STATE OF OREGON
DEPARTMENT OF GEOLOGY & MINERAL INDUSTRIES
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THE ORE.-BIN

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TO ALL EXCHANGE LIBRARIES:

Announcement is made of the release of Geology and Geologic Map of the Round Mountain Quadrangle, Oregon, Map Series no.2, by W. D. Wilkinson and others.

Copies of this publication will be mailed from this office about March 15th, 1940. If not received within ten days from the above date, advise this office immediately; otherwise, replacement for copies lost in the mail or elsewhere cannot be made.

NEW GEOLOGIC MAP ANNOUNCED.

Announcement is made of the publication of the following geologic map and text by the Department of Geology and Mineral Industries:

> "Geology and Geologic map of the Round Mountain Quadrangle, Oregon", by W. D. Wilkinson and others: State Department of Geology & Mineral Industries, Map Series no.2; black and white geologic map, 30 minute quadrangle, scale 1:95,000; text, column, bitliography on back. Price 25 cents postpaid.

The Round Mountain quadrangle includes one of the three main quicksilver producing areas of the state. The map may be of considerable use to prospectors in that it delimits the area in which the quicksilver can be found, and suggests the best areas for prospecting. The map and text is also a valuable contribution to the rather scanty geologic history of central Oregon. Dr. W.D. Wilkinson, of the Department of Geology of Oregon State College, is senior author and has spent many years working out the past story in the rocks of that part of the state.

Eight geologic formations, ranging in age from Cretaceous to Pleistocene, give one of the most complete Tertiary sections known in the state. These were mapped by a party of seven men, under Dr. Wilkinson and John Eliot Allen of this Department, who spent six weeks in the field with plane table and chain.

A description of the formations is followed by a study of the structures and an outline of the economic geology of the region with discussion of seventeen of the mines and prospects in the area.

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This is our Special Annual Issue of THE ORE.-BIN. In it, we are including a sort of summary of developments in mining, metallurgy, chemistry, and certain topics which are of general interest in connection with the utilization of industrial minerals - all for the year 1939. Part of the material contained herein represents information obtained by the Director in a recent trip to attend the annual meeting of the American Institute of Mining and Metallurgical Engineers in New York, then during his discussions in Washington with the technicians of the U.S. Geological Survey and U.S. Bureau of Mines, and in various industrial centers in the East and Middle West with corporations producing or treating both metallic and non-metallic mineral products. Persons interested in more complete information in regard to any of the topics below are invited to write to this Department.

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Platinum is coming into wider use of late as a substitute for gold for dental and other uses, because, especially in foreign countries, the gold supply is small. Some of the platinum group of metals, particularly palladium, are being widely used in dentistry. In the United States, increased use of platinum in manufacture of electrodes for aircraft engine spark plugs is noted. Platinum is quoted at about $40 per ounce. The price increased somewhat during 1939. World production of platinum is roughly one-half million ounces, of which nearly 1/4 comes from the Sudbury copper-nickel ores.

Zinc is being used much more widely in alloys for die-castings for special automobile parts. Metallic zinc powder is in increased demand for use in paints and priming for galvanizing. There is a large current demand for rolled zinc for dry battery cans, we learned from MINING & METALLURGY, due to increased use of dry batteries in radio for war purposes, wartime blackouts, and the popularity of the new portable radio sets. Regardless of present demand, the situation of zinc in the United States seems much less satisfactory than that of lead. The reduction of 20% in the duty on slab zinc and ore which took effect in January 1939 as a result of a trade treaty with Canada is given as a partial cause for this situation.

A new Super-finish (to remove surface defects and scratches from mechanical operations on metallic surfaces) has been developed by Chrysler Corporation, according to MINING & METALLURGY. The polishing process is applied to surfaces regardless of whether they are flat or rounded. Ordinary abrasives of the proper type in a lubricant medium are applied under pressure to the metallic surface. After the Super-finished surface has been treated, it is stated, there are no indentations deeper than a few millionths of an inch. The Super-finish also is applied to bearing surfaces in such a fashion that closer clearance can be maintained with a minimum of lubrication.

