SCIENCE NEWS

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THE DISCOVERY OF QUARTZ CRYSTAL DEPOSITS AND NEW PRODUCTION METHODS

QUARTZ crystals, essential for military radio and radar apparatus, have finally been pushed off the "desperately needed" list by discovery of quartz deposits, by salvage of crystals formerly discarded, and by research successes that have increased the production of crystal oscillator plates more than a third. Supplies are still barely adequate, WPB reports, but only a few months ago it seemed as if there would be only half enough.

Prospectors tracked down every clue that might lead to the hiding place of one of the nation's most badly needed natural resources. Recently they have discovered deposits in North Carolina, Virginia and California. Experts from the U. S. Geological Survey are now pushing exploration in these and a dozen more western states. During the past year deposits of electronic-grade crystals also have been unearthed in Arkansas and hundreds of pounds of crystals have already been produced, put into war equipment, and sent on their way to fighting fronts.

Engineers sent to the scene are blowing the tops off two Arkansas mountains to get at the new sources. Thousands of pounds of crystals—good and bad—have been brought to light. Although quartz had been known to exist there for decades—the beautiful, transparent, six-sided crystals being sold to tourists as souvenirs—industrial production was not considered until urgent war needs developed.

Further search revealed favorable territory just northwest of Hot Springs, 30 miles wide and 100 miles long, stretching in a westerly direction almost to the Oklahoma border. Further prospecting is expected to discover hundreds of small workable deposits throughout this region for years to come. Government mineral experts consider the Arkansas find as a reserve, however, and warn that our entire domestic production probably will be only a small part of the quartz crystals needed. Experts and equipment have recently been sent to Brazil to expand production there. Deposits deep in the Amazon jungle remain our chief source of supply.

Meanwhile, research workers have made three quartz crystals do the work of four. They have developed new methods that add to the supply as effectively as the discovery of new deposits. Thinner saws for cutting the crystals into the wafer-thin plates were developed, saving much of the crystal that was formerly sawed away into useless dust. Then it was found that the crystals could be cut into still thinner slices, thus doing away with much wasteful grinding in the finishing operation. In use for only the past few weeks, the new cutting methods are producing at least a third more usable material.

Next the thousands of pounds of low-quality crystals that have been piling up in warehouses, discarded as unfit for electronic use, have been examined. Experiments showed special uses for some of these crystals and the huge amount of waste material on hand was converted into a usable stockpile.

More quartz crystals are needed. Quartz is among the world's commonest minerals. But the large, clear crystals required for radio purposes are rare. Amateur prospectors who want to help the war effort may send sample crystals, which they may discover lining cavities in rock or in the dirt and gravel near-by, to the Miscellaneous Minerals Division, War Production Board, Temporary R Building, Washington, D. C.

Only separate crystals as clear as glass are wanted, not clusters or grainy masses. Colored quartz, such as amethyst and onyx, can not be used. Each crystal must weigh at least a half pound; measured in inches such a crystal will be about an inch in diameter and three inches long. The whole crystal need not be perfect but large portions must be entirely free from specks, bubbles, lines, clouds or flaws of any kind. Good parts must be at least two cubic inches in size and at least half as large as the imperfect section, otherwise it is not practicable to saw out the good portions.—GLENN SONNEDECKER.

OIL FROM OLD WELLS

MORE oil from the nation's oil fields by less labor are the twin benefits of the electric pilot described by Dana G. Hefley and P. E. Fitzgerald, of Dowell Incorporated, Tulsa, Okla., in a report to the American Institute of Mining and Metallurgical Engineers. After primary oil has been pumped from a well by ordinary methods, the instrument is used to locate areas that are likely to contain secondary oil deposits, then puts acidizing chemicals into the right place where they help to get out additional oil.

Using acid to increase production of an oil well and to shorten the time needed for recovering oil has often been successful. But most of the acidizing methods used depend upon data about the well supplied by the geologist and engineer. In many cases, the zones specified were inaccurately located or the data were too meager for successful oil recovery. The electric pilot, however, can quickly locate the areas containing oil, and then chemicals can be introduced through the device into the desired zones. Much time and quantities of acid are thereby saved in getting the secondary oil from the wells. An electric circuit is completed and registers on an ammeter when contact of one or both electrodes of the electric pilot has been made with a conductor such as acid or salt water in the well; no current registers if the instrument contacts a non-conductor such as oil.

Thus in actual well application, the amount of fluid injection can be controlled by maintaining the proper acid-oil level through reading the changing fluid-interfaces. The use of the locator is valuable in acidizing many wells with high gas-oil ratios, high water-oil ratios, two or more "pay" zones, sands exposed above or below limestone, leaky casings and deepened wells.

Better oil recovery and improved operating technique has resulted from use of the electric pilot.

