The data of the 5-day ACTH study suggest an answer. Were susceptibility, independently of any immediate effect of the seizure, associated with heavier adrenals, one would expect to find evidence for this in the 5-day ACTH study.

We are grateful to Dr. Norton for having called our attention to an error that had actually reduced the amount of information available in the raw data of our original research.

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Received February 17, 1954.

Water Resources of the Louisville Area, Kentucky and Indiana

A study recently made by the U.S. Geological Survey indicates that the potential water supply from both surface and ground-water sources in the Louisvills area, Kentucky, is more than sufficient for present needs.

Use of water in the Louisville metropolitan area for all purposes amounted to 765 million gallons per day (mgd) in 1952. Of this amount, 34 mgd came from wells and 731 mgd was withdrawn from streams. Of the 731 mgd, 659 mgd was untreated Ohio River water used by industries for cooling.

In certain parts of Louisville where ground-water supplies are being used, the present use of about 30 mgd could be increased only slightly. However, northeast of Louisville, about 280 mgd of ground water could be developed in a 6-mi strip along the river between Harrods Creek and Zorn Avenue. This water, if developed, would be induced infiltration from the river and would be suitable for industrial or domestic use.

Southwest of Louisville, the water available in sand and gravel deposits is about 12 mgd, and about 40 mgd could be developed in addition by induced infiltration from the river. Although detailed information is not available for the Indiana side of the river, additional supplies can probably be developed near the river northeast of Jeffersonville. The area north of Utica Pike is not considered favorable for development of large quantities of ground water, because of the high elevation of the bedrock.

Water from wells in the sand and gravel is of better quality than water from wells in the limestone. The average hardness of water from 15 wells in limestone that have been sampled annually since 1944 is 580 parts per million (ppm). In 1952, the average hardness of water from wells in sand and gravel was 475 ppm. The quality of the water in the sand and gravel is affected by the type of underlying bedrock. For example, water from sand and gravel over the limestone is harder than water from sand and gravel overlying shale.

The daily flow of the Ohio River at Louisville will drop as low as 2600 mgd on the average of once in 20 yr. Present use is 730 mgd, or 29 percent of 2600 mgd. Most of the water is returned to the river and is available for reuse downstream.

The river will reach a stage of 445.5 ft above mean sea level at the upper gage at dam 41 on the average of once in 20 yr. Normal pool stage is 420 ft. Most floods occur in the 4-mo period January through April, and all high floods have occurred during those months.

Considerable variation in the chemical quality of Ohio River water at Louisville is caused by changes in volume of flow, industrial and domestic pollution, and other factors. Ohio River water at Louisville is moderately hard. During 1952, the hardness ranged from 270 to 58 ppm, and averaged 119 ppm.

The small streams in the area are not important as major sources of water; however, Harrods Creek and Pond Creek are each capable of supplying about half a million gallons per day.

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Received March 16, 1954.

Zoological Nomenclature

NOTICE is hereby given that the International Commission on Zoological Nomenclature has under consideration the following case involving the possible use of its Plenary Powers: *Caenisites* Buckman, 1925 (Class Cephalopoda, Order Ammonoidea), proposed suppression of. Full particulars of this case are given in part 12 of volume 6 of the *Bulletin of Zoological Nomenclature.*

Any comments should be sent to me as soon as possible and, in any event, should be dispatched in time to reach this office not later than August 26, 1954, when voting on this case will begin.

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Received March 1, 1954.

Structural and Igneous Geology of the La Sal Mountains, Utah

Part of the effort of the U.S. Geological Survey is devoted to such basic questions as the ultimate source of the metals contained in mineral deposits. The search for new deposits and for extensions of old ones would be greatly facilitated if we understood the source of the metal and why it happened to be deposited where we find it. Basic questions of this sort prompted the decision to map and study the structural and igneous geology of the La Sal Mountains.

The La Sal Mountains include three of the 15 laccolithic mountain groups on the Colorado Plateaus. These 15 centers of igneous activity seem to represent

a single intrusive process—one that operated under very similar physical and chemical environments but was arrested in a different stage of development at each mountain. This concept suggested the desirability of mapping all the laccolithic mountains on the Colorado Plateaus to obtain working models illustrating the different stages in the igneous and mineralizing process.

These geologic problems fundamentally are physicochemical; but whereas the chemist deals with volumes that can be placed in a test tube, the geologist is confronted with volumes measurable in cubic miles. In the laccolithic mountains, the systems involve volumes ranging from 2½ to more than 9 mi^3. The spatial relationships, chronology, and changes in environment of such mountainous volumes are determined not by weights and measures but by surveying.

