

to recognize the ovule for what it really is and to teach accordingly should help to clarify the present confusion.

Transeau and his colleagues pointed out many years ago that the term "ovulary" is more appropriate than "ovary" as applied to flowering plants but, sadly, few writers have followed their lead. Similarly "destaminate" seems more appropriate than "emasculate" though not in general use.

The term "fertilization" is used indiscriminately by many writers, including some highly trained botanists, as applying to any event or any process that contributes in any way to the production of offspring; from union of gametes, to penetration of ovules by pollen tubes, to pollination of pistils, to enrichment of soils. More discriminating writers define and use this term as applying only to the union of gametes, such as an egg and a sperm. Some avoid the confusion by using "syn-

gamy" or "gametic union"—which is highly commendable.

Apparently Asa Gray was expressing the best knowledge available to him when he characterized pollen grains as "male generative cells" and when (1858) he wrote "The use of the pollen is to lodge on the stigma of the pistil, where it grows in a peculiar way, its inner coat projecting a slender thread which sinks into the pistil, somewhat as a root grows down into the ground, and reaches an ovule in the ovary, causing it in some unknown way to develop an embryo, and thereby become a seed." Also when (1877) he referred to the endosperm tissue of a seed as "albumen" and likened it to the white of a bird egg. But why the revisers of his *Manual of Botany*, up to the monumental 8th edition of 1950, continue to use his outmoded terminology and thus to perpetuate discredited concepts, is not apparent.

Newly Discovered Fossils

A Dartmouth College geological team has discovered 720 million-year-old animal fossils that may help clear up a mystery about how advanced forms of life evolved on earth. The fossils, found in the Canadian arctic, are at least 120 million years older than any advanced forms known to paleontologists.

There, in an unaltered group of Precambrian sedimentary rocks in the Shaler Mountains, unique because they were little changed by the pressures of mountain building or the weight of overlying rocks, they found fossilized remains of brachiopods. They also turned up several kinds of fossilized tracks and trails made by burrowing wormlike animals and small tubes and spines of an as yet unknown species.

The test results, by radiocarbon dating, showed that the fossils are at least 720 million years old and may be considerably older. The previously generally accepted date for the beginning of advanced forms of life on earth was about 600 million years ago.

The discovery of the brachiopods is impor-

tant to paleontologists because this is the first solid evidence that these creatures existed in the Precambrian geological period, the Dartmouth scientist said.

Most geologists believe that a sudden change in the earth's physical environment took place about 600 million years ago, he said. Biologists feel that the earliest animals with specialized organs and tissues could have developed only after oxygen became plentiful in the air and oceans. With abundant free oxygen possibly created by more abundant plant life, they suggest that an "evolution explosion" occurred and many types of quite advanced animal life seemed to appear quite suddenly.

In the ordinary course of evolution, these advanced forms of life would seemingly have to evolve from earlier, fairly complex creatures. But previously there was no fossil evidence to support this.

The party's findings appear to constitute a breakthrough in our knowledge of life during the earliest, very long periods of geologic time. They push back the known dates of more advanced forms of animal life by at least 120 million years.