The U.S. Bureau of Mines (Information Circular no.8788) has made a study of the mechanics of lime plants. From this it appears that small plants producing less than 1,000 tons per year cut but little figure in the total lime production; that the big companies producing 50,000 tons or more per year are more sensitive to depressions and market situations and showed a wide fluctuation in the rate of operation; whereas the medium-sized plants producing from 10,000 to 50,000 tons of lime per year are the most regular in their operations.

Alaskite, a rock consisting essentially of quartz and alkaline feldspar, is a new material of much promise in the ceramic industry, according to a review in MINING & METALLURGY. This rock when ground to a powder and treated electro-magnetically for removal of dark colored minerals, furnishes a satisfactory product for the manufacture of china sanitary ware products. It is stated that the rock may provide an important source of mixed feldspars for pottery.

Nepheline-syenite is finding increased production for use in the ceramic industries. It is now supplying a portion of the material for the Canadian glass trade, and it is said that production may be stepped up to take care of the needs of new glass plants in Ontario.

In the cement industry there seems to be a trend toward manufacturing a product of increased fineness. Difficulty in final grinding is met on account of the tendency of the smallest particles to flocculate or draw together into mounds or lumps because of their taking on slight electrical charges. The Dewey & Almy Chemical Co. of Cambridge, Mass., we learn from MINING & METALLURGY, has discovered a so-called dispersing agent which is added to the clinker grinding mill in the proportion of one part to three thousand. On account of the action of this reagent the mill capacities are stepped up as much as 20-40%, with a considerable saving in grinding costs for the final product.

Garnet is finding increased use as an abrasive for sand-blasting purposes. It is competitive, states MINING & METALLURGY, with silica sand or silicon carbide powders.

Substitution of borts (low-grade diamonds of gem quality) for black diamonds is an important trend in the diamond drilling industry. Bits are being made which use from 50 to more than 100 individual bort stones, machine cast by a patented operation. These bits are much cheaper than the old-fashioned diamond bits, which usually contained 8 large-sized black diamonds. The new bort bits are being used widely in most kinds of diamond drilling where the ground or rock is not fractured too badly. In fractured ground nothing has been found to surpass the old style diamond bit, set by hand with black diamonds.

Glass wool, according to MINING & METALLURGY, is attaining increased refinement and wider use as a substitute for asbestos in heating insulation. Glass wool is in general superior to insulation made from wood waste products because the latter are not fire resistant. Owing to the bulkiness of glass wool, it is uneconomical to ship it very great distances, therefore the product is commonly manufactured in areas of large population for consumption and shipment within a radius of a very few hundred miles from the producing plant. This is an industry which might well be looked into for the Portland area, where people are becoming more and more conscious of the economical soundness of properly insulating their houses against heat losses.

About 100 tons per month of massive serpentine, according to MINING & METALLURGY, are being shipped from Nottingham, Penna., to a point in the Middle West,

presumably for utilization of its magnesia content. Perhaps we can pick out some use for certain deposits of rather pure serpentine that are located in southwestern Oregon.

General Motors Corporation in 1939 took out a patent for a brake lining manufactured from glass fiber. We understand the fiber is combined with a synthetic resin and presumably molded into brake block shapes. A number of amazing materials are now being made from glass fiber. These include cloth of various types and intended for various uses. The elasticity of glass when spun into infinitesimally fine fibers is the basis for its increased use for new industrial materials.

Pyrite, according to MINING & METALLURGY, was being shipped for some months last year from Canada into the United States at the rate of 1,000 tons per day. This material will replace in great part the importation of pyrite from Spain. Such importation, of course, has been interfered with on account of war conditions. The Wescott process for recovering sulfur from pyrite was perfected in 1938 by the Aldermark Copper Corporation, Ltd., of Quebec. The operation of the plant, however, we understand, has been delayed because of the heavy demand for pyrite for other uses.

