kingum Conservancy District, the writer discovered waterworn fragments of coal scattered throughout sand and silt sediments laid down during the ice-age. These deposits are located near the mouth of Conotton Creek between Dover and Mineral City, Ohio. Here an extensive area parallels the creek and is evidently a flood-plain deposit, below which the stream has cut its channel, forming a terrace. Excavations and bore-holes indicate that the deposit is a series of water-laid beds, much of it apparently deposited in slack water. The material is mainly fine quartz sand and clay, the size of the grains and the proportion of sand and clay varying considerably. In these beds fragments and finely ground coal occur in such abundance as to render the sand unfit for foundry purposes. The coal is not scattered uniformly throughout the mass but seems to be more abundant at certain horizons. Some of the fragments are two inches long and appear to be waterworn. In some cases the smaller fragments are thoroughly weathered and break down readily to black powder. Some of the larger fragments are un-weathered and angular. Since the deposits are extensive they must contain a large amount of coal. It is probable that the sands and silts are of glacial origin, although it is possible that they may be of post-glacial age. During the retreat of the ice-sheet from Ohio, the streams were doubtless flooded; slack-water conditions occurred and the fine sand and silt was laid down. The coal fragments evidently were eroded from veins No. 5, No. 6 and No. 7, which outcrop on the hillsides in the region.

According to Wilber Stout, state geologist of Ohio, fragments of coal are prominent in the deposits of molding sand and along the railroad east of the No. 2 brick plant of the Burton-Townsend Company at Zanesville, and small pieces of coal occur in the molding sand deposits in South Zanesville, worked by the Ayres Mineral Company. In fact, coal is present in some quantity in all these deposits. While engaged in field work the writer has observed small fragments of coal in glacial sand and gravel deposits in Holmes County, Ohio.

The same process is doubtless taking place to-day in southeastern Ohio, in the Appalachian Plateau and elsewhere, where the coal veins are being eroded and the material deposited by the streams in their channels and on their floodplains. The Susquehanna River in eastern Pennsylvania is an outstanding example. This stream and its tributaries, which drain the anthracite coal fields, have been carrying coal in the geologic past and the process to-day is very pronounced. During every heavy rain the swollen tributaries are black with coal-dust and mud eroded from the slack-coal deposits from the heaps of culm and waste from the mines. The fragments are rolled along the channel or float down stream and are ultimately deposited on the bottom of the Susquehanna, from which dredges remove the coal in large quantities.

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MAGNESIUM SULFATE VALUELESS AS A CONTROL FOR THE BEAN BEETLE

A RECENT article in SCIENCE[1] would indicate "that $MgSO_4$ used as a spray, in the proper concentration, constitutes an effective control for the Mexican bean beetle (*Epilachna varivestis* Muls.)." About ten years ago a report became current that magnesium sulfate, $MgSO_4 \cdot 7H_2O$ (Epsom salt) was satisfactory for the control of the Mexican bean beetle, and large quantities of it were sold in several southern states. Some tests were undertaken to determine the value of this material.

At Athens, Ohio, in 1928, a plot of beans was sprayed with magnesium sulfate in solution at the rate of 1 pound to 10 gallons of water, on August 9, August 17 and August 25. A number of other insecticides were used in the same experiment on plots in the same field. On September 5, to quote from original notes, referring to the plot treated with magnesium sulfate, "Bean foliage injured 20 per cent. to 95 per cent. (estimated), plot average 60 per cent., not distinguishable from the checks at ends of rows. Numerous pupae." In this field the plots treated with calcium arsenate and those treated with magnesium arsenate showed visible foliage injury by the bean beetle estimated at 1 to 2 per cent. In the same field the untreated check plots showed injury ranging from 40 to 70 per cent., with an average of 60 per cent.

Since it was thought that possibly a stronger concentration than that used in the initial test might be effective, another plot was included with a later experiment and the material was used at a concentration of 1 pound to 2½ gallons of water. The field of beans was beginning to show some injury by the Mexican bean beetle. On August 24, 1928, the plot was sprayed and received only one treatment. On September 5, to quote from original notes, referring to the magnesium sulfate plot, "Bean beetle injury to foliage 75 per cent. (estimated), as bad or worse than check aside plot." The untreated checks in this experiment were estimated to be injured by the beetle to the extent of 65 to 70 per cent., respectively, while the plot treated once with magnesium arsenate was injured to the extent of 15 per cent.

