266 $m\mu$ and a smaller peak at about 310 $m\mu$. This spectral behavior can be accounted for if the formation of both the glycol and the 4-dihydro, 5-hydroxy compound (I) are assumed to occur in the ratio of about 1:3. The glycol gives, on acid treatment, dimethyl isobarbituric acid and the dihydro-hydroxy compound, after the acid-catalyzed dehydration, gives dimethyl uracil with an absorption maximum at 266 $m\mu$ in both acid and alkali solutions.

The dihydro-hydroxy product and the glycol have also been characterized in other ways.

1) Chromatography of the product treated with acid showed the presence of both dimethyl isobarbituric acid and dimethyl uracil.

2) The rate of formation of the ultraviolet-absorbing product on treatment with acid was compared with the rate of formation of the ultraviolet-absorbing product formed photochemically from dimethyl uracil.

The second order rate constant (at 25°C) of the acid-catalyzed restoration of the ultraviolet absorption at pH 1.30 was found to be 1.13×10^{-2} lit. mole^{-1} sec^{-1} for the photochemical product and 1.10×10^{-2} lit. mole^{-1} sec^{-1} for the product obtained on irradiation with x-rays; this latter value was confirmed by measurements of the rate of double-bond restoration from the uptake of molecular bromine, which gave a rate constant of 1.12×10^{-2} lit. mole^{-1} sec^{-1}.

These figures support the conclusion that one of the products formed by x-irradiation of aqueous solution of dimethyl uracil, in the absence of oxygen, is the 4-dihydro, 5-hydroxy compound, identical with that produced photochemically (*6*).

G. SCHOLES
J. F. WARD
J. J. WEISS
University of Durham, King's College, Newcastle upon Tyne, England

References and Notes

1. R. L. Sinsheimer and R. Hastings, *Science* **110**, 525 (1949).
2. C. H. Thompson and A. M. Moore, *Can. J. Chem.* **35**, 163 (1957).
3. G. Scholes and J. Weiss, *Nature* **185**, 305 (1960); G. Scholes, J. F. Ward, J. J. Weiss, *J. Mol. Biol.* **2**, 379 (1960).
4. B. Eckert and R. Monier, *Nature* **188**, 309 (1960).
5. J. Weiss, *J. chim. phys.* **52**, 539 (1955).
6. We should like to express our thanks to the North of England Council of the British Empire Cancer Campaign and to the Rockefeller Foundation for financial support.

9 January 1961

Five New Minerals from Moctezuma, Sonora, Mexico

Abstract. Five new minerals have been found in a tellurium deposit near the town of Moctezuma, Sonora, Mexico. Preliminary study shows that they are a lead-oxy-fluoride, a zinc tellurite or tellurate, a manganese-zinc tellurite or tellurate, a manganese tellurite or tellurate, and an iron tellurite or tellurate.

Mineralogical interest in the deposit at Moctezuma was first aroused by the identification of several rare minerals, including mackayite, emmonsite, tellurite, native tellurium, and paratellurite. Paratellurite was recently described by Switzer and Swanson (*1*). Moctezuma is the second occurrence of mackayite and paratellurite.

Five new species of minerals have been found in this deposit. Since complete chemical data are not available, the naming of these minerals is being delayed. Preliminary descriptions of the five minerals follow.

Lead-oxy-fluoride, which was found in extremely small amounts, occurs as minute, yellow plates with a high adamantine luster. The x-ray powder data agree with those for synthetic Pb_2OF_2 published by Byström (*2*). The x-ray data and appearance of material synthesized during the present study are the same as those of the natural mineral. At present, there is not enough of the mineral for a chemical analysis.

Zinc tellurite or tellurate occurs as small, brown, hexagonal prismatic crystals terminated by a bipyramid. It is optically uniaxial positive with $\omega = 1.85 \pm 0.01$ and $\epsilon = 1.93 \pm 0.01$. A spectographic analysis gave only zinc and tellurium as major constituents. The x-ray powder data do not match those of any known tellurium minerals. The strongest spacings (in angstroms) are 8.1 (very strong), 4.04 (strong), and 2.75 (strong).

Manganese-zinc tellurite or tellurate is a red to purple mineral which occurs in platy masses. Partial optical data are: biaxial positive, $2V = 60°$ (estimated, $\beta = 1.89$, and $\gamma > 2.10$. The specific gravity, determined with the Berman balance on 20 mg of material, is 5.01 ± 0.02. Since only manganese, zinc, and tellurium were reported as major constituents by spectrographic analysis, the mineral is probably a manganese-zinc tellurite or tellurate. X-ray powder data are different from those of known tellurium minerals. The strongest spacings (in angstroms) are 2.98 (very strong), 3.30 (strong), 1.62 (strong), 4.00 (strong −), 4.93 (medium strong), and 2.21 (medium strong).

Manganese tellurite or tellurate occurs as pale green to colorless platy masses and occasionally as small euhedral crystals. The crystals are plates and have an octagonal shape. The material examined has variable physical properties, and an isomorphous series is indicated. The following data are averages of values obtained from several samples. The mineral is optically biaxial positive, $2V = 15°$ (estimated), α and β are approximately 1.89, and γ is about 2.0. The specific gravity is 5.05. Spectographic analysis yielded manganese and tellurium as major constituents and zinc in lesser amount. Strongest spacings (in angstroms) are 2.03 (strong), 3.36 (strong −), and 2.61 (strong −).

Iron tellurite or tellurate (a mineral or mineraloid) is amorphous to x-rays and occurs as red-brown botryoidal coatings. Optically the material is very weakly anisotropic and has a mean index of 1.885 ± 0.005. The specific gravity is about 3.7. Only iron and tellurium were detected as major constituents by spectographic analysis.

JOSEPH A. MANDARINO
Earth Sciences Division, Royal Ontario Museum, Toronto
SCOTT J. WILLIAMS
Scott Williams Mineral Company, Scottsdale, Arizona

References

1. G. Switzer and H. E. Swanson, *Am. Mineralogist* **45**, 1272 (1960).
2. A. Byström, *Arkiv Kemi, Mineral. Geol.* **24A**, 1 (1947).

7 February 1961

Evaluation of the Origins of Strontium-90 Contained in Wheat Plant

Abstract. Twenty percent of the strontium-90 in wheat flour in 1959 was due to root absorption, 30 percent was due to floral absorption from soil particles attached to the ear, and 50 percent was due to current fallout. In 1960, 35 percent was due to root absorption, 50 percent to floral absorption from soil, and 15 percent to current fallout.

For evaluation of the Sr^{90} hazard level in the future, the argument concerning radioactive contamination of wheat and other cereals by fallout has been narrowed down to the problem of how much Sr^{90} in grain depends on the