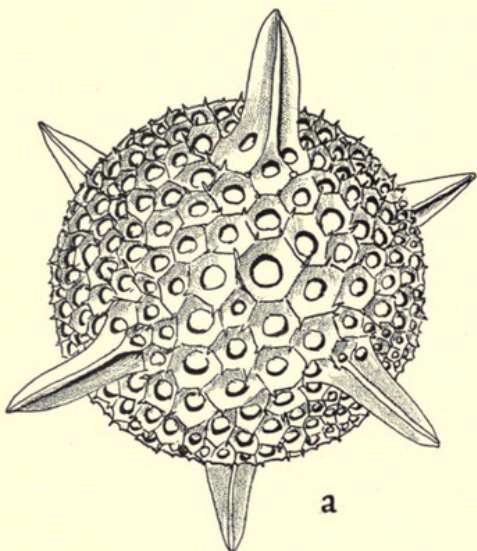


AN 'ANIMAL' SOMETIMES MAY BE A PLANT OR VICE VERSA

By EUGENE S. RICHARDSON, JR.
CURATOR OF FOSSIL INVERTEBRATES

"YOU CANNOT sometimes always tell..." goes a bit of jargon heard in circles that avoid over-academic English. It often applies very appropriately to the



problem a biologist faces in determining whether an organism should be classified as an animal or a plant.

In Frederick J. V. Skiff Hall (Hall 37) the exhibits of fossil invertebrates and plants are arranged in two parallel sequences on the north and south sides of the hall, respectively. The fossils on the south side are arranged in a time sequence, according to the periods of geologic history in which they flourished. On the north side of the hall similar fossils are displayed in a biological sequence, starting with the simplest forms and running through the various major groups to the most complex creatures. Following the fossil invertebrates come the fossil plants, seemingly a completely different sort of life.

Yet, if we turn to the case showing the simplest of the invertebrates and study them a bit, we find that the distinction between plants and animals is somewhat obscure. Now, it's easy enough to be certain that a cactus is a plant and a porcupine an animal, even though you may regard this as a minor matter when you run into either one in the dark. The cactus, like a proper plant, stays in one place and makes its food supply from sun, air, and soil minerals, while the porcupine, in true animal fashion, wanders about and eats solid food.

The simplest invertebrates (Protozoa) and the simplest plants (Protophyta) are very much alike in that their tiny bodies, microscopic in size, are not made of a number of cells, as are the bodies of the larger plants and animals. They may be considered as single cells or as undivided bodies.

Many of them have both the plant characteristic of manufacturing their own food and the animal ability to move about and capture solid food, so that there has been a running argument for about three hundred years as to just which kingdom they should be put in. It was suggested as early as 1860 that they should be considered a separate kingdom, and the name Protista is now used in some circles to apply to the group. Thus it seems that there are four kingdoms instead of the traditional three: Animal, Mineral, and Vegetable.

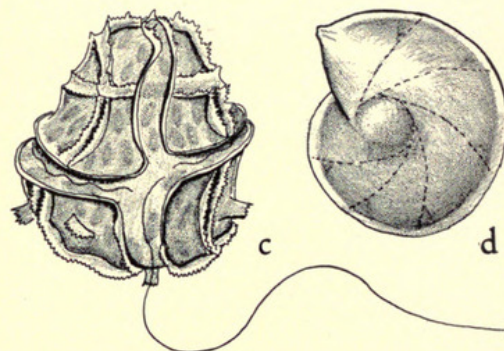
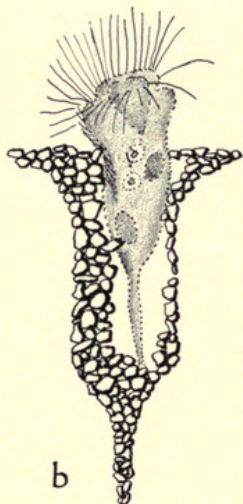
FIRST CALLED ANIMALCULES

The first man to see a living protistan was Anton van Leeuwenhoek, the inventor of the microscope. Peering through his new gadget in 1676, he watched a company of "animalcules," as he called them, disporting themselves in a drop of pond water. Even though the microscope had never made them visible, the protistans would have been important to man, as they include germs of many diseases and the factors of rotting and decay.

Other protistans produce visible effects by sheer force of numbers, as individuals of *Haematococcus pluvialis* suddenly multiplying in rainwater pools, coloring them red and impelling witnesses to report "rains of blood"; or *Noctiluca scintillans*, floating in the ocean in countless millions, the combined phosphorescence of many small individuals making the water glow where it is disturbed.

