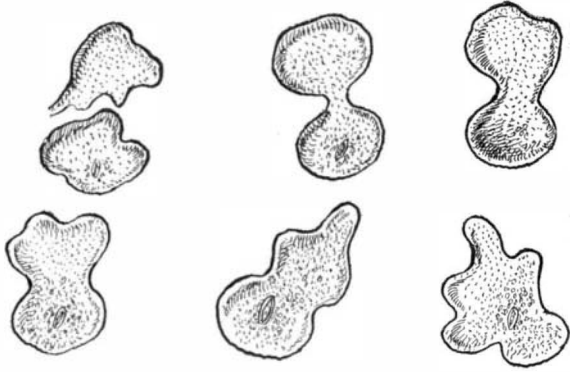


**THE AMCEBA—A SLIME MONSTER AND ITS VICTIM.**  
BY J. CARTER BEARD.

The other day, when amusing myself with my microscope, a catastrophe occurred in the field of vision, which is quite equal in its tragic elements to, and much more wonderful than, anything I have ever seen without the aid of my instrument.

I had under inspection something that looked like



**AMCEBA, SHOWING SIX CHANGES DURING THE PROCESS OF FUSION.**

a bit of slime. It had neither head, body, nor limbs, nor any division of parts. It had no more apparent organization than the drop of slime or jelly it so much resembled; yet it without doubt possessed animal life, and power of movement.

It is called the amœba, and is probably one of the strangest objects in existence. As I watched it through the glass it began to progress slowly in one direction. Instead of crawling like a worm or a snail or creeping like an insect, it simply flows; being a sort of liquid animal. No other word can express its motion. First it throws out projections or false limbs or feet, as they are called. This it can do in any given number and from any part of its substance. Then it ran its entire substance into these projections. Having collected itself, with a more literal reference to the meaning of the term than that in which it is commonly used, the amœba is ready to repeat the process and advance another step. Perhaps the nearest and best illustration of how this is managed is furnished by a bit of water making its way down the inclined lid of a desk; the small currents or splashes it sends ahead of the main body answer to the pseudopodia or false feet of the amœba, and its alternate filling up of these small channels and its bursting forth and sending out new ones almost exactly parallel the progress of the animal. There is this difference, however—liquid can move only down inclined surfaces, while the amœba is enabled by some incomprehensible agency to move along level or even ascend inclined planes.

The creature has no heart, brains, blood, nervous system, or muscles, and yet it seeks, pursues, and captures and devours its prey, and seems to have a mind and will of its own, and to enjoy life fully.

As I was watching the ever-changing shapes assumed by the amœba in its progress, my attention was called to an object close at hand which I had not before noticed. This was the most delicate, fairy-like little sylph it is possible to imagine—a sort of a living top or iridescent crystal, flashing prismatic rays as if it inclosed a tiny rainbow, as it stood spinning in the water backward and forward on its stem. I knew it for a urocentrum, a more highly organized animal, if

that the urocentrum was its point of attack. There could no longer be any doubt. The pseudopodia at last touched the living top; then they encircled it. The urocentrum seemed to be aware of this, and moved restlessly in its prison. After a while, however, as if it received some paralyzing shock, the fairy top ceased to spin; the ends of the pseudopodia are fused together, and the slime monster flowed over and engulfed the little creature, which is its manner of swallowing its victim. Thus having pursued its prey without the aid of limbs, and devoured it without a mouth, the amœba proceeded to digest it, although stomachless.

If anything related to the animal can be stranger than the peculiarities embodied in the foregoing narration, it is to be found in the complete breaking up of one animal and the production thereby of a number of baby amœbæ, which when united formed the parent. When this remarkable change is about to happen, the amœba ceases to move or take food, and forms about itself a thick shell or covering. As an egg hatches the shell bursts, and the amœba is found to have resolved itself into a number of little balls, each ball a perfect amœba, and quite able to set up in business for itself. Stranger still, they sometimes conclude to unite forces, and by coalescing or flowing together, again become an animal.

**Fighting Insect Pests.**

BY CHARLES F. HOLDER.

