there is a state of all-round (hydrostatic) compression in the test material under the indentor tip. This, however, is not so. It is well known that we are not dealing with a state of hydrostatic compression in hardness tests. Such an assertion is devoid of all physical basis. Almost all research workers are of one mind in saying that hydrostatic compression does not take place under the impression of the sphere in the Brinell test.

In order to examine this point we made the following experiment. Cementing several copper plates together, we pressed the sphere of a Brinell press into the whole block. Then, after removing the load, we separated the block along the diametral plane of the hole and polished the surface of the cut. The resultant polished section showed clearly that the thinning of the plates under the impression was not uniform (see Fig. 1). Analogous results are given by another experiment. We take a thin plate of red copper about 1 mm thick, lay it on the polished surface of a steel sample, and impress a Brinell sphere into this system under a load of 3000 kg. After removing the load we cut the copper plate along the diametral plane of the hole. It is immediately obvious on studying the section that at the bottom of the hole the plate is severely thinned (to a thickness of about 0.1 to 0.2 mm). This is because under the influence of the nonuniform compression the material of the plate flows from the center of the depression to the periphery. On all these grounds, we consider that there is no foundation in asserting that hydrostatic-compression conditions exist in static methods of hardness measurement.