Bubble Force Makes Billions

Fortunes Extracted Daily From Froth by Treatment of Low-Grade Ores.

GREAT SAVING OF

Knowledge of Colloid and Organic Chemistry Necessary for the Flotation Millman-Skillful Work for a Profit.

New York.—Billions are being added to the world's wealth by the forces at method of mineral separation, by which every day in the year fortunes are literally extracted from froth, is and at the same time rejection as now exercising so powerful an influence on mining operations in this and other countries that, according to Columbia university authorities, the fu- present-day standards and the ores ture of copper production, and therefore of the electrical industry, largely hinges on bubbles.

The process of ore concentration has always been considered important in dressing plant could be and was inci- paign. mining engineering schools and the flotation process is a leading factor in laboratory practice at Columbia, where the ore dressing laboratory is now undergoing considerable expansion.

According to both Dean George B. Pegram of the Columbia School of Mines, Engineering and Chemistry, and Arthur F. Taggart, professor of ore dressing, the advent of flotation has worked a revolution in mining meth-

"The word 'bubble' used in connection with mining properties formerly referred to a kind of financial management which could hardly be tolerated in these dry and sober days, but in the last few years bubbles have taken on a new and more important significance for the larger part of the mining industry," said Dean Pegram. "The most important problem of the mining engineers is usually how to concentrate the mineral in low-grade ore to such an extent that the working of the ore will be profitable. A process has been developed which applies particularly to all sulphide ores, and these include most of the copper, zinc and lead ores, in which the ores may be beautifully concentrated by the action of fine bubbles of air attaching themselves to the particles of mineral, finely ground and

Separate Sand and Froth. froth, while the sand and other worthless material sink to the bottom of the vessel. This flotation process has not only made much more profitable the working of the better grade of copper, zinc and lead ore, but has also made very profitable the working of ores which previously could not have been handled without actual loss.

"The whole secret of the bubbles of air gathering up the mineral particles and leaving the sand depends upon treating the finely crushed ore in water with one of various chemical substances, among them oleic acid and pine oil. Only a very small amount of the oil is necessary, less than 1 per the introduction of grinding machinery ment, preferably in chemistry, physics cent by weight of the amount of mineral that is in the ore.

"After the proper reagent has been added to the water and the finely crushed ore, air is introduced into it either by heating it in with a stirrer or by forcing it in through fine pores in the bottom of the vessel, or any way in which to bring fine bubbles of the air into intimate contact with the fine particles of the ore. The separation is marvelously complete, the mineral going to the top in bubbles, forming a thick froth, which is collected by suitable arrangements, while the sand and other gangue material settles quite clean of any valuable mineral to the bottom of the vessel.

"Of course the process is made to run continuously, and in some mills as much as 4,000 tons of mineral in froth inically and at greater length in a preis separated each day. Altogether in vious two-reel subject, "Grain-Dust 1918 there were 60,000,000 tons of ore | Explosions in Mills and Elevators," treated by the flotation process.

of copper production, and therefore of the electrical industry, is very largely

dependent on the same forces that are at work in the soap bubble." Professor Taggart declared that the demand for specialists in ore dressing with expert knowledge of the design and operation of the bewildering array of machinery now employed has become so insistent that school curricula must be altered to offer the necessary preparatory courses.

"Ore dressing is an indispensable link between mining and metallurgy in present-day practice in the extraction of metals from the earth," said Professor Taggart. "It consists in nonwork in the soap bubble. The flotation | chemical concentration of the valuable part of an ore into a bulk much smaller than that of the original ore, waste of the worthless portion.

"Until about fifteen years ago most mills were small as compared with were relatively high grade. The ore treatment problem was a simple one, and as a result the technical as well as the executive direction of the ore the record will be used in the camdental to the direction with which the concentrator was built.

"The services of a specialist in concentration were considered unnecessary. With the development of the uct. large, low-grade, disseminated copper deposits, the importance of ore dressing took a sudden jump. These deposits contain only from twenty to forty pounds of copper per ton of ore. The ore bodies as originally discovered contained from 20,000,000 to 100,000,000 tons each of such ore. For economical lation of machinery, sufficient grasp of working of such deposits elaborate the principles of economics and busiconcentrating plants, capable of handling from 5,000 to 40,000 tons of ore

per day were necessary. Skillful Work for Profit.

"These plants required the most skillful direction possible if a profit was to be made from their operation, and a demand for specialists in concentration immediately arose. Within the last seven years the successful application of processes of froth flotation | tion of the fundamental sciences and a to the treatment of these low-grade firm grounding in the use of the Engores has resulted in the saving of four lish language to express ideas and to to six pounds more copper per ton than present results and conclusions; in was formerly possible.