Concrete is being used for construction of a floating pontoon bridge across Lake Washington at Seattle. This bridge will be more than 6,000 feet long and will consist of 25 pontoons each 350 feet long. A section in the middle of the bridge is removable by a telescoping mechanical arrangement so that water traffic may pass through. Anchors are attached to each of the pontoons to prevent swaying of the bridge, which is designed to resist the force set up and the waves created by a 90-mile-an-hour wind. During recent storms, with 4200 feet of the bridge in position, winds with a velocity of 50 miles per hour shifted the structure sideways only about 2 inches. It is interesting to note that the Golden Gate Bridge, a steel and concrete suspension structure, is said to sway a total of nearly 12 feet in a wind of hurricane velocity. The reinforced concrete pontoons are "poured" while in a drydock, and floated into position, where they are fastened together with heavy anchor bolts. The pontoon type of construction was selected because of the great depth of water, more than 200 feet, and because the present bridge will cost only slightly more than $4,000,000, as against the estimated cost of $20,000,000 for the conventional type of bridge. An excellent description of this pontoon bridge, the largest of its kind in the world, is given in the COMPRESSED AIR magazine, to whom we are indebted for the above thumb-nail description.

Modern Calyx drills which remove a core 6 feet in diameter are also described in the COMPRESSED AIR magazine. This drill is now being used for the emplacement of deep footings for bridges where a footing of substantial diameter is desired, and yet where it would not be feasible to sink a caisson. The drills may be mounted either on scows floating on the river, or on land locations. The Calyx is one of the two methods becoming more and more popular for rapid and satisfactory sinking of mine shafts.

Steel production of the eastern mills has been falling off rapidly very lately from a near 100% capacity around the first of the year. This is alleged to be due to a combination of causes, among which are uncertainties over the war situation and uncertainties over automobile sales for the current season.

Lead is in a strong position mainly on account of demand caused by war conditions. During December sales reached a record high of 104,000 tons, or around 2½ times the current domestic mine output. Nevertheless, the price has not increased in proportion to what the demand would indicate it should.

Cobalt imports during 1939 were almost double those of 1938, although it does not appear that the actual consumption was substantially greater than in the latter year. The increased imports went mainly into inventories.

Magnesium, according to the ENGINEERING & MINING JOURNAL, set a record world production as a result of new plants built in the United Kingdom, Italy and Japan. Military aircraft construction led in consumption of magnesium alloys but the use of high-pressure die castings as well as sand castings expanded also. The price of the metal was reduced by the Dow Chemical Co., sole domestic producer, from 30¢ to 27¢ per pound. Much work has been done by the U.S. Bureau of Mines in their research laboratories on the problem of economic production of magnesium metal from domestic magnesite.

The manganese situation has been somewhat affected by war conditions. About 700,000 long tons of manganese ore, containing about 300,000 tons of manganese, were imported during 1939. Of this, the largest amount, or 27%, came from Russia. The rest came from the Gold Coast, British India, Cuba, and Brazil. Domestic production amounted to little, only about 28,000 tons in 1939. The U.S. Bureau of Mines and the U.S. Geological Survey gave considerable attention to manganese in 1939, and will give even more attention during 1940, we were informed in Washington. Exploration is now going on in the Olympic Peninsula of Washington. Due mainly to the research work of the Bureau of Mines on the deposition of metallic manganese, one of our domestic corporations is carrying on exploration in the Artillery Peak region of Arizona on oxide ores, running only 12% to 15% Mn. It is probable that some attention will be given this year to exploration and metallurgy of manganese carbonate ores in California and elsewhere. This Department will shortly undertake an investigation of some low-grade manganese deposits in Baker county, Oregon, to determine whether they are worthy of recommendation to the U.S. Bureau of Mines for attention under the Strategic Minerals program.

Mercury jumped from less than $80 to about $160 per flask during 1939. Oregon quicksilver was sold this last week at a price of $180 per flask. Price fluctuations have been marked during the last six months as the demand for the metal is based both on the war news from European countries and on the current requirements of industry in this country. The largest individual quicksilver producer in the United States at the present time is the Bonanza Mine at Sutherlin, Oregon, H. C. Wilmot, manager. The Bonanza produced 500 flasks in February 1940, and is pegged for a continuing production of nearly 600 flasks per month. With the Bonanza producing at this rate and other operations accelerating their production, it is not unlikely that Oregon production will equal that of California for the year 1940.

