present flora of New Zealand can not legitimately be postulated as having entered that region as a unit at the central point advocated by Willis, nor can the flora of any region as a whole be dated from one period of time or from a single geographical point.

Finally the statement that the dying out of species is a rare event is overwhelmingly opposed by all of the facts of paleontology and by all of the facts of history unless its adherents are prepared to accept the Mosaic cosmogony. This comment is as true of vertebrate and invertebrate paleontology as it is of plants. In the case of the last the probability is very great that the present flora of the globe represents a minute fraction of the extinct floras. Pointing in the same direction is the well-authenticated fact that in all the orders of plants that are prevailingly arborescent the geologic distribution where it is known is found to have been more extensive than the present distribution. The same statement is true of the higher animals and of such invertebrate groups as I am familiar with.

So-called monotypic genera, whether plant or animal, at least in the majority of cases, are relicts of a once wider distribution. Among plants this is strikingly true of arborescent forms and needs qualification only in the case of certain mainly herbaceous, relatively modern and prevailingly temperate groups such as the Papilionaceæ, Labiatæ, Scrophulariaceæ, Plantaginaceæ, Valerianaceæ, etc.

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SCIENTIFIC BOOKS

A Text-book of Sanitary and Applied Chemistry; or, the Chemistry of Water, Air and Food. By E. H. S. Bailey, Ph.D., Professor of Chemistry, University of Kansas. Fourth Edition revised. New York, The Macmillan Company. 1917. Cloth. 12mo, xxiv + 394 pp. Price $1.60.

As Dr. Bailey says in his preface, the object of the book is to furnish a text, for the use of students, upon chemistry as applied to the most important topics having to do with daily life in the household. The opening chapters deal with the Atmosphere, Fuels, Heating and Ventilation, Lighting, Water, Sewage, Textiles, Soap, Disinfectants and Poisons. The second half of the book treats of the chemistry of food. The treatment is naturally descriptive only and does not cover analytical processes. Throughout the text there are distributed 197 well selected experiments which will greatly help to fix important facts in the student's mind.

W. P. Mason

SPECIAL ARTICLES

THE UFFINGTON SHALE OF WEST VIRGINIA AND ITS SUPPOSED MARINE FAUNA[1]

At a number of localities in northern West Virginia the Uffington shale of I. C. White[1a] lies at the base of the Conemaugh formation, occupying the interval between the Mahoning sandstone above and the Upper Freeport coal of the Allegheny formation below. It is a dark shale, a portion or the whole of which is sandy and bears plant fossils in abundance. It is variable in thickness, forty feet being about the maximum reported, while over much of the area it is lacking altogether, the sandstone being in contact with the coal. The replacement of the shale by the sandstone is clearly the result of erosion as is indicated by the sinuous contact between the two strata, the shale often varying in thickness as much as twenty feet in a distance of a hundred yards.

In 1871, John J. Stevenson, in a paper entitled: "A geological examination of Monongalia county, West Virginia," by John J. Stevenson; together with lists of fossils and descriptions of new species, by F. B. Meek,"[2] described a "dark colored, fine grained, argillaceous" shale overlying the "Upper Freeport" coal and containing abundant invertebrate fossils. Its thickness is given as 12 feet. It is said to be best exposed in the "bluff bordering the bottoms two or three

[1] Published by permission of I. C. White, state geologist of West Virginia.

[1a] I. C. White, West Virginia Geol. Survey, Vol. II., 1903, p. 323.

[2] West Virginia University, Board of Regents, Third Ann. Rept., 1871, for 1870, pp. 41 to 73.

hundred yards above the old 'Point House.'" It is also reported as underlying the "Mahoning" sandstone. Meek's list of fossils includes 7 brachiopoda, 13 pelecypoda, 10 gastropoda, 2 cephalopoda, a trilobite and a crinoid, besides crinoid columns. Three new species of pelecypoda were described; namely, *Nucula anodontoides, Yoldia carbonaria* and *Y. stevensoni*. Stevenson informed I. C. White that most of his fossils were collected at the town of Uffington.[3]

White in 1903 described the Uffington shale at Uffington and reported Stevenson's fossils as found in it, thus describing it as bearing both plant and animal remains.[4]

Stevenson in 1906 repeats White's statement that the Uffington shale—which name he now employs for the first time—bears a marine fauna.[5]

Hennen in 1913 mapped the outcrop of the Upper Freeport coal of the area and described the Uffington shale,[6] but did not observe animal fossils in it.[7]

After a close examination of the area the following facts bearing on the location of the marine fossils have come to light, correlation and identification of strata being based on the work of White and Hennen:

At Uffington the Uffington shale is 30 feet thick, plant-bearing throughout and very sandy in the lower half. Above it lie in ascending order the Mahoning sandstone, 39 feet thick, clay-shales 20 feet in thickness, the Brush Creek coal, 6 inches thick, and 3 feet of dark shale of the Brush Creek limestone horizon containing abundant marine fossils. Above the latter is the Buffalo sandstone, 16 feet thick.

At Rock Forge, 4 miles east of Uffington, stands the old "Point House," a frame dwelling, a relic of the settlement built during the operation of the Deckers Creek Iron Works which has been inactive since about 1855. Here the "bluff" referred to by Stevenson is capped by the Buffalo sandstone overlying 13 feet of dark shale containing abundant marine invertebrate fossils, the Brush Creek limestone horizon, which is just above the level of Deckers Creek. The strata at this point dip to the west, and seven tenths of a mile to the northeast the Upper Freeport coal rises to the creek level with the Mahoning sandstone resting directly upon it, no shales intervening between them.

