NOTES AND NEWS

CLOSER INSPECTION OF INDUSTRIAL DIAMONDS PRIOR TO USE ADVOCATED

A. E. ALEXANDER,
Bureau of Natural Pearl Information, New York, N. Y.

The article by Drs. Kraus and Slawson, on the "Cutting of diamonds for industrial purposes"[1] is extremely timely and should prove invaluable to the individual or firm engaged in the cutting and merchandising of this widely used industrial tool.

During the past ten years, the writer has at one time or other been associated with one or more firms manufacturing spark-plug porcelain. The conventional method, usually employed to process an extruded, unfired ceramic blank, is to shape the material on a silicon carbide or aluminum oxide wheel. Or, if the ceramic materials have been dry pressed, a final, finished shape can be imparted by the use of the same type of grinding wheel. These wheels are grooved to the desired form and the accurate dimensions and tolerances maintained by means of a specially cut diamond-set shaping tool.

In connection with this work, it was found after several months experience, that some of the industrial diamonds lasted very much longer than others. The life of the diamond, or its rate of wear was found to vary from a week to as long as a month-after which a new diamond had to be purchased, or the old one re-cut. At the writer's suggestion, a routine inspection of all industrial diamonds, prior to purchase, was installed. The method instituted consisted of two optical examinations, one using a polarizing microscope, the other employing conventional binocular equipment. It was found that many diamonds, when examined under crossed nicols, revealed that the stones were in a state of strain. The sales engineering representatives of the several firms which supplied the industrial diamonds in question, were interrogated about this phenomenon. Apparently no knowledge was had to the effect that the diamonds were so strained, nor was any microscopic examination of any kind (outside of possibly a jeweler's loupe) seemingly made on the stones held in stock.

In addition to the evidence of strain, it was further found that some of the industrial stones were flawed, or contained one or more types of inclusions. Again, many stones were cut as "conveniently" as possible, so that the face that could withstand the greatest wear, viz., the hardest, was not always correctly placed with respect to the particular shape wanted.

[1] Kraus, E. H., and Slawson, C. B., Cutting of diamonds for industrial purposes: *Am. Mineral.*, **26,** 153–160 (1941).

As stated above, the stones were subsequently examined in lots, by means of appropriate optical equipment. Only those diamonds which were nearly free from strain or showed no evidence of this condition were chosen. Industrial diamonds, which were flawed or which contained inclusions of any kind which were so oriented in the stones as to cause possible failure on use, were eliminated from consideration. And lastly, any stone not properly cut was likewise unacceptable.

Where a large number of stones are used, the employment of an inspection system, along the lines suggested above, and performed preferably by an individual possessing some knowledge of the mineralogy and crystallography of the diamond, will do much to reduce replacement costs and unsatisfactory performance.

PROCEEDINGS OF SOCIETIES

THE PHILADELPHIA MINERALOGICAL SOCIETY

Academy of Natural Sciences of Philadelphia, December 5, 1940

Dr. Thomas presided, with 52 members and visitors present. Dr. Daniel L. O'Connell of the College of the City of New York addressed the Society on "The Saurel Symbols for the 32 Crystal Classes." By the use of only a center of symmetry, axes of symmetry, and inversion axes (planes of symmetry were ignored) a thoroughly consistent and logical scheme for deriving and designating the 32 crystal classes was developed by the late P. Saurel, Professor of mathematics in the College of the City of New York. The exposition of the system by Dr. O'Connell was discussed by Drs. Wherry and Patterson.

January 2, 1941

Dr. Thomas presided with 47 members and visitors present. Dr. George T. Faust of the U. S. Department of Agriculture spoke on "Economic Petrography," emphasizing the importance of petrographic analysis in planning methods for beneficiation of ores. Mr. Louis Moyd related some experiences on his mineralogical expedition into Ontario in November.

February 6, 1941

Dr. Thomas presided, with an attendance of 71 members and visitors. Dr. William Parrish of State College addressed the society on "Isomorphism and solid solution," in which data on atomic and ionic radii and their relation to coördination numbers were reviewed. Interstitial and substitutional solid solutions and the formation of stable compounds were discussed from the viewpoint of crystal chemistry and structure. They can be differentiated by specific gravity methods and *x*-ray studies. Factors influencing the formation of solid solutions such as the 15% rule (limit of tolerance of radii of replaceable atoms), close similarity in crystal structures, etc., were discussed. Ordered, disordered structures and superstructures were described. Some of the principles developed were illustrated in deriving chemical formulae from chemical analyses of sphalerites and spinel. The speaker stressed the importance of the study of compositional variation in mineralogy.

Mr. Louis Moyd exhibited peristerite and ellsworthite from Hybla, Ontario; cyrtolite, cancrinite, sodalite, biotite, hackmanite and nepheline from Bancroft; cyrtolite and tremolite from Otter Lake; calcite, fluorite, diopside, molybdenite, and fluorite from Wilberforce; and wernerite from Calumet, Ontario.

FORREST L. LENKER, *Secretary*