMI alone will produce nearly twice the amount of magnesium produced in the entire world in 1939.

BMI, as the plant is known throughout the country, probably is one of the most phenomenal projects the world has seen; where bricks are laid with a precision which would make a watchmaker proud; where pipelines are made of silver, lead, zinc, rubber, copper and glass; where the magnitude of the great desert basin itself dwarfs the plant into relative insignificance; where practically every craftsman was required to call back into use every trick and skill he ever knew.

To supply the plant with

water, a pipeline was constructed from Lake Mead, 15 miles away, lifting the water approximately 800 feet from the surface of the lake.

Two transmission lines bring 200,000 kilowatts of electric power from Boulder Dam to the plant. The electric equipment cost \$12,500,000.

By way of comparing the Basic Magnesium job, it is noteworthy to use the Boulder Dam job as an example. Construction engineers all over the world considered Boulder Dam one of the most amazing feats of engineering and construction in the world, and yet at its peak the Boulder Dam job employed only 5250 men, as compared with 13,618 men on the Basic job at its peak.

The Chlorine Plant at Basic Magnesium is one of the three largest in the world, producing 225 tons of chlorine each day and 250 tons of caustic soda. Approximately 370 tons

of salt a day are dissolved into 300,000 gallons of brine to make the raw materials from which the chlorine and the caustic soda result.

Before the war the British plant, near Manchester, England, was said to be one of the largest in the world. Basic Magnesium is two and one-half times larger. It consists of 10 metal reduction plants; two chlorine plants; three refineries, and a large preparation plant where the raw materials are made into pellets. Total cost of the plant is approximately \$150,000,000.

Plan Hawaii-to-L. A. Air Line

Transcontinental and Western Air Lines are contemplating the building of a huge base here to be used as a terminal for a proposed Los Angeles to Honolulu air line.

LAS VEGAS, NEV., REVIEW JOURNAL

OCTOBER 23, 1943

The Answer Hasn't Been Written Yet

In the early days of BMI, Howard Eells, Jr., then president of the company, used to draw glowing pictures of Las Vegas as "the Pittsburgh of the light metal industry." That was his vision, his firm belief.

Las Vegas went along with that picture and has kept it constantly in view. It is a definite possibility—one that CAN be realized if we get the breaks.

Alongside that rosy picture, another has appeared. Nobody has painted it—it has come into being gradually, with circumstances generally yielding the brush. And it is NOT a rosy picture—in fact it is decidedly of the opposite hue. It shows the magnesium plant shut down and abandoned—just another "battleship" useless when the war is won.

You can take your choice and, as things stand at the moment, you might be right either way.

So far as the big plant itself is concerned, BMI has done an outstanding job since Manager F. O. Case took over for Anaconda. A production cost which will be competitive in the post-war era is in sight. Anaconda can make the plant go IF the Defense Plants Corporation gives the green light. Whether that will be forthcoming or not, remains to be seen.

The future of magnesium depends on the manner in which light metals become predominant in the years following the war. Their development has been one of the more important industrial results of the conflict. The question is whether the great capacity for production will be curtailed, once the war is over, or whether it will be used to the limit.

The Magazine of Wall Street, which is on top of all such questions, recently said in the regular section devoted to a discussion of events and trends "On The Industrial Front" has this to say:

"Government policy ament post-war use of its huge productive capacity for light metals is definitely hardening in favor of encouragement of far greater intra-industry competition. Intention is to promote wider use of aluminum through lower prices, if necessary by using government plants as a lever to break the existing price leadership.

"Magnesium poses a more difficult problem as considerable government capacity is uneconomical for peace-time production. But indications are that nothing will be allowed to dampen the impetus that war has given magnesium's progress."

The formula, then, appears to be getting the price down to a competitive basis. As we pointed out above, BMI is already in sight of that goal. More than that—the possibilities from the development of by-products is tremendous. The big question-mark is the attitude of D.P.C. toward making this a permanent industry and giving BMI the support and latitude necessary to bring this about.

So far, it's still a big question-mark, or worse, for admittedly there is nothing particularly encouraging on this score from Washington. Alcoa and Dow Chemical have been fighting BMI tooth and nail, seeing in it a dangerous competitor. And D.P.C. apparently listens.

Circumstances, such as development of world markets far beyond the wildest dream of present analysis, may compel a change in attitude or may demand the entire magnesium-producing capacity. There are many other possibilities, also. The final answer has not yet been written, nor is it in the immediate present. If the reverse were true in either case we would have cause for grave concern.

L. V. Tribune

10-24-43

Sunday, October 24, 1943

Back From China, Now BMI Guard

Regardless of how you look at it, Mark E. Gibson is one man who has plenty of grievances against the Japs. He is now a guard at B.M.I.'s huge plant at Basic Townsite.

In addition to the anger every real American harbors against Tojo, Mark Gibson figures the Nips owe him half a million dollars.

Here's why: When the Japs bombed the U. S. S. Panay in 1938 they bombed other things, too, including Mr. Gibson's Mongolia ice cream plant in Shanghai. When the Nip planes had left, his life work and his savings were rubble.

He was pretty mad—so he enlisted at once in Gen. Chiang Kai-shek's army, serving with the Chinese against the Japs for 26 months. The veteran of two armies has nothing but praise for the Chinese military.

Guard Gibson has spent 36 years in the Orient. He speaks many Chinese dialects. As an American soldier in the Philippines he has been on every one of the 7000 islands which make up that group.

He says: "I know every hog trail on Bataan."

In the Philippines he was bodyguard to three governors-general—Harrison, Wood and Forbes.

After service with the Chinese Mr. Gibson got back to San Francisco in 1940 and immediately re-enlisted in the American Army.

Recently discharged, he tried the ease of retirement, but couldn't stand it. So he picked out B.M.I. as an important war industry and came to work and says he likes it.

L. V. Review Journal 9-22-43

A Nevadan Is Honored

Cornelius Francis Kelley, chairman of the board of Anaconda Copper Company, this week became the second recipient of the Charles F. Rand Memorial medal "for distinguished achievement in mining administration."

Presentation was made at a meeting of the board of directors of the American Institute of Mining and Metallurgical Engineers. First to receive the award was Robert Crooks Stanley, chairman of the International Nickel Company in 1941.

Kelley is a native of Nevada. He was born in a little mining camp near Eureka, and is quite proud of his native state. He took his big step in Butte when he made his way from the ranks to the top of the nation's greatest copper mining company.

While its general offices are in New York City, Anaconda has remained a western company down through the years. And it has been most successful in developing many new enterprises in fields rather far removed from its first love—the mining and processing of copper.

Anaconda got into the light metal field when the company purchased control of Basic Magnesium Incorporated from the Eells interests, and took over active operation of the local industry. It was this connection that brought Kelley back to his home state for the first time in many years, and during his stay here, he evidenced considerable pride in playing a part in bringing to Nevada, its greatest industry.

Kelley's recognition from the American Institute of Mining and Metallurgical Engineers is well deserved. He has been an outstanding figure in the industry for more than a generation. And all Nevada will be proud to know that a native of this state, traditionally famed for its great mines and the part they played in the earlier history of the nation, has been so honored.

Mighty Achievement

One of many gigantic construction feats performed by the McNeil Construction Company was the completion of Basic Magnesium's \$150,000,000 plant in record time. The speed

and efficiency with which this task was handled will go down in years to come as one of the "miracles" performed by American industry in meeting the demands of the war effort.

L. V. Review Journal
10 --1943

42 BMI Workers To Get Diplomas From War School

Forty-two employes of Basic Magnesium completing the first 32-hour course in metallurgy under the engineering, science and management war training program will be awarded diplomas tonight at Henderson school, Basic Townsite, by Jay Carpenter, director of the Mackay school of mines of the University of Nevada.

Basic Magnesium is the first war industry in Nevada to train employes for key positions within its own organization under the ESMWT program sponsored by the United States office of education and administered by state universities.

Two other classes in metallurgy are now being taught and another is scheduled for October 25. Instruction in metallurgy of magnesium will begin November 21.

L. V. Review Journal
10-11-43

McNeil Company Ends Construction Job at BMI Plant

Construction activities at BMI were over Saturday afternoon so far as McNeil Construction company is concerned, and except for 85 employes in the accounting and general store departments, the once vast crew has vanished from the project.

Ed Ball, who with the late Dude Brannon was first on the job for McNeil back in September of 1941, and has been general labor superintendent throughout the entire period of construction, and G. P. Smallwood, general superintendent of construction, turned in their last shift Saturday, and left today for Los Angeles.

Ball saw his crew grow from one man beside himself to a total of 10,087 on July 16, 1942, and then gradually fade away again as the various units of the plant were completed.

So splendid a hurry-up construction job was done by the McNeil company, that the first magnesium was produced August 31, 1942, not quite a year from the time ground was broken for the plant.

Office buildings, warehouses and other units used by McNeil during their tenure are being turned over to BMI to fit into their operating plant as planned.

According to John Pionke, in charge of personnel for McNeil during the construction days, now engaged in closing out the project for his company, the last McNeil employe will be finished with his work within another month or six weeks.

Friction In Nevada Hurts War Effort

Bad Blood In Las Vegas Threatens Production Of Magnesium

By DREW PEARSON

Bad blood in Las Vegas, Nev., threatens to interrupt production of magnesium for airplanes and bombs.

Las Vegas is the two-fisted Wild West town that grew out of the desert, now notorious as the last frontier.

Washington officials were not worried over "colorful" Las Vegas, as long as the Basic Magnesium plant nearby continued to produce that precious industrial metal. But they are worried today because bad blood between labor and management threatens to let the electrolytic cells get cool, which means a complete stoppage of production for weeks.

The management (Anaconda Copper, under contract with Defense Plant Corporation) accuses the CIO union of inciting race friction between white and Negro

workers. And the CIO accuses Anaconda of bad faith in refusing to recognize the union.

The situation was bad enough before this issue developed. Labor turnover has been high from the beginning, due to the intense desert heat, chlorine gas in the air, plus general discomfort. Bad food has sent as many as 125 men to the hospital after a single meal, and for a long time the only place to cash a pay check was in a gambling house.

Work For First Pay

To offset labor turnover running as high as 250 men a day, the management got help from Los Angeles police judges, who would sentence a man to "Thirty days in jail—or Las Vegas." Bums arrived by the bus load, worked long enough to draw their first pay, and quit.

Fresh trouble developed when the company decided to segregate whites and Negroes. CIO leaders objected, saying this would incite race hatred. The company declared it would quiet race hatred.

Negroes didn't like the segregation, and began quitting. Over 500 have "terminated" in the last few days.

CIO sent their stewards to talk to the men. CIO insists they were to placate the men and urge them to stay. But the company declares

Monday, November 1, 1943 TUC

they were urging the men to quit.

Under the hot desert sun, blood is coming to a boil. And just as fast, the electrolytic cells are cooling off. There seems to be a general unawareness of the fact that magnesium is needed for winning the war.

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LAS VEGAS, NEV., REVIEW-JOURNAL
NOVEMBER 12, 1943

B. and P. W. Club Plans Session Here

Dorothy Brimacombe, state president of the Business and Professional Women's clubs, announced today a leadership conference to be held in Las Vegas tomorrow, from 9:30 a. m. to 4:30 p. m. Representatives from Ely, Pioche, Boulder City, and Las Vegas will be here.

The morning and afternoon sessions will be held in the Methodist church parlors and a noon luncheon will be held at the Nevada Biltmore Hotel. Reservations for the luncheon are necessary.

A speaker from BMI will be here to talk on "Women and Work at Basic Magnesium." Mrs. L. E. Burr will speak on "Juvenile Delinquency Problems in Nevada," and Mrs. G. Laurence Ulom, state chairman of the women's division of the salvage department, will talk on "Women and Salvage." A state board meeting will take place immediately following the afternoon speeches.

James R. Hobbins of New York City, president of Basic Magnesium, Inc., has arrived in Las Vegas on a routine inspection trip and for a conference with executives of the company here and of the Gabbs properties. He is a guest at El Rancho Vegas.

Hobbins is conferring with F. O. Case, general manager of BMI, and with Tom Russell, superintendent of operations of Gabbs, during his visit here.

He is one of the nation's leaders in mining and business concerns. Hobbins is president of the Anaconda Copper company, a position he has held since 1940, and also is president of the Diamond Coal and Coke company, the Butte Water company, the Andes Copper Mining company, the Chile Copper company, and the Chile Exploration company. In addition he is vice-president or director of many mining and business concerns in this country.

Gov't to Limit Employees of Local Firms

SOUTH SAN FRANCISCO, Nov. 12.—(U.P.)—Within the next six months essential industries in the bay area will require 180,000 additional men and women, Adrian Falk, member of the war manpower commission and chairman of the bay area manpower mobilization commission, told a meeting of Peninsula personnel directors here.

"We are going to have to get these 180,000 people from those now living here, as lack of housing prohibits the importing of additional manpower," Mr. Falk said.

Ceiling on Employees

"A plan is being set up to classify to what degree the production of each manufacturer is essential, and a ceiling will be set on the number of persons any firm or business may employ. Every firm will have to get along with the irreducible minimum of workers."

"Our main job now is to recruit new workers, and since the bottom of the manpower barrel has been scraped, we will have to rely upon the thousands of women shown by our surveys to be available in the bay area. This is particularly true on the Peninsula, where you have a greater number of women available per capita."

Form Committee

"A manpower mobilization committee should be formed on the Peninsula. Civic organizations must pitch in and help with such problems as caring for the children of women workers."

"This war can only be won if the armed forces have the tools with which to fight. These tools will not be forthcoming in sufficient volume until we supply the missing manpower."

Following Falk's talk, a Peninsula manpower mobilization committee was formed, with Clyde Earl Lawton of San Mateo, and Robert L. Baker of San Jose.

Ship building, radio communication and detection, airplane parts, firefighting equipment, Diesel engines, and magnesium plants are some of the vital war industries of the Peninsula now in need of additional personnel.

BMI President Is Visiting Here

When the final tale is told, the achievements out here on the hillside at BMI will be one of the most brilliant and outstanding of the entire war effort. There have been more obstacles overcome, more pioneering done, more real genius demonstrated from top to bottom in the big plant than in most any other spot in the nation. Trained and expert engineers who view the plant from the inside are actually astounded at the job that's been done.

BMI to Go on 48 Hour Work Week

The Basic Magnesium plant will go on a straight 48 hour week beginning next Monday, it was announced today by F. O. Case, general manager of BMI.

"We are following out the presidential order to place all war plants on this basis," Case said.

Employees will be staggered as to days off so the plant will continue to operate seven days a week.

Alcan Road Film Shown at BMI

Movies showing the construction of the Alcan highway and the various phases of synthetic rubber production in the United States, were shown Thursday in the auditorium at Basic townsite by the Goodrich Tire and Rubber company, under the direction of District Manager J. E. Wacksmith, assisted by A. B. Crandall, Bob Adams, and Mel Oerter of BMI.

The program was arranged at the request of Basic Magnesium officials.

MAGIC MAGNESIUM

Some people are indulging in a lot of worry lest the end of the war result in decreasing the demand for magnesium to such an extent that Basic Magnesium, Inc. and other plants producing that metal shall be forced to close.

It would be natural, of course, to expect magnesium plants to run at reduced capacity during a few months of the readjustment period following the war. Nevertheless, with the immense resurgence of activity from war production to the lines of private enterprise producing to meet civilian needs, magnesium will really come into its own.

In this connection we notice a short article in Time magazine of date November 8, 1943, under the heading of "Chemists at Work" the following:

"The light metal magnesium, virtually ignored in the U. S. before the war, is revolutionizing U. S. metallurgy. Thanks to chemists, it is now being produced cheaply and plentifully, playing a big role in the war (e. g., in a four-motored bomber it saves enough in engine weight alone as compared with aluminum, to increase the bombload by 30 lb.) Among its many postwar possibilities, Haynes sees a magnesium grand piano that one husky man can lift by himself."

The truth is that the war, with all its evils and horrors beyond description, has been productive of some good to humanity in the long run. Among the benefits we may name is the introduction of the metal magnesium into the industrial life of America to such an extent as to revolutionize some lines of production and provide for the mass of the people luxuries and conveniences never before known at prices so low that practically all may enjoy them.

LAS VEGAS, NEV., REVIEW-JOURNAL
NOVEMBER 24, 1943

Special Edition Describing BMI Is Presented Today

The Review-Journal today presents the first complete pictorial of the construction and operation of the big plant of Basic Magnesium Inc. at Henderson.

This presentation, consisting of 32 pages, is being published simultaneously by the Review-Journal and the Reno Evening Gazette, and distributed to the majority of readers of both newspapers.

The pictorial was made possible through the close cooperation of both papers and the management at BMI, and stories and pictures appearing herein are being given the public for the first time with full approval of the U. S. Army through which all such copy must pass.

To meet the requirements of newsprint rationing, the Review-Journal has found it necessary to make cuts in the regular edition of the paper throughout the remainder of this quarter. The number of pages has been diminished, and the Thanksgiving issue, due tomorrow, is being eliminated entirely.

Because of these requirements, the number of BMI pictorials is necessarily limited. We suggest that if you desire to send a copy to friends, you read your own carefully and mail it on. There will be only a very few available for public sale.

L.V.R. Journal 11-26-43

BMI Payday Is Shifted Today

Payday at BMI will be advanced from Friday to Thursday beginning December 2, it was announced today by F. M. Hanrahan, comptroller.

Beginning next Thursday, all field employees will obtain their checks on the new date at the time offices of the company.

Those who have been paid on a semi-monthly basis will be shifted to a weekly status in the near

ADVANCE AND BE BITTEN

The army has thrown a rather powerful guard around vital areas and installations at Basic Magnesium, Inc., and it ill behoves any one to loiter around those places, even with the most innocent intentions. Two Great Danes, four Dobermans, and three German Shepherds, trained as attackers and defenders, are on duty. The army gives one of the Great Danes a jaw-power rating of 900 pounds to the square inch. And that hurts!

L. V. Tribune 11-17-43

Army Sends Nine Watchdogs Here To Guard BMI

Nine husky dogs of the Army's K-9 service have added their watchfulness toward guarding vital areas and installations at the Basic Magnesium plant.

The dogs—two Great Danes, four Dobermans and three German Shepherds—came to Basic Magnesium from San Carlos, Calif., under the care of Sgt. Lisle B. Bordwell and Guard W. W. McAnally.

The men had just completed an eight-week course of instruction at the Army's camp there, and are now further training the dogs and instructing other guards in proper methods of handling the valuable animals.

The detachment of nine huskies is an experiment in Nevada. They are the first to be assigned to any war plant in the state and, if proved successful, will be followed by many more from San Carlos, to be assigned to other vital areas.

"These dogs are unbelievably smart and faithful—efficient in patrol, sentry, trailing and attack duty," say their guards.

Special Edition Describing BMI Is Presented Today

The Review-Journal today presents the first complete pictorial of the construction and operation of the big plant of Basic Magnesium Inc. at Henderson.

This presentation, consisting of 32 pages, is being published simultaneously by the Review-Journal and the Reno Evening Gazette, and distributed to the majority of readers of both newspapers.

The pictorial was made possible through the close cooperation of both papers and the management at BMI, and stories and pictures appearing herein are being given the public for the first time with full approval of the U. S. Army through which all such copy must pass.

To meet the requirements of newsprint rationing, the Review-Journal has found it necessary to make cuts in the regular edition of the paper throughout the remainder of this quarter. The number of pages has been diminished, and the Thanksgiving issue, due tomorrow, is being eliminated entirely.

Because of these requirements, the number of BMI pictorials is necessarily limited. We suggest that if you desire to send a copy to friends, you read your own carefully and mail it on. There will be only a very few available for public sale.

L. V. Tribune 12-2-43

37 Original Basic Employees Still on Job

Two years ago the little group that was then B.M.I. moved from the hangar at Boulder City into the administration building at the Plantsite — one which burned down a few months later.

Of the group on the payroll December 1, 1941, 37 were still on the job just two years later. Two others who were then on the payroll of Basic Refractories are still there. They are Bill Christopher and Harley Lee.

Three more, now there but who were working away from the project two years ago, are Robert Schurtz, Donald Musser and Dr. Albert Boyle.

Others, in the order of seniority are: Max Muller, J. H. Brant, W. B. Dyer, H. W. Gale, Jr., F. V. Wetherill, Alvir Larson, J. J. Rutz, G. M. Dyer, Fred D. Gibson, Leona

L.V.R. Journal 12-7-43

Mass Meeting Is Set For Tonight

A mass meeting of BMI workers and other interested residents of this area, will be held tonight in the War Memorial building, Las Vegas, to discuss the proposed strike at Basic, a vote on which is scheduled to be taken December 22.

The meeting will get under way at 8 o'clock and will include discussion of the strike, the reason it is being sought, and the probable result if it is called.

Speakers from various labor groups are expected to take part in the forum, with many facts scheduled to be brought out which have heretofore not been revealed.

The meeting is open to the public.

BMI Area Has One Of Best Disposal Plants In West

The Basic Magnesium, Inc., plant and adjacent housing areas have one of the most modern sewage treatment plants in the southwest, which during the peak flow the past summer treated one and one-half million gallons of water a day.

The plant is the nineteenth one designed and installed by Ralph O'Neill, who now is superintendent of the water system at BMI as well as having charge of the sewage treatment facilities.

Two outfall sewers have been installed, one serving the 1800 housing units and the other leading from the BMI plant. There are 1000 houses in the Townsite proper, 500 in the FPHA area, and 300 in the Carver Park area. In addition the Basic Trailer park is served.

The two sewers lead to a point about a mile east of the housing area, where the plant is located. The sewers come together, and the sewage passes through a grit channel, where sand is removed. It then goes into a Parshall flume, where the total flow is measured. Solids are shredded by a comminutor, then settled and removed in a clarifier. The overflow is sprinkled onto the surface of a biological filter by a rotary distributor, where finely divided and colloidal solids are destroyed by aerobic bacteria. The filter distributor is propelled by jet action of the water. The entire plant is so arranged that in case of power stoppage, the plant goes automatically into gravity flow operation.

The plant has facilities for chlorination of the sewage at several points in the process for odor control and for final sterilization.

