

dividual members, many of whom have reported that this information has helped them in processing automobile scrap. Promising results have also been obtained from experiments in chemical leaching of residual copper from automobile scrap. An efficient selective leaching agent has been developed, and preliminary cost estimates for commercial-scale processing have been favorable.

Less successful to date, but still showing promise, are two furnace treatments. One involves heating the auto hulk in a rotary kiln at a temperature that liquifies low-melting nonferrous metals and embrittles the copper so that it can be flaked free and separated. The other treatment involves melting the scrap and preferentially tying up the copper in a slag fraction.

The Bureau is highly optimistic about a process that utilizes steel scrap in an entirely different manner. Chopped-up scrap is heated in a rotary kiln with nonmagnetic taconite—a material that previously has resisted treatment for recovery of its iron content. The iron in both the ore and the scrap is converted to a magnetic iron oxide which can be readily concentrated. At this stage, a conventional iron-oxide pellet can be made containing more than 63% iron, or another Bureau technique can be applied to yield a prereduced pellet with an iron content of more than 80%. By late 1968 a prototype plant will begin operation near the western end of the Mesabi Range to demonstrate the process. The plant will have a daily capacity of 600 tons of crude ore. Since the process requires ore and scrap in about a 20-to-1 ratio, the test plant will use 30 tons of scrap per day. A commercial processing plant turning out 5 million tons of high-grade ore concentrates a year would consume 600,000 tons of scrap.

Still another project, started last year and aimed at recovering the metal and mineral content of municipal incinerator wastes, already has attracted wide interest. Separation and recovery of the valuable mineral constituents poses several technical problems, but none of these appear unsurmountable. When the project has been further advanced it is probable that the recovery method will be demonstrated in a model municipal waste plant to be built in cooperation with the Public Health Service.

One other project, still in an early stage, already has shown promise of partial achievement of objectives. Work on centrifugal dewatering of red mud from Jamaican-type bauxite has been sufficiently encouraging to stimulate a major manufacturer of centrifuges into conducting a number of tests for the Bureau at no charge. Success in this phase of red mud research would result in substantial recovery of alumina and soda for processors of bauxite. Subsequent problems, recovery of iron and titanium and the final disposal of the residue, are yet to be solved.

A contract and grant program aimed both at training personnel and conducting basic research was begun by the Bureau this year and is now operating at an annual level of \$600,000. None of the projects begun to date are sufficiently advanced for a meaningful assessment of progress.

Hundreds of samples of mine and mill wastes have been subjected to extensive scientific scrutiny to establish their chemical and physical properties and to determine the most likely materials for mineral recovery or conversion to useful products. A preliminary study of the magnitude and sociological significance of the solid waste problem is scheduled for completion by the middle of 1968.