THE COST OF ELECTRIC LIGHT

ELECTRIC light costing only a tenth of what it does to-day and used lavishly in our homes is foreseen as a practical possibility, for thirty years hence, by Ward Harrison, of the General Electric Company, in a report to the Illuminating Engineering Society.

Our lighting of to-morrow may be as different from present day lighting as Edison's first incandescent lamp differs from present lamps. A 100-watt lamp of to-day gives us five times the light of a lamp of the same wattage in 1913 and at half the cost of current.

The best artificial light source of to-day, the fluorescent lamp, is less than one quarter efficient. Improvement in its efficiency will mean more and better light. Maintenance of candlepower and eliminating the starters now used on fluorescent lamps are only two of the refinements which the future may bring.

The greatest advantage of the fluorescent lamp, according to Mr. Harrison, is its superior quality of high-level local lighting, but future lighting promises to be many times brighter. Conquering glare and heat, still largely untouched by illuminating engineers, will be another step forward.

Since light is expected to be cheaper, future building designs will include light as part of the whole construction plan, emphasizing light itself, rather than lighting fixtures.

SOUTHERN ITALY

THE best time to visit southern Italy, according to German-published Baedecker's guidebook for tourists, is in the spring or in late September and October. The winters are unpleasant; the fierce rays of the Italian summer sun are enervating. The best route is overland by way of France, or by boat to Naples. No mention is made of the new route from Tunisia to Sicily, and so on to the many excellent landing beaches around the edges of the Italian boot.

Southern Italy, including the department or province in which Rome is situated, contains about 35,000 square miles of territory. This is a little less than the area of Indiana, and nearly three and a half times the size of Sicily. In pre-war days some 13,000,000 persons lived in this area, four fifths of them in cities and only a fifth on the land.

About one tenth of this population lived in Rome, and more than 920,000 in Naples. Over 210,000 lived in Bari, an east coast town with an important military airfield. Approximately 150,000 were in Taranto, one of Italy's most important naval bases, which is reported to have also an adjacent flying field. Reggio di Calabria, across the strait from Messina, Sicily, had a population of about 122,000. It is about 300 miles from Reggio to Naples by the west coast railroad, and 200 by air.

The Apennines, or Appennino Mountains, are scattered over half of the interior of southern Italy, their extension reaching to near Reggio. A western range follows the western coast two thirds of the way up to Naples. Coastal plains follow the southern coast and the eastern coast along the Adriatic Sea. The volcano Vesuvius is but a few miles from Naples.

The main railroads of southern Italy follow the coast lines. From Reggio Calabria one follows the west coast to Rome and beyond. Another follows the coastline along the sole of the boot, proceeding then up the Adriatic to northern Italy. Branch lines run into the interior, and a few lines connect the two coasts. But the direct route from the toe of Italy to the north is by way of Rome. The destruction of the great freight and passenger center in Rome, through which run all west side lines to the south, was a military necessity. It was a severe blow to the defense of the entire Italian boot.

ITEMS

THOUSANDS of scientific books are being sent to prisoners of war at their own request by the War Prisoners' Aid of the Young Men's Christian Associations. 3,179 volumes were mailed during the five months from last December to May, and expansion of the service is foreseen since shipping space is now provided more regularly. Each book is sent free of charge through the "Men of Science-Prisoners of War" Service, as the YMCA has termed it, to fill the needs of the individual. Due to the great number of prisoners desiring serious literature and the growing shortage of books in Europe, requests are continually received from the international YMCA organization in Geneva, Switzerland, and from the British Red Cross. Shipments have run the gamut of sciences from astronomy to zoology, plus the classics, philosophical and legal tomes, and the other humanities as well. Agriculture was at the head of the list with 422 requests; the social sciences were a close runner up with a total of 413. Language problems of men interned in a nation of foreign tongue may be reflected in the 385 volumes on languages mailed during the months just reported. Medicine and biology were also high on the list with 372 requests.

NEW aid to doctors trying to locate and remove foreign bodies such as coins and safety pins lodged in the lungs is expected from an x-ray machine newly installed at the University of Pennsylvania Hospital. The chief feature of the new x-ray machine is the miniature turntable incorporated in it which enables the doctor to change the patient's position so that the pictures can be made from any angle, even vertical, without lifting or turning the patient bodily. The machine is called a biplane fluoroscope because with it examinations can be made and x-ray pictures taken in both horizontal and vertical planes. It was made by the Westinghouse Electric and Manufacturing Company.

ANOTHER case where a war-necessitated "ersatz" material proves superior to its vanished predecessor is the bubbly rubber sponge much used for cushions, insulation and other purposes in pre-war days, now replaced by a new material known as plastic foam, which looks like packed snow and is claimed to be superior to the original rubber product. For one thing, it is lighter than balsa, as well as proof against fire and water, and so is well adapted for use in floats. Production at present is in limited quantities, and all that is being turned out goes into insulation for warplanes.