"The advent of flotation called for a mill man of much broader scientific neers. education than the old concentration processes required. A flotation mill a superstructure composed of courses man needs a working knowledge of leading to a thorough knowledge of the the newest branch of physical chemis- properties and occurrences of min-"The bubbles with the sulphide min- try, viz., colloid chemistry, and should erals, to an understanding of the prinalso have some acquaintance with or- ciples and simpler details of the design ganic chemistry. Coincident with the of structures, the generation and transadvent of flotation in milling there has mission of power, the methods of minbeen a revolution in the methods of ing, the general principles of metalgrinding ores preparatory to concen- lurgy and the principles of economics tration. In the old concentration and business finance and accounting. processes it was impossible to treat

very finely ground ore economically. works best on finely pulverized ore. Hence it was necessary, on the intro- forts and initiative. duction of flotation, to devise methods of an entirely different type. In con-

MAKING CANNED SPEECH



Senator Warren G. Harding, Republican presidential nominee, dictating his first speech for a phonograph record. His subject is Americanism and

developed also machinery for sizing and dewatering the finely ground prod-

"The men who will successfully handle this work must understand the physical principles underlying the operations of ore concentration, and must have, in addition, the collateral engineering knowledge essential to the designing of structures and the instalness to be able to judge results from a commercial standpoint, sufficient knowledge of mining to understand how ores are produced to the surface of the ground, and, finally, sufficient knowledge of metallurgy to understand the demands of the metallurgist as to the character of concentrate produced.

"The instruction of such men in college then should consist in a foundaother words, such basic instruction as is essential to the training of all engi-

"On this foundation should be built

"Finally, following some elementary instruction in ore dressing, the stu-"Hence all grinding was done with dent should be assigned a definite, the end in view of producing as little fairly difficult problem in that subject, slime as possible. Flotation, however, which he is expected to carry through to a conclusion largely by his own ef-

"In connection with this problem of grinding different from those at that there should be time in the curriculum time in use, such methods being aimed to allow the student to elect one or at producing slime. This resulted in more courses in some other departor metallurgy, such courses being along

nection with the new grinding and flo- the line of the problem under investitation machinery there was necessarily gation."

One-Reel Motion Picture Used by Agricultural Department in Edu-

Why dust is dangerous is shown conclusively in a one-reel motion picture, "Explosive Dusts," recently issued by the United States department of agriculture, in co-operation with the United States grain corporation. The picture is a popular presentation of a subject that was covered more techwhich traveled all over the United man service in helping to stop the dis-

The old two-reel picture is being retained for the use of workers in the bureau of chemistry. The new onereeler is especially designed for showing in high schools and other scholastic institutions, as well as before grain and milling men, fire prevention and insurance associations, and others directly interested in the subject.

Sampson was pretty good at city laborer.

wolf, weighing 60 pounds or more, was killed the other day by James Kees, who lives east of this city, in a woods adjoining the golf links of the Richmond Country club. The animal had been preying on poultry in the vicinity

'DRY' LICENSES **EXCEED 57,000**

Nearly 16,000 Physicians Have Received Permits to Write Prescriptions.

DRUGGISTS IN BIG NUMBERS

Only 238 Permits for the Manufacture of Intoxicants Have Been Issued, One-fourth of Them Being From California.

Washington. - More than 57,000 druggists, retail and wholesale, and manufacturers of proprietary medicines, flavoring extracts, sirups, etc., have been licensed in the United States and its consular possessions to date, under the national prohibition act, according to statistics just compiled in the office of the prohibition commissioner, John H. Kramer.

The records of the internal revenue bureau also show that nearly 16,000 physicians in the United States, Hawaii and Porto Rico have received permits to write prescriptions calling for the dispensation of intoxicating liquors for medicinal purpose and that additional permits at the rate of 1,000 a month are being issued to physi-

Tabulation by states of the physiclans licensed up to June 25 show that the prohibition director for Massachusetts has issued more than 15 per cent of the number of such permits distributed. New York state has another 15 per cent.

Massachusetts Leads.

The exact figures are: Massachusetts, 2,450; New York, 2,421 Pennsylvania, 1,525; Ohio, 1,450; Maryland, 1,225; Missouri, 1,150; Minnesota. 693. In states such as Illinois, Kansas and Indiana, where state codes will not permit of the use of such permits, no physicians have been licensed by the government so to prescribe.

Porto Rican physicians, apparently, are awake to their opportunities under prohibition, 176 licenses to physicians more than have been issued in Missis- other state. There are 602 issued in

Lack of Food and Materials Pre-

vents Their Working With

Old-Time Vigor.

HAVE NO HATE FOR AMERICANS

Hope to Establish Friendship Between

two Countries, Says German Agent

-Country at Present Has

Nothing for Export.