According to the ENGINEERING & MINING JOURNAL, the phenomenal rise in molybdenum production was checked in 1939. The production was about 31,000,000 pounds last year, or 7% less than that for 1938. The Climax Molybdenum Corporation of Climax, Colorado, produces about 2/3 of the domestic metal. Until recently, Russia, Japan and the United Kingdom have been receiving molybdenum exports from this country, although the question of continued export to Japan especially is doubtful, since the State Department has included this metal on the moral embargo

list. The most interesting angle in the molybdenum picture during 1939 was the increased production of this metal as a by-product of the copper operations at Bingham Canyon, Utah, and Chino and Miami, Arizona.

Vanadium imports, according to ENGINEERING & MINING JOURNAL, were about 30% larger in 1939 than in the previous year. All American imports came from Peru. The principal domestic producer is the United States Vanadium Corporation, from Colorado and Utah ores.

Prospecting, it was brought out at recent meetings in New York of the American Institute of Mining & Metallurgical Engineers, is receiving increasing attention on the part of large mine operators in various parts of the world. Methods are continually being improved and especial attention is being given to geophysical methods and refinement in drilling and sampling. One of the new devices is a rotary type of prospecting drill, especially adaptable for testing placers on unconsolidated materials. It combines some of the advantages of the churn drill with certain advantages of the rotary as used in oilfield practice. It will remove, virtually intact, a "core" about 9 inches in diameter, and since the casing is rotated, will diminish the amount of contamination of sample. The machine is not yet in production. If it does what the first model tried out in the field indicates, it should be a boon to prospecting for dredge ground. . . The use of fluorescent lights for prospecting for scheelite is an interesting new development. Surface work can be done at night, and by using portable equipment an engineer can walk over a deposit and obtain some acceptable idea of the amount of tungsten contained in outcrops. The device is also used for "assaying" stopes in underground tungsten mines, and, it is said, does a very acceptable job in the hands of one accustomed to using the device in this manner.

Improvements in hard rock drilling underground were made in 1939. One of the larger manufacturers of rock drills is perfecting a high speed (3600 rpm.) type of post machine which is electrically operated and almost automatic. Special alloys or bort are used for the bits, which are cooled by a stream of water forced through the hollow drill rod, in the same manner as in a water leyner. It is estimated that the drilling cost with this new machine will be very materially reduced. . . Jack bits or detachable bits are becoming increasingly popular for general use underground as their quality is being improved. W. M. Ross (MINING & METALLURGY) estimates that about 1/4 of hard rock drilling is now being done with replaceable bits. Jack bits, as now manufactured, are used three or four times, each time after resharpening in a grinding device, and are then thrown away or saved for scrap.

The "burnt cut" is a method of drilling and blasting a drift round of holes so that sequence of blasting first breaks a cut in the center of the face to the approximate depth of the center holes drilled. The remaining top, side, and bottom holes all break to the center cut. The unique feature of the "burnt cut" is that, of the nest of symetrically spaced holes drilled near the center of the face, some are not blasted but serve to relieve the ground so that those blasted will break efficiently. A description of the method as practiced at the Hollinger is given in T.P.No.1159 American Institute of Mining & Metallurgical Engineers.

Dredge practice did not change materially in 1939. Some operations changed over from tables to jigs, some discarded their jigs. New replaceable bucket lips are increasing in popularity. More attention is being given to refinements in gold saving than previously. Especial attention is being given to riffles. Hard rubber riffles are coming in, it appears, and rubber strips are replacing metal

stripping for the wearing top surfaces of Hungarian riffles in dredge sluices. Rubber lining for sluices is becoming quite common. One angle of dredge practice which has been sadly neglected but which is now receiving some attention, is that of accurate and automatic sampling of the tailings. . . . The new "upside-down" resurfacing type dragline dredge of H. F. England and Associates has been in operation in Prairie City, Oregon, since about the first of the year and is reported to be working successfully. In this operation the screen is at deck level and is horizontal, with the worm arrangement for discharging the oversize at the back of the boat. Undersize is pumped to a combination of riffles and jigs set above the screen. It is stated that the swell of ground in this operation is very much less than in the conventional type of dredge operation and the tailings piles are quite smooth.

Deep mining - to depths of 9,000 to 10,000 feet - according to ENGINEERING & MINING JOURNAL, which involves technical problems of humidity control, ventilation, ground support, hoisting and drainage, may be practical in the near future. This statement is based on the apparently successful solution of technical problems.