The gases from the digestion tank, which are mainly methane, are used to fire a boiler from which hot water is circulated through heat exchangers which reduce time required for reduction of the sludge from 95 days to 24 days. Waste gases are burned for odor control.

The plant is equipped with a complete sewage works laboratory.

Gravelle, T. W. Harris, Jerome Simpson.

Helene S. Eichaker, D. L. Wooster, Camille Zeldin, Elizabeth Keddy, E. H. Clary, R. E. Herrick, Paul T. Barnes, Jay C. Robinson, Stanley M. Smith, Samuel G. Lindsley, Clark S. Hardy, Ralph S. Lammie, John L. Love.

Russell F. Randall, Richard J. Heber, Evelyn G. Bruce, Genevieve Dahlquist, Joseph A. Pater-

noster, Asa R. Chase, A. L. Johnson, James Winston, Blanche R. Wyatt, Frank W. Gale and H. A. Raab.

L. V. Tribune 12-9-43

Basic Guard, Wife Sharpshooting Contest Winners

Myra Dodge, technical service employe at B.M.I., is the best proof that her sharpshooting husband, plant guard Marvin Dodge, is a good teacher. Mrs. Dodge has returned from Glendale, Calif., where she chalked up 399 out of a possible 400 score in the Pacific Southwest small bore rifle shot to add a cup and three more medals to the family collection of sharpshooting trophies.

Keen-eyed, steel-nerved Guard Dodge is a marksman of national repute. He has competed in shooting matches in many parts of the country, in pistol, small bore and high power rifle divisions.

Shooting has been a business more than a hobby for Mr. Dodge.

CONSTRUCTION BATTALION UNIT TO GO UP ON 600-ACRE TRACT

McNeil Construction Company of Los Angeles Awarded Contract for \$4,000,000 Project and Establishes Offices in Pleasanton

Following a visit of navy officials to Pleasanton last week, the navy moved swiftly to start to acquire title to a tract of land north of Pleasanton on which to begin erection of what is officially described as "a replacement and recuperation center for personnel of the construction battalion." Official, also, is the statement that \$4,000,000 will be the initial amount to be spent on the project, although semi-officially it was learned that in all probability the outlay contemplated by the navy may be several times that amount.

Exact Location Vague

So much of a surprise, in fact, was the move made by the navy that up to yesterday afternoon, so far as could be learned, not even the owners of the tract of land to be acquired had been advised that their property was to be condemned and then paid for in due time, according to an old navy custom.

Moreover, not even officials of the McNeil Construction Company of Los Angeles who moved into Pleasanton Monday and established offices here are sure just where the land is. All they know is they have the contract to build the center and that the tract, 600 acres, more or less, is north of Highway No. 50 and extends back toward the hills north of Santa Rita, which is about three miles north of Pleasanton. Where the east and west boundaries of the tract are is a matter shrouded in mystery. Some believe it is bounded on the east by the Tassajara Road, while others claim its eastern boundary is farther west than that road. It is believed, however, no matter where the east and west boundaries may be, or what size the tract may eventually prove to be, it is generally understood that it takes in part of the land known as the Dougherty tract.

Contractors Optimistic

Meanwhile, McNeil Construction Company officials, ensconced since Monday in temporary offices in the buildings at 409 and 411 Main Street in Pleasanton which formerly housed the ten-cent store and millinery store, are not worrying. Surveyors will soon show them where the land is, they say, after which work will be started on the project in earnest, following erection of an office building on the tract for occupancy by construction company officials.

According to Wm. Curlett, general manager of the project for the McNeil Construction Company, who heads the company's personnel now in Pleasanton, the problems involved in handling the \$4,000,000 contract, while of some magnitude, are not regarded as appalling by his company, which has just completed \$2,000,000 worth of Coast Guard installations at Wilmington, San Diego, and Santa Catalina, and is at present engaged

in building a \$100,000,000 magnesium plant at Las Vegas, Nev.

Construction Workers Needed

"We are, however, going to need a lot of help in the way of manpower," Curlett stated. "We want 2,000 men, and our personnel director, Ben Harwood, a member of our Pleasanton office force, is now placing advertising in Bay Area newspapers to obtain them. Our purchasing agent, A. L. Van Gorden, also a member of the staff here, is already making arrangements for materials and supplies. We plan to use as much local help as possible and patronize Pleasanton business houses every time we can. Already, in our office here, we have employed three assistants who live in Pleasanton, Mrs. A. R. Torrey, Mrs. John J. Amaral, and Mrs. C. S. Simonsen."

Year Required To Build

Structures to be built on the tract north of Pleasanton, Curlett states, will be of frame construction, and will include buildings to house a power plant, central heating plant, etc. The work already contracted for will require at least a year to complete, and if additional construction is demanded by the navy, a longer period will of course be required to complete the project.

No estimate is available at this time as to the number of men the project will accommodate when completed, although it is said the number probably will be in excess of 1500. This will be the first center of the kind to be established in the Pacific Coast area.

LAS VEGAS, REV. JOURNAL
OCTOBER 14, 1943

Traffic System Changed at BMI

Effective at 7 o'clock tomorrow morning, all passenger car stickers at the Basic Magnesium, Inc., plant will be void, and new stickers permitting traffic within the fenced area will be issued to a limited list of employees, according to an announcement made by H. G. Satterthwaite, general superintendent.

Service by the plant buses now operating inside the fence will be discontinued at the same time. Pony Express buses, on all trips between Las Vegas and the plant at shift change times, will enter gate three and will make two complete circuits through the plant. There also will be regular Pony Express bus service at shift change times between Anderson's Camp, Townsite, Victory Village, Carver Park and the plant. All local passengers will be serviced by these buses. Las Vegas buses will be reserved for through passengers only.

The Answer Hasn't Been Written Yet

In the early days of BMI, Howard Eells, Jr., then president of the company, used to draw glowing pictures of Las Vegas as "the Pittsburgh of the light metal industry." That was his vision, his firm belief.

Las Vegas went along with that picture and has kept it constantly in view. It is a definite possibility—one that CAN be realized IF we get the breaks.

Alongside that rosy picture, another has appeared. Nobody has painted it—it has come into being gradually, with circumstances generally wielding the brush. And it is NOT a rosy picture—in fact it is decidedly of the opposite hue. It shows the magnesium plant shut down and abandoned—just another "battleship" useless when the war is won.

You can take your choice and, as things stand at the moment, you might be right either way.

So far as the big plant itself is concerned, BMI has done an outstanding job since Manager F. O. Case took over for Anaconda. A production cost which will be competitive in the post-war era is in sight. Anaconda can make the plant go IF the Defense Plants Corporation gives the green light. Whether that will be forthcoming or not, remains to be seen.

The future of magnesium depends on the manner in which light metals become predominant in the years following the war. Their development has been one of the more important industrial results of the conflict. The question is whether the great capacity for production will be curtailed, once the war is over, or whether it will be used to the limit.

The Magazine of Wall Street, which is on top of all such questions, recently said in the regular section devoted to a discussion of events and trends "On The Industrial Front" has this to say:

"Government policy anent post-war use of its huge productive capacity for light metals is definitely hardening in favor of encouragement of far greater intra-industry competition. Intention is to promote wider use of aluminum through lower prices, if necessary by using government plants as a lever to break the existing price leadership.

"Magnesium poses a more difficult problem as considerable government capacity is uneconomical for peace-time production. But indications are that nothing will be allowed to dampen the impetus that war has given magnesium's progress."

The formula, then, appears to be getting the price down to a competitive basis. As we pointed out above, BMI is already in sight of that goal. More than that—the possibilities from the development of by-products is tremendous. The big question-mark is the attitude of D.P.C. toward making this a permanent industry and giving BMI the support and latitude necessary to bring this about.

So far, it's still a big question-mark, or worse, for admittedly there is nothing particularly encouraging on this score from Washington. Alcoa and Dow Chemical have been fighting BMI tooth and nail, seeing in it a dangerous competitor. And D.P.C. apparently listens.

Circumstances, such as development of world markets far beyond the wildest dream of present analysis, may compel a change in attitude or may demand the entire magnesium-producing capacity. There are many other possibilities, also. The final answer has not yet been written, nor is it in the immediate present. If the reverse were true in either case we would have cause for grave concern.

L. V. Age
10-15-43

Magnesium Pen Set Given Dr. Fletcher

On the eve of his return to England, Dr. S. J. Fletcher was presented with an unusual desk set at a Last Frontier dinner party. The handsome set, engraved, consisted of an alloy magnesium base cast in the BMI experimental foundry, and two pens. It was keenly appreciated.

The donors were English trainees and other associates and the party was given in commemoration of Dr. Fletcher's contribution to the building and development of this project. Present were: J. G. Boddy, H. Raab, W. McClintock, H. Hendrickson, F. Woodman, G. L. Lee, C. H. Mahoney, C. Martin, G. Dyer, A. Ellings, W. Holland, B. Harden, T. Turchan, C. Berry, F. Gibson, W. Koontz, R. Winn, C. Bassett, R. Hauser, A. Newell, F. McEntee, Jr., W. Hoover, J. Ruiz, W. Hoesch, P. Dolley, R. K. Lawson, and the guest of honor—The Bombardier.

LAS VEGAS, REV. JOURNAL
OCTOBER 13, 1943

War Dogs Aid in Guarding Plant

Nine "dogs for defense," trained for patrol duty with guards, have been loaned by the army for the duration to help safeguard vital areas and installations at the Basic Magnesium, Inc., plant.

The dogs—four Dobermans, two Great Danes, and three German Shepherds, were brought from San Carlos, California, recently by Sergeant Lisle B. Bordwell and Guard W. W. McAnally. The latter took an eight-week course of instruction at the dog reception and training center at San Carlos, and will further train the animals here and instruct guards in handling them. These are the first dogs used by a war industry in Nevada, and if the experiment proves successful, more dogs will be added at BMI, it was announced.

L. V. Age
10-15-43

Marine Fighter Is Basic Guard

Out of the service less than a month, ex-Marine Leroy Rockwell has joined the BMI plant protection guard force. Rockwell was sent back from the South Seas because of wounds and malaria. He saw a strenuous service there for eight months.

He was a machine-gunner with the raiders—the men who went in first—at Guadalcanal, Tulagi, and other Jap-infested islands. He is credited officially with 150 Nips who will fight no more.

Rockwell says he thought San Diego the most beautiful place in the world when his hospital ship came safely into port there. He must have thought the nurse who received him in the naval hospital the most beautiful woman, too, for he married her and brought her to Las Vegas. The former marine, who hails from Kewanee, Illinois, has three brothers in the navy.

L.V. R. Journal
10-29-43

Metallurgist Will Visit BMI Plant

Dr. Gilbert E. Seil, member of the war metallurgy committee, is expected to arrive here shortly to visit the Basic Magnesium, Inc., plant. He also will go to Gabbs to inspect the BMI properties there.

Dr. Clyde Williams heads the war metallurgy committee, which is composed of several eminent metallurgists who are assisting in the war effort. He also is head of the Patten Memorial Institute in Columbus, Ohio, where studies relating to the mining industry are conducted. Dr. Seil will report on his findings here to Dr. Williams and other members of the committee.

L.V.R. Journal
10-18-43

42 BMI Workers To Get Diplomas From War School

Forty-two employees of Basic Magnesium completing the first 32-hour course in metallurgy under the engineering, science and management war training program will be awarded diplomas tonight at Henderson school, Basic Townsite, by Jay Carpenter, director of the Mackay school of mines of the University of Nevada.

Basic Magnesium is the first war industry in Nevada to train employees for key positions within its own organization under the ESMWT program sponsored by the United States office of education and administered by state universities.

Two other classes in metallurgy are now being taught and another is scheduled for October 25. Instruction in metallurgy of magnesium will begin November 21.

L.V.R. Journal
10-28-43

Jay Carpenter Tells Importance Of Nevada Mining

The importance to the state of Nevada of recent mining and milling operations established in Clark county, particularly the Basic Magnesium, Inc., plant and the Manganese Ore company mine and mill were stressed here Tuesday by Jay Carpenter of Reno, dean of the school of mines of the University of Nevada. Carpenter was a guest speaker at the Las Vegas chamber of commerce meeting held at El Rancho Vegas.

Carpenter, who has made a tour of all facilities in this area relating to the mining industry, referred to the history of this area, dating from the establishment of the Union Pacific railroad and the building of Las Vegas, and the factors which have contributed to the phenomenal growth of the population.

Today Las Vegas "is primarily a mining center and is mainly supported by the mining industry, just as Virginia City and Goldfield were," Carpenter said. "This is difficult to realize because we see no mine shafts here and we hear no whistles blowing," the speaker stated. "Yet the Basic Magnesium plant which has doubled your population is simply the reduction plant and is dependent on mining just as though the mine were on your front door step."

He referred to the history of Nevada, which parallels the history of mining in the state, with fluctuation of population attendant to mining booms.

Matt Murphy, Nevada mining inspector, recently made a study of the number of men working in mining in Nevada, Carpenter said. His figures show that 57 per cent of the total now are employed in the production of magnesium or manganese, which makes Las Vegas basically a mining center.

Clark county now is credited with the largest population of Nevada, Carpenter said.

Nevada's most serious problem in the mineral industry today is now much of the last expansion in the mineral industry growth and production can be maintained in the post-war period, and Clark county is vitally concerned, he said. Much of the present mining activity has been abnormal, in response to war needs.

Greatest hope lies in the wisdom of the government to continue to provide these strategic materials and buy sufficient stockpiles in order to avoid disaster, Carpenter said. He pointed to the importance of the senate bill of Senator James G. Scrugham of Nevada, which would provide for stockpiling of such materials. Senator Pat McCarran of Nevada now is leading a group of western senators to form a block to fight for western industry, he said. By giving our support to other states, we in turn will gain support for ours, Carpenter said. Governor E. P. Carville of Nevada is cognizant of these future problems and has

ENGINEERING AND MINING
JOURNAL

"For over three-quarters of a century the outstanding authority of the metal and non-metallic, milling, smelting and refining industries."

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OCT 1943

Alexander H. Kingard is now employed as chief engineer and manager for Compania Minera del Gran Oeste at that company's tungsten mines in Lower California, Mexico. The company employs about a hundred men. Previously to his present professional work Mr. Kingard was with the McNeil Construction Co. as construction engineer for its Basic Magnesium project at Las Vegas, Nev.

MINING JOURNAL
PHOENIX ARIZ.
10/30/43

James E. Sellers, who resigned recently as chief engineer with the War Production Board, is connected with the "Amboy" Chemicals, 106 South Marguerita, Alhambra, California. The plant operations of the company, which Sellers organized, are at Amboy, California. "Amboy" Chemicals is reported to have a contract with Basic Magnesium, Inc., for 60,000 tons of rock salt for Basic's plant at Las Vegas, Nevada. The company at present is working out details for establishment of a chlorine plant at Fontana, California, to utilize waste gases from the plant of the Kaiser Company's Iron and Steel Division, in the treatment of dolomite.

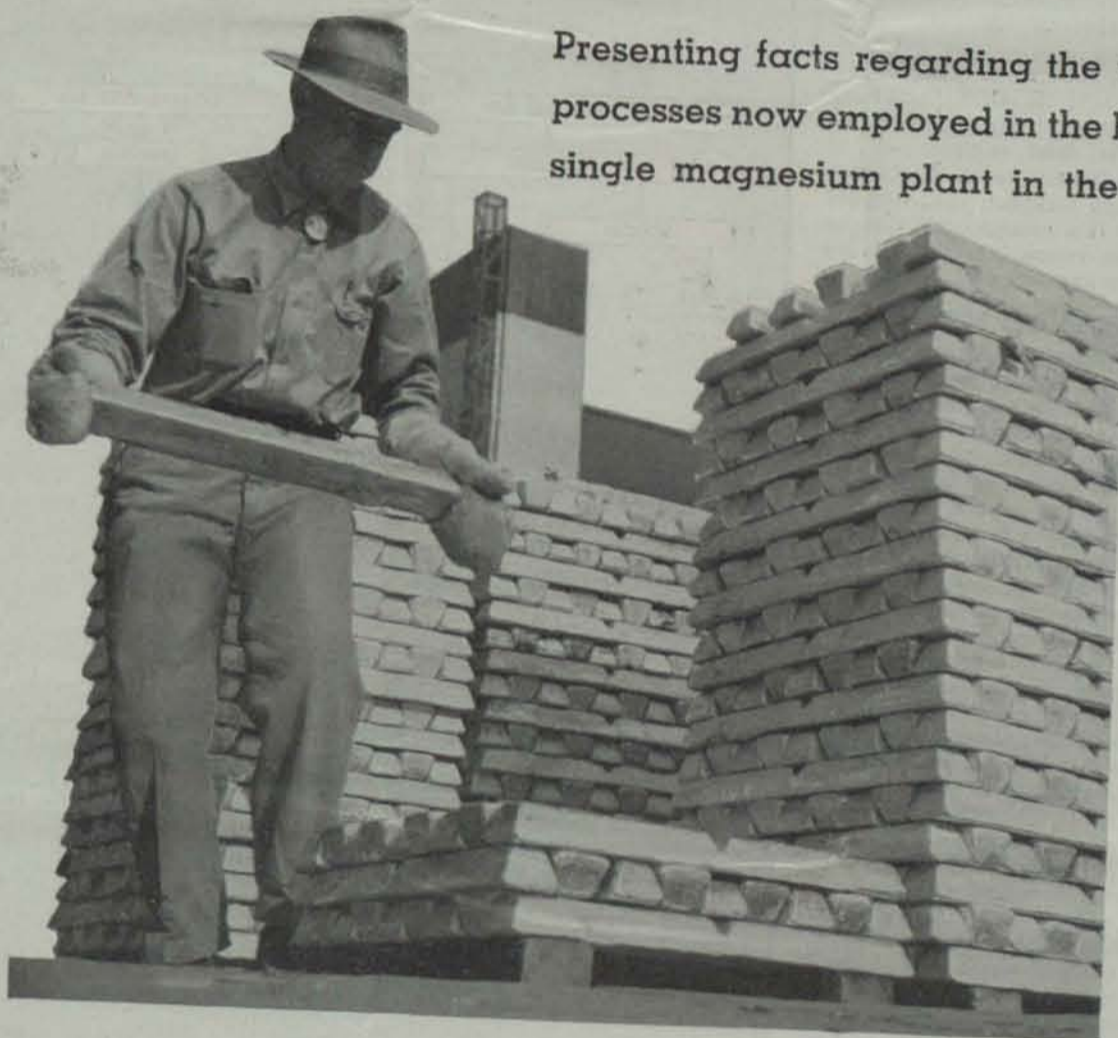
started a program of economic conferences to pave the way toward future prosperity in Nevada.

He urged completed support of such constructive programs by the people of Nevada in order to insure continuance of industry and mining so vital to the state.

MINING AND MINING
JOURNAL
"For over three-quarters of a century the outstanding authority of the metal and non-metallic, milling, smelting and refining industries."
McGraw-Hill, 330 W. 42nd St.

THE WHY AND HOW OF BASIC MAGNESIUM

Presenting facts regarding the unique processes now employed in the biggest single magnesium plant in the world



SOUTHERN NEVADA, at first glance, appears to be populated at present largely by soldiers, fero dealers, and employees of Basic Magnesium, Inc. In fact, BMI, as they call it down there, takes up more space, is the subject of more gossip, has cost more money, and actually turns out more metal than any other one magnesium plant in the world.

It was reported in August to be operating at about 100 percent of capacity. To give you an idea of what this 100 percent means, BMI at full capacity produces over twice as much volume of metal, measured in cubic feet, as one of our larger open-pit copper mines. Furthermore, consider that BMI represents only a part of our magnesium production capacity, and you will begin to realize the magnitude of this new industry of ours.

R. H. Ramsey
Assistant Editor

Basic Magnesium, Inc., was originally the corporate result of a union between Magnesium Elektron, Ltd., chief British producer of magnesium, which was to furnish the technical know-how, and Basic Refractories, Inc., a Cleveland, Ohio, firm headed by Howard P. Eells, who was to supply the raw material and direct the enterprise. Defense Plant Corp. financed the deal whereby a magnesite deposit in Gabbs Valley, Nevada, owned by Basic Refractories, Inc., would be developed, and a reduction plant erected on a site convenient to Boulder Dam power. The contract was signed on Aug. 13, 1941; foundations were being poured in November; and in

August, 1942, magnesium ingots were being produced. Construction work was largely handled by McNeil Construction Co., of Los Angeles, although MacDonald Engineering Co., Engineers, Ltd., and Fritz Ziebarth, assisted in setting up power lines, pipe lines, reservoirs, and in other jobs.

Plant design was directed by two MEL technicians, Dr. S. J. Fletcher, chief chemist, and J. R. Charles, chief engineer, of the British company. At first, Charles and Fletcher were asked to design a plant to produce about 45 tons of magnesium daily, but no sooner had they completed this design than they were asked to more than triple this output. In three months these men did a job that might reasonably have occupied a year.

Following the first production of magnesium in August, 1942, however,

October, 1943—Engineering and Mining Journal

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CHEMICAL & METALLURGICAL
ENGINEERING

"The Monthly Magazine of the Process Industries"
McGraw-Hill, 330 W. 42nd St., New York

MAGNESIUM

Production at the World's Largest Plant

ROBERT H. RAMSEY Assistant Editor, Engineering & Mining Journal

Chem. & Met. INTERPRETATION

We have all heard rumors and stories about that plant out in Nevada—Basic Magnesium, Inc. Some have been exaggerations while others, sounding fantastic, have been understatements. In order to get the true story for its readers, our sister publication, *Engineering and Mining Journal*, sent Mr. Ramsey out to Las Vegas last May. His account of construction and operations at BMI appeared in the October issue of *E.&M. J.*, pp. 61-67. The following description is largely abstracted from Mr. Ramsey's article.—Editors.

SOUTHERN NEVADA, at first glance appears to be populated at present largely by soldiers, fero dealers, and employees of Basic Magnesium, Inc. In fact, BMI, as it is called down there, takes up more space, is the subject of more gossip, has cost more money, and actually turns out more metal than any other one magnesium plant in the world.