New York.—The German people are

eager to work and readjust themselves

and pay their war indemnities, but

they cannot do so until they have help

in the way of food and materials, ac-

cording to Otto J. Marum, the German

agent for an American Leather com-

pany in Milwaukee, who recently ar-

rived from Germany. He says that the

German workman is so underfed that

he cannot possibly do a proper day's

work, and that the high prices for all

the necessities there, combined with

the pay of the laborer with the mark

at its present low rate of value, is

causing hardships and great suffering

among the working classes that can

put up at the best hotels where there

is plenty of good food, and make a

superficial inspection of some of the

more accessible districts, cannot judge

of the lack of food throughout the

country," said Mr. Marum. "Deformed

children are seen everywhere where

the working people live, but one falls

to take into consideration that their

whole organism is undermined and

that they will always bear the marks

of what they have suffered in the last

Nothing for Export.

port, partly because of the great

dearth of coal for factories and manu-

facturing purposes, and also because

there are so few raw materials. The

raw materials now available fill only a

very small percentage of the domestic

needs. The people are striving to at-

tain their old-time efficiency, but liv-

ing costs must go down in order that

wages may be reduced for profitable

front other countries now are present

in Germany in a more aggravated

form. For instance, the housing prob-

lem had reached a much more acute

"The same general problems that con-

"There is nothing at present for ex-

"The visitors who come to Germany,

scarcely be realized.

few years.

production.

much discontent.

German People

Eager to Work

Camel Meat Is Put on Sale in Paris



The zoo in Paris was unable longer to feed many of its animals, and the camels were sold to a butcher, who slaughtered them and offered the meat to his customers as a substitute for beef.

North Dakota, South Dakota, West Virginia, Georgia, Florida and Maine combined.

number of retail and wholesale druggists, manufacturers of proprietary medicines, extracts and other products requiring the use of intoxicating liquor as an ingredient. Permits for these dispensers of products containing considerable quantities of intoxicants have been issued to 16,000 in New York state alone, or about 28 per cent

of the total in the country. Pennsylvania ranks second with about 12,800 such permits issued up to June 25. Illinois is third with nearly 3.000. Massachusetts is fourth with about 1,800 and Ohio is less than a hundred behind in fifth place.

More than twice as many permits to prescribe intoxicating liquors have for the sale alone of liquors have ing been issued in that territory, or been issued in Pennsylvania as in any

hibitive to build any but the simplest

structures. However, it is believed

that by fall conditions must improve

somewhat and prices will be reduced.

Prices on all commodities are most

exorbitant. Men's suits that were a

few years ago 120 marks are now

bringing as high as 2,000 to 3,000

marks. Shoes which were 18 to 25

marks are now 400 to 500. Only the

profiteers can afford such prices, and

there are profiteers in Germany as

well as elsewhere. All meat, flour,

sugar, butter, milk and other neces-

sippi, Arkansas, New Mexico, Nevada, | the Keystone state out of 3,243 for the entire country. These are issued principally to distillers and others, having intoxicating stuff in bond, but some New York state is far in the van in wholesale liquor dealers and possibly some druggists may be found in this

> Permits for Manufacture. Only 238 permits for the manufacture of intoxicants have been issued, and more than a fourth of these, or 64, have gone to the winerles of California. Two permits of this class have been issued to distillers of whisky, both in Pennsylvania, according to enforcement officials.

Thirty-five of the sixty rectifiers' license have been granted to firms in

New York state. Ohlo's state prohibition director has issued more permits for the transportation of intoxicating liquor than any other, with 350. Kentucky is second with 251 and Pennsylvania third with 199. Massachusetts ranks fourth with 147. California fifth with 140, New York sixth with 128, Connecticut seventh with 112 and Missouri eighth

All other classes of permits for the use in any way of intoxicating liquor, in its importation or exportation, for manufacture or use of intoxicating cider for conversion into vinegar, and for the sale or purchase of alcoholic preparations, sirups and beverages of more than half of 1 per cent alcoholic contents are issued direct from the prohibition commissioner's office, as also are permits to operate dealcoholizing plants and rectification establishments.

Permits "H" for the use of intoxicating liquors-in the manufacture of medicinal preparations, extracts, sirups, etc.-have been issued up to the number of 45,808 and permits "I" for the "use and sale" of such liquors have been issued up to the number of 11.370. These two classes of permits take in both wholesalers and retailers of intoxicants-always with the qualification "for medicinal purposes"-and because of the confusion resulting from these similar classifications, "H" and "I" permits now are being consolidated in many instances so that druggists, for instance, may not only dispease whisky, etc., on prescription, but may also use it in concocting medicinal preparations of more than one balf of 1 per cent alcoholic content.