Electrostatic separation is a subject which has received much attention lately in connection with the production of industrial minerals. Mr. Jarmen of the firm of Sutton, Steele and Steele, gave a most enlightening address on this practice recently at the Institute meeting in New York. It was brought out that the capacity of machines which have been developed in recent years has been increased so that now electrostatic separation is indicated in an increasing number of operations for minerals separation. Very recently a 750-ton per day phosphate plant located in Georgia has begun operation with electrostatic separation the principal process. Whereas in the past humidity has been a difficult problem affecting the recovery in electrostatic separation plants, we are now informed that this difficulty has been much reduced. Ores are pulverized and classified to approximately minus-20 and plus-150 mesh, dried in a rotary dryer to a temperature at least 200°F., and immediately passed over the slowly revolving electrodes of the electrostatic machine. It is unnecessary to take out all inherent moisture, although the surface of the individual particles must be dry. It is stated that some materials successfully separated by this process go through the machine with 5% to 8% of inherent moisture. The writer had a long conversation with one of the principal developers of the electrostatic process. During this conversation it was brought out that electrostatic separation is apt in the next few years to cut deeply into the present wide use of the flotation process for the selective separation of metallic sulphides.

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MINING GEOLOGY IN OREGON.

The importance of detailed structural studies as guides to the finding all types of ore is being recognized both in academic and mining circles, and geological work of this nature is progressing in Oregon to a greater degree than ever before.

The Cornucopia Gold Mines, foremost lode gold producer in the state, is now completing a detailed structural and geologic map, the first to be completed in the long history of the mine. According to the MINING JOURNAL, this information is supplemented by diamond drilling, exceptionally comprehensive sampling, and by

a continuous study of the vein material in thin section by micro-geologic methods. It has been found by Dr. G. E. Goodspeed, who has studied thousands of thin sections of the veins, that the pay shoots at this mine follow veins that show microbrecciation in the quartz, and that when this does not appear, the vein will be barren. The extension of this mine to greater depths than ever before penetrated in Oregon (over 3000 feet below the outcrop on the vein) has lent added confidence to the belief that veins in eastern Oregon will "go down".

Work done for the Horse Heaven Quicksilver Mines by Dr. Lloyd Staples has emphasized the fact that the concentration of cinnabar depends on structural conditions even more than in the case of most metals. He explains in the Mineralogist how the difference between a low-grade prospect and a good mine depends upon the absence or presence of a structural trap for the cinnabar concentration. The mapping last summer of the Round Mountain Quadrangle quicksilver area east of Prineville by the State Department and Dr. W. D. Wilkinson of the State College also showed that quicksilver properties tend to line up along major structural trends or lines of faulting. Although of entirely different origin, the chromite deposits of the state have also been shown to follow more or less this criterion.

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BLACK SANDS.

Mention Oregon black sands as a commercial possibility and you'll probably get a pitying look. This attitude is readily understandable. For every successful attempt to make a profit out of these sands, there has been a discouragingly large number of failures. The reasons for failures are well known to experienced people. The sands have been worked for gold and platinum. Some ventures have failed because of inexperience, but most of them have been due to the difficult problem of separating the gold, sometimes finely divided, from the heavy residues of black sands which accumulated in sluices or various other pieces of apparatus.

What is this material called black sands that has caused the beach placer miner so much grief? Everyone has noticed black streaks or bands in sandbars of stream beds or parts of ocean beaches. Usually the mineral forming these streaks is essentially magnetite or magnetic oxide of iron. Most rocks contain a small amount of magnetite as an accessory mineral. It is black and more than twice as heavy as the silicate rocks with which it may be associated. When surface rocks weather and the eroded portions are carried downgrade by rains and streams, the heavier magnetite grains resist the washing action more than the silicate grains, and so tend to form concentrations in black spots, streaks and bands. Ocean waves act on beach sands in a similar manner, thus forming concentrations of the heavy mineral along beaches. Ancient shorelines exist in the form of terraces, perhaps hundreds of feet above the present ocean level and back several miles from the present beach. The ancient beach terraces contain black sand concentrations similar to present-day beaches.