Everything about BMI is colossal. It uses all the power Boulder Dam can spare, all the men it can get, all the electrical equipment three of our largest companies could manufacture, and it is still growing, although BMI was reported in August to be operating at about 100 percent of capacity. To give you an idea of what this 100 percent means, BMI at full capacity produces over twice as much volume of metal, measured in cubic feet, as one of our larger open-pit copper mines.

It must be admitted, however, that although both Canada and the United States produced some magnesium metal as far back as 1918, Germany has until recently led in magnesium production and technology, chiefly because magnesium is one of the very few metals Germany possesses within her borders. Alloys of magnesium were used by the Germans in the first World War and were manufactured afterward by I. G. Farbenindustrie under the trade name of Elektron alloys, a circumstance to which Basic Magnesium, Inc., owes its existence.

Major C. J. P. Ball, a British officer, became interested in these alloys during the war, and for years thereafter he worked toward forming a company

to produce them in England. In 1936 he was successful and Magnesium Elektron, Ltd., was formed, a company which was able to purchase German patent information and which had the benefit of German experience in magnesium production. At present the big MEL plant near Manchester accounts for about 80 percent of English magnesium production.

PLANT HISTORY

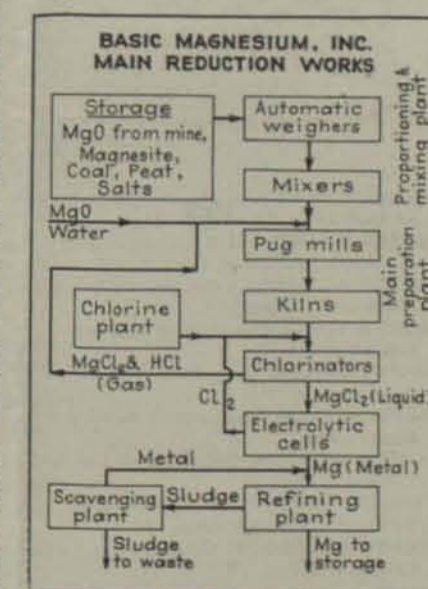
Basic Magnesium, Inc., was originally the corporate result of a union between Magnesium Elektron, Ltd., who was to furnish the technical know-how, and Basic Refractories, Inc., a Cleveland, Ohio, firm headed by Howard P. Eells, who was to supply the raw material and direct the enterprise. Defense Plant Corp. financed the deal whereby a magnesite deposit in Gabbs Valley, Nevada, owned by Basic Refractories, Inc., would be developed, and a reduction plant erected on a site convenient to Boulder Dam power. The contract was signed on Aug. 13, 1941; a crew of men went into the desert to cut the sagebrush off the proposed plant site in September; foundations were being poured in November; and in August, 1942, magnesium ingots were being produced. Construction work was largely handled by McNeil Construction Co. of Los Angeles, although several other firms assisted in setting up houses, pipe lines, and other jobs.

Plant design was directed by two MEL technicians; Dr. S. J. Fletcher, chief chemist, and J. R. Charles, chief engineer, of the British company. Accompanied by some 3,000 drawings and specification sheets, these two men

left England in May, 1941, on a ship which was torpedoed and sunk in Mid-Atlantic. Fletcher and Charles were picked up by other ships in the convoy, but the drawings were lost. Upon arrival in Cleveland on June 3, they cabled to England for microfilm copies of the entire set, the first of which arrived by special bomber on June 7.

At first, Charles and Fletcher were asked to design a plant to produce about 45 tons daily of magnesium, but no sooner had they completed this design than they were asked to more than triple this output. Naturally this involved more than multiplying everything by three and the result was an enormous amount of work handled by these two men under the greatest possible pressure. In three months these men did a job that might reasonably have occupied a year in ordinary times.

Following the first production of magnesium in August, 1942, however, the output of metal did not come up to expectations. Although the story of what actually went on during BMI's early operations would undoubtedly be a most interesting one, it has never been completely told and will not be told here. Whatever the cause, the effect was that on Oct. 26, 1942, Anaconda Copper Mining Co., at the invitation of governmental agencies assumed direction of BMI by buying



Marvels Of BMI Plant Described After Tour

ROSEBOWL PIGSKIN TO WAR



Frankie Alberts, left, great Stanford quarterback, now a lieutenant in the Navy, is shown "passing the ball" in a new kind of play. He turned in one of his prized possessions, the football used in the Indians' victory over Nebraska in the last Rosebowl game, to a Gilmore dealer, to be sent to service men on some "fighting front." Alberts was doing his part in the drive for equipment to give our fighters some much-needed recreation. Play equipment left at any Gilmore station will be given to the Army, Navy and Marine Corps.

By FLORENCE LEE JONES
I've just made a tour of the Basic Magnesium, Inc., plant and felt like a modern "Alice in Wonderland." I was led into tunnels, up flights of stairs, into huge buildings, onto elevators, and saw mazes of conduits carrying power cables, a big building filled with marvels of electric equipment all operated by remote control and not a single person inside the structure, millions of dollars worth of silver doing a commercial job for Uncle Sam, and finally watched strange little vehicles operated by women drivers carrying the finished products—shining magnesium bars—to the loading platform ready for their war job.

Gabbs is about \$150,000 per month.
After our interview, we meet our guide for the day. He is instructed to show us "everything," and we start out in an automobile to make our tour. We travel over oiled highways from one big installation to another.
We learn the startling fact that about 40 per cent of the gigantic project is underground, and proof comes at our first stop. This big building is known as the electric control house. Outside we see the huge power cables leading to the plant from Boulder dam and Parker dam. Inside is a control room which looks as though it might have been lifted from the great Boulder dam power house itself. A huge wall drawing shows the intricate power system for the entire BMI plant, with power lines, booster plants and all the electrical system necessary for the magnesium production.

Weary at the end of this six-hour excursion, I could think only, "What a lot of trouble to go to just to produce a tiny piece of magnesium." Then I realized how the enemy must feel as the Allied planes fly over their cities and factories, dropping magnesium bombs which spell total destruction and represent so much effort from thousands of workmen far out on the southern Nevada desert.

Vegans Unacquainted
Even the people of Las Vegas, who can stand on the porches of their homes at night and see the bright cross of lights on the hill where three years ago only sand and sagebrush covered the desert, do not realize the full magnitude of this great giant of industry. Restrictions on visitors have resulted in a lack of acquaintanceship with the big plant by the people whose lives have been so vitally affected by the construction of the project.

So come with me on this tour to see the great BMI plant.
We arrive after driving through Las Vegas, Whitney, and Pittman, all of which have grown beyond anyone's dreams of a few years ago, just because the big industry was established on the long hill which used to be a mere speedway between Las Vegas and Boulder City. Even the double-highway leading to the project has the BMI stamp of progress on it.

We stop in the parking area near the personnel building, where a guard directs us to park our car and report to a certain office. Inside, two guards stand behind a desk and at their backs is a sign warning visitors that they enter the plant at their own risk. A sign on the wall reads "A copy of the form which we are required to sign before entering. The guard courteously requests that gloves be removed so we can tear off an attached stub from our permit and states that "we have to have your fingerprints, you know." He telephones to the plant protection headquarters to confirm our identity and our appointment. We receive a sheaf of papers, pass through a turnstile where there are more guards and walk to the administration building.

Inside the long rambling building containing hundreds of doors and windows, we are greeted by usherettes presided over by Mrs. Ruth Lausch of Las Vegas. They extract one of the sheets from our credentials and send us finally to the office where our real tour begins.

Inside BMI Gates
This procedure seemed like a lot of trouble too, but every American can be glad that it is so difficult to enter these barriers where so much vital war material is produced to help lead the Allies to victory.

Our host signs our credentials to show we actually carried out our announced plans. He gives us a copy of "Welcome to BMI," a pamphlet sent to prospective plant employees telling of some of the problems and kind of job they can expect.

Before our tour starts, we are taken to the office of F. O. Case, general manager, for a short interview on the progress of the plant. He pays tribute to faithful employees, who realize the importance of their jobs and carry on day after day, no matter what their personal problems may be. He tells us the production of magnesium is a "continuous process," and that the plant has been in full production since August 1, 1943.

The plant runs 24 hours per day around the calendar, observing no holidays. At present there are approximately 5440 employees at the BMI plant itself and about 500 at Gabbs, where the magnesite ore is produced. The monthly payroll at BMI is approximately \$1,000,000, and at

There is a testing laboratory for electrical instruments used all over the plant. Here workmen bring removable parts to repair them. One cabinet contains special portable testing equipment to be taken to the various units for use on the spot.
We learn that the electrical installations for the plant cost \$35,000,000 alone, a major project within itself. Some of the largest transformers in the world are in the main switch yard, comparable to the Edison company's switch yard at Boulder dam.

Tunnel for Cables
Through this tunnel pass conduits carrying power cables. Branching off from this tunnel are conduits leading to each of the big metal units where the magnesium is electrolyzed.
There is a testing laboratory for electrical instruments used all over the plant. Here workmen bring removable parts to repair them. One cabinet contains special portable testing equipment to be taken to the various units for use on the spot.

On our tour we pass sub-stations and booster plants which send power all over the project.
We make a wide swing around the plant to come to big ponds at the extreme west end of the plant, where waste solution is stored temporarily. However, a new plant has been constructed and will result in the reclamation and utilization of the materials in these ponds.

We pass a 750-foot redwood cooling tower, which is reported to be the largest structure of this kind ever built. Its purpose is for cooling circulating water used in the process.
We drive by peat moss beds, which extend for almost a mile along the western border of the fenced area. Here guards are on constant patrol, watching for the start of a fire from the highly combustible material. Crews are busy with hoses, spraying water over the peat moss to keep it near its native water content and prevent spontaneous combustion from the drying which results in this arid climate.

We see the strangest buildings on the project, typical of the English lineage of the plant, which were intended for the peat storage. Their use in the English plant, after which the BMI project is patterned, was successful, but the desert climate and the peat moss were not compatible in an enclosure, officials found, so the outdoor pits are used instead. The two huge buildings, with sharp triangular roofs, intended for this purpose have been converted into warehouse space for the "construction and acquisition" department.

Coal for Process
We see the big storage for the coal brought from Carbon county, Utah, for use in the magnesite plant.
In the "caustic area," where everything is gargantuan, we see where the salt is mixed with water and goes into "raw brine" tanks. We learn a new word, "clariflocculator." We aren't sure of its meaning, except that it is part of the process for the brine. From the clariflocculator, the brine goes into sand filters and turbo mixers to meet the standards of the finished brine.

We see railroad cars loaded with fine white powdered magnesite from Gabbs, which has been shipped directly to the plant. Inside is a workman operating a gigantic "vacuum cleaner" which picks up the "powder" and carries it in a hose to silos, where it is kept until it is ready for the process. Trucks are unloading the same materials into silos. Some of the railroad cars are placed over openings into underground storage units, into which the contents of the car are released.

We are in what has been dubbed by workmen as the "dust bowl" of the plant. A cloud of fine particles fans out overhead and is whipped by the wind, but even some of this dust is recovered from the atmosphere by huge blowers and is stored for use. Peat moss is pulverized in this area, as is the coal.

The magnesite, peat moss, and coal, in their pulverized form, are automatically weighed and are carried into the preparation building by a big belt conveyor to a gigantic mixing trough in which paddles rotate and knead the material as the liquid factor is introduced. The ingredients become a gray mud which moves along a screw conveyor to an exit point where it is ejected in the form of briquettes.

In the next step, the briquettes go to tunnel kilns, where the moisture is dehydrated. In the room where this process is in operation, there are big "dust conveyors" which suck the particles into tubes and convey them to silos for future use. We see huge banks of batteries required in the complicated process. A loud whistling noise drowns words in this building.

Pellets and Briquettes
From the kilns the mud briquettes go into a cooler and come out a dark gray color resembling lava. Pellets produced from the same material are almost feather weight when handled. The pellets fall into large cubicles carried on trailers to which are linked little "jeep" engines. Seven or eight of these cubicles, each containing about 1000 pounds, are pulled by one engine. The pellets, now cooled, contain magnesite, coal, peat moss, and concentrate.
Chlorine, produced from the salt brine by electrolysis, is wait-

ing for the pellets when they are hauled from the preparation building to the chlorinator buildings. The pellets are put into the top of a huge chlorinator or electric furnace, into which chlorine gas is introduced, and subjected to intense heat. The molten mass then becomes anhydrous magnesium chloride. There are eight of these three-story high chlorinators in each of the 10 metal units.
There are 10 cell buildings, all duplicates of the original plant in England after which this project is fashioned. In these buildings are the silver bus bars taken from the vaults of the United States treasury and now guarded by 22 men representing that federal agency. We expect to see \$23,600,000 worth of bright shining silver, but we are disappointed. We see instead heavy bars, held by huge bolts, all painted a dull red. The only difference between the copper bus bars and the silver ones is that the precious metal is stamped with the letters "USA." A silver guard explains that the "anodes have to be taken out sometimes, and we have to be there to guard the silver." Every particule of silver dust is carefully preserved.

The anhydrous chloride is tapped in the liquid state from the chlorinators into large iron cubicles mounted on small trucks. The trucks transport the liquid magnesium chloride from the chlorinators to electrolytic cells where it is subjected to electrolysis which causes the magnesium to rise to the top like cream on milk. It is ladled off and poured into molds. When cooled, these become "magnesium cheeses." They weigh from 65 to 90 pounds each.

Refining Process
After cooling, these cheeses are removed to the refinery, where they are alloyed and refined, then poured into ingots, billets or slabs. In each of the refineries are melting furnaces, where

the "cheeses" are melted. Automatic casting machines are to convert the metal into ingots about 22 inches long and three inches wide.
The magnesium ingots, weighing about six pounds, drop down a slide from the automatic casting machines, where workmen and checkers stack them onto small cars. This finished product is now ready for its final stage. We see a woman driving a strange electric jeep, with a lift on the front for the load, wheel her vehicle into position to receive the magnesium bars. She drives the jeep out into a spacious room, where many women are employed. She drops her load and leaves for another.

Women then handle the bars, wrapping and stacking them on the loading platform, where they are ready to be placed in a railroad car to be shipped out for use in making airplane parts and for conversion into incendiary bombs for Hitler's displeasure and discomfort.
We drive past change houses provided for the workmen, canteens operated by the Anderson Brothers Supply company of Nevada, Inc., where hot food is available, we pass one of the most complete electric repair shops in the nation, we see a brick plant, we see storage for salt, we pass huge caustic tanks lined with nickel, we see a tremendous boiler house... all this essential but incidental to the main magnesium process.

We enter a huge building known as a "rectifier room" and learn there are five more just like it, plus four motor generator rooms. Everything is automatic within these buildings which distribute and control the power required for the various units. We go into a long tunnel leading from this building and see some more of the underground BMI. We do not see a single person in this big structure, and we have a strange feeling for the magnitude of man's imagination and ingenuity.

Our tour is ended. We check back at the administration building, through the turnstile, and then to the personnel office, where our last credential, duly signed, is returned. We leave a little world all its own behind us. That is the modern "Alice in Wonderland" world, and we are going back to reality.



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BMI Water System Is Described Today

By FLORENCE LEE JONES

Water from the clear, blue depths of Lake Mead is aiding the allies in the defeat of the axis by supplying the needs of the Basic Magnesium, Inc., plant and providing for the personal comfort of the workers and for their gardens and lawns at their picturesque homes on the hill overlooking the project.

Under ordinary circumstances the water system would have been a major project within itself. In fact, for many years studies had been made of the practicability of pumping water from Lake Mead into Vegas valley. Then under pressure of World War II, with the construction of the BMI plant speeded up beyond imagination, the installation of the water system passed with small notice. Now with a constant supply, meeting the varied requirements for the big magnesium plant, the Manganese Ores company properties, and the housing units of the area, the water system is almost "taken for granted."

Project Extensive

So vast is the project that it takes several hours to visit the various installations, and only a privileged few are permitted to see all the intricate workings of the system. These must be escorted by an official and make known their definite purpose. Guards are stationed at every point. They scrutinize passes, record the information, and note the time of arrival and departure of all escorted parties. At night "war dogs" and their masters, who are specially trained guards, are on patrol.

Ralph O'Neill, superintendent of the water and disposal systems for Basic, who has had a wide background of experience in such facilities, pointed out the huge amount of work to be done, investigations to be conducted, and design to be completed before any part of the construction could be started.

Cantilever on Island

Most spectacular of the various installations is the huge cantilever at Lake Mead, which appears to be a steel bridge. This structure was built on an island, extending from a cliff on the north side and facing the main body of the lake. It has a total length of 386 feet, and the unsupported projection of the cantilever is 233 feet.

At the end of the structure are six intake pumps with 18-inch columns 196 feet long, which extend deep into the lake. The seasonal variation in the water level at Lake Mead made necessary the length of these pump columns.

In the large room housing the turbines which operate the pumps the architect took cognizance of the magnificent view and designed a huge circular window which frames the blue water of the lake, with Fortification Mountain and the Paint Pots in the background on the opposite shore. An "iron-railed deck" is another indication of his appreciation of the natural beauty of the setting. As one walks around this deck there is a feeling almost of being aboard ship, except the swaying motion is absent.

Valve Installation

From the esthetic to the purely practical aspects of the cantilever, one observes a lower deck where valves are located and utility installations are placed.

All equipment is automatically controlled by an automatic telephone system from the booster reservoir. No operators are required at the cantilever, and only occasional oiling or maintenance work is necessary.

The huge 400-horsepower motors make a singing noise when they are in operation. Under average conditions the pumps can lift 31,000,000 gallons of water per day. Surge suppressors installed at the intake protect the pumping equipment against excessive shock.

A control house stands alongside the cantilever and houses electrical equipment which operates the pumping units. A large control panel, completely automatic, a battery room, and a room for the guards are included in the structure.

Pipeline Through Causeway

The huge pumps force the water into a 40-inch pipeline, which runs through the causeway that connects the cantilever island with the mainland, and about one and one-half miles inland. The water is lifted approximately 150 feet to a million-gallon reservoir at the booster pumping plant. All the pipe is of heavy steel and is welded. The heaviest pipe section has a wall thickness of nine-sixteenths of an inch.

At the booster pump station more guards await and more gates must be unlocked to admit the visitor. The mammoth reservoir is concrete lined and has a

wooden cover to control algae. Alongside the reservoir is a big well which contains a float switch for each of the pumps located at the lake. When the water drops in the reservoir these float switches turn on the pumps about two and one-fourth miles away. To prevent shock from surge, the pumps start up in measured sequence and are turned off in the same sequence.

Big Control House

An all-concrete, modern styled two-story building is located at the foot of the hill near the reservoir. Inside are control panels which are duplicates of those at the cantilever control house.

In the building are six horizontal centrifugal pumps, each having a motor of 1250 horsepower, which lift the water 625 feet and send it on its course to the terminal reservoir above the BMI plant. Float switches at the terminal reservoir turn on these horizontal centrifugal pumps in measured sequence.

Power to supply these units and keep the equipment in operation comes from Boulder dam to a substation at the BMI plant. An overhead line leads from the sub-station to the booster pump station, where another sub-station is located. From that point the power is carried by underground conduit to the intake pumping station.

Surge Suppressors

As one of the big centrifugal pumps automatically starts, the surge suppressor attached to the pump goes into action. A pressure gauge on the wall records every surge wave between the terminal plant and the booster pumping station. A Ventura meter on the wall records the amount of water taken from Lake Mead, and from this chart is tabulated the cost of water controlled by the Colorado river commission.

From the booster pumping station the huge pipeline has been laid across the mountains toward Henderson. Tremendous cuts through solid rock were necessary along much of the route. A dirt road leads along the route to permit access for maintenance of the line. Air valves are located at the crests of hills, and surge suppressors are spaced at intervals all along the line. Some of the pipe is exposed where it crosses deep gullies, but for the most part the line is underground.

2 Big Reservoirs

The pipeline leads to the two terminal reservoirs which are located high on the big hill above the townsite. These huge concrete-lined open tanks have a maximum capacity together of 34,000,000 gallons. For the Henderson water supply, water is pumped into six 50,000-gallon redwood tanks to maintain water pressure. This comes from the treatment plant.

Armed guards are stationed in high lookout towers within the fenced area of the reservoirs, and all visitors are met at the gate by a guard, who examines credentials.

To control algae in the big reservoirs, a small amount of copper sulphate is fed into the water as it flows from the pipes into the reservoir. The copper sulphate is precipitated out of the water in the tanks.

The water treatment plant is located beside the terminal reservoirs and is modern in every respect and largely automatic. Water is filtered, stabilized and softened in this building.

Chemical Action

For the established water the only chemicals used to precipitate the calcium and magnesium are caustic soda, a by-product of the BMI chlorine plant, and aluminum sulphate.

From each reservoir a big pipeline leads into the plant. A valve has been installed which will allow the operator to by-pass the treatment plant if an emergency arises.

An automatic valve admits just the amount of water into the plant that is being dispersed through the water system.

All of the water is passed through two reaction tanks, each of which has a self-contained flocculating device. It then passes through a battery of eight rapid sand filters, and the water for general use passes on to the stabilized water reservoir. Solids are removed from the water in the sand filters. In this state of

treatment the total hardness of the water is reduced to less than 40 per cent of the hardness of the raw water from Lake Mead and is comparable to the quality of the domestic supply in most cities.

Several feeders have been installed in the plant to provide for introducing chemicals in the water if needed. Chemical tests are made every two hours and bacteriological tests are made at frequent intervals.

Automatic Chlorinator

The very latest type of chlorinator in use in water treatment plants has been installed here. It works automatically from a master meter and feeds a measured amount of chlorine into the water.

Chlorine gas from the BMI plant is used. Caustic soda, a by-product of the chlorine plant, is pumped to the water treatment station. For the production of zero hardness water, the stabilized water is passed through Zeolite cells and thence to a stabilized water reservoir. For the regeneration of the Zeolite, salt brine is pumped from the BMI chlorine plant and through a pressure filter before use.

Stabilized water is used generally throughout the BMI project. Zero hardness water goes to the boiler plant and a few other points in the magnesium plant which require this type of water. Tempered water for domestic use, a mixture of zero hardness water and stabilized water, is blended through automatic mixing valves, and the hardness is held at approximately 65 parts per million, which is ideal for domestic uses. A small booster pumping system supplies the water to the housing area at the required pressure.

