

of Mines scholarship. The inception of these two schools, and the greater ease with which employment can be obtained in their vicinity, will, no doubt, militate to a certain extent against overcrowding at this school.

An important alteration has been made this year in the conduct of public assay-work. A commodious wooden building has been built round the large chimney of the old assay-room, and is fitted with furnace, muffles, grinding-plate rolls, fume-chamber, sink, benches, &c., and all the necessary apparatus, while adjoining it is a compact well-lighted balance-room, for which a new and expensive bullion-balance has been imported from London. This separate assay department supplies a long-felt want, and the public will have the satisfaction of knowing that their assays are performed by a competent assayer in a building entirely distinct and separate from that used by the students. It will also materially aid the teaching staff in the efficient control of both the public assay-work and the teaching department. The following table shows the number of public assays performed during the last twelve months:—

Number of public assays	487
Number of assays in connection with ton parcels of ore	413
Total	900

The great majority of samples for assay are sent from districts outside of the Thames, and many come from various parts of New Zealand other than Auckland.

Extensive alterations have been made in the experimental plant. As the old battery could not cope with the large increase in the number of test parcels, and was, besides, constantly needing repair, it was decided to shut down, and make the necessary improvements. First of all, with a view to giving the necessary increase in motive-power, a new 9 in. main, a quarter of a mile long, was laid down so as to connect the battery in a straight line with the county's large supply-pipe. A new valve and all necessary connections were fitted to the main, and this portion of the work completed before Christmas, 1897. The plant was then shut down in December, new foundations for the mortar-block, three new stamps, cams and cam-shaft were placed in position, and special housing round the box was built up to prevent the escape of dust in dry-crushing.

The mortar-box has been placed in a lower position, and the stages and platforms altered. The ore now passes through a Dodge rock-breaker near the furnace, and is fed into the stamps automatically by a Challenge self-feeder. Bucket elevators, fastened on belting, convey the dry-crushed ore from the front of the stamper-box into a large sheet-iron hopper, whence it is distributed by means of shoots to the amalgamating-pans and cyanide-vats as required.

A trial run of the new machinery was made in the middle of March, 1898, and, after a few alterations, the work of crushing test parcels was resumed. The new battery has been kept busy ever since, and several parcels are now on hand awaiting treatment.

There has been no lack of test parcels during the last twelve months, and although, owing to an enforced idleness of three months while the above-mentioned alterations were in progress, the total number of parcels treated is less, still the plant, while in repair, was in constant work, and the average for the nine months is well up to that of the previous twelve months. During the nine months the plant was working sixty-two parcels, aggregating 89,211 lb., were treated, of which thirty-seven were pan-amalgamated, thirteen treated by potassium-cyanide, and twelve were miscellaneous, as shown by the accompanying tables. It was found necessary to subject four of the parcels to a chloridizing roast before treatment. The average percentage of saving by amalgamation amounted to 83·8 per cent., and by cyanide to 61·6 per cent., much the same as during the previous year.

In the list of the experimental treatment of the various parcels of ore several poor extractions are noticeable. In considering these, and in fact all the figures of percentages, it should be remembered that the plant has been erected for experimental purposes, and is worked accordingly. It is not a works for reduction and extraction purposes, but rather one to which the owner of a parcel may bring his ore, have it tested by some process he himself decides upon, or, leaving the matter to the discretion of the Director, has the parcel treated by perhaps several different methods, all of which cannot result equally well. The poor extractions have in many cases resulted from treating the ore according to the instructions of the owner, who has probably, however, obtained thereby just as much valuable information concerning the ore as he would have had the parcel been treated successfully by some other process. Low extractions in experimental treatment teach valuable lessons only less in importance to those afforded by the discovery of the most successful mode of treatment.

In many instances my instructions have been to test the ore by cyanide, and demonstrate by experiment whether or not the ore is suited to this process. Where, however, the process named by the owner as the one to be adopted has yielded poor results the test has in most cases been supplemented by treating the parcel by a second or even a third method, and generally a satisfactory extraction has been obtained. Amalgamation and the cyanide process are the most common processes adopted. Chlorination tests are made on certain ores, and tailings are usually cyanided. Latterly a new process, the permanganate (chlorination) process, has been added to the above list.

Dr. Black carried out various experiments in connection with his patent in the Thames School of Mines plant, and on his departure donated a set of his apparatus to the school. As I am thoroughly acquainted with the working details and the chemistry of the process, the school is now in a position to treat small parcels of ore by this method.

The school is gradually gathering together a representative collection of minerals, and thanks are due to the Under-Secretary and the Inspectors of Mines for donations of mineral specimens.