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DEPARTMENT OF GEOLOGY & MINERAL INDUSTRIES
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. Because of increase in circulation of the Ore.-Bin with re- .
. sulting increase in cost of preparation and mailing, the De-.
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Earl K. Nixon, Director of the Department, has been granted a short leave of absence to investigate iron ore possibilities in Peru, South America. He will travel by plane and return early in May.

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The Portland office of the Department will move to a new location on May 1. The new address will be 702 Woodlark Building, at the corner of SW. Alder Street and 9th Avenue.

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RUZICKA WOOD-COKE PROCESS

Dr. Stevan Ruzicka of Yugoslavia and more recently of New York was awarded Patent No. 2,184,317 on December 28, 1939, covering wood-coke and a process for making such material. Essentially the process consists of four steps:

1. Carbonization of wood at low temperature with recovery of volatile products.
2. Grinding and mixing with suitable binders.
3. Briquetting the finely ground material.
4. Coking in chambers at high temperature.

It is claimed that this coke may be made of any material consisting of wood cellulose or lignin. Waste timber and lumber, hog fuel, bamboo, etc., may be used. The raw material is subjected to destructive distillation in retorts at temperatures from 200° to 300° C., and the volatile products are recovered in the usual manner. Methyl alcohol and acetic acid are valuable by-products of the first step.

Standard disintegration machinery may be used in the preparation of the finely ground charcoal. The charcoal powder, after screening, is mixed with suitable binders which may be pitch or tar obtained from distillation of wood, coal, lignite, shale, or petroleum; or a mixture of several binders. The inventor claims conifer tar binds better than tar from leaf woods.

The binder and charcoal are then molded into briquettes of suitable shapes;- egg, spherical, or cylindrical.

Coking of the briquettes takes place in ordinary coke ovens at a temperature of 1100° C. This step also yields volatile by-products which can be recovered. During this coking step, the binder is drawn into the pores of the charcoal and is also chemically combined with the charcoal to form a solid mass.

Dr. Ruzicka believes that the resulting coke will have compression strengths above 1000 lbs. per square inch and friability of less than 5%.

The coke thus produced has no sulphur (if eucalyptus wood is not used) and phosphorus, and is low in ash. It may be used to advantage in various industries as follows:

Electric-furnace reducing agent.
Blast-furnace fuel.
Domestic fuel.
Production of silicon and calcium carbides.
Production of electric furnace electrodes.

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A WARM SPRING DOME IN THE SNAKE RIVER CANYON

Just above the mouth of Soda Creek, where it enters the Snake River Canyon about 20 miles down the river below Huntington, an interesting warm spring deposit forms a prominent dome on the west side of the river. The location of the deposit is on the "Soda Creek Ranch", owned by Mrs. Hortense Pinus, located in the $N\frac{1}{2}$ of section 19, Township 11 S., Range 46 E., Baker county.

The dome, which is presumably composed throughout of calcareous tufa or lime deposited from the spring waters, has a maximum diameter at its base of about 200 feet, and a height of about 50 feet. The top of the dome lies approximately 150 feet above the low water level of the river. When visited by Department geologists in December 1939, the spring issued from crevices in the summit of the dome at an estimated rate of 1 or 2 gallons per minute, and had a temperature of 75 or 80 degrees. Considerable gas accompanies the flow.

The dome is situated at the south edge of a band of limestone where it crosses the Snake river, the rock adjacent to the deposit being a much altered greenstone. It is probable that the water-channel developed along a fault at this point.

A partial analysis of the water shows that it contains 1720 solid parts per million; the material determined as being 49.7% CaO, 5.9% MgO, and 2.2% SiO_2. Calculating CaO as $CaCO_3$ or calcium carbonate, gives 39% CO_2, which totals 96.8%, leaving only 3.2% unaccounted for, which is probably CO_2 in combination as $MgCO_3$.

RUBBER

It is reported in Chemical and Metallurgical Engineering that the Standard Oil Company of New Jersey has acquired patent rights from Germany's I.G.Farben Industrie to manufacture "Buna" synthetic rubber in the United States. Possible manufacturing cost is estimated as low as 20 cents a pound, which is about the same as the present cost of natural rubber. Success of plans of Standard Oil would make this country independent of foreign rubber, imports of which in 1929 amounted to about $175,000,000 in value.

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SPECTROGRAPHIC ANALYSIS.

