ginia, streams brought in sand and silt from eastern and southeastern sources. For a brief time a shore line was established in western West Virginia, and bars formed along the shore near the mouths of the rivers. Marine beds, mainly silt and very fine sand, were deposited to the west in eastern Kentucky.

By middle Berea time, downwarp in eastern West Virginia depressed the eastern Ohio Bay area, and the sea transgressed the shallow river channels that had been scoured in early Berea time.

Near the end of Berea time, the lands around the Ohio Bay sank slightly and the sea encroached, covering the Berea delta in northern Ohio and the sand-filled stream courses in central West Virginia. By the close of Berea time, the transgressing sea had spread the reworked sand and silt into a broad, thin sheet that is nearly continuous from northern Ohio to southeastern West Virginia.

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Crystalline Regions in Metamict Minerals

A vexing problem in mineralogy is the nature of the metamict state [A. Pabst, *Am. Mineralogist* 37, 137 (1952)]. When certain minerals are subjected to emanations from radioactive elements, disorder in their structures results. Under prolonged or intense bombardment, damage to the original structure may be so great that the original structure cannot be directly determined by present x-ray or optical techniques.

In considering the problem, it seemed reasonable to expect that, even though damage is so great that the areas of relict crystal structure are too small and widely separated to be resolved optically or to give a meaningful x-ray diffraction pattern, they are large enough to be characterized by selected-area electron-diffraction patterns.

To test this hypothesis, samples of zircons from Ceylon and Oklahoma were examined. From each zircon two portions of material were selected—one was only weakly birefringent and gave a diffuse x-ray pattern, and the other was optically anisotropic and gave a sharp x-ray pattern. In every case, both portions gave sharp electron-diffraction patterns that were essentially identical.

These preliminary studies indicate that the electron-diffraction method is a powerful tool for the investigation of the physical nature of the metamict state and for the identification of metamict phases. Detailed investigations in this field are being continued.

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Geophysical Surveys in Salt Lake Valley, Utah

A few years ago while the point-to-point aeromagnetic profile was being recorded, as is customary on all cross-country flights of the U.S. Geological Survey aircraft, an anomaly was discovered in the Salt Lake Valley between the Park City–Little Cottonwood and the Bingham mining districts. Later an aeromagnetic survey with 1-mi spacing was made of the northern Oquirrh Range and the southern part of the Salt Lake Valley to determine the magnetic characteristics of the Bingham stocks, to map the anomaly discovered in the valley, and to investigate the possibility that it might represent an intrusive mass similar to the Bingham and Little Cottonwood stocks.

The resulting aeromagnetic map showed one large elliptical anomaly with its long axis east-west in the Bingham Canyon area. The high point was over the south edge of the Utah Copper stock, the southernmost of the Bingham stocks, where it is in contact with the Oquirrh formation. The anomaly was obviously related to the intrusions, and the displacement of the anomaly maximum from the center could be attributed to the greater concentration of magnetic minerals produced by the mineralization and contact metamorphism of the stock. In Salt Lake Valley, low magnetic gradients were observed in general, with the exception of the elongate high over the southern part, which may be an extension of the Bingham Canyon anomaly. This elongate high is north of and parallel to the Traverse Mountains from their intersection with the Oquirrh Range to the Lone Peak salient of the Wasatch Mountains; it lies over an area covered by valley fill. Within this elongate high are several closures of still greater magnitude. The most prominent, which is approximately 3 mi southwest of Draper, is comparable in magnitude and extent to the anomaly over the Bingham stocks. Depth estimates indicate the source of the anomaly to be near the surface.

In August and September 1953, a vertical intensity magnetic survey was made of an area of 5 mi^2 in the Jordan River valley south of Salt Lake City to provide more detailed information on the source of two of the prominent aeromagnetic anomalies, including the one near Draper. A gravity survey was also made to provide supplementary information to aid in the interpretation. The area in which the survey was made is entirely covered by alluvium, and there is no direct geologic evidence available on possible sources of these anomalies.

The vertical intensity magnetic map shows two magnetic highs, one sharp and the other broad, corresponding except in intensity to the aeromagnetic anomalies. A positive gravity anomaly superimposed on a strong regional trend was found in approximately the same location as the sharp magnetic anomaly, which corresponds to the previously mentioned Draper anomaly. Attention was concentrated on this anomaly, and the depth of the disturbing body

was determined from the vertical intensity data as about 500 ft.