It is thus seen that the dark fossiliferous shale of Stevenson at Rock Forge is Brush Creek. It was found to contain a number of the species listed by Meek.

Stevenson's description of his fossil bed does not agree with the characters of the Uffington shale at Uffington. It is less than one third as thick—the shales do not thin down in the immediate vicinity of the town—no sandy shale is reported and the strikingly abundant plant remains are not noted, nor does another fossiliferous stratum of black shale appear in the section below the well-marked Ames limestone, with which neither of the strata under discussion could have been confounded.[7a] It is therefore concluded that Stevenson collected marine fossils from the Brush Creek and not from the Uffington and it appears that at the time of writing he correlated the coal which lies below the true Uffington with the "Kittanning." This coal he mentions as seen at low water in the Monongahela River between Morgantown and Uffington and is the Upper Freeport of White and Hennen. It is therefore apparent that Stevenson's "Upper Freeport" is a higher coal. From these considerations it seems that there is little doubt that the Brush Creek coal and fossiliferous shale are Stevenson's "Upper Freeport coal" and "Dark shale just below the Mahoning sandstone," respectively. Diligent search by the writer failed to reveal marine fossils in the Uffington shale, while a number of Meek's

[3] I. C. White, oral communication.

[4] W. Va. Geol. Surv., Vol. II., p. 323.

[5] "Carboniferous of the Appalachian Basin," Geol. Soc., America Bull., Vol. 17. 1906, p. 132.

[6] R. V. Hennen, West Virginia Geol. Surv., Report on Monongalia, Marion and Taylor counties, p. 321.

[7] Oral communication.

[7a] A sparse marine fauna is occasionally found in the green and yellow shales of the Pine Creek limestone horizon above the Buffalo sandstone.

listed species were found in the Brush Creek. Besides the writer, Messrs. S. B. Brown, David White, J. W. Beede and R. V. Hennen[8] have examined the Uffington shale at Uffington and vicinity without discovering marine fossils.

Studies of the Conemaugh formation in West Virginia and Maryland by the writer have not revealed a marine fauna at this horizon nor has such been reported by other observers in these and adjoining states, with the exception of the instances mentioned above and two other West Virginia localities reported by Stevenson. These places are: in Wirt county 8 miles north of Burning Springs[9] and at Cutright in Upshur county.[10] These localities have since been studied by members of the West Virginia Geological Survey during the preparation of county reports. From the similarity of the sections given by the different observers[11] the fossiliferous members at these localities also appear to be Brush Creek.

In Ohio the shale is reported by Condit but marine fossils were not found.

The Uffington shale may then be re-defined as follows:

The Uffington shale is a plant-bearing bed of shale, frequently sandy in the lower portion, of non-marine origin, occupying in places the interval between the Upper Freeport coal and the Mahoning sandstone, and indicating by its variable thickness and undulating upper surface that erosion took place over the area of its outcrop before or during the deposition of the Mahoning sandstone. The maximum reported thickness of the shale is 40 feet and, though lacking in many places, its appearance at widely separated points in Maryland, West Virginia and Ohio shows that its former distribution was perhaps general in the Appalachian Carboniferous area.

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[8] Oral communication from S. B. Brown and R. V. Hennen.

[9] Geol. Soc. America Bull., Vol. 17, 1906, p. 149. "Carboniferous of the Appalachian Basin," by J. J. Stevenson.

[10] Idem., p. 135.

[11] R. V. Hennen, W. Va. Geol. Surv., Wirt, Roane and Calhoun counties, Rept., 1911, p. 258; and I. C. White, W. Va. Geol. Surv., Vol. II., 1903, p. 279 (recent field work by D. B. Reger in the preparation of a report on Upshur county confirms the correlation of I. C. White).

BOSTON MEETING OF THE AMERICAN CHEMICAL SOCIETY

The fifty-fifth meeting of the American Chemical Society was held at the Massachusetts Institute of Technology, Cambridge, Mass., from September 10 to September 13, inclusive. The general program was carried out under the able leadership of Professor Julius Stieglitz, president of the society, and Dr. Charles L. Parsons, secretary, while the local arrangements were under the direction of Professor H. P. Talbot, assisted by the chairmen of the numerous committees. The various divisions were presided over by J. E. Breckenridge, T. J. Bryan, E. H. S. Bailey, L. F. Kebler, L. E. Weber, C. L. Alsberg, J. R. Bailey, H. P. Talbot, and H. E. Howe.

During the session, the usual order of business was carried out, consisting of meetings of the council, with general and public meetings. A strong feature of the meeting was the stress placed upon "War Service of the Chemist." A shore dinner at the Hotel Pemberton, held on Tuesday evening, was much enjoyed and served as a pleasant break in the work before the Society. Wednesday evening was given over to the address by President Stieglitz, who took for his subject, "The Outlook for Chemistry in the United States." This address was printed in the issue of Science for October 5.

During the entire week, the time was taken up by the reading of papers.

Division of Biological Chemistry

C. L. Alsberg, *Chairman.*

I. K. Phelps, *Vice-Chairman and Secretary.*

Abstracts have been received of the following papers:

Oxidase action in the nucleus: W. J. V. Osterhout. The Indian pipe (*Monotropa uniflora*) contains a colorless chromogen which darkens on oxidation. This process takes place more rapidly in the nucleus than in the cytoplasm, indicating that the nucleus is the center of oxidation in the cell.

The dynamics of the process of death: W. J. V. Osterhout. Determinations of the electrical