DISCUSSION

ORDOVICIAN BLACK SHALES OF NEW YORK

THE Ordovician "black" shales of the Mohawk valley, in New York, display a remarkable succession of fossil-bearing zones in a monotonous lithologic sequence. Before the stratigraphic arrangement of these had been worked out, the whole had been generally regarded as "Utica."

The senior author has shown,[1] however, that while the true Utica in passing eastward changes into the "Frankfort" sandstone facies, the underlying Trenton limestones correspondingly change into similar black shales, distinguished by him as the Canajoharie shale.[2] At the inception of this change, near its western end, the higher Canajoharie had earlier received the name Dolgeville "passage beds." At east, the black shale facies passes over into a more sandy one, represented at first (in its upper part) by the Schenectady,[3] and across a fault zone wholly by the Snake Hill beds.[4]

All these "black" shales are characterized by graptolites, which straggle eastward into the sands and westward into the limestones, thus serving as diagnostic and guide fossils. By their aid, eight faunal zones have been discriminated,[5] three within the true Utica, four in the Canajoharie and still another lower one in the Snake Hill.

At the time, except for the Deer River or uppermost Utica, formational names were not proposed for these, as was done for the succeeding zones in the Lorraine sandy beds farther west and northwest. Since, however, these zones have been established beyond question, and geographic names for them will be convenient, they will be designated as follows:

Holland Patent, for upper Utica or zone of Climacograptus pygmaeus.

Loyal Creek, for middle Utica or zone of Dicranograptus nicholsoni.

Nowadaga, for lower Utica or zone of Climacograptus typicalis.

Fort Plain, for uppermost Canajoharie or zone of Climacograptus spinifer.

Chuctenunda, for upper middle Canajoharie or zone of Lasiograptus eucharis.

Gansevoort, for middle Canajoharie or zone of Glossograptus quadrimucronatus cornutus.

Sprakers, for lower middle Canajoharie or zone of Diplograptus amplexicaulis.

Morphy, for lowest Canajoharie or zone of Mesograptus mohawkensis.

Van Schaick, for lowest Snake Hill or zone of Climacograptus caudatus.

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[1] R. Ruedemann, *New York State Museum Bulletins* 162: 5–6, 29, 1912; 42: 558–559, 1901; 169: 51–52, 1914; 258: 24–26, 73, 1925; 285: 29–33, 1930.

[2] *Ibid.*, 162: 28; 227: 123, 1919.

[3] *Ibid.*, 162: 38; 169: 95; 227: 123.

[4] *Ibid.*, 162: 59; 227: 123.

[5] *Ibid.*, 227: 116, 123–126, 130; 258: 24–26, 52–53; 285: 5, 31.

NATURE OF THE LIGHT RAYS ON THE SURFACE OF THE MOON

THE recent announcement by the Committee on Lunar Geology of the Carnegie Institution suggests a plausible explanation of the nature of the bright rays radiating from certain craters on the moon's face. Some thirty of the moon's thirty thousand visible craters show this characteristic, led by Tycho, whose rays can be followed for more than a third of the moon's circumference.

The committee reports that the moon seems to be covered with volcanic ash, a condition quite in keeping with the multitude of true volcanoes which may be detected.

Volcanic ash is characterized by its division into irregular even ragged pieces with a wide range in size. Under the waterless, airless condition of the moon and with the small value of lunar gravity it is to be expected that this material will form a cover possessing a high degree of randomness in the arrangement of its particles.

If then the underlying solid were struck a sharp blow, producing a bell-like vibration, the vibrations would serve to shake down and so orient the superficial particles in such a way that their light-reflecting properties would be changed.

We are thus led to interpret the rays as a purely superficial indication of elastic vibrations in the solid substance of the moon, material we naturally infer is of the same general nature as terrestrial igneous rock. This surface effect, depending only on the vibration of the underlying solid, would naturally run over mountains, through craters and across plains, as observed, and being an orientation of the surface particles rather than a depression of the parts, there would be no resulting shadows.

The moon shows evidences of its history on its surface in a most impressive way and the larger craters may easily be classified as to age. It is notable that those with rays are "young," with sharply defined edges and little evidence of more recent disturbance. This is as we should expect, for whether we consider the volcanic or the impact activity every movement of material covers existing landscape features including the rays, which, having little height, would be early obscured and so observable only in connection with the later craters. Indeed, it is quite probable that the rays, which to us are such an important feature of the lunar face, would be quite undetectable to one on the moon itself.

To secure such a ringing blow as is evidenced by Tycho would undoubtedly require a rare combination of high meteoric speed with favorable angle of impact.

Interpreted thus, the rays form valuable corroborative evidence that a portion of the lunar craters are of meteoric origin.

Regarding meteoric velocities, Olivier[1] has assembled a great amount of observational data, indicating that meteors enter our atmosphere with velocities ranging up to 80 Km per sec. (50 miles per sec.), a velocity capable of giving a truly sharp concussion if unchecked by a protecting atmosphere. In this connection it should be recalled that the earth's dominating gravitational field would quite effectively screen our side of the moon from the impact of low velocity meteoric matter.

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[1] "Meteors," Charles P. Olivier, Williams and Wilkins Company, 1925.

HIGHWAY MORTALITY AMONG MAMMALS

IN the course of an automobile trip taken recently (October 13 to 16, 1934) between Iowa City, Iowa, and Albany, New York, a distance of 1,063 miles, Mrs. Stoner and I kept a record of the larger mammals lying dead on the thoroughfare. All highways traversed were paved, and practically the entire distance was covered during the hours of daylight. Our journey carried us successively through Davenport, Iowa, Ottawa and Joliet, Illinois, Valparaiso and Elkhart, Indiana, Ypsilanti and Detroit, Michigan, Windsor, Hamilton and St. Catharines, Ontario, Canada, and Niagara Falls, Batavia, Auburn, Pompey and Cherry Valley, New York.

It seemed apparent that all the mammals counted had been killed by passing automobiles. Some of the bodies were badly crushed and evidently the animals had been dead for a few days. However, most had met death but a short time before we passed. A few were scarcely mutilated.

While neither the number of individuals nor of species represented by our records is strikingly large, the mortality rate among a few species due to rapidly driven motor cars is comparatively high. And when account is taken of the thousands of miles of excellent paved roads which extend throughout the United States and Canada, it becomes apparent that the total mammal mortality due to the constantly increasing number of high-speed automobiles driven over constantly improved and extended super-highways attains rather appalling proportions. Particularly is this true among skunks and cottontail rabbits.

The list of six identifiable species of mammalian casualties encountered on this trip in Table 1 also includes a number of individuals which, in passing, it was not possible to determine satisfactorily. It is

TABLE 1

TABULAR SUMMARY OF MAMMALIAN CASUALTIES ENCOUNTERED ON THE HIGHWAY BETWEEN IOWA CITY, IOWA, AND ALBANY, NEW YORK

State or province	Date	No. of miles	Name of mammal							
			Common skunk	Domestic cat*	Gray squirrel	Muskrat	Brown rat	Cottontail rabbit	Undetermined	Totals
Iowa	Oct. 13	58	1					2	2	5
Illinois	Oct. 13	183	2	3				4	3	12
Indiana	Oct. 13 and 14	97	1	3		1	1	3		9
Michigan	Oct. 14	165		6				1	2	9
Ontario	Oct. 14 and 15	255	1	3	1			3	3	11
New York	Oct. 15 and 16	305	9	3	1			4	3	20
Totals		1,063	14	18	2	1	1	17	13	66