The anomalies due to geometric bodies of different sizes and shapes were computed, using solid-angle formulas, and it was found that anomalies resulting from a vertical cylinder of infinite depth extent with a radius of 500 ft, depth of burial of 400 ft, magnetic susceptibility of $12{,}350 \times 10^{-6}$ cgs units, and a density contrast of 0.25 most closely approximated the observed anomalies. Rock of dioritic or slightly more mafic composition but with about 4 percent magnetite enclosed in limestone or quartzite would have this susceptibility and density contrast. Since rocks of similar composition have been found in the area, postulation of such a body is reasonable. The near-circular pattern and lower northern gradient of the Draper anomaly indicate that the source is a stock-like intrusion with a northward dip rather than a local occurrence of mafic extrusive rock. The depth of burial determined is an approximation, since the body was assumed to be vertically polarized, but is not more than 1000 ft and is probably less than 500 ft.

If the source of the anomaly is an intrusion, mineralization and contact metamorphism similar to those observed elsewhere in the Salt Lake Valley may be associated with it. To determine this, additional geophysical work and/or drilling will be necessary.

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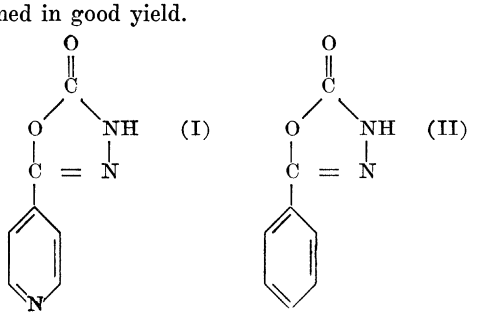
The Action of Phosgene on Acid Hydrazides to Give 1,3,4-Oxdiazolones of Interest in the Treatment of Tuberculosis

FREUND and Kuh (*1*) have described the action of phosgene under pressure and at raised temperatures on certain phenylhydrazides to give small yields of N^4-phenyl substituted 1,3,4-oxdiazolones. Dornow and Bruncken (*2*) describe a similar reaction in which certain acid and diacid hydrazides yield 1,3,4-oxdiazolones on treatment in aqueous acid solution at room temperature with phosgene [see Lieser and Nischk (*3*)].

On treating isonicotinic acid hydrazide at room temperature in an inert solvent or in aqueous acids, such as hydrochloric acid, with phosgene, the corresponding 1,3,4-oxdiazolone (I) mp 265° C (decomposition) is formed in good yield.



2-Pyridyl-(4)-1,3,4-oxidiazolone-(5)

The reaction is apparently general for this type of acid hydrazide. Benzhydrazide reacts for example, with phosgene (*3*) to give 2-phenyl-1,3,4-oxdiazolone mp 138° C (II).

(I) is, as would be expected, soluble in aqueous acids and alkalis while (II) is, of course, soluble only in alkali. (I) on prolonged hydrolysis with concentrated hydrochloric acid yields practically quantitatively isonicotinic acid, hydrazine, and carbon dioxide.

(I) showed on *in vitro* tests slightly less activity against M. tuberculosis than isonicotinic acid hydrazide. *In vivo* tests in the guinea pig infected with strain H 37 Rv showed it to be, however, somewhat more active than isonicotinic acid hydrazide, both when assessed by weight-gain curves and histological examination of the various organs. The LD_{50} (subcutaneous) of (I) was approximately one-tenth that of isonicotinic acid hydrazide when determined in the mouse and one-third that of isonicotinic acid hydrazide in the rabbit (*per os*). Chronic dosing of (I) in 4 times the therapeutic dose in the guinea pig during 2 mo showed favorable weight-gain curves and no pathological changes in any organ. Chronic toxicity tests (*per os*) in the rabbit using 10 times the therapeutic dose showed no pathological changes.

(I) and certain derivatives (*4*) are at present undergoing clinical trial. Certain derivatives of (I) show a high degree of *in vitro* activity against isonicotinic acid hydrazide resistant strains on *M. tuberculosis*.

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References and Notes

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2. A. Dornow and K. Bruncken, *Ber.* **82**, 121 (1949).
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A Constituent of Human Perspiration with Intense Ultraviolet Absorption

GOLDRING, Hawes, Hare, Beckman, and Stickney (*1*) have reported the presence of a substance in human perspiration with intense ultraviolet absorption, capable of affecting absorbance readings if transferred to cell contents or surfaces. We wish to confirm the existence of this material for both men and women, and to describe a number of characteristics observed in a preliminary study.

Extraction experiments on small areas of skin indicated that the substance is taken up insignificantly by hydrocarbon or chlorinated solvents, to some extent by ethanol and methanol, and extremely well by water and alkaline solutions. Relatively large amounts can be collected by rinsing down the body surface with water, especially after a period of strenuous physical activity.

The rinse water, clarified by filtration through an