At the present rate of withdrawal from bond it will take only five years for the available supply of whisky in the United States to be consumed.

DANGERS OF DUST SHOWN

cational Campaign.

"It may truly be said that the future | States and into Canada and did yeo-

asters that threatened America's bread supply during the war.

Requests for the loan of the film should be made through some field worker of the department of agriculture, or they may be sent directly to the department. Arrangements also have been made enabling outside persons and institutions to buy prints of the film at the cost of manufacture.

ŢŖŖŖŖŖŖŖŖŖŖŖŖŖŖŖŖŖŖŖŖŖŖŖŖŖ Modern Sampson Unhurt By Toppling Building

handling buildings but he could boast of no superiority over John Pettibone, a New York

After a two-story frame building had toppled over on Pettibone, and the employees, whose lives he had saved by his shout of warning, together with a detail of police and two fire companies had dug him out, Pettibone walked disdainfully home, leaving the ambulance and pulmotor crews rubbing their eyes.

Gray Timber Wolf Killed.

Richmond, Ind .- A gray timber

sitles are still rationed by the government, and it is quite likely that this will continue for some time.

Trade With Italy. "Trade has been established with Italy and relations with that country are good, and gradually improving. If the people of this country could get real facts and correct statements, there would be little, if any, ill feeling between the two countries. The war feeling is rapidly disappearing and in Germany there is none of the hate that some of the newspapers speak of. There exists the best of feeling throughout Germany for the Americans in general.

"The influx of the Senegal negroes to Frankfort and other places in Germany caused no end of ill feeling and misunderstanding, with keen bitterness. The negroes were quartered in the school houses and other public bulldings and so much disorder resulted that finally the French were obliged to remove them.

"The German people are mainly law abiding, and the bolsheviki will never take a strong hold there. The great order of the post offce department the mass of people are good workers and office has been closed, and soon the very industrious, if given a chance, railroad will be discontinued, with and are not at all in sympathy with trains running only to Hitchcock. the methods of the present disturbers of Europe. Their ambition is to become a steady, progressive country, but they greatly need assistance to build up and grow strong again. Their their rendezvous, from where they are coal fields are now owned by France; their farm lands have deteriorated, and much of their manufacturing machinery is gone. It is next to impossible for the farmers to operate, be- house in its history would not seat cause of the scarcity of farm labor and the cost of that available. There is a great shortage of potatoes, as the potato fields of Posen are now owned by the Polish nation."

Sisters Meet After Years.

Springfield, O .- Mrs. Thomas Smith of Jackson, O., and Mrs. James Delastate than here. The government made ney of Pottsville, Pa., sisters, met here an effort to adjust this by obliging those with more rooms in their resi- the other day for the first time in 58 years at the home of Mrs. Smith's son dences than were actually needed for their own families to take others into Thomas M. Smith. Both lived in their homes—as renters, of course— Pottsville when little girls, Fiftybut since they are allowed the use of eight years ago Mrs. Smith came to the kitchens and laundries and other Ohio and settled in Jackson. The long separation was the result of both havparts of the houses the arrangement has made for great confusion and ing large families which required their attention. Mrs. Smith has 17 children "The high prices for all building and Mrs. Delaney has 14. One of Mrs. materials and the high wages for Delaney's sons, Thomas, of Philadel- aim is to combat political strikes and workmen have made it almost pro- phia, came here with her.

FEUDS KILL TOWN OF 1,000

Ferguson, Okla., Dies Fighting-Had No Church and but Small School.

Oklahoma City, Okla.-Hate killed Ferguson. Fifteen years ago a town of 1,000 people, having a large salt factory, a gypsum plant and shipping facilities, Ferguson today is dead. By

Ferguson is said to have died fighting as it had lived. Main street fights were common. West of town alleged outlaws "Yeager" and "Black," had said to have stolen horses and cattle of farmers and citizens.

Ferguson never had a church, nor talk of a church. The only schoolmore than twenty-five children.

**************** To Flog Profiteers Is Aim of This Bill

Budapest.-In deference to urgent requests of the national assembly the Hungarian government has drafted a bill prescribing corporal punishment for profiteers.

Tananananan hannan hann

Create Civilian Unions. Brussels.-Most of the large cities of Belgium, following the examples given in France and Switzerland, are creating civilian unions, whose chief assure the working of public services.

Now Making It Up to Her



Just to show that the disturbance recently enacted at the opening of her show in London is deeply regretted, the English theater going public, is now tendering to Laurette Taylor many demonstrations of their approval. At a performance a week ago, she was presented with a beautiful wreath of flowers, for several days. Kees killed the aniand the boys' band from one of the orphan homes near London played for her. | mal with a rifle after several shots.