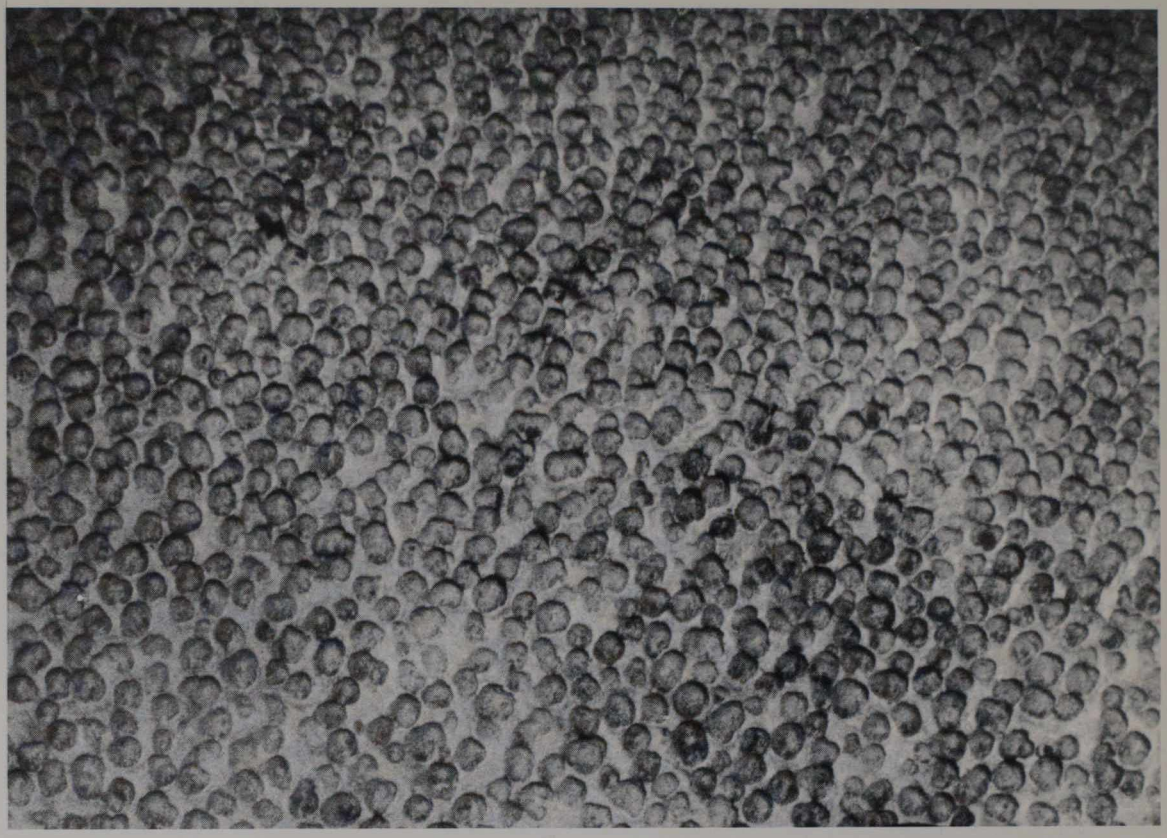

and 5 feet deep; the operation would cost far more than the value of the gold.

Today's scientists are not interested in filtering sea water. They are after nodules — lumps of manganese, nickel, copper and cobalt. Potato-sized and potato-shaped, they lie in layers on the ocean's floor, some in shallow waters, as off Scotland, most apparently in the Pacific at depths of 10,000 to 13,000 feet.

Scientists have known about the nodules for a century, and they now know two ways to harvest them: one, the favoured way, is to suck them up through a vacuum tube; the other is to scoop them up with a continuous-line bucket dredge. An estimated investment of between $150 and $250 million would be required to harvest a million tons of nodules in a year, and the harvest would yield an estimated 15 to 30 per cent profit. A number of companies in North America, Europe and Japan are investing in the technology. Science writer M. Radetzki noted recently in the magazine *Cooperation Canada* that "the establishment of oceanography divisions has become something of a status symbol for big firms with ambitions as technological innovators."

The supply of nodules could last practically forever. There is said to be enough copper on the ocean's floor to supply the world at its current levels of usage at least 1,100 years, enough nickel for 23,500 years, enough manganese for 34,800 years, enough cobalt for 260,000 years. The supply renews itself: new nodules add 55,000 tons of copper to the Pacific floor each year.

Most of the nodules lie far beyond the claim of any coastal state and the question of who will reap the harvest is unresolved. Only the industrialized nations now have the money and technology to engage in the exploitation. If the matter were to be decided on the basis of technical ability alone, it would mean that some of the last great unexploited resources on earth would benefit those nations whose wealth is already excessive. The developing nations would not only fail to share the new wealth, but would also be directly damaged by its development, since today they produce some 35 to 40 per cent of the nodule metals and they would lose some or possibly all of their markets. It is generally agreed that the seabed under the deep seas should be supervised by an International Authority, but it is proving difficult to agree on the powers to be given to this body. Developing countries have insisted that all activities in the deep seabed area, including scientific research, should be conducted solely by the Authority, through a subsidiary called the Enterprise. Several well-developed countries have proposed a system of licensing, whereby the Authority would allow contracting states and their nationals to explore and exploit. Canada, believing the delicate issue needed to be compromised, proposed that there be a mixed system whereby the Authority could license exploration and exploitation by contract or do the jobs itself when it had acquired the means to do so.

NODULES: LAMONT-DOHERTY GEOLOGICAL OBSERVATORY