Complete Laboratory

The water treatment plant is equipped with a complete laboratory, in which routine chemical and bacteriological determinations are made for the control of the treatment process.

Pipelines lead from the water treatment plant to the BMI plant. Within the plant there are four complete water systems. One is for stabilized water, one for zero hardness water, one for domestic water for drinking purposes, and one for recirculation to reclaim clear water which otherwise would be wasted from the plant process.

In the office of Superintendent O'Neill in the water treatment plant are recording devices which give him information on conditions all through the extensive water system from the intake cantilever to the booster pumping station, along the pipeline, and within the treatment plant itself.

Plant Costs \$700,000

The cost of the treatment plant was approximately \$700,000, which O'Neill states is less than the cost of most plants of comparable size and capacity built in peace times.

Only 16 men are required to operate the water system treatment plant on a 24-hour basis. O'Neill has a complete organization of men above military age, and of these about one-third had overseas duty in World War I, and most of the others are former service men, he stated. He trained his personnel in their respective duties, as almost no men with experience in such work were available for this job.

The history of the water system dates from early in the fall of 1941, when a contract was let with the J. M. Montgomery company for design and with Engineers, Ltd., for construction. Before any work could be done, considerable investigation and design was necessary.

History Recalled

Meantime, the McNeil Construction company was employing hundreds of people to build

the magnesium plant, and water was needed for the project and personnel. It was necessary to haul water from Las Vegas by rail. The water was emptied from tank cars to the six 50,000-gallon redwood tanks now used for storage for the residential area. Under this first plan, water was distributed over the project through temporary mains.

While the project was dependent on this temporary supply, the disastrous fire which destroyed the administration building occurred in March, 1942. Shortly after the fire temporary facilities from Lake Mead were put into operation.

The first work started by the water system contractor was the trenching for the 40-inch pipeline. Much of the work was done in solid rock.

For temporary use inlet pumps were placed on a barge in Lake Mead, which discharged water into a tank on the shore. Large booster pumps then lifted the water into the 40-inch pipeline and carried it to the big reservoirs as soon as they were completed.

Supplies on Barge

Meantime the big steel cantilever was being fabricated and then was erected by the American Bridge company on the island in Lake Mead near Hualapai Beach. A causeway connecting the island with the mainland was being built by Engineers, Ltd. First supplies for the intake equipment were taken to the island by barges while the causeway was under construction.

During the summer of 1942 the Peerless turbine pumps were installed on the cantilever, and the Byron Jackson centrifugal pumps were placed in the booster pumping station.

By the time the first metal unit went into operation at the BMI plant in September, 1942, an adequate water supply had been provided through the permanent system. O'Neill reports there never has been a time of water shortage in the area served since April, 1942.

In addition to supplying the BMI plant and all housing units adjacent, the water system provides water for the Manganese Ores company, where a million-gallon water storage tank has been installed.

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Taxpayers Benefit Because of BMI

Jay Carpenter, Bureau of Mines Head, Tells of Advantages to State

By Jay A. Carpenter, Director of the Nevada State Bureau of Mines
Basic Magnesium is outstanding in the entire history of Nevada for

- First: Being the largest single investment of capital in a mining and metallurgical plant;
- Second: Being the largest daily consumer of electrical energy of any metallurgical plant;
- Third: Being the largest employer of labor both as to number and payroll;
- Fourth: Being the first producer in the field of light metals;
- Fifth: Being one of the largest monthly producers of metal in dollar value on record, and
- Sixth: Being assessed on its property for the largest sum of any mining venture known to our tax records.

To the resident of Nevada, it means an increased pride in and benefit from a growing, prosperous state with a substantial saving in his state tax bill due to the huge addition to the tax roll by the BMI property.

The interesting story to substantiate the above statements follows, being taken from a recent review of the state's mineral industry problems:

When mining thrives in Nevada, ranching and cattle raising thrive through finding home markets, and there is a general prosperity in the towns.

In early years Nevada's mining industry paid a large percentage of the taxes but in the succeeding decades the assessed value of agriculture and ranching increased more rapidly than that of city property, then in time the public utilities assumed the largest share of the taxes, especially railroads.

An analysis of the state tax levy for 1943 shows an increase from a total tax valuation of \$221,000,000 in 1942 to \$241,000,000 in 1943, a striking increase with over half of this due the Basic Magnesium, Incorporated plant at Las Vegas.

Of the \$241,000,000, \$90,000,000, or three-eighths is assessed against the railroads and the public utilities. The next largest division is city and town real estate and improvements accounting for \$40,000,000 or one-sixth, while mine plants and improvements amount to but \$13,000,000 or only five per cent. However, the Basic Magnesium, Incorporated plant in Clark county is listed as a county improvement and not under mining as are the mills and smelters located at the mines. Including Basic Magnesium, Incorporated in mining it would raise the assessed value of mining plants and improvements to ten per cent. In addition the assessed value from net proceeds or profits of the mines for 1943 will total about \$10,000,000 more, thus giving mining as a whole about fifteen per cent of the state's tax burden.

It is interesting to note that Washoe county has the largest assessed value of \$50,000,000, but that in '43 Clark county has stepped to second place with an assessed value of \$42,000,000, doubling in amount since '41, or in two years time.

The importance to Clark county and the state of the Basic Magnesium, Incorporated, and the Manganese Ore Company's plants is very evident as they form nearly one-half of the taxable value of the county, and one-tenth of that of the state. If these plants are forced to cease operation after the war there will be a serious question as to the valuation to be placed upon them for assessment and as to Clark county's ability to balance its budget.

Another method of estimating the importance of the mining industry to the state is on the basis of the number of men employed in the industry.

Our state mine inspector, Mr. Matt Murphy, has published a list of mines operating on September 1, 1943, giving the number of their employees as 11,425. In Utah a very careful analysis has been made of all labor in the state. There is dependent on each miner for family support two and a half individuals. Now Utah is known for its belief in marriage and large families. Suppose we then figure that in Nevada there is only one dependent for each worker, thus giving about 23,000 directly dependent on mining and metallurgical plants. The Utah study found that three other persons were dependent for a living on each of the mining population, such as store keepers, professional men, amusement men, including their families. For the 23,000 directly dependent on mining there would be 69,000 dependent upon these mining people, or a total then as an estimate of 92,000 people of the state's present population of about 140,000, or nearly two-thirds of the population of the state directly dependent upon the mining industry.

WITH MAGNESIUM
Of this figure of the 11,425 mining employees fifty-three per cent were concerned directly with the mining of magnesium ore and its

reduction to metal—an industry built up almost since 1939!

The Basic Magnesium, Incorporated, plant at Las Vegas accounts for 5600 or nearly fifty per cent of the total mining employees and thus accounts mainly for the rapid growth in population of Clark county and its possible closing down at the war's end would likewise jeopardize the livelihood of two-thirds of its people.

With this data given you on the state's rapid growth of mining population and mineral output, you can realize that Nevada's most serious mineral industry growth and production can be maintained in post war years, and thus avert another depression period. This is especially applicable to Clark county.

ABNORMAL NOW

Much of the present mining activity is abnormal and in response to war demands. In 1910 to 1920 when the state had a population of 80,000 people, which had then doubled since the period of depression from 1890 to 1900, it was due to the rapid development of the large gold and silver mining camps such as Tonopah, Goldfield, Rochester, Wonder, and a dozen others. The mining of strategic metals such as tungsten, mercury, and manganese had a modest beginning in 1918 during the last World War. The present deposits of magnesium ore were not even located. Today magnesium mining represents one-half of the mining and metallurgical employment of the state, with copper one-fourth, while gold and silver mining is now but a minor per cent of the total, due in part to the closing of many of those mines by government edict.

Will gold and silver mining take up the slack in the immediate post-war period? No—even with \$35 an ounce for gold the number of mining employees in Nevada in 1940 before the European war had had much effect, was only 6262 compared with over 11,000 now. Also the large silver camps of the 1910-1920 period are pretty well exhausted and were mining during a \$1.00 an ounce price for silver in 1920 compared with seventy-one cents today.

The only possible cause that could result in a large resumption of prospecting for, developing, and mining gold and silver mines in Nevada in the post-war period would be the marking up of the price of gold and silver in terms of our paper currency—say gold to at least \$70 and silver to its once former price of \$1.29 an ounce or to higher figures, with the restoration of gold coins to insure future stability.

In my opinion if the war and its consequent inflation continues for three or more years with the corresponding stupendous mounting national debt, revaluation of gold and silver will take place to reduce the national debt and to give sufficient metal coin to give stability and backing to the paper currency.

It is apparent that the resumption of gold and silver mining at present prices can not begin to absorb the mining and metallurgical labor now employed in the strategic metal and mineral production. What other solution is there to this problem?

OUR MAIN HOPE

Our main hope lies in the wisdom of the national government in continuing to purchase these strategic metals in immediate post-war years to allow a gradual adjustment, and by that purchase to provide sufficient stockpiles to avoid, in the case of another war, the wild scramble and shortage of the two world wars.

This is the purpose of Senator James G. Scrugham's proposed bill S. 1160 for the continued purchase and stockpiling of strategic metals which has had the national attention and careful consideration of our most important mining men and economists.

There is a strong group in our country who favor the purchase of foreign metals at lower prices to promote and insure trade in our manufactured products, and just-

this also on the basis of conserving our ore resources.

This is the old battle between the producers of raw materials and the manufacturer, and Senator Scrugham is the champion of our metal producers.

With post-war years will come the question of the survival of the new industries of the west based upon western raw resources and low-cost hydro-electric power vs. the long-established industries in the east. One specific illustration is whether Basic Magnesium, Incorporated, will survive in the face of the competition of the older eastern plants.

Nevada's mineral industry is the state's most important industry, both as to maximum labor employed and as to maximum value of its production.

Nevada was but a desert trail to California until the discovery of the Comstock in 1859. By 1864 it was a camp of many thousands and producing millions and was the economic basis of the entrance of Nevada into the union as a state in 1864.

The constitution and early laws of Nevada emphasized the predominance of the mining industry. First, by law, mines and milling plants are given the right of eminent domain, that is the condemning and taking of private property when necessary for their operations. This is a distinct concession to a private industry. Second, the constitution provided that taxation was to be based on valuation, except mines and mining claims, the proceeds of which alone shall be assessed and taxed. This means that the under-surface values of a mine are assessed each year at a valuation equal to the profits or net proceeds. This is a distinct differentiation from other types of property, the reason being the extreme difficulty of placing an assessment value on underground values. The law requires that every mine shall report its gross production, its costs, and its net proceeds each year. As a result we have a complete official record of the state's production since 1864.

IN NEW BULLETIN

For the first fifty years these statements were filed in the county court houses and have been filed away in the basements and garrets. Our Nevada State Bureau of Mines has accumulated this continuous record and will distribute it as a new bulletin next month. It will show the state's total mineral production by years, by counties, and by districts, the counties by years and districts, and the districts by years with the name of any producer in the district in the last eighty years who reported a gross production of over \$5000. This will be a fine contribution of the bureau to the Nevada mineral industry.

The figures for the state from the discovery of the Comstock in 1859 to 1940, inclusive, total 168,000,000 tons of ore of a gross value of \$1,442,000,000. The table of yearly production illustrates how closely the mineral production in Nevada is associated with periods of state prosperity and depression. The first great era of prosperity reached its climax in the '70's with the Comstock at its zenith, with other camps such as Austin, Belmont, Hamilton and Aurora beginning flush production, and with mines discovered and opened up all over the state.

In the years '76 and '77 the state's production reached \$45,000,000 a year, not to be equaled again for forty years.

After the '70's there came a gradual decline to a low ebb from 1890 to 1900. In 1900 the year's production was only \$2,700,000, with the state's population dropping to only 40,000. Then came the discovery of Tonopah in 1900, of Goldfield in 1902, and of large scale milling and smelting of copper ore in the Ely district, with a rise in production to a peak in 1918 of \$48,000,000. Then followed another recession down to a production of only \$4,000,000 in the depression year of 1932. A distinct revival started in 1937 rising to a production of 43,000,000 in 1940 with a state population of 110,000. Production figures since 1940 are held confidential by the government, but 1943 will, I am sure, exceed \$50,000,000 to be the highest annual figure in the history of the state. From 1940 to 1943 there has been a twenty-five

...increase in population since 1900...
...state accounting for...
...larger county in Nevada...
...As Vegas becomes...
...boom mining...

the output of metal did not come up to expectations. Although the story of what actually went on during BMI's early operations would undoubtedly be a most interesting one, it has never been completely told and will not be told here. Whatever the cause, the effect was that on Oct. 26, 1942, Anaconda Copper Mining Co., at the invitation of governmental agencies, assumed direction of BMI by buying the controlling interest held by Basic Refractories, Inc. F. O. Case is now general manager, H. G. Satterthwaite is general superintendent, and V. E. MacDonell is chief engineer—all of them are Anaconda men. The status of Magnesium Elektron, Ltd., was not affected by this change, and Charles and Fletcher remain at the plant in their former capacities.

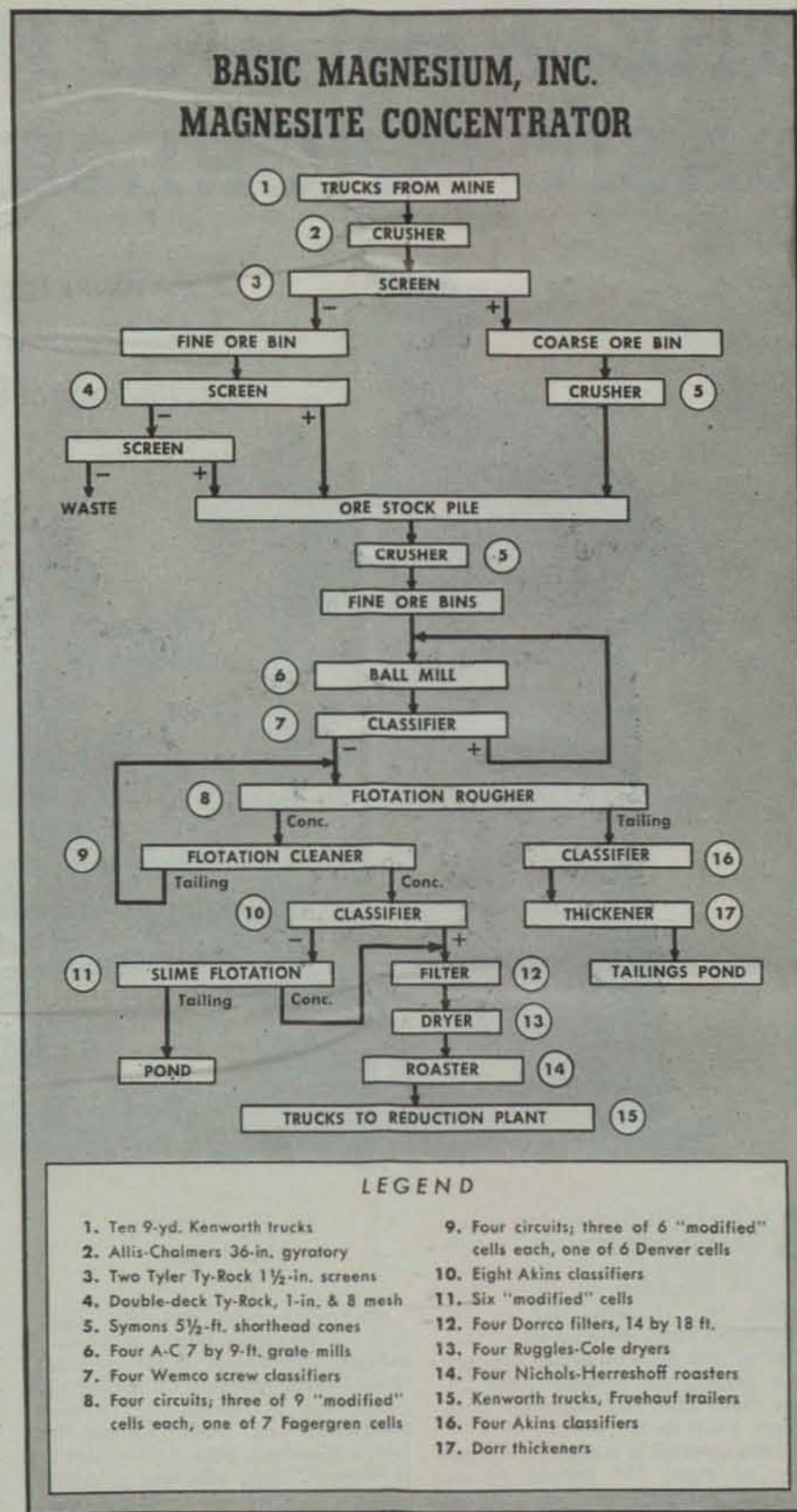
Mine and Mill

BMI has grown so hugely in the last year, and is even now changing in so many details, that a description of it is a formidable task. Probably the best place to start is at the mine, some 300 miles north of the reduction plant, and far up on the side of one of those vast Nevada valleys. Here, 31 miles from the railroad and 1,100 miles by rail from the reduction plant, is a concentration of almost pure magnesite (magnesium carbonate). Adjoining it is a large deposit of brucite (magnesium hydrate), but this is being worked by other companies. The magnesite outcrops about half-way up the mountain slope above the valley and consists of a dense, thickly bedded, very hard rock in a formation which is variable but generally dips westward, away from the hill. Color of the magnesite varies between a dark blue-grey and a faintly bluish white. Surrounding the magnesite are dolomites of varying composition, except for the deposit of brucite which adjoins it on the south.

Original development work on the deposit consisted of extensive diamond drilling, which was done on 50-ft. centers, and on the basis of which the estimates of available tonnage and composition were made. When the deposit was opened up, however, it was found that serious variation in composition occurred within narrow limits in the deposit, enough, in fact, to render large parts of it unusable.

Obviously, this complicated the problem enormously, and for a long time mining was done in a cut-and-try manner, which, though expensive, was made necessary by the need of getting ore to the reduction plant. Anaconda's engineers, however, anticipate more success in working out a suitable mining method, and in a few months the mining picture may be different.

The deposit was entered by drilling and blasting out a series of 60-ft. main benches, each divided into three 20-ft.



sub-benches, to afford the greatest degree of selective mining. Because of the lack of uniformity of the orebody, a great deal of additional sampling was necessary.

In sections where wagon drills are used for primary blast holes, 24-in.

vertical holes are put down on 14-ft. centers, and all drill cuttings, caught in Worthington dust collectors, are assayed. Two samples are taken from each drill hole, the upper 10 ft. making up one sample and the lower 10 ft. making up the second. Results of

for CHEMICAL ENGINEERING ACHIEVEMENT

SYNTHETIC RUBBER INDUSTRY

in the Government's synthetic rubber program. Great and perhaps equal credit should be given to those concerns that have contributed most importantly to the process engineering and design of these plants. Included, too, are the companies that have constructed new or expanded facilities for producing essential chemicals, catalysts and feed stocks without which the program would have failed. And, finally, recognition is due the construction companies and the manufacturers of chemical engineering and process control equipment whose joint contributions were essential to the success of the entire project.

To list by name each of the companies that belong in one or more of the foregoing groups is indeed an herculean task and one that lies beyond even the combined knowledge and experience of the Committee of Award. Fortunately, however, the able staffs of the Office of the Rubber Director and the Rubber Reserve Company are available for our consultation and with their cooperation and support, the list is being compiled for publication in our November issue. At that time *Chem. & Met.* will present in an unusually well illus-

trated article and report, a more detailed explanation of the manner in which these industries have shared their engineering and material resources in building the American Synthetic Rubber Industry.

Respectfully submitted,
SIDNEY D. KIRKPATRICK, *Secretary*
Committee of Award

★ ★ ★

NOTE.—The 1943 Award for Chemical Engineering Achievement will be appropriately presented to the American Synthetic Rubber Industry at a subscription dinner to be held in the grand ballroom of the Waldorf-Astoria Hotel in New York City on Wednesday, December 8, 1943, in connection with the 19th Exposition of Chemical Industries. Members of the chemical engineering profession and others interested in celebrating this achievement of American industry are cordially invited to join us on this occasion. For further information, address M. A. WILLIAMSON, publisher, *Chemical & Metallurgical Engineering*, 330 W. 42nd St., New York, 18, N. Y.

WALTER G. WHITMAN, Massachusetts Institute of Technology, Cambridge, Mass.
GEORGE GRANGER BROWN, University of Michigan, Ann Arbor, Mich.
CHARLES A. MANN, University of Minnesota, Minneapolis, Minn.
JAMES R. LORAH, University of Missouri, Columbia, Mo.
HENRY J. MASSON, New York University, New York, N. Y.
CHESTER P. BAKER, Northeastern University, Boston, Mass.
JAMES R. WITROW, Ohio State University, Columbus, Ohio
RICHARD L. HUNTINGTON, University of Oklahoma, Norman, Okla.
GEORGE W. GLEESON, Oregon State College, Corvallis, Ore.

DONALD S. CRYDER, Pennsylvania State College, State College, Pa.
MELVIN C. MOLSTAD, University of Pennsylvania, Philadelphia, Pa.
JAMES COULL, University of Pittsburgh, Pittsburgh, Pa.
DONALD F. OTHMER, Polytechnic Institute of Brooklyn, Brooklyn, N. Y.
JOSEPH C. ELGIN, Princeton University, Princeton, N. J.
JOHN L. BRAY, Purdue University, West Lafayette, Ind.
LEWIS S. COONLEY, Rensselaer Polytechnic Institute, Troy, N. Y.
ARTHUR J. HARTSOOK, The Rice Institute, Houston, Tex.
HOWARD S. GARDNER, University of Rochester, Rochester, N. Y.