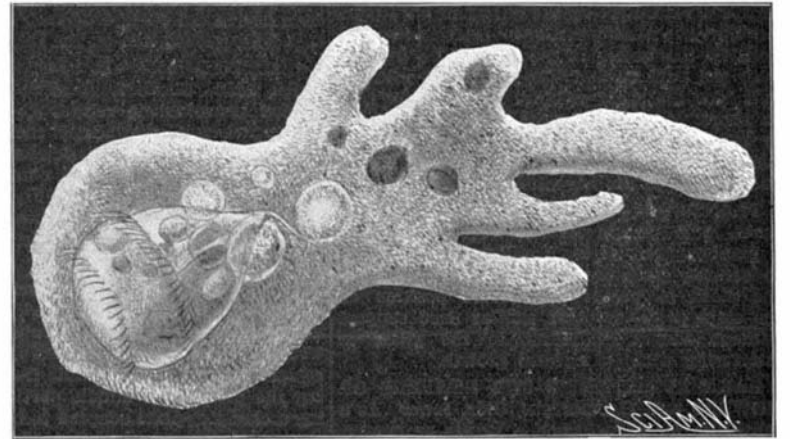
The stranger passing through the ranch country of Southern California is frequently puzzled by the singular "outfits" which are seen. Some resemble old-fashioned fire engines; others, wagons bearing derricks. Trees are seen covered by tents. A ranch hand vigorously works a hand-pump, while another directs a nozzle at a tree, apparently painting it after the modern fashion. All these notably dissimilar appliances are the attempts of the orange, lemon, olive, and other fruit growers successfully to fight the scale and various pests that make war against trees. That a vigorous and relenting warfare is necessary, every fruitman or orchardist well knows.

Every plant of value to man appears to have its enemy, and not merely one but many, and expert skill is required not only to combat the enemy, but to discover some enemy to aid in the battle. When the mission fathers introduced the olive, they soon discovered an enemy whose very existence they had not previously noticed. This was the black scale, *Lecanium olea*, the insect which resembles an excrescence on the limbs, and which would hardly be recognized as an insect, so inconspicuous is it. Dark and rounded on the top, only when it is turned over is it noticed that it is a living creature. The black scale is so slow of motion that apparently it does not move, but it increases with a rapidity that is appalling to the orchardist. The common name of scale is given to several insects, the black, white and red scales being the best known. They belong to the family *Coccidae*, and are bugs provided with sucking organs with which they draw upon the vitality the tree. The long scale, *Mytilaspis gloveri*, was probably brought from China, and appeared in Florida in 1838, and though persistently fought, it is found on lemon and orange trees of Florida to-day. In 1890 it was discovered in California, being brought to this region with the purple scale which is found in all orange or lemon groves. It is a disagreeable scalelike creature which multiplies with great rapidity, the young thrusting the proboscis into the tender branch and immediately beginning to exude a waxlike substance, which as it accumulates adds greatly to the size of the insect.

The effect of the black and purple scales is not to kill the tree, but to seemingly paralyze it. Several trees affected in the writer's grounds have not flowered and are at a standstill. The red scale, *Aspidiotus*, is almost equally dreaded, affecting the leaves of plants. The Florida scale, *Icerya*, some years ago almost ruined the orange industry of Southern California. Trees were so covered with the scale that they had the appearance of having

snow upon them. Then there are the white fly, the red spider, and many other insects, suckers and borers, which prey upon the trees and make the life of the orchardist miserable. To stay the ravages of these enemies the genius of the rancher is called into play, and as a result we have singular vehicles and curious pumps and tents. Everything that the ingenuity of man could suggest was tried upon the cottony scales without avail until Mr. Albert Koebele, of the Department of Entomology, discovered the natural enemy of this pest in the twice-stabbed ladybird of Australia. This little insect was introduced, and in a marvelously short time practically exterminated the dreaded white scale, and the orange groves of California took on a new growth. But the black and other scales still flourish, and no deadly enemy has been found for them; instead, the rancher attacks them with various sprays and poisons.

