CaO-V_2O_5-H_2O SYSTEM

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As an aid in determining environmental conditions of naturally occurring hydrous calcium vanadates, an investigation was made of the CaO-V_2O_5-H_2O system. The variables of the system, in the order of their importance, are pH, temperature, and concentration. pH values ranged from 0 to 12; temperature from 25 to 90° C.; and the V_2O_5:CaO ratio from 0.5 to 10. The stability areas of eight crystalline phases were delineated. These phases can be divided into two major groups: the colorless phases, which are stable above pH 6.5; and the colored phases, which are stable below 6.5. According to the phase diagram, the stable phase below pH 2.2 at 25° C. (pH 3.0 at 90° C.) is hydrous vandaium pentoxide. Between 2.2 and 6.5 two naturally occurring minerals, hewettite and pascoite, are stable.

The stability field of pascoite is large at ordinary temperatures but gradually diminishes as the temperature rises and disappears at about 70° C.; at the same time the stability field of hewettite increases at the expense of the pascoite field. In the pH range from 6.5 to 7.5 and at temperatures less than 40° C., rossite is the stable phase. At higher temperatures several unnamed phases appear. At pH 7.5 to 10.0 two hydrous pyrovanadates(?) occur. Their stability range is influenced both by pH and by the V_2O_5:CaO ratio. Above pH 10, $Ca(OH)_2$ rapidly precipitates, and calcite forms if the solution is exposed to the atmosphere. Those phases whose stability field is near pH 7 seem to be the most soluble.

RADIOACTIVITY OF SOME RECENT BOTTOM SAMPLES FROM LAKE PONTCHARTRAIN, LOUISIANA

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An examination by means of a scintillation detector and a scaling circuit of some recent bottom samples taken from Lake Pontchartrain has been carried out under carefully controlled conditions. Considerable variation has been found in the disintegration rates. The data collected have been compared with both mechanical and chemical analyses of similar samples taken from the area and a correlation has been made. The areas of finer textures show the higher counts and the area of low organic content likewise have higher counts than the areas of higher organic matter. The detrimental factors due to background count have been removed by heavy shielding and by the determination of the residual background before and after sample counting. In order to insure accuracy with such low counting rates as exhibited here, a counting time of five hours has been utilized.

NEW MINERALS, REEDMERGNERITE ($Na_2O \cdot B_2O_3 \cdot 6SiO_2$) AND EITELITE ($Na_2O \cdot MgO \cdot 2CO_2$) ASSOCIATED WITH LEUCOSPHENITE, SHORTITE, SEARLESITE, AND CROCIDOLITE IN THE GREEN RIVER FORMATION, UTAH*

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Cores and cuttings from the Green River formation in Utah contain two new minerals, reedmergnerite and eitelite, with leucosphenite, searlesite, crocidolite, and shortite, in dolomitic shale. Reedmergnerite ($Na_2O \cdot B_2O_3 \cdot 6SiO_2$) occurs in many wells in Duchesne and Uintah counties as crystals rarely more than a millimeter long, colorless, triclinic, space group *P1 or P$\bar{1}$* forms (100)(001)($\bar{1}$02)($\bar{1}$01) in one zone, and (010)(100) and ($\bar{2}$10)

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another; habit stubby prismatic; $D=2.69$; indices of refraction: $\alpha=1.560$, $\beta=1.564$, and $\gamma=1.572$. The name honors Frank S. Reed and John L. Mergner, technicians of the Geological Survey, whose skill has served petrological science for more than 40 years. Reedmergnerite and $Na_2O \cdot B_2O_3 \cdot 2SiO_2$ are the only known ternary phases of the system Na_2O-B_2O_3-SiO_2, and apparently both must form hydrothermally under relatively low temperature and pressure.

Searlesite ($Na_2O \cdot B_2O_3 \cdot 4SiO_2 \cdot 2H_2O$) occurs sparingly with eitelite, etc., the fourth reported occurrence and the first in Utah; however, J. J. Fahey, who described this mineral from Wyoming in 1950, also noted its presence in cores from the Green River formation in Utah in 1952.

Eitelite ($Na_2O \cdot MgO \cdot 2CO_2$) has been found only in the Carter Oil Company Kermit Poulson No. 1 around 2850 feet, in crystals a few millimeters in diameter. Indices of refraction: $\epsilon=1.450$ and $\omega=1.605$; good basal cleavage; agrees with hexagonal symmetry reported by Eitel and Skaliks, who synthesized it in 1929. This is the second of the alkali-alkali earth carbonates synthesized by Eitel and Skaliks found in nature, the other being fairchildite, $K_2O \cdot CaO \cdot 2CO_2$.

Eitelite is named to honor Wilhelm Eitel, Director, Institute of Silicate Research, University of Toledo, Ohio.

IGNEOUS PETROLOGY OF PARAGUAY*

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A collection of igneous rocks made by E. B. Eckel in southern and east-central Paraguay as representative of the principal rock types of the region has been studied. Eight new analyses are given of granite, aplite, rhyolite, and quartz porphyry, two of basalt, and two of alkalic rocks—nepheline syenite and shonkinite. Each analysis is supplemented by spectrographic determination of 19 minor and trace elements. A widespread series of granitic, rhyolitic, and porphyritic rocks has been various ascribed to ages ranging from Precambrian to Tertiary; however, all of these rocks have a notably consistent petrographic character, chemical composition, and suite of trace elements, suggesting that all of these rocks may be co-magmatic and essentially contemporaneous. No evidence of a stratigraphic nature opposed to this suggestion is known to the writers. The presence of boulders of such rock in conglomerate of Permian age indicates Paleozoic or older age for these silicic rocks. Among basaltic rocks and diabase is one occurrence containing well-developed pseudobrookite. A heretofore unrecognized suite of alkalic rocks, ranges from nepheline syenite to shonkinite; the latter contains an unusual type of kataphorite, similar to an amphibole previously known only from Wyoming and Western Australia.

The silicic rocks are presumably the southern extension of the Brazilian basement complex; the basaltic rocks are part of the vast Parana basalt of Triassic-Jurassic age of southeastern Brazil and eastern Paraguay; the alkalic rocks represent a group of magmas of relatively local extent but sporadically widespread; they may be younger than Precambrian. But no closer age designation can be made now.

ZONED PLAGIOCLASE IN METAMORPHIC ROCKS

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Since metamorphic plagioclase is often stated to lack normal, and especially recurrent, zoning, and since the presence of such zoning in a granitic rock is widely accepted as proof

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