CHARLES D. LUKE, Syracuse University, Syracuse, N. Y.
ROBERT M. BOARTS, University of Tennessee, Knoxville, Tenn.
EUGENE P. SCHOCH, University of Texas, Austin, Tex.
J. HENRY RUSHTON, University of Virginia, Charlottesville, Va.
FRANK C. VILBRANDT, Virginia Polytechnic Institute, Blacksburg, Va.
HENRY K. BENSON, University of Washington, Seattle, Wash.
OLAF A. HOUGEN, University of Wisconsin, Madison, Wis.
ERNEST D. WILSON, Worcester Polytechnic Institute, Worcester, Mass.
BARNETT F. DODGE, Yale University, New Haven, Conn.

MAGNITUDE OF 'BMI' METAL PLANT REVEALED BY ANACONDA'S FIGURES

Features of interest in connection with the construction and operation of the colossal Basic Magnesium, Inc., plant in Clark county are cataloged in a folder issued by the company, a division of Anaconda Copper Mining Co.

It points out that although Basic is not to be classified as a brick, sheet metal, electrical or plumbing "job," it has established world records in all four of these categories.

Water and Electricity—Amounts used each day would light Los Angeles, a city of 1,800,000 inhabitants, and supply each person with 17 gallons of water a day.

Plumbing—More than 350 miles of piping including 22 miles of glass tubing. Approximately 700,000 pounds of dynamite was used in excavating the trench for the water line from Lake Mead.

Materials Used in Construction—A total of 685,865 tons hauled in by freight and truck, or enough to fill a freight train more than 100 miles long.

Copper—More than 600,000 pounds, the largest has bar installations in the world. If this copper were made into pennies, it would make a stack of pennies more than 900 miles high.

Silver—For the first time in the history of the world, large silver bars—more than \$25,133,400 worth—some of these bars are plants of pure silver 12 feet long. They would make a stack of silver dollars more than 30 miles high.

Steel—The second largest structural steel job in the world.

Paint—Approximately a quarter million gallons, enough to paint a 3-inch traffic strip three times around the world.

Purchase Orders—One order was for \$2,000,000; six others for more than \$1,000,000 each.

Excavations—Equivalent to a hole three-fourths of a mile deep and one acre in area, or large enough to bury every man in the armed service of the Axis nations, place on top of their bodies a city block 50 stories high, and still have a pit 30 feet deep and a city block in area.

Air Conditioning—Air in each metal unit is changed every minute. Concrete—A quarter million cubic yards.

Water and Sewage—BMI has one of the most modern water treatment and sewage disposal systems in the world. To make certain water used in the houses and at the plant is pure, it is analyzed every two hours.

Basic Magnesium, Inc., the largest plant of its kind in the world, is located in Clark county, Nevada, about 15 miles from the town of Primm. It is situated in a vast, unpopulated area, and its construction is one of the most important in the history of the West.

Las Vegas, Nev., Nov. 20.—(AP)—This gay and carefree desert city might lay just claim to being the country's luckiest. It never has had a depression, and even in the bleak years following 1929, Las Vegas never experienced anything more serious than acute growing pains.

Las Vegas has been a boom town for so long it now accepts the condition as normal. Right now, it's almost a boom boom town.

Boulder Dam is the answer to the town's prosperity in the midst of depression. In 1929, Las Vegas' static population was 5,177. There was a certain amount of tourist trade, quite a divorce and marriage business, and some amateur stock raising and mining. But, all in all, it was just another western desert town.

Then, the dam builders moved in with more than 5,000 workmen, you probably know, spells a popular game of chance. When Mark Twain visited Las Vegas in 1849, he applied for these call letters, and some tolerant officials granted and granted them. You can literally gamble for pennies here. There are any number of slot machines which will accept that modest sum, and sometimes give you back a few. There also are nickel, dime, quarter, half-dollar and dollar slot machines. For the record, however, there are more in the post-office or the court house.

Las Vegas, The Town That Never Had a Depression

Boulder Dam, Magnesium Plant, Divorces And Gambling Boom City

Las Vegas, Nev., Nov. 20.—(AP)—This gay and carefree desert city might lay just claim to being the country's luckiest. It never has had a depression, and even in the bleak years following 1929, Las Vegas never experienced anything more serious than acute growing pains.

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These five materials: magnesia, magnesite, peat, coal, and salts, are removed as needed by belt conveyors to the proportioning plant. Here each is weighed out of its respective bin by a Jeffrey feeder and sent by screw conveyor to one of several rotary mixers.

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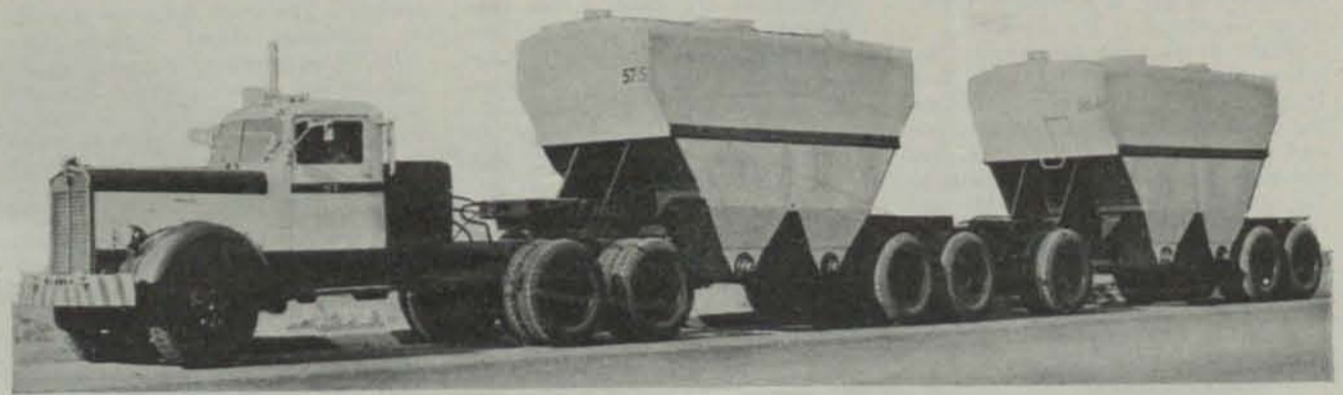
Magnesium ingots, the finished product, are stacked and stored awaiting shipment



the problem one would expect it to be. People drink a lot of beer here, but they manage to stay on the sober side, even when they're out for a gay evening. The city and county officers are uniformly courteous, but one gets the impression they could be tough if the situation demanded.

For many years Las Vegas has been a restricted, regulated, red-light district, but the Army put a stop to that, although there exists a well-founded suspicion that no all the girls left town.

Law enforcement isn't nearly as strict as it used to be. There are any number of slot machines which will accept that modest sum, and sometimes give you back a few.



THIRTY TONS of calcined magnesite is hauled in each truck-trailer unit shuttling between BMI's mine and reduction works

Holes are drilled on 18-ft. centers and samples are taken after every 5-ft. advance in the hole, in order to outline the orebody and determine grade as is done in wagon drilling. Following assay of the samples, the holes are loaded with a powder which gives a detonation velocity of 5,000 to 7,000 ft. per second, and are fired by Primacord.

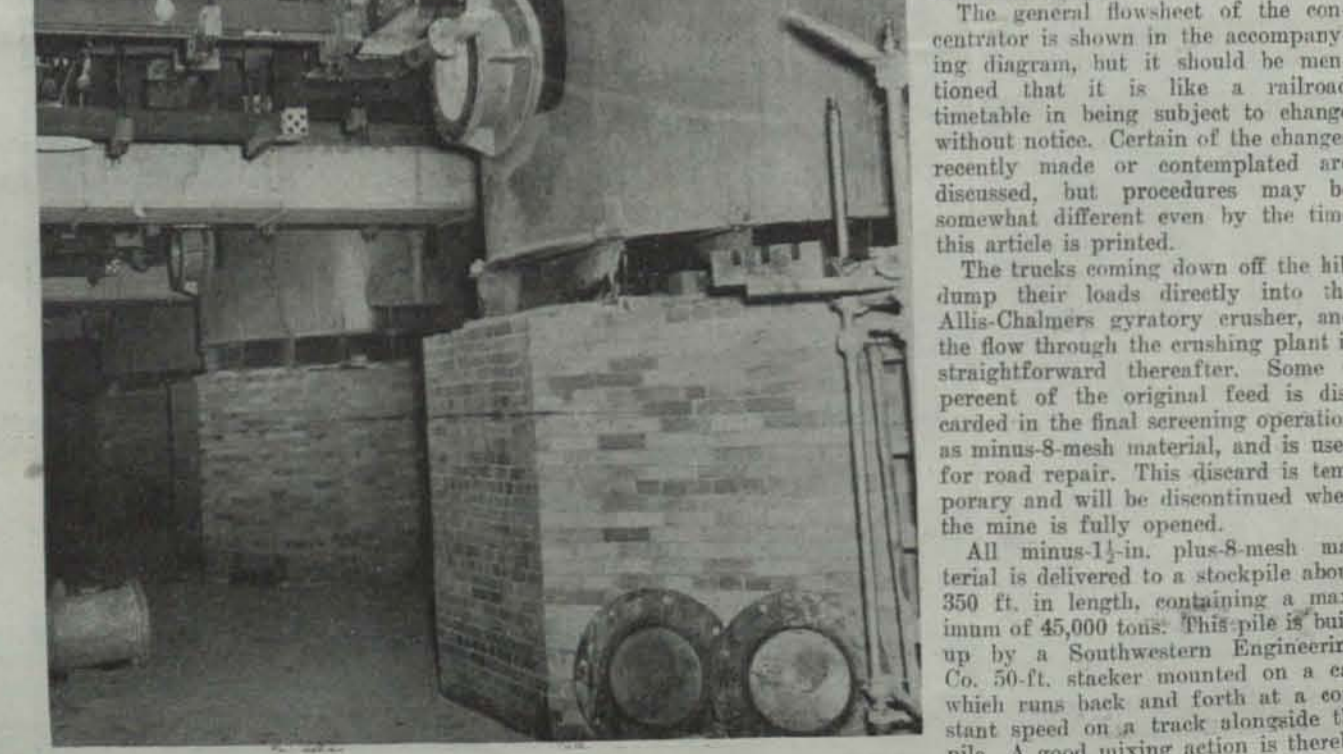
either to the crushing plant or to the waste dump as its composition dictates. Ten Kenworth trucks powered by Cummins diesel engines are used.

Following the decision as to which part of the bench will be regarded as ore and which as waste, intermediate wagon drill holes are drilled between the sample holes, resulting in 7-ft. spacing for primary blasting. Seven Worthington wagon drills are used in this work.

The general flowsheet of the concentrator is shown in the accompanying diagram, but it should be mentioned that it is like a railroad timetable in being subject to change without notice.

The trucks coming down off the hill dump their loads directly into the Allis-Chalmers gyratory crusher, and the flow through the crushing plant is straightforward thereafter.

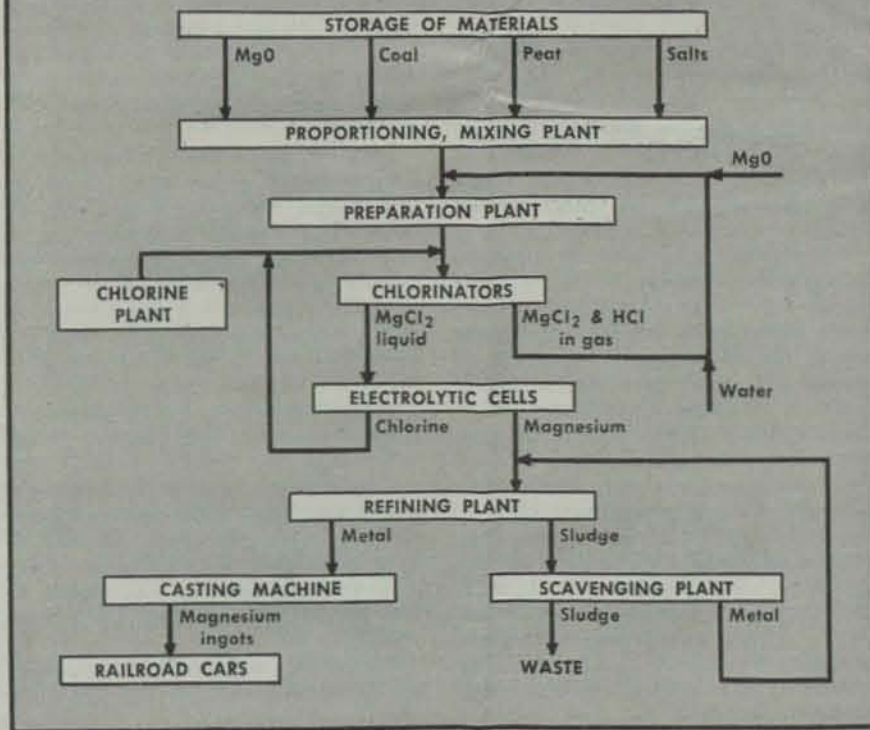
As mentioned in the foregoing, ore sent to the mill must meet certain requirements of composition. It must contain not more than: 4 percent insoluble material, 4.5 percent CaO, or 2 percent FeO and Al₂O₃. MgO content should be about 40 percent.



MOLTEN MAGNESIUM CHLORIDE is formed in the chlorinators, cylindrical electric furnaces, from magnesia, coal, chlorine. Hole in back of each is for one of electrodes

MINING UNIT & NEW INDUSTRIAL FROM HER HAS BEEN OPENED.

BASIC MAGNESIUM, INC. MAIN REDUCTION WORKS



duction plant, and it all sprang out of the desert so fast, that one can't avoid a feeling of unreality as he is shown through the huge buildings. In fact, the structures themselves heighten this effect, for they were designed on modernistic lines totally unlike anything ever before seen in an ordinary mining camp. I suppose the comparison has been overworked by this time, but the impression is inescapable that these blocky, broad shouldered buildings must have been erected overnight by a crew of genies of the sort who used to handle Aladdin's construction jobs. He got results by rubbing a lamp; we got BMI by writing a check for a hundred million dollars. Personally, I don't believe in either one of these operations, but the reality of BMI is nevertheless indisputable.

Reduction Plant Operations

Sequence of operations in BMI's sprawling main reduction plant is as follows: (1), calcined magnesite, mixed with coal and peat and suitably prepared, is heated in electric furnaces (hereafter called chlorinators) in an atmosphere of chlorine; (2), the anhydrous $MgCl_2$ formed in the chlorinators is transferred to electrolytic cells wherein molten magnesium collects in a pool on the electrolyte's surface; (3), dipped out of the cell by hand, the molten magnesium is then

refined and cast into bars. In addition to these main units, the preparation plant, the chlorinators, the cell houses, and the refining plant, the company also operates a chlorine plant, a flux preparation plant, a caustic soda plant, a brine plant, and a $MgCl_2$ liquor preparation plant, most of which are as large as any similar units operating elsewhere.

As indicated in the accompanying flowsheet, upon arrival at the reduction works, concentrates are transferred by Fuller-Kinyon equipment into one of five 60-ft. silos, each of which holds about 5,000 tons. For use in the BMI process these concentrates must contain less than 1.5 percent CaO , 1 percent insoluble matter, 0.5 percent each of FeO and Al_2O_3 .

The other primary constituents of the feed to the reduction plant are peat moss from Canada, coal from Utah, and certain salts of unspecified composition which assist in the subsequent reactions. Coal acts as a reducing agent and peat makes the mixture porous. Incidentally BMI has absorbed a substantial part of Canada's output of peat and will continue to do so until current experiments looking toward the elimination of peat as a necessary constituent are successful. For use in the process, the peat is shredded in a hammermill to minus 8 mesh. The coal and the salts are

ground in Raymond pulverizers to minus 200 mesh, and all three ingredients are then stored in small concrete silos.

These materials—magnesia, peat, coal, and salts—are removed as needed by belt conveyors to the proportioning plant. Here each is weighed out of its respective bin by Jeffrey Waytrols and sent by screw conveyor to one of several rotary mixers. From these mixers the charge is fed continuously to several pug mills in which concentrated magnesium chloride solution is mixed with the dry mass until a thick dough has been produced. This magnesium chloride solution is obtained by mixing calcined magnesite with HCl obtained from the chlorinator exhaust gases. Between this point and the chlorination step, two processes are followed. The purpose of each is identical; that is, it is desired to dry the dough in pellet form so that it will make a more suitable feed for the chlorinators.

In one part of the preparation plant, the dough from the pug mills is extruded by a screw conveyor through a rectangular opening about 8x10 in. in size and cut into 2-in. bricks which pass on a metal conveyor through a drying oven. They are then loaded on small cars and conveyed through a tunnel kiln, where a heat is applied sufficient to cement the mix but not hot enough to more than char the peat in the mixture. These hard blocks are then broken up into 2-in. lumps for chlorinator feed.

In the other part of the plant, the dough from the pug mills is fed to rotating cylinders in which the pasty mass is broken up and formed into a collection of balls or pellets averaging about an inch in diameter. These pellets are discharged into dryers and then pass into one of four Kennedy-Van Saun rotary kilns, each 100 ft. long. The same temperature conditions are maintained in these kilns as in the tunnel kilns already mentioned. After passing through water-cooled cylinders, the rotary kiln product is ready for the next step.

The pellets of mixed and dried raw material are transported to the chlorinator buildings in trains of small dump cars, each one a kettle-shaped pot holding perhaps 300 lb. of pellets. These chlorinator and electrolysis buildings are the most prominent feature of the BMI plant. Each one covers about the area of a football field, and they are several stories high. Each building is divided into two main rooms; in one of them are placed eight chlorinators, and in the other and larger room, 88 electrolytic cells. Before going into more detail about these units, however, it might be well to have a look at the plant now supplying chlorine to the process.

With a capacity of about 200 tons



Cell for production of magnesium. Molten chloride is poured in through small doors in front and metal is dipped out through the same openings



Construction view. Cell tanks are refractory-lined steel arranged in eight rows of eleven

such small amounts, they do not accumulate rapidly and only after about three weeks of operation is it necessary to shut the chlorinator down to clean out these residues. Electrodes are also changed or dressed up at this time.

When it is desired to tap a furnace, a truck-mounted ladle is moved up underneath the tapping point. The clay plug in the tap hole is driven out and a red, liquid, stream of anhydrous $MgCl_2$ pours out. The fluidity of the chloride is rather surprising; it flows and splashes like water in contrast to the behavior of molten metal.

When full (each ladle carries about 2 tons) the car bearing the ladle is driven to the nearby banks of electrolytic cells, each one of which has openings in the top fitted with small doors. These doors are opened in turn, a funnel-like apparatus inserted into the opening, and the molten chloride is poured into the cell through the funnel. A ladle-full suffices to re-fill several cells, and when empty, the ladle is immediately returned to a different chlorinator for another load.

MAGNESIUM CELLS

The cells, arranged in 8 rows of 11 each, are covered receptacles about the size of two bath tubs placed side by side. Tanks are of steel, but the entire lining is of a refractory material. Through the covers of the cells project the electrodes, 6 steel cathodes and 3 graphite anodes, and an exhaust pipe through which chlorine leaves the cell. The gas escapes at the anodes and is caught by shields which enclose the anodes to a depth well below the electrolyte surface. Magnesium metal forms at the unshielded cathodes and

gradually collects in a pool on the surface of the chloride. Looking into the cell, one sees the bright-red surface of the molten chloride swirling violently under the pull of the cell's magnetic field. Swept here and there on this surface are numerous shiny globules of metallic magnesium, the drops which eventually coalesce to form a pool of the metal several inches deep. When this condition has been reached, two men dip out the molten metal into a gas-heated ladle for transfer to the first casting operation. Thereupon more chloride is poured into the cell and the cycle is repeated. Magnesium is removed from each cell about once a day.

The impure magnesium taken from the electrolytic cells is carried in the truck-mounted ladle to a row of molds at one side of the cell room. In these molds which resemble oversize dish pans, the magnesium is cast into short cylindrical pigs, each one weighing about 60 lb. These pigs are then removed as needed to the refining plants.

At BMI the electrolytic procedure is simplified to the extent that the chlorinators produce absolutely anhydrous $MgCl_2$. Efficiency of the BMI electrolysis is well over 85 percent, which was the highest mark attained previously.

To supply the 20,000 amp. current required at BMI, both motor-generator sets and mercury-arc rectifier equipment are used, with rectifiers supplying 60 percent of the power. No one manufacturer could have furnished the huge outlay of d.c. equipment required, therefore Westinghouse, General Electric, and Allis-Chalmers combined to fill the order. Total power used in the entire plant is 220,000 kw.,

enough for a city the size of Los Angeles. In the actual electrolysis, about 8 kw. are used per lb. of magnesium produced. Power enters the plant at 232,000 volts, is transformed down to 13,800 volts, and the portion used for electrolysis is converted to d.c.

BMI now has a fine new refining plant and others are being built, but in the early hurry-up days of the operation, magnesium was refined "by hand," so to speak, because demand for the metal was so urgent. In fact, one of the original refining plants is still operating in order to keep the flow of magnesium ingots at its maximum, pending construction of a new refining unit.

The new refining unit is housed in a separate building, and in this one unit nearly all of the current output of metal can be refined. Along one side of the central room of the refining plant, large enough to resemble a good-sized copper or lead refinery, is a raised platform built around 11 pot furnaces, heated by oil, and each one holding 2 tons of molten metal. The raw magnesium pigs from the cell houses are melted and purified in these pots. When the sludge has settled to the bottom, the pot itself is lifted bodily out of the furnace by an overhead crane and is transferred to one of three casting machines located along the opposite wall of the room.

These machines consist of an automatically controlled tilting frame to hold the pot of magnesium, and an endless chain of 5-lb. molds to receive the molten metal. The frame is, in fact, a tilting furnace, for it is heated by propane gas in order to keep the metal at the proper temperature dur-

(Continued on page 115)

conveyor running in a concrete tunnel under the length of the stockpile.

Slime, as in most non-metallic flotation plants, is the source of much trouble in the mill. Originally desliming cones were used prior to flotation, and, at one time, feed to the fine-grinding circuit was added directly to the classifiers rather than to the ball mills in an effort to cut down slime production. Both these schemes have been discarded, however, and the slime problem is now dealt with by reagent control and by adjustment of the flotation circuit. Grinding is to 55 percent minus-325 mesh.