In one method of extermination, the tree is covered with a bag or balloon of canvas. The derricks for lifting the canvas are placed on a heavy truck or dray, and driven to the side of the affected tree; the bag is lowered over it and the space filled with a chemical produced by the combination of ninety-eight per cent of potassium cyanide, sixty-six per cent of commercial sulphuric acid and water. This work is now systematized, and in the hands of companies, and with many large tents, some seventy feet in diameter, they treat tree after tree in a rapid manner. If this is done in summer, it is of little use, as the eggs are not destroyed except in rare instances; but in October or November, when the young are all out, this method is very effective. The engine-like appliances seen in the groves are for spraying trees and consist of a pump worked by one or two men, and a reservoir large enough to contain several gallons of "distillate." The hose



**HIGHLY MAGNIFIED AMCEBA PROTEUS WITH A LARGE UROCENTRUM TURBO IN DISTENDED HINDER PART.**

is mounted with a long nozzle, by which the men can reach every part of the tree, and is more or less effective, but will not, as a rule, destroy the eggs. The washes are of various kinds. One of the most effective is an emulsion of crude kerosene, whale-oil soap, and water, costing when made ten or twelve cents per gallon. Another effective spray is resin wash, made of resin, caustic soda, fish oil, and water. This is forced up under the limbs and leaves, and literally covers the tree and all its parts, killing the various insects as it runs down. But so tenacious of life are the latter, that often several treatments are necessary.

How the trees are covered with tents and how they are sprayed with pumps is shown in the illustrations accompanying the article on "Orange Culture in California," published in the SCIENTIFIC AMERICAN for February 21, 1903.

**An Early Advertisement of Jenner's Vaccine.**

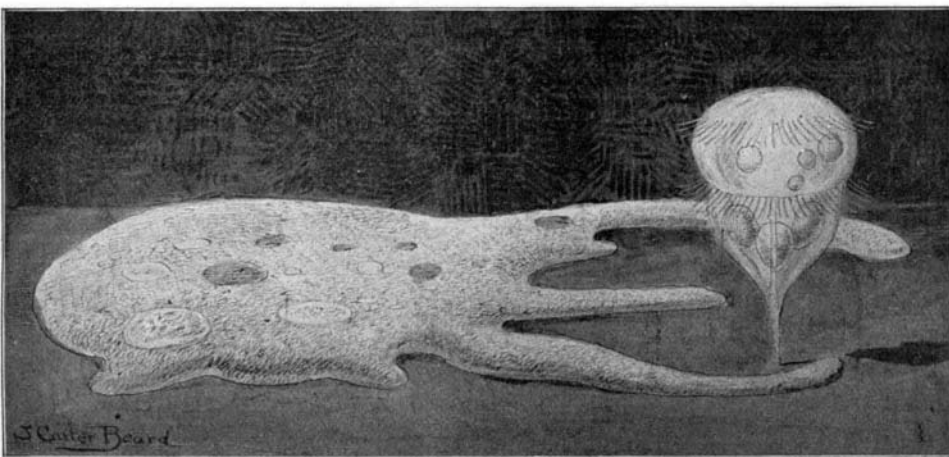
A little more than a hundred years ago Dr. Jenner announced his discovery of vaccination as an alleviator of smallpox.

The following is a verbatim copy of that call published in the London Times which was signed by about one hundred of the medical profession, scientists, members of Parliament, and the nobility:

London, January 10, 1803.

The invaluable Discovery of Dr. Jenner, for the Extinction of the SMALL POX, having undergone the most rigorous investigation, and received the sanction of Parliament, a MEETING will be held at the London Tavern, Bishopsgate-street, on Wednesday, the 19th inst., at 12 o'clock, to consider of the best means of carrying the same into effect; when the company of every Gentleman disposed to concur in this laudable Undertaking is earnestly requested. The Chair will be taken, by the LORD MAYOR, precisely at one o'clock.

One of our correspondents recently passed through a peculiar experience. He tasted of a small fraction of a grain of radium. It acted as a powerful stimulant, affecting both the heart and kidneys. It was several hours before his pulse became normal. It affected the mind also, producing hallucinations.



**HIGHLY MAGNIFIED AMCEBA PROTEUS WITH PSEUDOPODIA ADVANCED ENCIRCLING AN UNUSUALLY LARGE SPECIMEN OF UROCENTRUM TURBO.**

that term is applicable in contrasting it with an animal like the amœba with no organism at all.

I watched the slime monster with redoubled interest. It was certainly gliding along in the direction of the fairy top. How it was conscious, without ears to hear, eyes to see, or nostrils to smell, of the presence of the urocentrum, I must leave to far more learned and capable physiologists to make intelligible. I cannot even suggest an explanation. It was sufficiently evident