In regions where the rocks contain heavy accessory minerals besides magnetite, weathering and erosion result in concentration of black sands containing these heavy minerals along with magnetite. The Coast Range of southern Oregon, called by Diller part of Klamath Mountain Province, has large areas of such rocks, mainly peridotite and serpentine, which contain, besides magnetite, chromite, ilmenite, olivine, garnet, and sometimes zircon, as heavy accessory minerals. Thus the so-called black sands of both present day and ancient beaches along the southern Oregon Coast, particularly from Coos Bay south, are made up of all these minerals in varying

proportions. Since the Coast Range in this region also contains some lode gold deposits, the beaches also may have metallic gold in certain sections to form beach placers. Besides gold, some beach placers contain metallic platinum; also platinum alloys with iridium and osmium are sometimes found. The source rocks of the platinum are believed to be the basic igneous rocks of the back mountain province, although no platinum lode deposits have ever been found. No proportional relationships in the beach placers are known except that in several sections where platinum occurs in relatively large amounts, chromite is the dominant mineral in such black sand beds.

Of the heavy minerals in the black sands, the one of particular interest at this time is chromite. This is a so-called strategic mineral, that is, it is essential to our industrial machinery in time of war and this country lacks adequate proven supplies to meet all war-time needs. Oregon has various known chromite deposits other than beach sands, but even under the stress of national emergency, tonnage available would be relatively unimportant. In the case of beach sands the aggregate quantity of chromite existing is undoubtedly enormous. The critical commercial factor is whether the mineral can be made available, not only under conditions obtaining during emergency economic conditions, but also to supply the ever-growing normal industrial demand.

In order to determine the commercial possibilities, it is essential to know (1) whether the sands exist in mineable beds of economic size and grade, and (2) whether the minerals can be separated so that a product of commercial grade may be made. Incidentally, concentrates in the form of sand have not been used in the past for making ferro-chrome alloys. Lump ore is the material usually employed.

The Department of Geology & Mineral Industries has been concerned with the problem for over a year, believing that because failures were common in mining the beach sands for gold and platinum, this was no criterion to follow for evaluating chromite operation. Failing to interest chrome consumers in investigating the coastal black sands of Oregon, the Department started field studies on the problem in mid-November 1939. Knowing that the difficult metallurgy of the materials as well as the supposed lack of tonnage had discouraged investigation, work was started on the metallurgical angle first. Tests, carried out gratis by an eastern laboratory along lines suggested (the Department lacking funds to provide special facilities), indicate that the metallurgy is relatively simple. Attention was then given to tonnage possibilities. Obviously the matter of tonnage is related closely to the metallurgy, for each deposit represents a different problem in minerals separation. The Department now has enough information to justify the opinion that the available tonnage is sufficient to justify serious investigation and some exploration to obtain quantitative results. No more encouraging statement can be made at this time.

Preliminary testing results on the better grade of bank material show about 90% recovery of chromite. This chromite concentrate is low in titanium but rather high in iron. Judging by discussions Mr. Nixon, director of the Department, had recently with a number of corporation heads in the east, the concentrate has reasonable possibilities for use in the production of ferro-chrome or refractories or bichromates.

Much work has to be done yet on the mineral separation angle, but it shows enough promise to warrant our suggestion to consumers that they seriously consider some drilling and detailed sampling. The U.S. Geological Survey has agreed to do some preliminary investigation, and the U.S. Bureau of Mines has the matter of a strategic minerals drilling project under consideration, based on data supplied them by the Department recently. Decision by the Bureau of Mines as to whether

or not to carry out the drilling project must be withheld until at least early summer.

As for the possibility of recovering gold and platinum values in a chromite operation, this is also very uncertain. These values are erratic in most beach deposits, and would not necessarily correspond with the chromite value. In other words, a workable chromite bed might not show recoverable values of gold and platinum. Likewise a bed of sand containing values in gold and platinum might be unworkable for chromite.