A number of different reagents have been used as the work progressed, but at present the combination is as follows: aluminum sulphate, sodium metaphosphate, caustic starch, acidified sodium silicate, and naphthenic acid. By suitable adjustment of reagents and circuit control, the recovery of the magnesite contained in the flotation feed has been raised from an initial 48 percent to about 70 percent, and the grade of concentrate has been improved as well.

The flotation machines used are of three varieties, as shown. The Fagergren and the Denver cells are experimental, and the third type, called

"modified" on the flowsheet, was standard but has been radically altered from the original design. As first supplied, these machines were of the individual-cell control type, with a weir and a pulp level control for each cell, but they have been altered to hog troughs by cutting openings between each cell to eliminate the weirs. New impellers of the general M. S. type have been substituted for the original rotors, and experiments were made with the addition of air to each cell. The resultant machine is not beautiful in appearance, but improved metallurgical results have been obtained with it.

Truck Transport Used

As shown on the flowsheet, filtered flotation concentrate passes through rotary dryers and on to four 14-hearth Nichols-Herreshoff roasters. Trouble is now being experienced with the dust-collecting system in this part of the plant, and the possibility of bypassing the dryers altogether is being considered. Filtered concentrate would then go directly to the roasters, eliminating some dusty handling of concentrate and dust loss in the dryers.

Calcined magnesite is carried to the railroad by Kenworth truck units, each pulling two 15-ton Fruehauf semi-

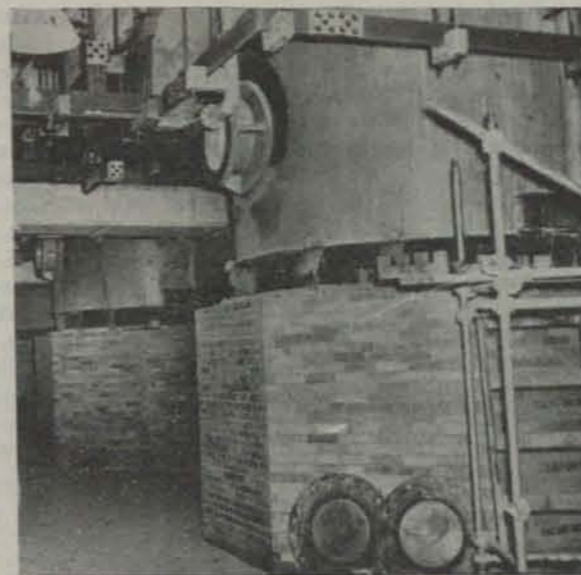
trailers. The truck units are powered by Cummins diesel engines, type HBSD6, equipped with superchargers; the trailers have specially designed bodies made in the form of bottom-discharge hoppers, the gates of which fit unloading bins at both the railroad and the reduction plant. Unloading is accomplished by suction hoses aided by screw conveyors in the bottom of the trailer. Loaded, the gross weight on the highway of each truck and trailer unit is 105,020 lb. At present, the calcines travel 31 miles by truck, then 1,100 miles by rail, to reach the plant; but as soon as sufficient trucks are available, the long rail haul will be eliminated and calcines will be trucked the 300 miles directly to the reduction works.

Southwestern Engineering Co., Los Angeles, Calif., did the engineering work for the concentrator, and Macdonald Engineering Co. built it. T. C. Russell is superintendent at the mine and concentrator; C. P. Donohoe is assistant superintendent and metallurgical superintendent; K. R. Crocker is mine superintendent; G. W. Nielsen is mill superintendent, with R. V. Thompson and Ray Handy assisting.

There is so much going on in the mile-long beehive of BMI's main re-



TOPS OF CHLORINATORS, in a row at left, include a charging device for feeding material with minimum escape of gas. At right are exhaust gas scrubbing towers in which magnesium chloride and acid vapors are removed from chlorinator fumes



Bottom of chlorinators in which molten magnesium chloride is produced from magnesia, coal and chlorine



Tops of chlorinators, left, include a charging device which minimizes escape of gas. At right are exhaust gas scrubbing towers

nator exhaust gases. Between this point and the chlorination step, two processes are followed. The purpose of each is identical: that is, to dry the dough in pellet form so that it will make a more suitable feed for the chlorinators.

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In the other part of the plant, the dough from the pug mills is fed to rotating cylinders in which the pasty mass is broken and formed into a collection of balls or pellets averaging about an inch in diameter. These pellets are discharged into dryers and then pass into one of four rotary kilns, 100 ft. long. After passing through water-cooled cylinders, the rotary kiln product is ready for the next step.

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larger room are located 88 electrolytic cells. Before going into more detail about these units, however, it might be well to have a look at the plant now supplying chlorine to the process.

CHLORINE PLANT

With a capacity of about 200 tons of liquid chlorine per day, BMI's chlorine plant is one of the largest ever built. The Hooker cells are housed in two buildings, 450 in each one. Salt is obtained by special government permission from Death Valley and is dissolved in water in Dorr turbo-agitators. The solution is brought to the proper concentration in large evaporators and is then pumped through the cells. A current of 750 amp. is applied to the cell circuit; voltage drop is about 3.3 per cell. For the present the hydrogen, the hydroxide, and the residual salt are all going to waste pending construction of means for their recovery. Eventually, the hydrogen will be collected for sale, as will the sodium hydroxide. The remaining salt solution will be concentrated and re-used.

Because chlorine is released in the electrolysis of magnesium chloride, most of the chlorine used in the chlorinators will come directly from the cell house, and eventually the chlorine plant will be required only to make up losses in the circuit. When this balance has been attained, BMI will have available for sale much of its liquid chlorine production.

To get back to the chlorinators, to which the chlorine is pumped in the gaseous state; these are cylindrical furnaces about 12 ft. in outside diameter and 25 ft. high, consisting of a metallic shell enclosing a refractory

lining. In this shell are a bell and hopper arrangement at the top for introducing the pellets, an inlet for chlorine gas, six openings through which carbon electrodes project into the interior, a port for the removal of waste residues, an exhaust port where gases escape from the furnace, and a tap hole near the bottom where molten $MgCl_2$ is removed.

Operation of these units appears fairly simple. About 300 lb. of fresh dry mix, prepared as outlined in foregoing paragraphs, is dumped into the top of the chlorinator every hour or so, and the accumulated molten $MgCl_2$ is drawn off below, also about once an hour. Inside the chlorinators, the electrodes, arranged in two sets of three each, carry a current which maintains an interior temperature of over 850 deg. C., or sufficient to permit reduction of the MgO contained in the dry mix. Under these conditions magnesia combines with carbon and chlorine to form anhydrous magnesium chloride and carbon monoxide. The molten chloride collects in the lower part of the furnace in a pool. Exhaust gases of the chlorinators carry hydrochloric acid and some magnesium chloride, as well as carbon monoxide. These gases pass through scrubbing towers and various solution tanks in which the HCl and the $MgCl_2$ are dissolved out. The resulting acid solution is then neutralized with calcined magnesite, evaporated to a high concentration, and stored for use in mixing the "dough" which eventually constitutes the chlorinator feed.

Left behind in the chlorinator is a residue composed of silica, alumina, iron oxides, and other impurities. Because these impurities are present in

of liquid chlorine per day, BMI's chlorine plant is one of the largest ever built. Engineered by H. K. Ferguson Co. of Chicago, it uses standard Hooker cells, which obtain chlorine by electrolysis of salt water. These cells are housed in two buildings, 450 cells in each one. Salt is obtained by special government permission from Death Valley and is dissolved in water in Dorr turbo-agitators. The solution is brought to the proper concentration in large evaporators and is then pumped through the cells.

A current of 750 amp. is applied to the cell circuit; voltage drop is about 3.3 per cell. Chlorine is evolved at the anode in the upper part and removed through the top of the cell. Hydrogen gas forms at the cathode and is removed through the back of the cell. Sodium hydroxide also forms at the cathode and passes out of the cell with the waste liquor, which contains about equal parts of salt and sodium hydroxide in solution.

Because chlorine is released in the electrolysis of magnesium chloride, most of the chlorine used in the chlorinators will come directly from the cell house, and eventually the chlorine plant will be required only to make up losses in the circuit. When this balance has been attained, BMI will have available for sale much of its

excess production of liquid chlorine.

To get back to the chlorinators, to which the chlorine is pumped in the gaseous state: These are cylindrical furnaces about 12 ft. in outside diameter and 25 ft. high, consisting of a metallic shell inclosing a refractory lining. In this shell are a bell-hopper arrangement at the top for introducing the pellets, an inlet for chlorine gas, six openings through which carbon electrodes project into the interior, a port for the removal of waste residues, an exhaust port where gases escape from the furnace, and a tap hole near the bottom where molten $MgCl_2$ is removed.

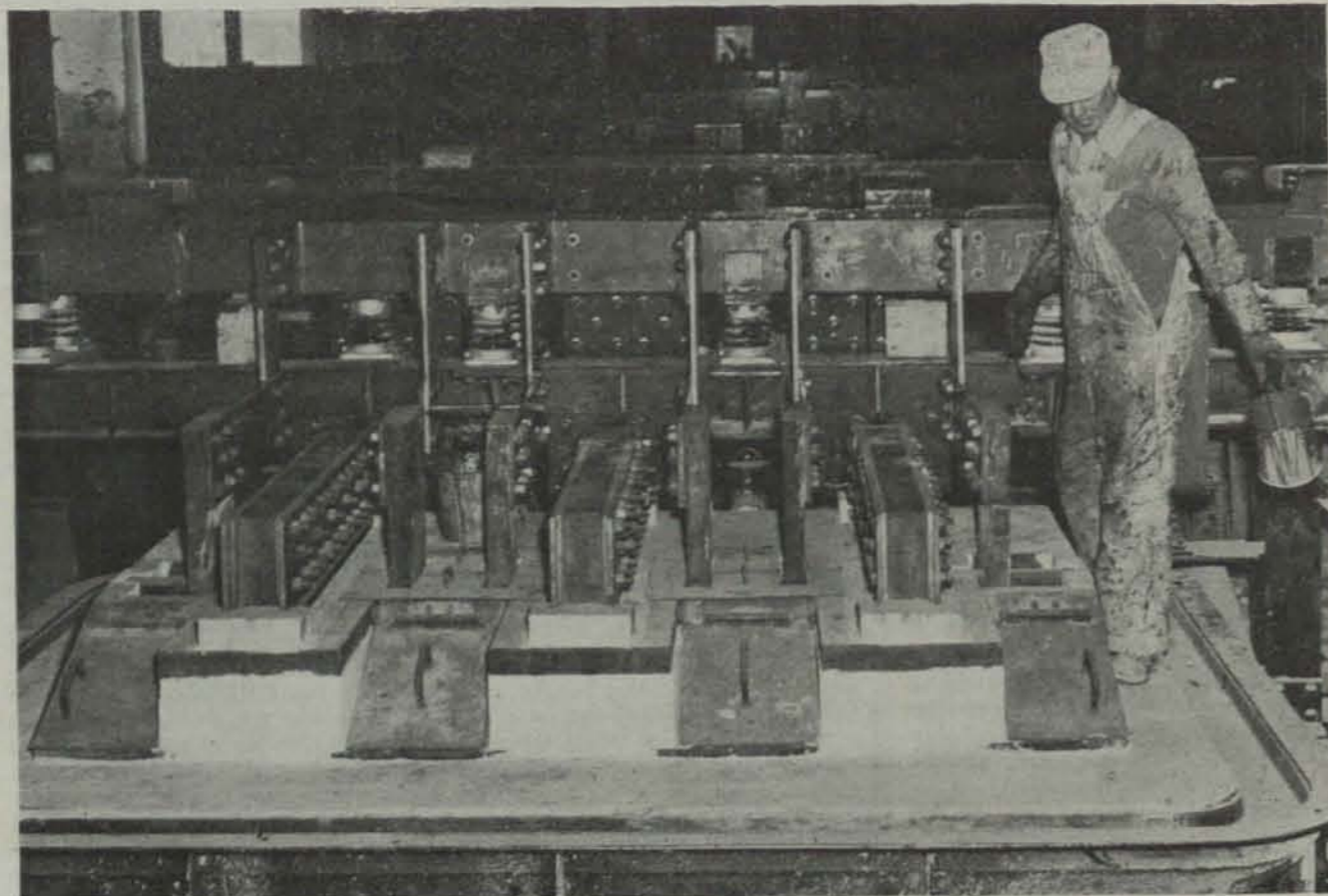
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Left behind in the chlorinator is a residue composed of silica, alumina, iron oxides, and other impurities. Because these impurities are present in small amounts, they do not accumulate rapidly, and only after about three weeks of operations is it necessary to shut the chlorinator down to clean out these residues. Electrodes are also changed or dressed up at this time.

When it is desired to tap a furnace, a truck-mounted ladle is moved up underneath the tapping point. The clay plug in the tap hole is driven out and a red, very liquid stream of anhydrous $MgCl_2$ pours out. The liquidity of the $MgCl_2$ is rather surprising; it flows and splashes like water in contrast to the behavior of molten metal.

When full (each ladle carries about two tons) the car bearing the ladle



MAGNESIUM ELECTROLYSIS is accomplished in cells like the one shown above, with 88 of them in a unit. Electrodes project through the top, molten chloride is poured in through small doors in front, molten metal is dipped out through the same openings

from a space undergoing evacuation. What actually happens, of course, is that as the piston of a reciprocating or rotary pump retreats, it creates an extra space into which some of the gas molecules diffuse as a result of their natural motion. Once in this extra space, and before more than a few have had a chance to diffuse backward out of the space, they are trapped by a valve or by the motion of the piston and are then expelled from the pump cylinder to a region of higher pressure, such as the atmosphere. The mechanism differs somewhat in the case of a centrifugal or jet pump, but the principle remains, namely, that vacuum pumps of all kinds can do nothing more than provide a space into which molecules from the evacuated space can diffuse, where they are then trapped and expelled from the system.

This principle has an extremely important corollary affecting the concept of pumping capacity. Since molecules can enter a pump only by their natural diffusion, then any cause which inhibits their entrance decreases the pump capacity. Resistance of the valve is one such cause. Even more important, perhaps, because it is more easily overlooked, is the capacity for molecular flow of the pipe which connects the pump intake with the evacuated space. Since this capacity varies with the length, diameter and straightness of the pipe, it follows that the pipe should be as large and as short as possible and have a minimum of bends. It is a common misconception, since a high vacuum pump handles only a negligible

weight of material, that the size and length of the intake pipe are unimportant. Actually, nothing could be farther from the truth, as this analysis shows. The performance of the evacuating device is completely at the mercy of the connecting pipe.

FLUID FLOW

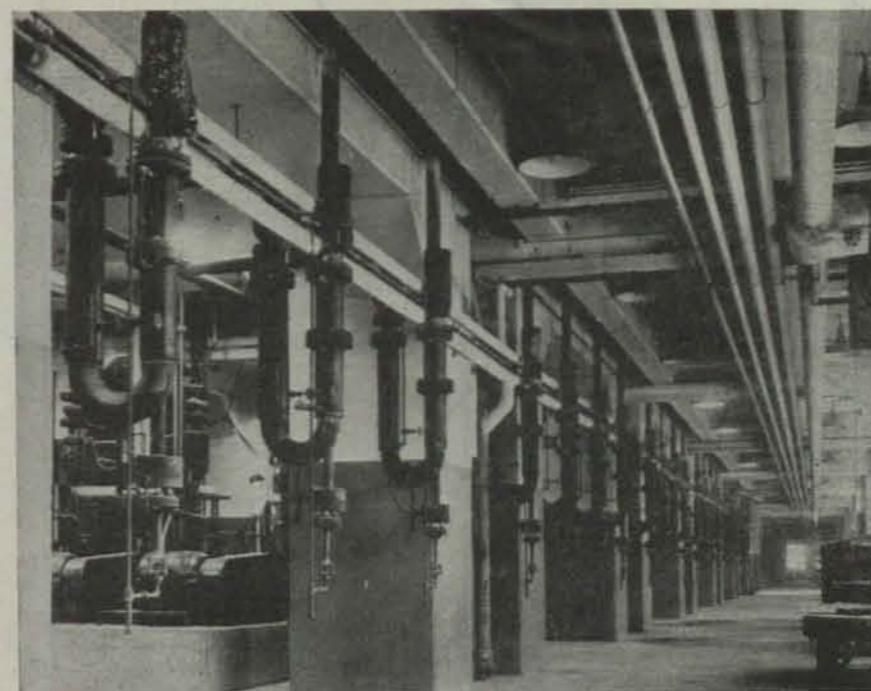
At higher pressures it is usual to consider that a fluid flows from a point of higher pressure to one of lower pressure. Actually, when the mechanism of flow is regarded from the molecular viewpoint, it becomes obvious that the pressure is merely a byproduct of the concentration of molecules and of their velocity, and that flow is only natural diffusion which seeks to equalize the concentration throughout the system. Viewed from this standpoint it becomes apparent that the rate at which molecules can diffuse from a point of higher to a point of lower concentration must depend on the distance they can travel between collisions with other molecules, as well as on the distance they can move before striking a wall. Since their motion is completely haphazard, then a general drift in one direction can be produced only by an excess of collisions behind the moving drift. However, proximity of a wall normal to the direction of drift has an effect similar to a high molecular concentration and tends to cause a cross drift which interferes with the main flow. It is reasonable to suppose, therefore, that the walls of a passage through which molecules are diffusing have a limiting effect on the flow rate over and above the

limitation imposed by cross-sectional area, and that the magnitude of this effect is a function of molecular speed and concentration, as well as the area of wall surface.

Actually, this is a fact. Knudsen studied the resistance of pipe to flow of gases at low pressures and found that the character of the resistance introduced by the pipe wall varies with the pressure, that is, with the concentration of molecules. At high pressures the flow may be calculated by conventional methods in terms of length, pressure difference, and a friction factor dependent on the Reynolds number. In the low-pressure range it may be considered that there is a stationary "tube" of molecules of considerable thickness against the pipe wall, the thickness varying in a complex manner with the molecular concentration. The high-pressure concepts of laminar and turbulent flow no longer hold. At pressures in the neighborhood of 1 mm., Knudsen found that the stationary molecule "tube" was relatively thin and that the resistance to flow varied directly as the length of the pipe, and inversely as the fourth power of its diameter. From 1 mm. down to 1 micron, he found the wall interference effect increasing rapidly to a maximum at about 1 to 10 microns, and that the relation between resistance, length and diameter was affected complexly by the concentration of molecules. At still lower pressures, however, where the mean free path becomes comparable to the pipe diameter, he found a decreasing resistance, which may be considered as a reduction in thickness of the tube of stationary molecules. Here the resistance was found to vary directly as the pipe length and inversely as the cube rather than the fourth power of the diameter. The curves of Fig. 2 illustrate the effect of this varying resistance in the cases of 1/4-in. and 1-in. pipe.

Flow in a low-pressure system is not ordinarily expressed in terms of weight, but, rather, as the volume of molecules at the existing pressure which passes a given cross-section of the conduit in unit time. Flow rate is often referred to as "speed," and its units are usually liters per second, or cubic feet per minute. Thus, the speed of a pump is the volume of molecules it can admit, while the speed of a pipe (Fig. 2) is the volume it can pass, both in unit time. Since flow capacity of a pipe varies inversely with its length, its speed is commonly expressed as volume per unit time and unit length. The total flow resistance of the component parts in a low-pressure system is calculated by adding the

Fig. 1—National Research Corp. mercury diffusion pumps evacuating retorts in the Michigan magnesium plant of Ford Motor Co.



is driven to the nearby banks of electrolytic cells, each one of which has openings in the top fitted with small doors. These doors are opened in turn, a funnel-like apparatus is inserted into the opening, and the molten chloride is poured into the cell through the funnel. A ladle-full suffices to re-fill several cells, and when it is empty the ladle is immediately returned to a different chlorinator.

These cells, arranged in eight rows of eleven cells each, are low receptacles about the size of two bathtubs placed side by side. Tanks are of steel, but the entire lining is of a refractory material. Through the covers of the cells project the electrodes, six steel cathodes and three graphite anodes, and an exhaust pipe through which chlorine leaves the cell. The gas escapes at the anodes and is caught by shields which inclose the anodes to a depth well below the electrolyte surface. Magnesium metal forms at the unshielded cathodes and gradually collects in a pool on the surface of the chloride. Looking into the cell, one sees the bright-red surface of the molten chloride swirling violently under the pull of the cell's magnetic field. Swept here and there on this surface are numerous shiny globules of metallic magnesium, the drops which eventually coalesce to form a pool of the metal several inches deep. When this condition has been reached, two men dip out the molten metal into a gas-heated ladle for transfer to the first casting operation. Thereupon more chloride is poured into the cell and the cycle is repeated. Magnesium is removed from each cell about once each day.

Enormous Power Outlay

The impure magnesium taken from the electrolytic cells is carried in the truck-mounted ladle to a row of molds at one side of the cell room. In these molds, which resemble oversize dishes, the magnesium is cast into short cylindrical pigs, each one weighing about 60 lb. These pigs are then removed as needed to the refining plants. Efficiency of the BMI electrolysis is well over 85 percent.

To supply the 20,000-amp current required at BMI, both motor-generator sets and mercury are Ignitron rectifier equipment are used, with rectifiers supplying 60 percent of the power. No one manufacturer could have furnished the huge outlay of d.e. equipment required; therefore Westinghouse, General Electric, and Allis-Chalmers combined to fill the order. Total power used in the entire plant is 220,000 kw., enough for a city the size of Los Angeles. In the actual electrolysis, about 8 kwh. are used per pound of magnesium produced. Power enters the plant at 232,000 volts, is transformed down to 13,800 volts, and

the portion used for electrolysis is then converted to d.e.

BMI now has a fine new refining plant, and others are being built, but in the early hurry-up days of the operation, magnesium was refined "by hand," so to speak, because demand for the metal was so urgent. In fact, one of the original refining plants is still operating in order to keep the flow of magnesium ingots at its maximum, until new units can be built.