Recently this material was tested by R. A. Fulton in the Columbus, Ohio, laboratory of the Bureau of Entomology and Plant Quarantine. When bean foliage was treated with dosages 100 times as great as the

[1] "Magnesium Sulphate, a New Insecticide," SCIENCE, 85: 428, 1937.

dosage of calcium arsenate which is fatal to the larvae of the Mexican bean beetle, no effects on larvae placed on the foliage could be detected. The larvae fed on the treated foliage, consumed as much leaf area as the larvae placed on untreated foliage and molted successfully.

Back and Cotton[2] found that "solutions of Epsom salt are of no value" for moth-proofing purposes.

Conversations with entomologists located in some of the southern states where growers had used magnesium sulfate in the field indicated that the material was valueless as a remedy for the Mexican bean beetle. One of them suggested that the reason some growers believed that benefits had resulted was that the larvae which were devouring the plants pupated shortly after the spraying, and that when observations were made the quiescent pupae only were present. The growers, not being familiar with the biology of the insect, decided that the treatment had killed them, since they were unable to move.

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A MATTER OF TERMINOLOGY

IN a recent number of SCIENCE[1] Dr. Ramaley raises a question of terminology which is often encountered by plant morphologists and teachers of botany, but I am not sure that he arrives at the best answer. He criticizes a recent text in which the terms *male* and *female* are applied to the parts of the sporophyte of a flowering plant, while he would apparently reserve these for the gametophyte.

This latter usage, suggested many years ago in connection with the growth of the idea of the alternation of generations, was supported by most morphologists, who insisted that the monoploid generation be regarded as "sexual" and the diploid as "asexual" or "non-sexual." It is hardly conceivable that any experienced teacher's lapse from this standard to-day should be due to a failure to recognize the two generations and to distinguish clearly between them. Even the poorest of our college teaching is probably too well grounded for that. I believe it is rather because the old distinction between the two as sexual and non-sexual is useless if not actually misleading. If categorical earmarks of the two generations are needed for pedagogical purposes, those based upon chromosome numbers and relations to spores and gametes are probably much more intelligible.

There is much to be said for the idea that the entire life cycle, consisting of both the monoploid and diploid parts, is a *sexual* life cycle, as contrasted with those cycles in which there is no union of gametes. Starting at any point in the sexual cycle, reproduction should be regarded as having been accomplished only when that point had been reached again. It is hardly logical to say that the gametophyte reproduces sexually (by gametes) or that the sporophyte reproduces asexually (by spores). Neither actually *reproduces* in that sense; it only produces something else as the first step in reproduction.

Those of us who had our early training under the strict morphological régime were taught to keep our fingers crossed when we spoke of "male" and "female" flowering plants or flower parts. I wonder, after all, how much logic there was to this inhibition. If there is any homology between plants and animals as far as sex is concerned, it is perfectly consistent to call staminate and pistillate individuals or parts of individuals male and female. As in animals, it is the diploid generation which is concerned, and to say that a thing is male or female simply implies that it is so specialized that it is instrumental in the production of sperms or eggs.

The process is a little more direct in the animal than in the plant, but the two cases are closely comparable. The comparison is somewhat obscured by the extension of the monoploid generation in most plants and by the greater prevalence of sexual differentiation in animals; but these are matters of degree rather than of quality.

The source of the confusion of words is the common one occurring when the application of a term is extended into a new field. The words "male" and "female," or their equivalents in other languages, were applied to animals for a long time before anything definite was known about sexuality in plants. Now, that the latter field is better known, who is to say how the old terminology is to be carried over? The answer comes only through usage; legislation almost universally fails in such cases. Consistency and convenience point toward the rejection of an illogical dictum of morphology and the promotion of a usage exemplified by the expressions which Dr. Ramaley criticizes.

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Peary. By WILLIAM HERBERT HOBBS. 502 pp., 27 maps, 13 half-tones, 10 records and diagrams and 36 drawings by the author. The Macmillan Company, New York, 1937.

IN a volume of some five hundred pages Professor

[2] U. S. Dept. Agr. Yearbook, 1927: 467. *Furniture Warehouseman*, 8: 800.

[1] SCIENCE, 86: 36, 1937.