An element subjected to intense heat such as an electric arc can be vaporized, in which state it will give off light consisting of wavelengths characteristic of that element. By dispersing this light with suitable means, a spectrum is formed in which these characteristic wavelengths appear as lines. The spectrum of some elements will consist of a few lines, while other elements will form a spectrum of hundreds of lines. In either case, the lines are characteristic of each element; and no line is common to two elements. Elements may be detected by spectral lines which are emitted in vapor state; while compounds may be detected by the spectral lines which the compounds absorb from a suitable light source.

Spectrometry is the art of measuring the wavelengths of these spectral lines. It is applied to both the visible and invisible, the latter being ultra-violet, spectra. The spectroscope, an instrument for studying the visible spectrum, has been used for years by astronomers to measure the spectra of celestial bodies. The spectrograph is an instrument which records photographically the emitted spectrum-lines, principally in the invisible ultra-violet region.

Spectrographs are of two general types: those which disperse a beam of light by means of a concave grating ruled with lines in the order of 24,000 or more per inch; or those which disperse a beam of light by means of prisms of glass or quartz. The two types differ in their spectrum dispersion; i.e., the ratio of the unit of wavelength measure to the wavelength. The grating produces a uniform dispersion, while the prisms produce a decreasing dispersion with increasing wavelength. The two designs consist essentially of a suitable light excitation source, a slit through which the emitted light passes, the dispersing system, and the recording film.

Spectrographic analysis, or spectrochemistry, is the recording and interpreting of the spectrum emitted by a substance in the vapor state. Qualitative analyses are made by measuring the lines emitted and thus determining the elements present. Quantitative analyses are made by measuring the intensity of the lines and comparing with lines produced by samples whose analyses are known. With this method, it is possible to detect 70 elements. The gases and certain non-metallic elements do not emit light, so absorption is resorted to for detecting these.

The advantages of spectrographic analysis are:

1. A single spectrum recorded on the film reveals all metallic elements present. No involved technique to separate the elements is necessary.
2. Small samples may be used; a few milligrams suffice.
3. No chemical preparation is necessary.
4. Analysis depends on direct measurements and not on analyst's judgment.
5. The sensitivity is great; elements present in the order of 0.0001 percent are easily detected.
6. The method is rapid. Qualitative determinations for any or all 70 elements may be made in a few minutes.

The field of application of this method has rapidly enlarged due to its sensitivity, accuracy, and speed. Applications now include analyses of practically any solid, liquid, or powdered material. It is particularly employed for qualitative and quantitative trace analyses. In many instances, spectrographic qualitative analysis has been used to supplement chemical analysis. The fields of application will be considered briefly in the following paragraphs. An index of literature on spectrochemical analysis has been published by the American Society of Testing Materials, which indicates the large number of fields that have adopted this method.

Chemistry: Rapid qualitative analyses, on an unknown are made to indicate chemical methods to be followed; checks on qualitative chemical analyses, purity of reagents, and completeness of chemical separations; detection and determination of elements in trace amounts. The chemical industry employs the method for the detection of impurities in paints, glass, fibers, chemicals, etc. Assaying of ores, products, etc., is greatly speeded up. In the canning industry, the determination of the rate of dissolution of the metal coatings in such foods as fruit and vegetable juices, beer, etc., is of particular importance, as is also the inspection of fruits and vegetables to determine the extent to which sprays and insecticides have been removed.

Metallurgy:
Detection of impurities in metals, analysis of scrap, and continuous control of plant operation are easily accomplished by spectrographic analysis. Research metallurgy is finding more application of alloys in which elements occur in very small amounts. Rapid metallurgical analyses are facilitated.

Biology and Medicine:
Rapid determination of inorganic constituents of blood, urine, tissue, bone, etc., is an example. Presence of elements in plants and organisms is easily determined.

Agriculture:
Problems involving plant physiology are often solved by detection of trace amounts. Soils, water, fertilizer, and agents added to soils may be rapidly analyzed.

Geology:

The greatest use is in the rapid and accurate analysis of rocks and ores to determine number and amount of elements present . All the applications to chemical analysis apply here. Associated metals and unsuspected metals are thus determined. Methods of correlation have been based upon presence of associated metals. The verification of mythical "mystery" metal claims is quickly and definitely accomplished.

The recent improvements in spectrographic instruments and the methods of interpreting the spectra have resulted in an increasing number of commercial applications. It is such a simple, rapid, sensitive, and accurate method that research laboratories and progressive industries continually use spectrographic ananlysis. It provides the assay laboratory with a means of carrying out, quickly and accurately, an analysis of a substance which would otherwise entail tedious and involved methods. Many assay offices including John Herman's of Los Angeles and Lauck's Laboratory of Seattle have installed these instruments.

