FROM THE EDITOR

The editor, on publishing the interesting data of G. A. Radchenko concerning the natural segregation of broken stone upon dumping, calls attention to the possibility, in a number of cases, of using segregation as a means for grading stone without mechanical devices, as was successfully accomplished, for example, in the construction of the rockfill dam of the I Khram hydroelectric power station. There the rock mass blasted from the spillway excavation descended along a steep slope from a height of 22 m to the site below. As a result of segregation, the large stone accumulated in the lower part of the dump and all the fines were retained in the upper part of the slope. The excavator at the lower site loaded the thus-graded large stone into transporters which hauled it to the body of the dam. At this time the rock was dropped down at another area of the slope.

When excavating rock in pits or quarries the granular composition of the rock mass is always continuous, with the inevitable presence of small fractions. The quantity of small fractions depends on the quality of the rock being excavated: mineralogical composition, tectonic disturbances, degree of weathering, and to some extent on the methods of blasting. At the construction of the Aswan high dam, where there was a great diversity in the quality of the rock being excavated, the quantity of small fractions (with a diameter smaller than 20 mm) amounted generally to about 10%, and when excavating deposits with a predominance of gneiss the quantity of small fractions increased to 25%.

On the basis of averaging a large number of screenings it is possible to obtain more or less regular characteristics of the granulometric composition of a rock mass. Individual samples of a rock mass taken from the same face can yield quite different results owing to the presence of large pieces.

With excavator loading at the face it is possible, and under certain conditions economically expedient, to concentrate the rock by appreciably reducing the quantity of the small fraction. When an excavator operator acquires necessary skills it is possible to obtain rock from a quarry with a more or less constant granulometric composition and even sufficiently pure stone such as is obtained on grading devices. Such work, of course, should be accompanied by control screenings of numerous samples.

The body of the Aswan Dam required great quantities of graded stone with a size of more than 150 mm, its clogging by 5-80 mm fractions could not exceed 5%, including no more than 2% of the 5-20 mm fractions. Two groups of stone-grading devices were constructed to obtain the graded stone: one on the banks of the Nile for loading the graded stone directly into barges, and the other on the precipitous slope of the Kor Kundë Ravine, where the graded stone was rolled down to the bottom of the ravine and loaded there by an excavator into dump trucks. Both stone-grading devices were equipped with stationary grizzlies made of drilling rods with a 200 mm opening and provided good sizing of the broken rock (for the graders on the banks of the Nile the average content of the fractions 5-80 mm was 2.03%, including 0.23% of the fractions 5-20 mm, and for the graders at Kor Kundë, respectively, 2.93 and 0.37%). The work of the graders on the banks of the Nile, which did not require secondary loading of the stone, was quite effective, whereas the use of the graders at Kor Kundë was stopped, since selective loading of the graded stone directly at the face proved to be more effective.

In excavating the borrow pit with simultaneous loading of both the selected graded stone (selective loading) and the remaining waste rock, the total productivity of one EKG-4 excavator was 52,000 m³ per month, including 16,000 m³ of graded stone, i.e., 31% (data are based on 36 excavator-months). The quantity of stone larger than
Fig. 1. Average values of granulometric composition of stone materials. 1) Wastes; 2) run-of-the-mine broken rock; 3) ordinary broken rock; 4) screened rock; 5) graded stone (selective loaded); 6) weighted average value for period from October 23, 1964 to January 31, 1965.

Fig. 2. Content of fractions $d < 20$ and $d = 20-80$ mm on slopes of shell No. 60 (reading of height from crest).

Fig. 3. Distribution of fractions as a function of relative height of slope (reading of height from crest). Fractions:
- a) $d < 20$ mm; b) $d < 80$ mm; 1) dump of broken rock $h = 12.5$ m; 2) ditto, $h = 13.0$ m; 3) experimental embankment, $h = 31.0$ m; 4) shell No. 60, PK 19 + 33, $h = 35$ m; 5) same, PK 19 + 84, $h = 33$ m.

150 mm in the broken rock amounted to 68.2%; consequently, less than half of that possible was removed by selective loading, but the waste rock was beneficially used. When loading only graded stone it was possible to remove up to 50% (18% stone loss), but the overall productivity of the excavator dropped to 35–40,000 m$^3$ per month, and the waste rock was not used.

When excavating the borrow pit for grading, the excavator hauled up to 60–65,000 m$^3$ per month, but for loading the stone and wastes at the grading unit two more excavators were required, thus there was about 14,000 m$^3$ of graded stone per excavator-month, and almost twice the number of vehicles were required in comparison with selective loading at the face. The process of selective loading is very simple, but requires skill on the part of the excavator operators. The process is as follows: the excavator while awaiting a dump truck "reshovels" the working face, making the broken rock roll down the slope, as a result of which segregation of the material occurs; the large stones collect at the base of the slope from where they are loaded by bucket into the dump truck. The purity of the