The public should be extremely cautious about accepting statements concerning unlimited tonnages of chromite-bearing sands in beach and back-beach deposits. Such statements are misleading. One could as well say that there is unlimited gold in the ocean. While it may be literally true, no practical value is attached since gold cannot be extracted from sea-water on anything even approaching a commercial scale. Also, in the case of chrome sands, they can be worked successfully only by technically skilled operators. The unskilled man would be foredoomed to failure.

To summarize beach sand possibilities for chromite production, the Department can say only that it believes such possibilities warrant detail investigation. If all the related problems can be worked out successfully, the importance to the state and country could hardly be overestimated.

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WORK OF FEDERAL AGENCIES IN OREGON IN 1940.

One of the state appropriations for this Department is the sum of $2000 for the year 1940 to cover cooperative work by the U.S. Geological Survey in Oregon. As a matter of fact, this is more of a token payment than anything else so far as Oregon is concerned. Our state is really getting the long end of the bargain.

Nevertheless it appears that in order to get the most out of the Federal agencies, both the U.S. Geological Survey and U.S. Bureau of Mines, the director of the Department has found it pretty good business actually to go east with a long-handled spade once a year and talk directly to the powers that be. They are really mighty fine people back there, both in the "Survey" and in the Bureau, but we have found that by sitting down and talking with them about problems of mutual interest and making requests the details of which would be difficult or awkward to cover by correspondence, we can sometimes obtain special consideration on matters of critical interest to us.

On a recent trip east, the Director was able to work out details of a number of cooperative projects to be carried out in Oregon by the Federal agencies and to discuss matters pertaining to new industries in Oregon with various eastern corporations, as well as to get "wised up" on new developments in metallurgy, mining, and geology, which may be applicable in Oregon.

The following projects are on the calendar for the U.S. Geological Survey and U. S. Bureau of Mines for the 1940 summer season:

1. Airplane photographing of about one thousand square miles in southern Malheur and Harney counties for geologic control, to be followed later this same season by quicksilver reconnaissance by C. P. Ross of this area. (This costs Oregon nothing.)

2. Continuation of T. P. Thayer's geological field party in the chrome area of Grant county. This is on Strategic Minerals appropriations and costs Oregon nothing.

3. Continuation of work of Francis Wells' geologic survey in Josephine county. This is partly on "strategic" appropriation and partly cooperative.

4. Magnotometer survey of a twenty-five or thirty-mile strip across part of the Willamette Valley by the Geophysical Division of the U.S. Geological Survey in connection with possible determination of oil structure. This is cooperative and will cost Oregon less than $200.

5. Preliminary work by U.S. Geological Survey in investigation of coastal chromite sand areas. Office work has been started on this already. Cost probably to be borne by Strategic Minerals appropriation.

6. Examination by U.S. Bureau of Mines of antimony prospects in Jackson county with possibility of selecting area for a strategic minerals drilling project.

7. Early completion of geologic map of Sumpter quadrangle in eastern Oregon by U.S. Geological Survey. Survey pays cost of work, Oregon the cost of publishing map.

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MINERALS IN THE BODY.

The following is taken mainly from Science Digest, which paraphrases:

By the development of spectrographic analysis it has been learned that certain chemical elements occurring in foods in mere traces - quantities so small that they had been completely overlooked - are tremendously important. Plants and animals attempting to live without these elements are stunted and deformed, or unable to live at all. On the other hand, just a little too much of these so-called trace elements may prove equally disastrous to the health and life of the plant or animal.

The skeletal system utilizes 99 percent of the body's calcium, and the strength of the bones and teeth, as well as the normal properties and behavior of the fluids and soft tissues of the body depend upon the presence of the right amounts and proportions of this element. The requirement for an adult should be 1 gram per day, and not less than 0.45 grams.

While the amount of phosphorus in the body is not so large as that of calcium, a very much larger quantity and proportion of the phosphorus belongs to the more active tissues, and so, as would be expected, there is a more rapid turn-over of body phosphorus than of body calcium. One gram of phosphorus per child per day seems to be ample. Rickets can be induced by diets high in calcium and low in phosphorus, or by diets high in phosphates and low in calcium.

