PHYSIOLOGY

New Blood Test May Decide Doubtful Parentage Cases

Reactions of Blood to Foreign Bodies Is Basis of Test Which Scientists Have Applied to Tracing of Kinship

CASES of doubtful parentage of children, such as agitate the courts from time to time, may possibly be decided with more certainty in the future, if a new blood test originated by two British scientists is developed to a point that now appears possible. The first experiments leading to the new technique were performed on cattle in Egypt by Dr. C. Todd and Dr. R. G. White, and further researches were conducted on fowls in England, by Dr. Todd working alone.

The test depends on the reactions of blood to foreign bodies that get into it. Blood invaded by germs, blood corpuscles of another animal, or anything else that does not belong there, generates substances to fight against the invaders. These substances are known to scientists by the general name of "antibodies." The familiar antitoxins used against various diseases belong to the antibody classification.

Attacked by Antibodies

Foreign corpuscles that find their way into the blood stream are attacked by two different types of antibody. One of them tends to dissolve the outsiders, and is called a "hemolysin," or simply "lysin." The other makes them stick together in clumps, and is called an "agglutinin." Both lysin and agglutinin reactions were used by the two British scientists in their researches, the former in the cattle work, the latter in the work on fowls.

Following hints contained in earlier researches, Dr. Todd and Dr. White first found that antibody reactions are not the same if corpuscles from different animals are used with the same blood sample, and that conversely blood corpuscles from the same lot will dissolve less readily in one individual's blood serum than they do in another's.

The key to their discovery came when they found it was possible to "exhaust" the antibody in a given preparation of sensitized serum. By adding considerable quantities of corpuscles from one individual to such a serum sample, a point is finally reached where that serum will no longer have any effect on corpuscles from that particular source; though it will continue to destroy any other corpuscles that are added to it.

To do away with the large individual differences in reactions of separate lots of serum, Dr. Todd and Dr. White prepared what they called "polyvalent" sera, by mixing together sensitized sera from a large number of different animals. This ironed out the individual variations, and made the mixture about equally effective against all corpuscles of the species used in its production.

When now such a polyvalent serum was "exhausted" with corpuscles from a single individual, it became highly selective, sparing those corpuscles only and destroying all others, except that in some instances it was not so destructive to blood corpuscles from animals nearly related to the test specimen.

The possibility of testing blood relationship was thought of by Dr. Todd when he was working on his fowls in England. He bred three different families of chickens, and tested blood obtained from the chicks against the corpuscles of their parents. In all cases but one, there was a strong "family reaction," the blood corpuscles of both parent fowls combined reacting toward the chick serum as the chick's own corpuscles would. Taken separately, either paternal or maternal corpuscles might fail to react; though where one failed the other always reacted. Thus a negative test would not necessarily indicate that parenthood could be denied, but a positive test would definitely mean that the individual so reacting, and none other, could be the parent.

So sure was Dr. Todd of the validity of his test that in the one case that failed, he tried the "errant" chick's blood against the parental corpuscles in his two other fowl families. It fitted one of these, and he concluded that there had been a mistake in marking the eggs before hatching.

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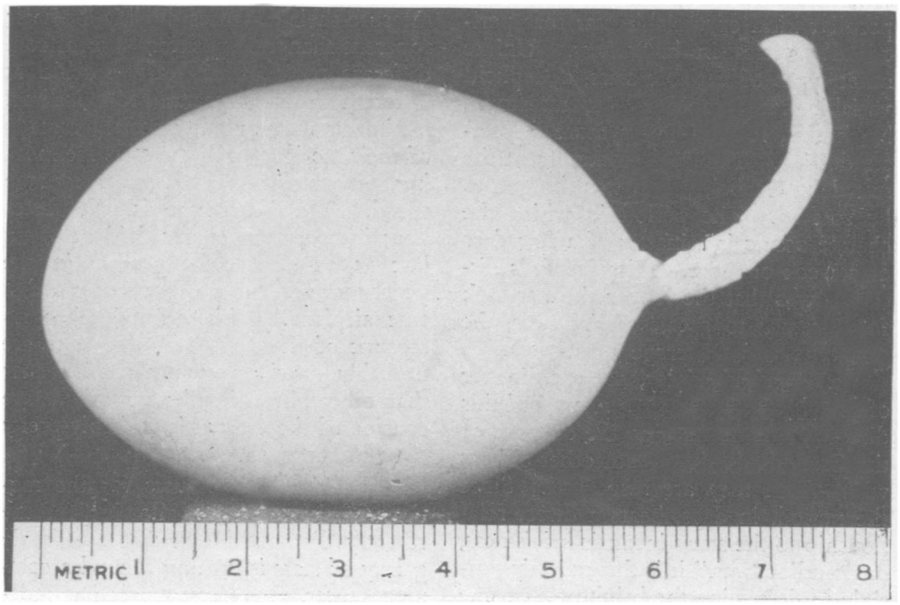
BIOLOGY

Hen's Egg Grows Handle More Than Inch Long

A HEN'S EGG with a peculiar handle-like appendage is California's latest scientific curiosity. It was studied by Prof. Bruce M. Harrison, biologist at the University of Southern California.

Extending like a tail from the large end of the egg, which was otherwise normal in size and shape, the appendage measured nearly an inch and a half



EASY TO PICK UP

Or so one would suppose if he came across an ordinary egg with a neat handle attached. This strange appendage occurred on an egg from a chicken ranch of San Gabriel, California. It is covered with shell and definite enough. But the mystery still remains as to who the mother is.

in length and over an eighth of an inch in diameter.