On the exhibit screen in Hall 37 are two examples of the group Flagellata, or whip-bearers, the Silicoflagellata and the Peri-

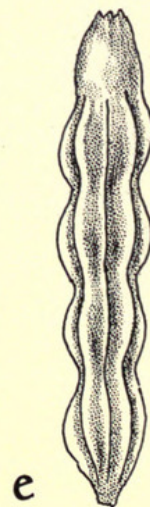
diniids (or Dinoflagellata), which illustrate well the confusion that may reign in attempting to assign these simple living things to either the plant or the animal kingdom. They are free-moving, and can capture their own food, which of course means that they are perfectly good animals, but on the other hand the Silicoflagellates have tests (shells) made of silica, and the Peridiniids have tests of cellulose, both of which are substances commonly found in plants. Furthermore, some of their very close relatives are green and contain chlorophyll, the amazing green pigment of plants, and can therefore manufacture their own food from sunlight and gas, as our friend the cactus does; therefore, they must be plants. The solution generally adopted is that the zoologists claim that they are animals and the botanists claim that they are plants, and both groups of scientists study them and admire them and covet them. This is much more satisfactory than leaving them in a crack between



the two fields with no attention being paid to them at all.

Protistans, then, form a perfectly good biological unit that may be easily defined according to the characters shared by all its members—that their bodies are not composed of individual, differentiated cells, but are "acellular." With the Protista removed, the other two kingdoms are now much easier to define than they used to be when they intergraded.

Since this convenient and entirely logical acknowledgment of the fourth kingdom was first proposed about a century ago, it is perhaps rather surprising that it has been ignored by most practicing biologists in the meantime. In January of this year, however, it was formally brought out again, dusted off, and given very respectable backing with the publication of the first volume of the chapter "Protista" of the new *Treatise on Invertebrate Paleontology*,



KEY TO ILLUSTRATIONS

Are they plants, animals, or members of a fourth kingdom distinct from the traditional animal, vegetable, and mineral realms?

In the drawings on this page, Dr. Richardson shows some of the kinds of fossil creatures that present this problem. They are called, in general, protistans, and the specific ones shown are: (a) Radiolarian, with shell of silica; (b) Tintinnid, with shell made of mineral grains fastened to organic membrane of the animal that is also shown; (c) Peridiniid, with cellulose shell; (d and e) Foraminifera, with limy shells.

sponsored by the Paleontological Society, the Society of Economic Paleontologists and Mineralogists, and the Geological Society of America in this country and the Palaeontographical Society of Great Britain. It remains to be seen of course, whether the new kingdom will now be widely accepted, but it is at last off to a good start.

By whatever name they are called, the protists are a fascinating study. Small though they are, they are far from simple, and those forms that have tests and can be preserved as fossils are objects of delicate beauty under the microscope. The economic importance of the Foraminifera, the most illustrious of the protists, has been mentioned in the BULLETIN ("Fingerprint Clues in the Quest for Oil," August, 1954). Samples of Silicoflagellates, Peridiniids, Foraminifera, Tintinnids, and Radiolarians are shown in the exhibit in Skiff Hall, where they are represented by plastic models, as much as 1,000 times life-size, created by Artist Joseph B. Krstolich, of the Department of Zoology.

COLLECTION OF MOTHS GIVEN TO MUSEUM

By RUPERT L. WENZEL
CURATOR OF INSECTS

During the past year the Museum received a collection of North American butterflies and moths as a gift from the estate of the late Arthur L. McElhose. The collection, which was accessioned recently, contains approximately 12,000 specimens. It is a particularly desirable acquisition because it contains more than 700 species of Microlepidoptera, of which only a few were represented in the Museum's collections.

The Microlepidoptera is a large and important group that consists of a number of families of moths, with about 5,000 species in North America. It includes many familiar and economically important species, such as the codling moth, the European corn borer, the oriental fruit moth, the clothes moths, and many leaf rollers and miners. One species, the pink bollworm moth, is regarded by some entomologists as a national menace because it may be responsible for the loss of as much as half the cotton crop in certain areas in the southwestern United States, which produce much of this highly important crop.

Most of the species of Microlepidoptera, however, are of little or no economic importance. Many are of interest because of their unusual habits. Of these, the public probably is best acquainted with *Laspeyresia saltitans*, the Mexican jumping-bean moth, whose larva lives principally within the seed pod of a Mexican spurge, *Sebastiania pringlei*. The larva causes the seed pod to jump by throwing itself from one side to the other within the pod.

