

CHEMISTRY

Hopes For Commercial Success In Taking Gold from Sea

Discovery That Electroplating Method Extracts Gold As Colloid, First Step Toward Practical Method

WITH \$25,000,000 worth of gold dissolved in each cubic mile of sea water, man has often sought a way of digging out this treasure. Using electrochemical methods, comparable to those used in electroplating, gold has actually been extracted from the ocean, but the rub is that, at best, the cost of the process is five times the value of the gold obtained.

Hopes that this may be reduced to the point where gold may be profitably extracted were raised by Dr. Colin G. Fink, of Columbia University, speaking before the Wilder D. Bancroft Colloid Symposium at Cornell University.

In electroplating, the metal in the plating solution is deposited on the cathode, the negative terminal. But when an effort is made to plate the gold out of sea water in this way, said Dr. Fink, the metal precipitates out rapidly, and fails to collect in the solid, crystalline form in which it is desired. By using a rapidly spinning cathode in place of the stationary one, it has been found possible to get a distinctly visible gold deposit. It is the cost of providing the spinning cathode that makes the method impracticable commercially.

In his search for the reason that gold

fails to deposit on the stationary cathode, Dr. Fink made the discovery that, when gold passes out of or into solution, two distinct steps are involved. Invisible dissolved gold first goes into myriads of minute particles of colloidal gold, and then later into the crystalline form of the metal. The stationary cathode fails because the metal precipitates out in colloidal form and drops away before crystallizing.

Now the problem remains as to how the colloidal gold may be converted into the metal crystals. Perhaps it can be accomplished with high voltage electric currents, or with bombardment of electrons. Dr. Fink plans to try these. In any event, he said, with due scientific caution, that "it is felt that, on the basis of the discovery, we have advanced one step closer to the commercial recovery of gold from sea water."

Aside from this, however, the discovery is of great theoretical significance, and has practical importance as well. For example, he said, it may hasten development of formulae for the electroplating of metals such as titanium and vanadium. In this way, it may have far-reaching commercial results whether the gold extraction is accomplished or not.

Science News Letter, July 5, 1941

● RADIO

Thursday, July 10, 2:45 p.m. EST

On "Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Col. Paul Logan, Subsistence Branch, Office of Quartermaster General, U. S. Army, will tell how the Army solves its problem of packing food.

Listen in each Thursday.

18,000 for hernia; 16,000 for diseases of the lungs including tuberculosis; 15,000 for venereal diseases, 13,000 for defects of the feet.

Of the 400,000 rejected, 200,000 were totally disqualified for health reasons for army service. Another 100,000 with non-remediable defects such as poor eyesight or hearing could be assigned if necessary to limited service. The remaining 100,000 had defects or diseases which could be remedied. Selective Service System authorities are considering steps for rehabilitation of these men.

The much-discussed and frequently misunderstood tooth standards required before a man is inducted into army service state that the man must have at least 12 teeth, of which there must be three pairs of opposite upper and lower teeth for biting and three pairs of opposite upper and lower back teeth for chewing. Even with these standards met, it is estimated that Army dentists must spend between six and ten hours per selectee filling cavities in the 12 or more teeth of each man accepted for training, which totals some 6,000,000 hours in the dentist's chair.

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FOR FAIRNESS

The Electric Eye for recording jumps is adjusted by L. H. B. Peer, of the General Electric Research Laboratory. The four light sensitive cells are below his left hand.

PUBLIC HEALTH

Drafted Men Must Spend 6,000,000 Hours at Dentist's

ON the eve of the drawing of the next 750,000 selectees for America's defense army, complete data on the health status of the first 1,000,000 men called for army training were announced by the Selective Service System for the first time at the meeting of the American Medical Association in Cleveland.

Of the 1,000,000 whose numbers were drawn last fall, local boards and army boards rejected a total of 400,000 for med-

ical and health defects. This is about the same percentage as were rejected in the World War draft. Rejections and causes were as follows: 75,000 for defective teeth; 45,000 for defective eyes; 37,000 for diseases of heart and blood vessels; 31,000 for musculo-skeletal defects ranging from paralysis and crippling to loss of the index and next finger on the right hand; 28,000 for mental and nervous disease; 22,000 for defective hearing;



OVER

The jumper cleared the bar by three inches—and got credit for it, with a new application of the electric eye for measuring jumps. Developed by General Electric engineers, it was tried out with great success the other day at a Schenectady track meet. Four parallel beams of light, an inch apart, are sent across from one upright to the other, and detected by photoelectric cells. The recording device tells which, if any, of the beams is interrupted by the jumper's body. Actually, no bar is necessary, though it helps the jumper by giving him a mark to aim for.

GENERAL SCIENCE

Soil Erosion More Destructive Than War's Havoc in Africa

Conservation Practices Begun Years Ago Fallen Into Disuse and Soil Is Eroded Down to Bedrock

NORTH AFRICA and the Near East, scourged for the thousandth time by war, have suffered even more during intervals of peace than from the havoc of actual armed strife. Partly because of war-caused paralysis of civil life, partly from internal disorder and weakness, soil-conserving practices begun by good farmers ages ago have been permitted to fall into disuse, and the impoverished soil has eroded to bedrock, Dr. W. C. Lowdermilk, of the U. S. Soil Conservation Service, stated in an address before the American Association for the Advancement of Science in Durham, N. H.

The world's earliest large-scale civiliza-

tions, in the Tigris-Euphrates and Nile valleys, have had diverse histories, Dr. Lowdermilk pointed out. The history of the land now called Iraq has had marked ups and downs. This is at least partly due to the fact that its agriculture depended on irrigation canals, which were at times permitted to silt up and become useless. For the past thousand years or more, the valley that was once the Garden of Eden has been in a "down" phase of its history, impoverished, underpopulated.

Egypt, on the other hand, has depended on the annual Nile flood for its irrigation, so that its only problems have

been much simpler ones of drainage, to prevent the water table from becoming too high and to eliminate saline deposits from certain spots in the soil.

Apparently the device of terracing sloping fields was first used by the ancient Phoenicians, in the fields on the mainland back of Tyre and Sidon, Dr. Lowdermilk said. As the necessities of the growing city populations pressed ever harder on the means of support, the stone-supported terraces were pushed ever higher up the hills. If the work had to be done at present-day wages the cost would be terrific.

Nevertheless, these ancient terraces have justified their existence. Where they have been well taken care of they are still functioning, after more than 2,000 years of use. Where they have been neglected and allowed to break down, the soil has slid into the valleys and choked the rivers, leaving the bare bones of the rock sticking out of the hillsides.

Dr. Lowdermilk drew a lesson for America from the history of these classic lands. Here, too, there has been neglect and wastefulness in land use, and soil erosion has got started at an alarming rate.

However, the speaker concluded, "this destructive force did not go unheeded. Far-sighted students of land foresaw the dangers of soil erosion. But it was not until experimental studies were begun by which it was possible to measure comparative losses of water and of soil under various types of cropping, slopes and climates, that the magnitude of the menace could be measured.

"On the basis of these researches, a nation-wide program of demonstration projects in erosion control and soil conservation showed the farmer and the technician alike how this enemy of civilization might be controlled. Out of these steps has grown a movement for conservation of land resources which was founded upon the lessons of the past and science of the present.

"Continued progress in this movement of conservation must be founded on the adaptation of the findings of research to problems in land use that become more and more intricate as the demands upon the land increase."

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Use Renewable Resources

LIVE on income, not capital; use renewable resources, rather than exhaust non-renewable ones. Such is the national policy that (*Turn to page 15*)