Microscopic and other investigations by Dr. Harrison showed that the appendage was caused by an excess of twisted white albumen or white of the egg, and that the chalaza, one of the albuminous threads within the egg used to keep the yolk in proper position, had extended outward during the egg's formation. The appendage was covered with shell and was hollow at its outer end because the albumen had shrunk some within the egg.

The unusual egg was laid at a chicken ranch at San Gabriel, Calif., but the mother of the egg kept her anonymity among a flock of a hundred white leghorns.

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ASTRONOMY

Yard Stick For Measuring Stars May be Twice Too Long

SOME ASTRONOMICAL distances that have been accepted as correct may be too large. Researches of Dr. B. P. Gerasimovic, a Russian astronomer who has been working at the Harvard College Observatory, indicate that distances determined by what is known as the Cepheid method should be reduced to about five-eighths of the values formerly adopted. A distance of a hundred thousand light years, or a hundred thousand times the six trillion miles that a beam of light travels in a year, for instance, should be reduced to the more modest figure of 63,100 light years.

The Cepheid method is based on a discovery made at the Harvard Observatory in 1908 by Miss Henrietta S. Leavitt, who died in 1921. It relates to a peculiar kind of variable star that periodically varies in brightness. Unlike other types of variable stars, a Cepheid variable has a rapid rise to maximum brightness, followed by a more deliberate decline. The name comes from the star delta Cephei, which was the first to be studied. The period in which the change occurs is a matter of a few days or a week or more. Miss Leavitt's discovery was that the longer the star took for a return to greatest brightness, the greater was its average brightness.

Dr. Harlow Shapley, present director of the Harvard Observatory, applied this discovery to determining the distance of the Cepheids, and hence of other objects with which they are associated. Since the period, in days, bears a direct relationship to the star's intrinsic brightness, or "candlepower," it is theoretically possible to determine the brightness of one by merely measuring the time it takes to make a complete change in brilliancy. When the candlepower, or "absolute magnitude" is thus measured, as well as the apparent magnitude by noticing how bright it appears in the sky, the distance can be found, because the light diminishes with distance.

In this way it is possible to tell the relative distance of the Cepheid stars, but in order to get actual figures in miles, the distance of some, at least, must be found independently. The distances to these standard stars form the yardstick by which the more distant ones are measured. According to Dr. Gerasimovic this yardstick is almost twice as long as it should be, and if the yardstick is too long, the distances that we measure with it are also too long.

None Close Enough

Unfortunately, none of the Cepheids are close enough for astronomers to measure their distances directly, by their apparent change in position as seen from different parts of the earth's orbit, at different times of year. More indirect methods must be used, especially a study of their motions. All the stars are moving, at somewhat the same average speed. The closer one is, the faster does it sweep across our field of view, just as an automobile passing in the street may seem to go faster than a distant airplane. This method takes no account of the fact that some stars are probably moving actually much faster than others, but when large numbers are considered the average is probably pretty close to the truth.

Using the latest figures for the motions of the stars, and allowing for the recently discovered fact that the whole galaxy of stars is turning around a common center, Dr. Gerasimovic has redetermined the distances of the nearer Cepheids. These data show that the average Cepheid variable star is about one magnitude fainter than astronomers would formerly have supposed from the time in which its light varies. Hence the faintness is not as much due to distance as has formerly been believed, and so the Cepheids apparently must all be moved in closer to us. Star clusters and spiral nebulae whose distances have been measured from a study of their Cepheids are also closer than was thought.

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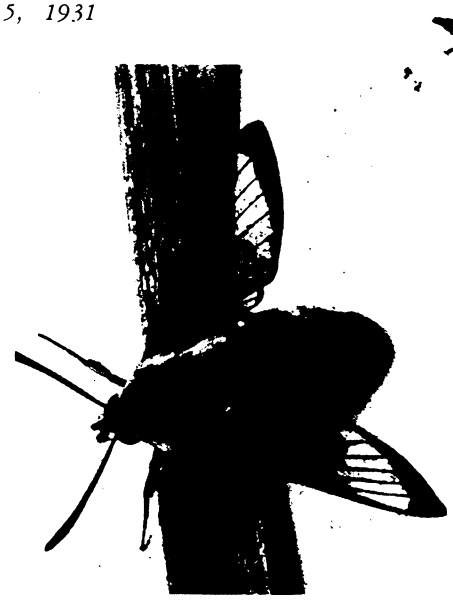

LIKE A BUMBLEBEE

But nothing more than a common, harmless moth. Hairy, banded body, swift humming flight, bee-like wings, when at rest, would all mark this insect as a bumblebee. But these features are only a part of his camouflage, which is revealed by the angle of his wings and the unmistakable antennae.

ZOOLOGY

Cats, at Least Big Ones, Don't Land Feet First

CATS DO NOT always land on their feet, Jay Bruce, mountain lion hunter, has reported to the California Fish and Game Commission.

Bruce based his statement on a recent lion hunt. He and his trained dogs had treed a huge male lion in the Silver Creek country. The big cat, which weighed 160 pounds and measured 7½ feet from nose to tip of tail, climbed to the 60-foot level in the tree and was attempting to get higher when it lost its footing and hurtled downward.

While falling it made several complete loops and finally landed squarely on its back. The force of the blow made it unconscious for several seconds, but it soon came to and counter-attacked the dogs. Then its career was ended by a pistol-shot.

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