McElhose owned and operated a bath and massage studio in Arlington Heights, Illinois. He was well known locally as an amateur lepidopterist and served as secretary of the Chicago Entomological Society from 1940 to 1943. His collection included the collection made by his brother, the late Henry McElhose of Ilion, New York, another enthusiastic and well-known amateur, who was a charter member of the Entomological Society of America. These two men exemplify the kind of amateurs who, even though they publish little, make a valuable contribution to their field of interest through the careful amassing of well-documented collections, that, after passing to a museum, serve as a source of study material for future investigators.

MUSHROOM FANTASY—

(Continued from page 3)

phenomenon. Young maidens made a practice of beautifying their skin by bathing in the "fairy dew," and took great care not to step within the rings lest the angered fairies send blemishes to plague them.

Shakespeare, in *Midsummer Night's Dream*, comments on the country people's belief that elves and fairies dance within the rings at night, seating themselves on the ring's dewy cupolas. Titania, while quarreling with Oberon, tells of the rage of the winds because the fairies no longer dance and of the "contagious fogs" that they "in revenge have sucked up from the sea." One result of the spiteful flood, she says, is that the "nine men's morris is fill'd up with mud." Morris means the dance of the nine men or gnomes who, after their Puck-like expeditions of malice, were said to dance with joy in the moonlight meadow within the mushroom rings. A vestige of that belief can be seen today in the conviction of many gardeners that growth of the mushroom is influenced by the changes of the moon.

A visit to the Hall of Plant Life (Hall 29) of the Museum will reveal a wealth of information about these controversial and exciting fleshy fungi.

As in early days in Europe, an itinerant barber sometimes acts as a surgeon among African natives. He relieves pain by bleeding with a hollow horn. The wide end is cupped over a cut on the site of pain, and the operator sucks air from the horn and plugs the hole at the tip with a pellet of wax, applied by the tip of his tongue. Such horns are shown as part of a barber's equipment in Hall D.

A "family tree" of mammals, including man, illustrating the manifold inter-relationships, is on exhibition in George M. Pullman Hall (Hall 13).

Lectures Begin March 5 . . .

PROGRAMS ON SATURDAYS FOR ADULTS, CHILDREN

The two annual spring series of Museum programs—Saturday afternoons for adults and Saturday mornings for children—will begin on March 5 in the James Simpson Theatre and continue throughout March and April. The lectures on travel and science for adults are at 2:30 P.M. The free motion-pictures for children are at 10:30 A.M.

The story of "Brazil" in color-film on March 5 will open the Saturday-afternoon lectures, which are provided by the Edward E. Ayer Lecture Foundation Fund. The lecturer will be Eric Pavel, a native Brazilian, who is film director for the Pan American Press and Film of Sao Paulo. He will show his films of Bahia, Rio de Janeiro, and the Amazon jungle, one of the world's least-known wildernesses. Included will be underwater shots of tropical fishes and marine plants, a fish-spearing expedition, glimpses of the teeming animal-life of the country's vast interior, visits to primitive Indian tribes, and scenes at Iguassu, the world's largest waterfalls. Pavel's films also document Brazil's great industries—coffee, sugar, and mining.

No tickets are necessary for admission to this and the eight subsequent illustrated lectures on Saturday afternoons in March and April. A section of the James Simpson Theatre where the programs are presented is reserved for Members of the Museum, each of whom is entitled to two reserved seats. Requests for these seats should be made in advance by telephone (WAbash 2-9410) or in writing. Seats will be held in the Member's name until 2:25 o'clock on the lecture day. Because of limited accommodations it is necessary to restrict admission to the Saturday-afternoon lectures to adults.

"Drums for a Holiday," a dramatic and colorful film of the forest people of Africa's west coast, will be the opening attraction on March 5 of the Saturday-morning entertainments for children, which are presented by the James Nelson and Anna Louise Raymond Foundation. The film shows the life of the Ashanti tribes on the Gold Coast and the growing, harvesting, and shipping of coconuts.

Complete schedules of the programs for both adults and children will appear in the March issue of the BULLETIN.

The faculties and students of all educational institutions are offered full use of the facilities of the Museum. Many schools at all levels—grade schools, high schools, colleges, and universities—have regular organized programs in which the Museum is recognized as a prime source of information.



Richardson, Eugene S. 1955. "An 'Animal' Sometimes May Be a Plant or Vice Versa." *Bulletin* 26(2), 6-7.

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