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NEW TYPE COPPER

(from Deco Trefoil)

Phelps-Dodge Copper Products Corporation has announced that it will produce a new type of copper which will be capable of resisting strong vibration and designed to eliminate the cause of at least 75 percent of all electrical failures. According to the statement issued by the company, "The improved metal is made without melting from electrolytic cathode copper which is plastically converted by tremendous pressure in a reducing atmosphere at elevated temperatures into smooth, dense copper bar, rod, strip, or other desired commercial shapes.

"Basically of the oxygen-free type, it is the only solid copper in the world which is not melted subsequent to the electrolytic purification process. The new method eliminates not only the casting process but also hot-rolling".

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METALS AT WORK

"Copper-bearing cement is a new product for structural purposes and is said to be superior to Portland cement in a number of particulars. By mixing finely divided copper incorporated with caustic magnesium in a solution of magnesium chloride a synthetic mineral is formed in the mix that is resistant to weathering. It is further claimed that the cement will take any kind of filler or aggregate and that it can be sprayed, brushed, or troweled on to any building material."

- Compressed Air Magazine

CHROMITE

According to U. S. Bureau of Mines Mineral Trade Notes (vol.10, no. 2, Feb.20, 1940), a property in Johannesburg, Union of South Africa, is able to ship chromite to the United States at the rate of 4000 tons per month after the first 3½ months (2000 tons a month at the end of the first 6 weeks). This material has a guaranteed minimum of 45% chromic acid, but the chromium-iron ratio is of the order of only 1.6 to 1 as against the 3-to-1 ratio specified by the Procurement Division of U. S. Treasury.

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SUPER X-RAY MACHINES

Dr. Carl T. Compton, president of the Massachusetts Institute of Technology, at a dinner given for him recently in Portland by M.I.T. alumni, described X-ray machines developed at the Institute in their application to the treatment of cancer. Three of these machines have been built successively and, to show improvements in design, the third machine occupies about a tenth of the space needed for the first machine. The latest machine, designed for use in the Massachusetts General Hospital, operates normally at 1,250,000 volts; it may, however, for special purposes be operated over a range down to 200,000 volts. The first machine built was installed about two years ago in the Huntington Memorial Hospital and has been used to give about 9,000 individual treatments. In certain cases such X-ray treatments are more desirable than radium treatments, are less expensive, and are more readily available. Dr. Compton was asked if development and use of such super-voltage machines would displace radium in cancer treatment. He replied that he thought that the two methods were supplementary and that the effect of using the X-ray machines might be to increase the use of radium, since a better understanding of special fields of each method was being developed by the X-ray treatments.

This new generator develops X-ray intensity greater than that of all of the available world supply of radium, but for certain deep-seated malignant growths the radium treatment is still necessary because of the peculiar penetrating quality of gamma rays given off by that element. One of the main objectives of research with the high potential machines by the Institute is in seeking methods to produce highly penetrating rays with properties similar to gamma rays.

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Attention is drawn to the following properties for disposal:

24-1 Placer property in Jackson county; 80 acres patented. Owner claims approximately one million yards of 75-cent gravel. Adjoining properties have produced for many years. Owner wishes to sell. T. A. Bird, 226 W. Manzanita, Grants Pass, Oregon.

24-2 Quicksilver property of two unpatented claims. Owner states engineer's report shows extensive ore body. Owner will sell. E. T. Carnegie, Route 2 Box 493, Grants Pass, Oregon.

24-3 Claims showing values in gold and zinc in Little North Santiam area. Owner reports assay values of $10 a ton with gold at $20 an ounce. John P. Hart, Mehama, Oregon.

24-4 Large semi-kaolin deposit SW. Oregon. Owner reports composition 30% alumina and 60% silica; softening temperature 2940°; white burning; plastic and low shrinkage. Coal and wood on property. Inquiries may be sent to the Portland office of the Department and will be forwarded to owner.

24-5 W. Dailey, 810 East H St., Grants Pass, Oregon, wishes to deal with persons who would be interested in working a quicksilver property in Jackson county. He reports some high-grade and average samples of 10 pounds mercury to the ton. Partnership or any reasonable offer desired.

FOR SALE: a one-yard Marion type 7 steam shovel, ready to operate, and 18 sluice boxes, 24" x 12", price $800. Contact C. W. Thurman, Route 1, Box 744, Grants Pass, Oregon.

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The Cosmo Metal Alloys Corporation, 275-281 Front St., New York City, announces that it is in the market for various kinds of metallic ores in any quantity.

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