

authors believe that this body shows that with strong fractionation a basaltic magma differentiates to a basaltic magma enriched in iron.

The small amount of siliceous rocks present are believed to have formed from assimilation.

ESPER S. LARSEN

## PROCEEDINGS OF THE SOCIETIES

### PHILADELPHIA MINERALOGICAL SOCIETY

*Academy of Natural Sciences, Philadelphia, Pa.*

A stated meeting of the Philadelphia Mineralogical Society was called to order by President W. Hersey Thomas on December 7, with 48 members and 30 visitors in attendance.

Dr. A. Williams Postel addressed the Society on the results of his studies on the granodiorites of the Philadelphia area. He first described the various facies of the Wissahickon schist, originally a sedimentary series of impure shales, now so highly metamorphosed as to be in the kyanite and sillimanite grades of metamorphism. The schist has been intruded by a series of igneous rocks, the earliest of which were basic and formed sills which have been metamorphosed to hornblende gneiss. Later, there was an intrusion of massive gabbro, and this was followed by the granodiorites—first the Springfield quarry type, then aplite veins, and finally the Ridley Park quarry type.

The Springfield granodiorite is porphyritic, coarse grained and has a gneissic structure parallel to that of the surrounding schists, but the microcline phenocrysts show no cataclastic structures. The basic sills in the Wissahickon vary in thickness and where they are in contact with the granodiorite, the intensity of their alteration is related to their thickness. Only the largest of the sills show unaltered interiors, the rest have been completely changed to biotite gneiss. The Springfield granodiorite is always associated with crushed Wissahickon gneiss, in which the stress mineral kyanite is present, denoting a sheared zone. Near contacts with the gabbro the granodiorite contains inclusions of gabbro and impregnates the gabbroic wall rock with quartz and alters its pyroxene to hornblende and biotite.

The speaker suggested three possible modes of emplacement for the Springfield granodiorite—first, that it was a normal silicate magmatic intrusive and that its foliation was imposed at the same time that the schist received its foliation and metamorphism. However, this could not be the case as the Springfield granodiorite also injects the gabbro which has no foliation or metamorphic structure, thus the granodiorite must be later than the metamorphism of the schist. A second possibility is that the magmatic granodiorite might have intruded the already metamorphosed Wissahickon schist, injecting it *lit-par-lit*, and assuming its structure. But a difficulty arises from the fact that the foliation of the inclusions in it are without exception parallel to the foliation of the country rock. This leaves only one interpretation. Dr. Postel believes that potash-silica-rich hydrothermal emanations from below have soaked and reacted with the Wissahickon schist to produce the Springfield granodiorite, and that it was never a true intrusive of magmatic form. In support of this hypothesis, he shows that the microcline porphyroblasts of the granodiorite have as inclusions plagioclase and quartz from the earlier schist, that seeming inclusions of basic rocks in the granodiorite are really altered basic sills, that the great variation in composition of the granodiorite is to be expected in a rock which formed as a result of reaction with the Wissahickon schist, which did not have a constant composition to begin with, and finally the constant association of the granodiorite with shear zones in the schist, which could form avenues of approach for the reacting emanations.

The Ridley Park granodiorite has a more constant composition and always occurs in dike form, the width of which is seldom more than ten feet. It is the speaker's opinion that the Ridley Park granodiorite shows the composition of the underlying mass from which the Springfield type emanations and the aplites have originated. The age of these intrusive rocks cannot be determined until the age of the Wissahickon schist is established. However, if they are the hydrothermal phases of the Port Deposit, Md., magmatic rocks, then they are post-Ordovician, as proven by Cloos and Hershey, who showed that inclusions in the igneous rocks had post-Ordovician structures of which the igneous rocks were free. Dr. Postel showed a structural and petrographic map of all the known outcrops found in the area covered by the rocks he studied, and illustrated his points with pictures of outcrops, photomicrographs, and results of chemical analyses.

LOUIS MOYD, *Secretary*

#### NEW YORK MINERALOGICAL CLUB, INC.

*The American Museum of Natural History, New York City, Dec. 20, 1939*

The meeting was called to order by President Lee with 39 members and guests present. After the brief business meeting Mr. Lee presented the speakers of the evening, O. Ivan Lee, and F. H. Pough, who addressed the Club upon "The Spruce Pine Pegmatites." Mr. Lee gave directions for reaching the district and described some of the individual quarries and their products. Dr. Pough described some of the quarries he visited in the fall and showed some lantern slides made by binding the garnet inclusions of the mica between two plates of glass and projecting the specimen as a lantern slide. This method proved very successful and the color zones were clearly visible in the flattened garnets. Both talks were well illustrated with color slides.

F. H. POUGH, *Secretary*

## MINERALOGICAL SOCIETY: LONDON

General meeting held in the apartments of the Geological Society of London on January 25th, 1940. Mr. Arthur Russell, M.B.E., President, in the Chair.

The following papers were read:—

- (1). *The structure of orthoclase*. By DR. S. H. CHAO, MR. A. HARGREAVES, and DR. W. H. TAYLOR.

Quantitative x-ray methods have been applied to the determination of the crystal structure of a typical orthoclase containing nearly pure potash-feldspar. The experimental procedure and the accuracy of the work are discussed, and the details of the structure are described.

- (2). *The existence of reversible photosensitivity in some artificial materials containing rutile*. By DR. W. O. WILLIAMSON (Communicated by the General Secretary).

Reversible darkening in daylight is shown by three types of material made from artificial anatase:

- (a) Anatase partly recrystallized by heat treatment, under "dry" conditions in the presence of iron or manganese, with the production of rutile. Certain iron-containing samples show a strikingly rapid darkening in daylight. This darkening is more pronounced in violet than in red light and is reversed on heating to below 100°C.
- (b) Anatase completely recrystallized in the presence of molten sodium chloride. The resulting product contains rutile and a sodium titanite in varying proportions.
- (c) Anatase converted into rutile by heating in the presence of iron, in an atmosphere containing hydrogen chloride.

The photosensitivity is held to depend on the entry of impurities into rutile crystals. Tentative explanations of it are given and the possibility of a connection with the known photosensitizing activity of titanium dioxide is stressed.

- (3). *Notes on the occurrence of fluorite in the West Cumberland iron mines and in the Lake District of Cumberland and Westmorland*. By MR. ARTHUR RUSSELL.

The presence of fluorite in the haematite ore bodies of West Cumberland, apart from its purely mineralogical interest, is of some importance as affording a possible clue to the much-debated question of the source of mineralization. A detailed description is given of its occurrence at a number of mines, drawings of crystals are given, and the sequence of the associated minerals is recorded.

Fluorite, hitherto regarded as a rare mineral in the Lake District, is described from three localities, two of which are new.

- (4). *A new method for the preparation of thin sections of clays*. By MR. A. V. WEATHERHEAD (Communicated by the General Secretary).

By the application of pyroxylin to suitably prepared clay samples, cellulose "peels" are obtained, which, when mounted in Canada balsam, enable a thorough examination to be made in polarized light under the microscope. Oil immersion objectives can be employed and under high magnifications the author has observed certain interesting authigenic constituents present in some clays. So far as can be ascertained these constituents have not yet been recorded and may form the basis for future research on these very fine-grained plastic rocks.

- (5). *A note on crystallographic calculations*. By DR. MAX H. HEY.

Solutions are given for the calculations of the elements of a monoclinic crystal from three fundamental angles in four cases where an unusual selection of fundamentals makes the usual methods of calculation impossible. One of these cases may be of practical interest for poorly developed crystals.