

engineering sciences

METALLURGY

Titanium ore enrichment process

Ilmenite and rutile are two titanium-bearing minerals, with rutile the lower grade of the two. The Australians, however, have now found a way to upgrade the inferior beach sand ilmenite to a synthetic rutile. The synthetic contains 96 to 97 percent titanium dioxide with properties equal to those of the best grades of rutile.

Ilmenite contains larger quantities of iron than rutile, and the upgrading process, developed by Dr. H. N. Sinha of the Commonwealth Scientific and Industrial Research Organization, consists of removing iron oxides from the ilmenite with hydrogen, assisted by dilute hydrochloric acid at 212 degrees F.

Ilmenite sells for \$10 a ton; the synthetic rutile should go for \$85 a ton.

DESALINATION

Electrodialysis plant for Benghazi

The world's largest electrodialysis plant for desalting water has been sold to the city of Benghazi in Libya.

Electrodialysis is a process in which an electric current is used to transport dissolved salts through a plastic membrane. Its chief advantages over other forms of desalination, such as reverse osmosis, is that it is very well developed and so requires less skilled operation. It is better suited for brackish water, than the distillation process used for heavily salt-laden water.

The \$2.1 million plant will provide the coastal city with 5.3 million gallons of drinking water daily. The original water source was becoming too salty.

The plant will be built by G&J Weir, a Dutch Company, utilizing an arrangement of electric cells that results in 15 percent more work from a given area of membrane. In turn, this has reduced the capital cost of building the plant by about 40 percent.

COMMUNICATIONS

Helping Bobby

The British are testing a communications system that will relay pictures of suspects, descriptions of stolen cars, sketches of roadblocks and other information directly into police cars. Called a mobile facsimile communications system, it employs a line-by-line optical scanner transmitting via radio frequency to produce a 5x4-inch picture on a sensitive paper medium.

MINING

Zinc hunt in Wisconsin

A team of two engineers and one geologist from the University of Wisconsin has been using water analysis to determine the likeliest places to look for zinc deposits in southwestern Wisconsin. Dr. Robert W. Heins, Dr. S. M. Wu and Jacques de Geoffroy, the geologist, began by collecting samples of spring water from 7,000 springs in an area of nearly 1,000 square miles. Using colorimetric tests, they identified and measured the amount of

zinc in the water. Then they plotted the amounts on a map and by selecting those plots with the highest amounts of zinc came up with 81 potential zinc deposit sites.

Five of the test areas have been test drilled by a mining firm and zinc was found in four of them.

TELEVISION

Tiny TV camera

A color television camera weighing only 10 pounds and measuring 11 inches in length, 4 inches in width and 7 inches in height, has been developed in Japan.

Electrical engineers at the Central Research Laboratory of Toshiba Company in Tokyo designed a special color separation optical system to simplify color signal pick-up and miniaturize the entire unit. Problems that had to be overcome included a pick-up tube that registered colors inefficiently and difficult-to-adjust color signal conversion. Conventional TV color cameras require nearly 100 separate wires, cables and other components to link the camera head with the control unit that determines final color appearance. But the Toshiba camera requires only one signal cable between camera and color receiver. The control unit is located inside the camera head.

CONSTRUCTION

Quick test method for concrete

Place in boiling water for two to three hours, then remove and cool: not directions for making a super-hard-boiled egg but rather a rapid process to determine the strength of concrete.

Normally, concrete hardens to 90 percent of its strength in 28 days but is ready for strength testing after seven. However, even this time is too long for design and delivery purposes, and so Danish engineers devised the rapid test method.

Test samples are poured into steel molds and boiled in water for about two to three hours, then cooled in water at room temperature for 15 minutes. They can then be subjected to the standard compressive tests and forecasts made as to its final strength.

ACOUSTICS

Unloading cargo with sound

Sweden is using sound waves to help unload fine, powdery cargo, such as grain, chalk and iron pyrites, from large holding containers.

The normal unloading procedure is to blow the powdered material out by a powerful stream of compressed air. However, arches are frequently formed and the emptying process stalls.

The Swedish firm of Kockum in Malmö found that by feeding in sound waves, it could knock the arches down and the unloading could proceed. The sound waves must be fed in from below rather than above the air stream to collapse the arches. One drawback is that sound insulation must be used because the process is a noisy one.