The total amount of iron in a healthy adult's body is between 3 and 4 grams, not much more than there is in a shingle nail. Over two-thirds of this is contained in the red blood cells - hemoglobin - which help carry oxygen from the lungs to all parts of the body. Most of the remainder is stored, ready for use

as hemoglobin, in the liver, bone marrow and spleen. Experiments show that only about 60 percent of the iron in the diet is absorbed by the body, so we must eat twice what we can really utilize. Anemia is the result of low iron intake or poor assimilation of iron. When the iron reserves of the body are exhausted it is very difficult to replenish them in a reasonable time from food sources. A slice of calves' liver 3x2 inches and a quarter of an inch thick will supply over 6 milligrams of available iron. Men, who eat more proteins than women, usually get from 8 to 18 milligrams of iron per day.

A deficiency in copper is rarely found in human beings. The infant is born with a reserve supply for use in the formation of red blood cells and hemoglobin, but these stores need to be refilled by addition of copper-containing foods to the milk diet during the first few months of life. Fortunately the best sources of copper are the iron-containing foods. In general, foods that will supply from 4 to 5 milligrams of iron will also supply about 1 milligram of available copper. The human body contains about 100 to 150 milligrams of copper.

The two chemically related mineral elements, iodine and fluorine, differ greatly in nutritional significance. Iodine is an essential constituent of the thyroid gland, which regulates the rate of energy expenditure and growth. Fluorine, on the other hand, cannot be considered an essential element of the human body, and its presence is probably due to its occurrence in the food supply. Lack of iodine in the food is the chief cause of goitre. Iodine is contained in large amounts in sea foods. Fluorine is dangerous in any concentrations and is to be avoided. It is especially bad for the teeth.

It appears that manganese in very small quantities is necessary to the human diet, although its particular action in the body is not yet known. Rats used in experiment, when deprived of manganese show sterility in the males and lack of maternal instinct in the females. Leg-bone deformity in chickens is accompanied by manganese deficiency. Studies indicate that as little as 1 ounce of manganese taken over a period of 12 to 14 years will furnish an adequate amount of this element for children. On the other hand,a manganese poisoning is known to occur among certain industrial workers employed in plants using considerable quantities of this element.

Cobalt is found in extremely small amounts in most of the organs of the human body. A persistent disease of sheep and cattle in New Zealand and Australia was found to be due to a lack of cobalt in the soils, and was cleared up by addition of that element to the fertilizer or to the salt licks.

About half the aluminum we eat today (about 1 ounce in six years) comes from the foods, and the other half from the aluminum cooking utensils now in common use. Although this amount has no poisonous effect upon the human body, the scientist has yet to discover what part aluminum plays in man's economy. The Aluminum Company of America has spent more than $200,000 in demonstrating the fallacy that aluminum cooking utensils poison food.

If the magnesium content of the diet is reduced to a very low level, a little less than 2 parts per million of diet, experimental animals become sick and die. There is evidence that in some way magnesium aids in the assimilation of fat. There have been a few cases in which the blood of human subjects suffering from irritability have shown low values for magnesium.

Zinc is always present in the human body, and it has been shown that the liver of an infant contains three times, proportionally, as much as that of an adult. This suggests a storage of zinc in the child before birth, as is known to occur in the case of copper and iron. A zinc deficiency in experimental animals has been produced, showing that zinc is necessary for normal growth.

There is growing evidence that arsenic, well-known poison and valuable drug, may also prove to be an indispensable element in human nutrition. It is generally found in traces in most of the human tissues. The liver appears to be the storehouse for this element.

Far less is known about bromine than the others of the halogens, but its constant occurrence in blood cannot be overlooked. In certain mental conditions, known as manic-depressive psychosis, the normal blood bromine is reduced to about half, and remains low until there is an improvement in the pathological condition. (Condensed from "Food and Life", U.S. Dept. Agr. Yearbook of Agriculture, 1939).

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Attention is drawn to the following properties for acquisition:

23-1 Quartz property, western Jackson county; patented. Reported by lessee to have 4000 tons proven ore, grade $5-$6. Mint returns on 200 tons production. Developed by 100-foot shaft and drifts. Will consider sublease. James A. Clement, Gold Hill, Oregon.

23-2 Placer property, eastern Grant county, unpatented. Owner claims extensive high-bar yardage. Water available. Will consider financial aid. E. R. Lafferty, Sumpter, Oregon.

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