The mapping and related studies indicate that the earliest intrusions at each of the mountains were physically injected masses of diorite porphyry in the form of stocks and laccoliths. The degree of induration of shale at the contacts of these intrusions and the alteration of coal xenoliths incorporated in them indicate that the temperatures of the melts were only about 500° C. The physical injection of these intrusions produced large domes around the stocks and anticlines over the laccoliths that were pushed out radially from the stocks. Middle La Sal Mountain and several of the other laccolithic mountains on the Colorado Plateaus did not progress beyond this stage.

After about 5 mi^3 of diorite porphyry had been emplaced, the composition of the intrusive melt became monzonitic. Between 1 and 2 mi^3 of monzonite porphyry was intruded. Its temperature and mode of emplacement were approximately the same as for the diorite porphyry.

During the monzonite porphyry stage, there was little alteration of the wall rocks; apparently the dioritic and monzonitic intrusions not only were cool but contained only minor quantities of volatiles. At South La Sal Mountain the igneous activity ended with this stage.

At North La Sal Mountain, however, the igneous activity did not end with this stage. The monzonite porphyry there was followed by intrusion of a dike-swarm complex of dominantly syenitic rocks, a series of feldspathoidal dikes, and an irregular stock of soda syenite. The earliest of these syenitic intrusions seem to have been emplaced by physical injection, but the later ones melted and assimilated some of the adjacent wall rocks and caused other parts of the walls to recrystallize. The surrounding country rock, including many of the earlier intrusions, became shattered by radially arranged zones of vertically sheeted joints. Hydrothermal solutions escaping from the syenitic intrusions by way of these fissured zones deposited gold-bearing sulfides in them.

At this stage in the history of the North La Sal Mountain, the roof over the instrusions became breached, and explosion breccias developed in four major pipelike masses and in several lesser ones. These explosion breccias undoubtedly mark the roots of volcanoes. Associated with the breccias are intrusions of aegirine granite and soda rhyolite. These intrusions are much richer in potash than the earlier ones, and they contain the form of quartz that indicates a temperature about 600° C. This temperature is higher than that indicated for the diorite and monzonite porphyries, but when the breccia pipes were formed the pressure conditions drastically changed; breaching of the surface and resultant volcanism could have caused retrograde boiling. The igneous activity at North La Sal Mountain ended with this stage.

Radioactivity in the La Sal Mountain intrusions appears to be related to the magmatic differentiation sequence and not to the hydrothermal activity. The radon is least in the dioritic intrusions, greatest in the syenitic ones, and seemingly not affected by differences in degree of hydrothermal alteration. The other metals —copper, lead, zinc, selenium, and presumably the gold and silver—are of hydrothermal origin. They are mostly in the zones of vertically sheeted joints, and mostly in the most altered parts of those zones.

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Received March 16, 1954.

Germanium Oxide-Titanium Phosphate Glass[1]

DURING the course of studies of various materials of possible use in delivering interstitial radiation by use of P-32 preparations, it was found that fusion of GeO_2 and $Ti_3(PO_4)_4$ produced glasslike melts. On increasing the Ti content, there was a marked decrease in the solubility, so that fusion of a mixture of 50% GeO_2-50% $Ti_3(PO_4)_4$ produced a stable glass, insoluble in water.

The $Ti_3(PO_4)_4$ was prepared by treating sirupy H_3PO_4 (95%) with concentrated HCl (37%) containing equivalent $TiCl_4$. The reaction mixture was heated to dryness, extracted with water, dried, ground to pass 100 mesh, and mixed with an equal weight of GeO_2. The resulting mixture was fused in an Alundum crucible at 1300° C (Pt-wound furnace). The viscosity at this temperature permitted easy pouring or drawing. A brown glass was produced that was annealed for 2 hr at 500 to 800° C and cooled with the furnace.

The brown color may have been due to some impurity in the $TiCl_4$ or to elemental Ge or Ti. The depth of the color increased as the Ti content was increased.

A study of the optical transmittance of a sample of 50% GeO_2-50% $Ti_3(PO_4)_4$, fused cast and annealed as previously indicated, is shown in Fig. 1 (data from the Naval Research Laboratory, Washington, D. C.). These findings show that in the range 0.5 to 2.7 microns, the transmittance is approximately 80%. Be-

[1] The opinions or conclusions contained in this report are the author's and do not necessarily reflect the views or endorsement of the Navy Dept.