Old and New Refineries

In this plant the impure magnesium pigs are melted in one of a series of small pot furnaces. A flux, consisting largely of powdered metal chlorides and fluorides, is then stirred through the molten metal and the resulting sludge is allowed to settle. When the magnesium is judged sufficiently pure, it is poured into a series of 5-lb. molds lined up on a nearby bench. Two men handle the pot, which is supported by a block and tackle from an overhead track, and one man stands before the mold bench tossing occasional handfuls of sulphur into the ladle and over the molds as they are filled. This latter also skims the film of oxide from any of the ingots upon which it seems to be forming too thickly. It is obviously a stopgap method which filled in until the new refining plants could be built, but it served its purpose for immediate production.

The contrast between the old and the new plants is amazing. The new refining unit is housed in a separate building, and in this one unit nearly all of the current output of metal can be refined. Along one side of the central room of the refining plant, large enough to resemble a good-sized copper or lead refinery, is a raised platform built around eleven pot furnaces, heated by oil, and each one holding two tons of molten metal. The raw magnesium pigs from the cell houses are melted and purified in these pots by the method already described. When the sludge has settled to the bottom, the pot itself is lifted bodily out of the furnace by an overhead crane and is transferred to one of three casting machines located along the opposite wall of the room.

These casting machines, made by International Derrick & Equipment Co., consist of an automatically controlled tilting frame to hold the 2-ton pot of magnesium, and an endless chain of 5-lb. molds to receive the molten metal. The frame is, in fact, a tilting furnace, for it is heated by propane gas in order to keep the metal at the proper temperature during the pouring. Tilting of the frame is synchronized with movement of the mold chain so that each mold is filled with exactly the right amount of metal. One side of each mold is built up in a V shape which overlaps the low side of

the neighboring mold, so that no metal is spilled as the chain advances. Movement of both furnace and chain is entirely smooth at all times, and the choking atmosphere of SO₂ which surrounds the hand operation is absent. A reducing atmosphere does surround the molten metal until it solidifies, but none of the fumes escape.

Care is taken to prevent pouring out of the pot any of the sludge which has settled to the bottom of it, and when all possible pure metal has been poured out, the tilting furnace is returned to an upright position and the pot taken out of it. The empty pot is transferred to the cleaning room nearby and a fresh pot is immediately placed in the casting machine. Two overhead cranes serve the refining room, and so rapidly do they carry the 2-ton pots on the round from furnace to casting machine to clean-up and back to furnace that there is never a break in the procession of trucks leaving the refining room loaded with magnesium. Even when an empty pot is exchanged for a full one at one of the casting machines, there is only a short pause in the steady clinking of ingots dropping from the end of the mold chain.

Women Handle Ingots

In the cleaning room, the pots are entirely emptied of sludge, and as much metal as possible is recovered. After a rapid inspection and cleaning, the pots are swung out again and put back into the nearest empty furnace to be refilled with raw magnesium.

Adjoining the refining room is storage space for ingots awaiting sampling, inspection, and weighing. Beyond the stacked ingots are assembly-line arrangements run by women, in which approved ingots are wrapped for shipment. This bare statement of fact does these women an injustice, however, for they work with a sort of desperate urgency unmatched anywhere else in the plant.

One could easily, and perhaps someone will, fill a book with the whole story of this enterprise. Aside from building the main plant, the erection of the workers' townsite, complete with air-conditioned houses, schools, and stores, is a major achievement, as is the construction of the power lines and pipe lines into the plant. Every type of engineering skill and experience had a part in this project, and is working right now to expand its production even beyond the incredible limits set originally. As to the future of this young giant, your guess is as good as anyone's, but its present and its past are written large across a square mile of Nevada desert and hundreds of square miles of Axis sky. BMI's men don't worry about tomorrow just yet; they are too busy turning out the magnesium we need today.

individual resistances exactly as in a series electrical circuit. If $R_1 = 1/S_1$, where R_1 is the resistance of some part of the system and S_1 is its volume flow capacity, or speed, then the resistance of the entire system is the sum of the individual resistances in series, and the reciprocal of the speed of the entire system is equal to the sum of the reciprocals of the speeds of each individual part, or $1/S = 1/S_1 + 1/S_2 + \dots$, etc.

Obviously, the effective speed of a pump cannot be greater than the speed of the system which it is exhausting. This emphasizes the importance of analyzing carefully the speed of the pipe connection between the pump and the evacuated space, and insuring that its size is great enough and its length short enough to give a speed equal to that of the pump.

VACUUM VAPORIZATION

Since the principal reason for employing extremely high vacuum in industrial chemical processes is to permit the distillation or evaporation of materials which otherwise could not be vaporized at a useful rate, it is

necessary to extend the molecular viewpoint used in the preceding section to show how high vacuum makes distillation and evaporation possible. If the liquid is confined in a vessel, molecules will leave the surface and pass into the vapor space until the number returning equals the number leaving, at which time an equilibrium will be reached and the concentration of vapor molecules (vapor pressure) will be a definite value, depending only on the character of the material and its temperature. At any temperature above the absolute zero a definite vapor pressure will be reached, whether or not there are other molecules of an inert gas present in the vapor space.

If some means is provided for drawing off the vapor molecules continuously from the vapor space, vaporization will continue because equilibrium cannot be reached. This vaporization will proceed whether the temperature is low or high, the only effect of temperature rise being to increase the rate of vaporization owing to increased velocity of the molecules. If inert gas molecules are present in the vapor space, however, they will inhibit vapor-

ization, simply for the reason of physical interference with the vapor molecules as they leave the liquid surface and attempt to diffuse away from it.

If the temperature is high enough to give the vapor molecules a vapor pressure equal to the inert gas pressure, and the process is not confined, then the inert atmosphere will be pushed back and vaporization will proceed so rapidly as to be called "boiling." If the vapor pressure is less than that of boiling, even if the process is not confined, diffusion of the vapor molecules outward through the inert molecules will be slow, and vaporization may then not be rapid enough to be perceptible.

There are several ways in which vapor can be drawn off continuously so as to bring about continuous vaporization. It can be done by condensing the vapor molecules on a colder surface (condenser), as rapidly as they diffuse to it from the evaporating surface, as in stills and evaporators; by pumping them from the vapor space, as in jet refrigeration; or by sweeping them away by moving the inert gas, as in spray ponds and cooling towers.

Fig. 2—“Speed” of ¼ and 1 in. pipe at micron pressures
Fig. 3—Piston pump characteristics at low pressures

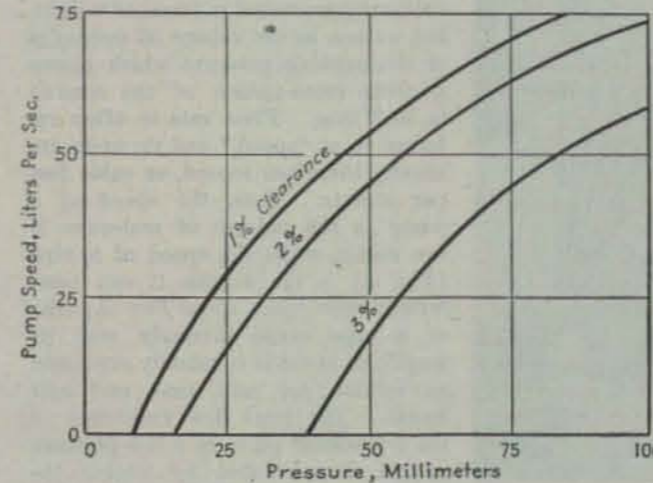
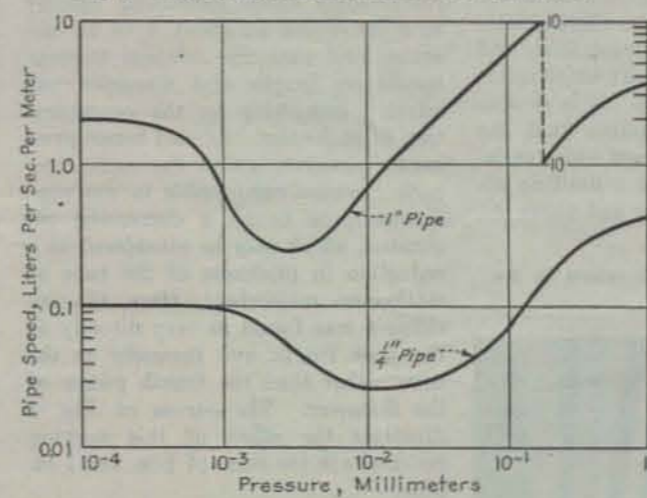
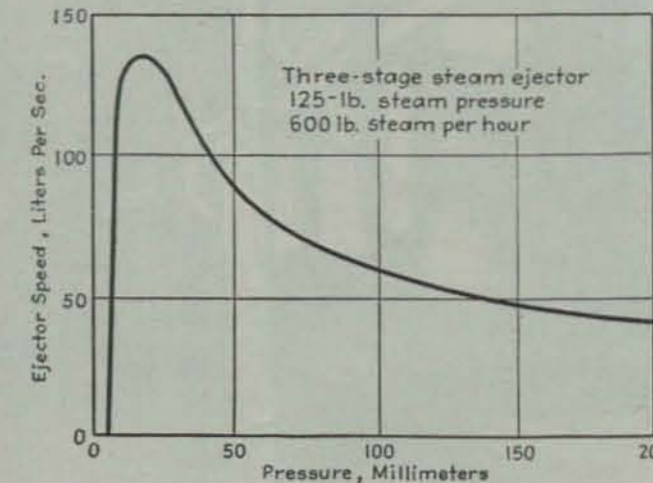
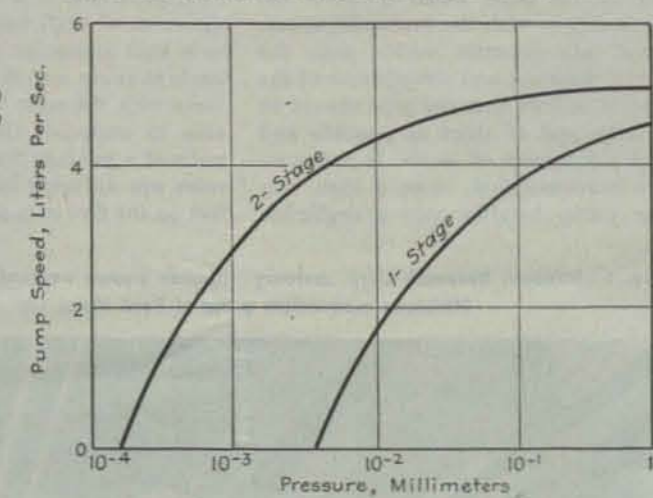


Fig. 4—High vacuum rotary pump “speed” at micron pressures
Fig. 5—Three-stage ejector performance at low pressure



New Type Concentrator Cuts

Here is the first published description of a 1,000-ton gravity concentration unit which occupies a space no larger than your living room, employs no moving parts, requires practically no supervision, yet equals or betters metallurgical results of conventional methods

John B. Huttl, Assistant Editor

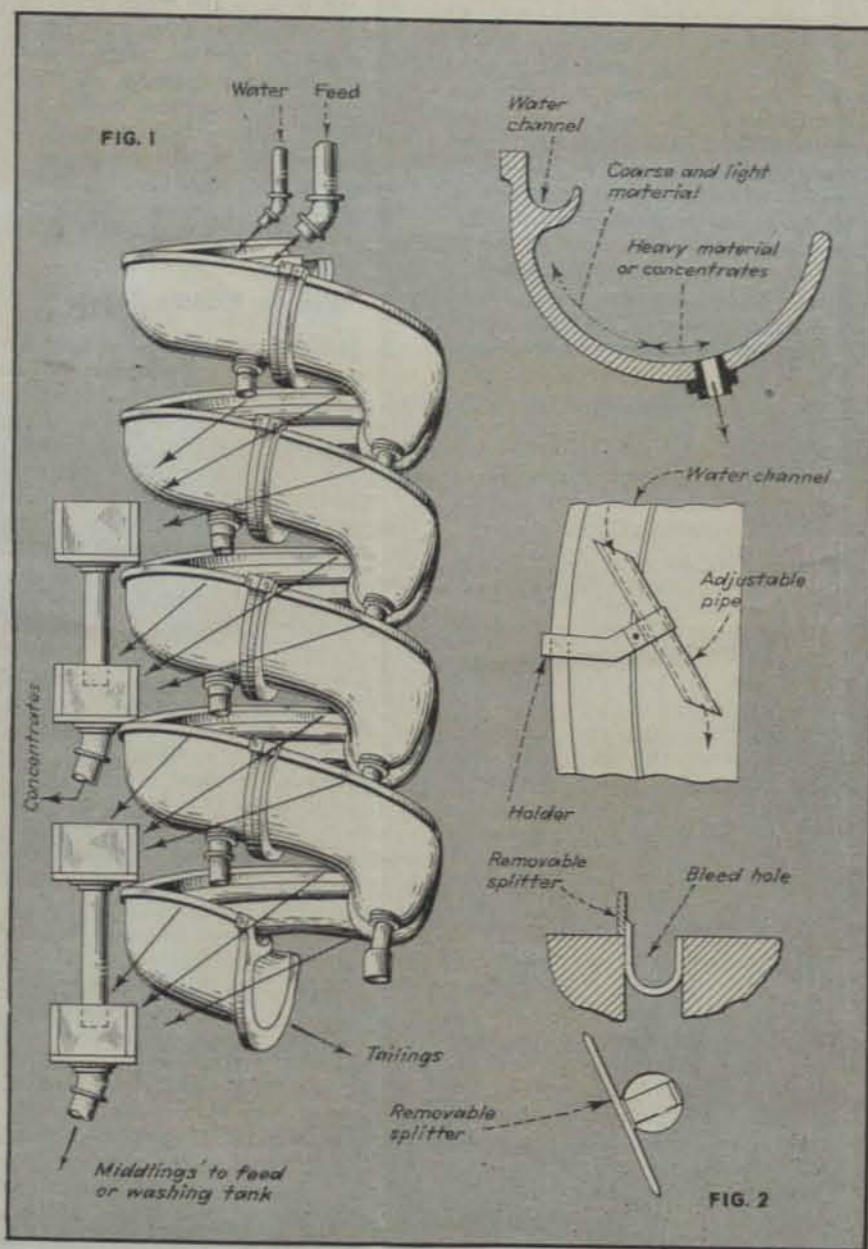


Fig. 1 . . . Heart of the Humphreys concentrator is this cast-iron spiral launder system. Centrifugal force does the work. Fig. 2 . . . Cross-section of launder showing product distribution and methods of supplying wash water and splitting out concentrates

ONLY RARELY is it possible for a technical publication to record the development of an entirely new metallurgical process or method, and that rarity makes it particularly gratifying to describe the new chromite concentrator being operated by Humphreys Gold Corp. at its property near Bandon, Coos County, Ore. By a simple enough application of centrifugal force, consisting of passing pulp through a system of spiral launders, metallurgical results have been achieved which equal or surpass those of orthodox methods, and a remarkable degree of simplicity and economy has been maintained.

Invented by I. B. Humphreys, vice president of the company, the spiral launder system was developed, after considerable test work, with the purpose of using it on the company's dragline dredges for recovering fine gold. The mine closing order intervened, however, and the company transferred its activities to strategic mineral production, particularly the recovery of chromite from marine black sand deposits in Oregon. Unable to obtain quick delivery of conventional concentrating equipment, Mr. Humphreys tested the spiral launders on the chrome-bearing material, and when the results were more than satisfying, the company erected a 1,000-ton concentrator using the new apparatus.

Elements of the present plant include: a diesel-powered dragline with a 1½-yd. Esseo bucket for mining the material; a preliminary screening and washing plant mounted on caterpillar treads; a desliming unit of unconventional design; and the spiral launder concentrator unit. These, together with accessory pumps, a classifier, another small dragline, and a few trucks, make up the equipment with which the company mines 1,000 tons per day of material containing 6 percent Cr₂O₃ and concentrates it to 25 percent Cr₂O₃ with a recovery of better than 90 percent.

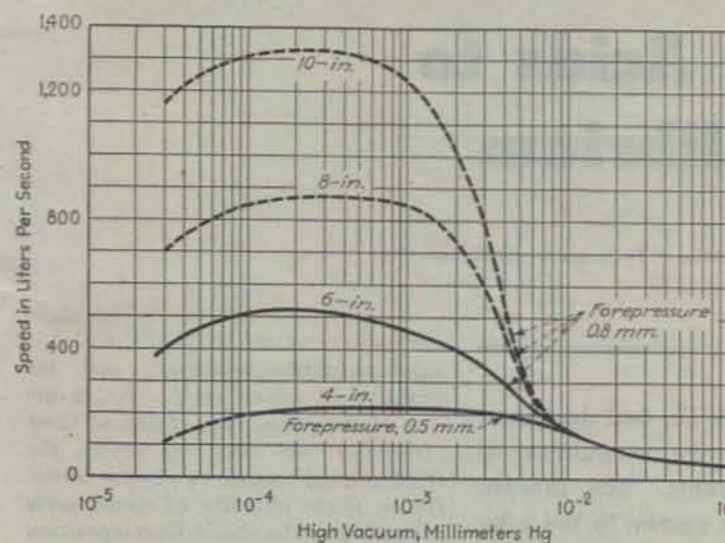


Fig. 6—Characteristic curves of a family of National Research Corp. experimental industrial diffusion pumps in sizes from 4 to 10 in.

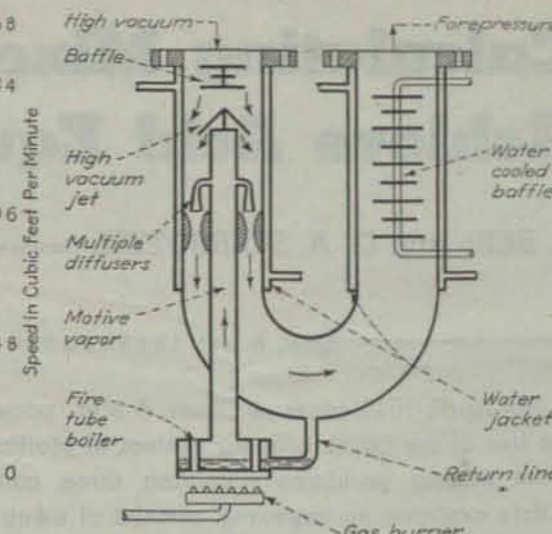


Fig. 7—Typical design of National Research Corp. industrial diffusion pump

With the first two methods, of course, if a high vapor pressure of inert gas is allowed to exist in contact with the evaporating surface, vaporization will necessarily be slow. On the other hand, if the inert gas concentration can be kept low, the inhibiting effect of the inert molecules will be slight. As the inert gas concentration is reduced, the temperature required to maintain rapid vaporization (boiling) can be made progressively lower, until a concentration is finally reached below which no further lowering of the boiling temperature will take place.

It is not generally realized that the boiling point cannot be reduced indefinitely by pressure reduction. Why this should be true is readily apparent, however, from a consideration of Table I. At a pressure of about 1 micron the mean free path of inert gas molecules in contact with an evaporating surface becomes so great that the inert molecules no longer exert an appreciable effect on the rate of vaporization. Hence, nothing is gained in a distillation or evaporation operation by attempting to reduce the inert gas pressure below about 1 micron. On the other hand, it is equally clear that pressures in the micron range are comparable in vaporization operations to theoretical cases where no inert gas exists, and so make possible the continuous vaporization of all materials. If the molecules are extremely large and their velocity at the available temperature is low, the resulting vaporization may be too slow to be of practical value, but it is obvious that the use of such pressures tremendously extends the list of materials that can be vaporized at useful rates. It is equally obvious that a useful rate can be obtained with many materials which are injured by high temperature.

VACUUM PUMPS

Theoretically, there is no reason why mechanical vacuum pumps cannot be used to reach the extremely low pressures discussed here, provided only that their lubricants do not themselves have vapor pressures as high as the pressures to be maintained. Practically, however, mechanical pumps cannot be used for the very low pressure range if there is a continual evolution of inert gas in the system, since it is ordinarily not feasible to attain a sufficiently large displacement rate. This is obvious from the fact that to obtain a displacement of a few hundred cubic feet per minute by means of a reciprocating or rotary piston requires either extremely large size or very high speed. Yet, at micron pressures an almost negligible weight of gas will occupy a tremendous volume. As an example, consider 1 cc. of gas at atmospheric pressure. If the pressure of the gas is reduced to 1 micron, its volume will expand 760,000 times, to 760 liters.

The various types of mechanical pumps have different ranges in which they achieve their best performance. A reciprocating pump, for example, is an efficient device if the pressure is near atmospheric, but operates at low efficiency in a single stage at pressures below about 25 mm. as shown in Fig. 3. Vane type rotary pumps are capable of working at somewhat lower pressures, but still are inefficient even when multi-staged, at pressures below about 10 mm. The oil-sealed rotary eccentric-cylinder high-vacuum pump which has been used so extensively in vacuum tube work is capable of efficient operation well below 1 mm., and in the com-

mercial type, as in Fig. 4, can exhaust to less than 10 microns in systems without a continuous evolution of gas.

None of these methods, however, is of sufficient capacity for work at micron pressures when considerable gas evolution is encountered. At such pressures there are totally unexpected sources of gases. All materials contain both absorbed and adsorbed gases which are given off at extremely low pressure, especially at high temperature. Metals, for example, contain a volume of occluded gas (as measured at atmospheric pressure) at least equal to the volume of the metal, and often several times this volume. Many liquids, especially those of high viscosity, can contain enormous quantities of absorbed gases.

Obviously, then, evacuating methods which do not demand a tremendous physical displacement are called for in extreme low-pressure work. Conventional steam jet ejectors are inherently capable of large capacity with moderate size apparatus, as shown in Fig. 5. Furthermore, they are readily operated in multi-stage, frequently having two or three stages, and sometimes as many as five or six. Ejectors with several stages have operated at pressures as low as 25 microns and above, and equally low pressures have been achieved with fewer stages when ejectors were arranged to discharge against low forepressures, such as can be produced by mechanical pumps or water jet ejectors.

Still, steam ejectors of present types are not the answer when pressures of a micron or below are required. Another type of jet device known as the diffusion pump, however, has proven eminently successful, first as a laboratory device, and very recently as a

(Continued on page 108)

Calculating Mixed Acids to Achieve Acid Equilibrium

E. BERL and G. A. STERBUTZEL *Carnegie Institute of Technology, Pittsburgh, Pa.*

Chem. & Met. INTERPRETATION

In the April, 1939, issue of *Chem. & Met.*, page 225, Dr. Berl described the use of the Gibbs trilinear system of plotting in the computation of plant mixing problems involving three components. The present article explains an improved method of using this system in the reinforcement of spent nitration mixed acid, so that the resulting quantity of mixed acid equals the original quantity. The method is applicable to rapid routine calculations and should be of great assistance to the nitration industry.—*Editors.*

IN NITRATION OPERATIONS the spent acid which results not only differs in composition from the original fresh mixed acid, but it is also less in quantity. The ideal method of reinforcing the spent acid is to add nitric acid and oleum in such proportions that the weight (volume) and composition of reinforced acid equal that of the original fresh mixed acid. The solution of this problem is extremely time-consuming by mathematical computation (Berl - Lunge, "Chemisch-Technische Untersuchungsmethoden," 8th Ed., Vol. 2, p. 674) but is readily accomplished graphically through the use of the Gibbs triangle, as shown in Figs. 1 and 2.

In Fig. 1 point L represents the composition of the spent acid resulting from a nitration, while M is the composition of fresh mixed acid which is to be produced by reinforcement. The ratio of the quantity of spent acid, to the quantity of reinforced fresh acid which is to be produced, is expressed on the chart by the length of line drawn through M and L. Assume that the fresh acid is 17 units, the spent acid 16 units, and the consumption in nitration 1 unit. Then the line AML is drawn so that AM equals 16 units (the spent acid); ML equals 1 unit (the reinforcing acid to be added); and AL equals 17 units (the reinforced acid).

If M and L are close together, as they are in the nitration of cellulose materials, it is difficult to draw the line AML as accurately as must be done, since the

This work was made possible by a grant to Carnegie Institute of Technology from the Buhl Foundation, for which the authors express their appreciation.

precise location of point A is imperative for subsequent steps. Point A can be located graphically by magnifying the small triangle 1, 2, 3, in which M and L are situated, to the size of the entire Gibbs triangle. With this done, points L' and M' occupy the same relative locations in the whole Gibbs triangle as do points L and M in the small triangle 1, 2, 3, and the slope of the line M'L' is determinable with high accuracy. This magnification of 10 times is readily accomplished by noting that the base of the triangle 1, 2, 3, represents 10 percent H₂O, its left side 60 percent H₂SO₄, and its right side 20 percent HNO₃. These quantities are subtracted from the coordinates of the points M and L and the results multiplied by 10, and plotted as M' and L'. For example, point L has the composition 12.5 percent H₂O, 63 percent H₂SO₄, and 24.5 percent HNO₃. The indicated subtraction gives for point L' the coordinates (12.5 - 10) x 10 = 25 percent H₂O; (63 - 60) x 10 = 30 percent H₂SO₄; and (24.5 - 20) x 10 = 45 percent HNO₃.

The position of point A' is found graphically by means of similar triangles. Owing to the magnification, M'L' = 10 ML. Lay off M'B' equal to 10 units of any convenient length and extend M'B' to a length of 16 units. Then draw line CA' parallel to the known line BL', thus locating point A'. Now, M'A' = 1.6 M'L' or 16 ML. Therefore, AML can be drawn parallel to M'A', with the length AM equal to that of M'A', thus giving the accurate location of A.

Point A has the property of being the pivot through which all straight lines joining the compositions of possible reinforcing acids must pass if both the composition and the quantity of the reinforced acid are to be correct. It can be considered that there are three "degrees of freedom" in spent acid reinforcing problems, including the composition of the nitric acid (or nitric-sulphuric mixture); the

composition of the sulphuric acid (or sulphuric-nitric mixture); and the quantity of mixed acids. As in the case of the phase rule, if two of these "freedoms" are fixed by choice, the third can no longer be chosen freely. Hence, if the quantity of mixed acids is fixed, then the choice of composition of one of the acids to be mixed will automatically fix the composition of the other.

The situation is illustrated by line NS on Fig. 1. Point S, the proposed composition of sulphuric acid (oleum) to be used might have been chosen at any point along the H₂SO₄-H₂O axis, but to do so would automatically fix the composition of nitric acid to be used as the other end of the straight line SA prolonged to the nitric acid side of the triangle. Obviously, since the possible compositions of HNO₃ are limited, this also imposes a practical limit on the composition of H₂SO₄ used. However, it should be noted that the mixing constituents need not be the compositions at the ends of the lines. A mixture of nitric and sulphuric acids and water, such as at point D, could be mixed with a mixture of oleum, nitric acid and water, such as E, if desired.

As the problem is illustrated in Fig. 1, the chosen oleum composition is 20 percent, or 104.5 percent H₂SO₄. This fixes the nitric acid composition at 89.5 percent HNO₃ and 10.5 percent H₂O. The proportions of acid N and acid S which must be added are determined by the relations of the length of lines AS and NA, where AS represents the weight of N, and NA the weight of S. The weight can be determined graphically by laying off FS equal to the number of units of reinforcing acid needed. Then line AG, drawn parallel to NF, locates point G and SG equals the number of units of N, and GF the units of S.

The methods just described can be extended to cases in which it is desired to add more or less reinforcing acid than corresponds to the acid equilibrium. For example, one may wish to eliminate part of the spent acid after each cycle to prevent the accumulation of impurities (nitrosyl-sulphuric acid, oxalic acid, alcohol nitrates, and nitro aromatics) beyond a certain level. In this case an additional amount of reinforcing acid must be used to compensate for the

Table I—Summary of Problem With Acid Equilibrium

	HNO ₃ , Tons	H ₂ SO ₄ , Tons	H ₂ O, Tons
Spent acid, 470.5t.	115.3	296.4	58.8
R ₁ , 13.17t.	0.79	13.49*	-1.11†
N ₂ , 16.33t.	14.02	2.31	
Total	130.11	309.89	60.0
Resulting composition by graphic method, %	26.02	61.98	12.00
Desired composition, %	26.00	62.00	12.00

* (0.94 × 1.09 × 13.17). † 13.17 - (13.49 + 0.79).

Table II—Summary of Problem With Acid Excess

	HNO ₃ , Tons	H ₂ SO ₄ , Tons	H ₂ O, Tons
Spent acid, 458.4t.	112.3	288.5	57.3
S ₁ , 9.7t.	17.65	10.13*	-0.43†
R ₁ , 31.9t.		11.04	3.21
Total	129.95	309.67	60.08
Resulting composition by graphic method, %	25.99	61.99	12.02
Desired composition, %	26.00	62.00	12.00

* (9.7 × 1.045). † (9.7 - 10.13).

spent acid so eliminated. On the other hand, if reinforcing acids which are too strong are used, a deficiency of reinforced acid results. This case is of little practical interest since it is hardly likely that acids of excess strength would be used on account of their cost. However, if such acids were used, the acid equilibrium could be restored by adding fresh mixed acid of composition M, which could be obtained by mixing any combinations of acids on opposite sides of M lying on a straight line through M.

The chart of Fig. 2 shows the same problem as Fig. 1, except that the line AML has been extended downward toward point B in the "super-nitric" region. The line is then calibrated to show excess or deficiency of spent acid. Compositions falling on lines passing through A achieve the acid balance, while those falling on lines below A, such as point D, give a deficiency of reinforced acid, and those falling on lines above A, such as point C, give an excess of reinforced acid. The calibration may be accomplished by using the equation

$x = 100(1-ky) / (y + 1)$, where x is the percentage excess or deficiency of spent acid (a plus sign representing an excess, and a minus sign a deficiency); k is the ratio of the weight of reinforced acid to weight of spent acid, in this case 17/16 = 1.0625; and y is the ratio of MC to ML, where C is any point along BL through which the line connecting the compositions of the acids to be mixed may pass.

The figures used in setting up Fig. 2 include the following compositions:

Components	Spent Acid L	Fresh Acid M
H ₂ SO ₄	63	62
HNO ₃	24.5	28
H ₂ O	12.5	12

The original quantity of fresh mixed acid is 500 tons, the loss in the process 29.5 tons, and the quantity of spent acid 470.5 tons. Therefore, $k = 500 / 470.5 = 1.0625$ and $ML = AL / 17 = AM / 16$.

As has already been pointed out, the exact location of point A is of great importance. Furthermore, all acid compositions on a line through A, when on opposite sides of A, can be mixed to give the acid equilibrium; while acid pairs on the opposite sides of LAB, which are connected by a line intersecting above or below A, give an excess or deficiency, respectively, of nitrating acid mix. The three possible cases then include:

1. Acid equilibrium.
2. Reinforcing acid excess, in which case some spent acid must be eliminated to produce the desired quantity of reinforced acid.
3. Reinforcing acid deficiency, in which case fresh acid of composition M must be added to produce the desired quantity of reinforced acid.

Case 1, Acid Equilibrium—Spent acid of composition L, to the extent of 470.5 tons, is to be reinforced so that 500 tons of reinforced acid of composition M results. This can be done by the mixing of acid pairs on the opposite sides of A which fall on any line through A. For example, if oleum of composition R₁ is selected, consisting of 84 percent of 40 percent oleum and 6 percent HNO₃ (which has a freezing point of -23 deg. C.), then nitric acid of composition N₂, consisting of 85.8 percent HNO₃, must be used (or some composition falling along N₂A). The 29.5 tons of total reinforcing acid will consist of (29.5 × N₂A/N₂) = 13.17 tons of R₁, and (29.5 × AR₁/N₂R₁) = 16.33 tons of N₂. Table I shows a summary and check of these figures. It will be observed that the accuracy possible with a Gibbs triangle of usual size (11.5 in. on a side) is greater than the accuracy of the data, which introduce errors owing to the difficulty of securing representative samples for analysis.

Similar results can be obtained if, for example, oleum of composition F (11 percent H₂SO₄) is substituted for R₁. In this case, 12.22 tons of F would be added to 17.28 tons of N₂ to attain the desired mixture.

Instead, if reinforcing acid of com-

Fig. 1—Graphical method of calculating reinforcing acids to attain acid equilibrium

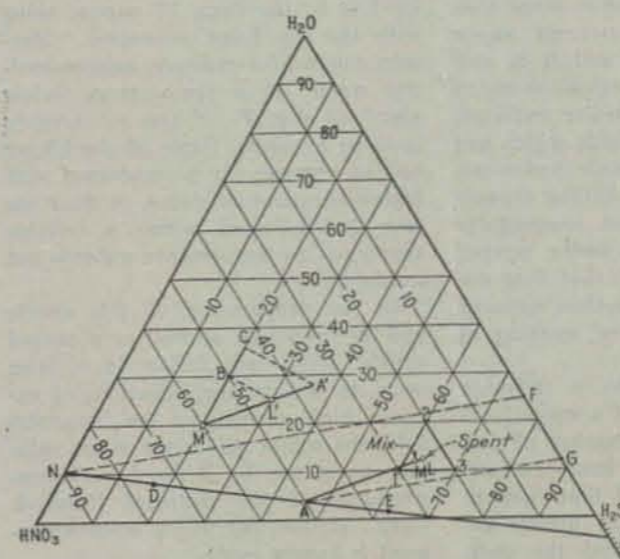


Fig. 2—Development of graphical method for problems where spent acid is in excess, deficiency or equilibrium

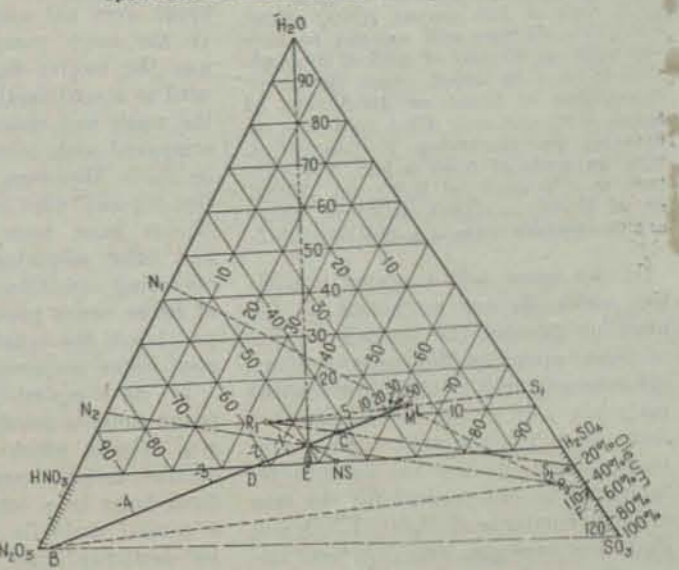


Table III—Summary of Problem With Acid Deficiency

	HNO ₃ Tons	H ₂ SO ₄ Tons	H ₂ O Tons
Spent acid, 470.5 t.....	115.3	296.4	58.8
H ₂ SO ₄ , 7.16 t; HNO ₃ , 12.34 t.....	12.34*	7.16*	1.23
L (to make up deficiency), 10 t.....	2.45	6.3	—
Total.....	130.09	309.86	60.05
Resulting composition by graphic method, %.....	26.02	61.97	12.01
Desired composition, %.....	26.00	62.00	12.00

* $(19.5 \times 36.7/100)$. * $(19.5 \times 63.3/100)$.

position E is available (47.8 percent H₂SO₄ and 52.2 percent of HNO₃) the desired mixture could be made from 28.23 tons of E and 1.27 tons of water, as shown by the line E-H₂O.

One further example is the use of 11.98 tons of a mixed acid of composition R (55.3 percent HNO₃, 34.6 percent H₂SO₄ and 10.1 percent H₂O) mixed with 17.52 tons of water-free mixed acid of composition NS (46.5 percent HNO₃ and 53.5 percent H₂SO₄).

Case 2, Acid Excess—If a mixture were made consisting of 470.5 tons of spent acid L, with reinforcing acid R₁ (34.6 percent H₂SO₄, 55.3 percent HNO₃ and 10.1 percent H₂O) and S₁ (104.5 percent H₂SO₄), the line R₁S₁ shows (where it crosses the excess scale AL at C) that an excess of 2.5 percent of reinforced acid would result, and that 2.5 percent of the spent acid must be eliminated. The spent acid L to be used, therefore, is $470.5 \times 0.975 = 458.4$ tons and the reinforcing acid is $500 - 458.4 = 41.6$ tons of R₁ and S₁. The required quantity of R₁ is $(41.6 \times CS_1/R_1S_1) = 31.9$ tons, and of S₁ is $(41.6 \times R_1C/R_1S_1) = 9.7$ tons. Table II shows a summary and check of these figures.

Case 3, Acid Deficiency—If a mixture composed of 100 percent HNO₃ and 100 percent H₂SO₄ should be used for reinforcement of 470.5 tons of spent acid of composition L, the intersection D of the line HNO₃-H₂SO₄ with the deficiency scale AB, shows that a deficiency of 2.1 percent would result. Instead of 470.5 tons of spent acid, $470.5/(100 - 2.1) = 480.5$ tons should be used, to which $500 - 480.5 = 19.5$ tons of the correct mixture of 100 percent H₂SO₄ and HNO₃ should be added to produce mixed acid of composition M. This is accomplished by adding to 470.5 tons of spent acid of composition L a mixture of $(19.5 \times 36.7/100) = 7.16$ tons of 100 percent H₂SO₄ and $(19.5 \times 63.3/100) = 12.34$ tons of 100 percent HNO₃. However, this mixture will amount to only 490 tons, so 10 tons of acid of composition L must be added. Since the above calculation is based on 480.5 tons of spent acid, and only 470.5 tons was recovered, the remaining 10 tons of L may be made of fresh acids. The mixture may be made of H₂SO₄ and HNO₃ or of H₂SO₄-HNO₃ mixtures which are on opposite sides of a line through L.

If the spent acid contains impurities which do not contribute to the nitration process, the analytical value of these impurities (for instance, nitrosyl-sulphuric acid, SO₂NH₂, and organic materials like oxalic acid, glycerine mono- and dinitrate, etc.) must be subtracted from 100 and the analysis recalculated to 100 percent for the sum of the percentages of H₂SO₄, HNO₃ and H₂O. For example, with 5 percent im-

purities and 23.3 percent HNO₃, 59.8 percent H₂SO₄ and 11.9 percent H₂O, the effective percentage of HNO₃ is $23.3/0.95 = 24.5$ percent HNO₃; of H₂SO₄ is $59.8/0.95 = 63.0$ percent H₂SO₄; and of H₂O is $11.9/0.95 = 12.5$ percent.

The graphic method described above is rapid in use and avoids the errors that are readily made in computations. Furthermore, it has the great advantage of permitting the discovery of optimum reinforcement conditions under any set of circumstances.

HIGH VACUUM

(Continued from page 105)

large capacity pump for industrial operations. (See Fig. 6.) In fact, there is no theoretical reason why diffusion pumps of any desired capacity (speed) up to many thousands of cubic feet per minute cannot be built. Pumps already built have capacities as high as 30,000 cu.ft. per min. at pressures as low as 10^{-4} mm. and there is no reason why pumps of several times the diameter and many times the capacity cannot be constructed if the demand for them should arise.

HOW DIFFUSION PUMPS WORK

The diffusion pump was developed by Langmuir in the United States about 1913, and by Gaede in Germany at about the same time, or shortly thereafter. In the earlier types, and, in fact, until quite recently, such pumps were always constructed of glass and hence were not adapted to large size. In the early pumps mercury vapor was the motive fluid, and it is still used to a considerable extent owing to the small and simple boiler required, compared with other fluids which can be used. However, certain hydrocarbon oils and other high-boiling organic liquids have been used successfully and offer advantages under proper operating conditions, in that they are of lower vapor pressure than mercury and hence are capable of working at even lower pressures.

In its simplest form a diffusion pump consists merely of a water-jacketed tube in which a number of jets of the motive vapor issue radially from holes in a central pipe beneath a conical umbrella which directs the jet downward and toward the walls

of the tube, as in Fig. 7. As molecules of the gas which is being evacuated diffuse into the curtain of motive vapor they are mechanically entrapped and moved beyond the curtain which has, of course, a component of motion in the desired direction. This is not to say that molecules of the gas cannot diffuse backward through the curtain, for some of them do, but about half of those which diffuse through do not return and the concentration below the curtain increases to the point where it is possible to remove the molecules from the system by means of a mechanical pump or steam ejector. Meanwhile, the curtain of motive vapor, having accomplished its purpose, reaches the water-cooled wall and condenses, flowing back to the boiler where it is re-vaporized for return to the jet. Pumps with only the umbrella type of jet are capable of operating at extremely low pressure, for example, at 10^{-7} mm. or even lower, using a low vapor pressure oil and properly designed baffles to prevent the motive vapor from backing up into the evacuated space, but they cannot operate with forepressures higher than about 0.25 mm. Therefore, the mechanical pump or jet which is used to discharge the trapped molecules must be capable of high efficiency at a relatively low pressure. Much higher forepressures are made possible by combining the umbrella type of diffusion pump with a stage of ejector type jets as shown in Fig. 7. Oil vapor pumps with such jets can operate at forepressures of several millimeters, and mercury pumps of this type at forepressures as high as 25 mm. No diffusion pump, however, can discharge directly to the atmosphere, all requiring operation in series with a mechanical pump or another ejector. All diffusion pumps require an efficient condensing arrangement for the motive fluid to prevent its loss in the form of vapor, along with the gas being evacuated. Mercury pumps, for example, require cooling water at a temperature below about 80 deg. F., if loss of mercury is to be avoided. Some of the higher boiling organics can be condensed with higher temperature water, so their use may be indicated where a reliable source of low-temperature water is not available.

In the preparation of this article and its drawings, as well as a second article which will follow in a later issue, to deal with applications of extreme high vacuum in the industrial field, the writer was given much valuable assistance by Richard S. Morse, president of the National Research Corp., Boston, for which acknowledgment is hereby made.

CHEMICAL & METALLURGICAL ENGINEERING

"The Monthly Magazine of the Process Industries"

McGraw-Hill, 330 W. 42nd St., New York City

MAGNESIUM

(Continued from page 101)

ing the pouring. Tilting of the frame is synchronized with movement of the mold chain so that each mold is filled with exactly the right amount of metal. One side of each mold is built up in a V shape which overlaps the low side of the neighboring mold, so that no metal is spilled as the chain advances. Movement of both furnace and chain is entirely smooth at all times, and the choking atmosphere of SO₂ which surrounds the hand operation is absent. A reducing atmosphere does surround the molten metal until it solidifies, but no fumes escape into the room.

Care is taken to prevent pouring out of the pot any of the sludge which has settled to the bottom, and when all possible pure metal has been poured out, the tilting furnace is returned to an upright position and the pot removed. The empty pot is transferred

to the cleaning room nearby and a fresh pot is immediately placed in the casting machine. Two overhead cranes serve the refining room, and so rapidly do they carry the 2-ton pots on the round from furnace to casting machine to clean-up and back to furnace that there is never a break in the procession of trucks leaving the refining room loaded with magnesium. Even when an empty pot is exchanged for a full one at one of the casting machines, there is only a short pause in the steady clinking of ingots dropping from the end of the mold chain.

In the cleaning room, the pots are entirely emptied of sludge, and as much metal as possible is recovered. After a rapid inspection and cleaning, the pots are swung out again and put back into the nearest empty furnace to be refilled.

Adjoining the refining room, is storage space for ingots awaiting sampling, inspection, and weighing. Beyond the stacked ingots are assembly-line arrangements run by women, in which approved ingots are

wrapped for shipment. This bare statement of fact does these women an injustice, however, for they work with a sort of desperate urgency unmatched anywhere else in the plant.

One could easily, and perhaps someone will, fill a book with the whole story of this enterprise. Aside from building the main plant, the erection of the workers' townsite, complete with air-conditioned houses, schools, and stores is a major achievement, as is the construction of the power lines and pipe lines into the plant. Every existing type of engineering skill and experience had a part in this project, and is working right now to expand its production even beyond the incredible limits set originally. As to the future of this young giant, your guess is as good as anyone's, but its present and its past are written large across a square mile of Nevada desert and hundreds of square miles of Axis sky. BMI's men don't worry about tomorrow just yet; they are too busy turning out the magnesium we need today.

