

DOUBLE ANIMALS.

BY J. CARTER BEARD.

There not infrequently occur, even among human beings, instances of diphtherous birth in which two individuals are inseparably joined together.

Helena and Judith, the Hungarian sisters, who were born in 1701, and who lived twenty-two years; the famous Siamese twins, who died in 1874 at the age of sixty; the South Carolina negresses, Millie and Christina, who were exhibited at Barnum's museum on Broadway, and the Bohemian sisters, Rosalie and Josepha, are well-known examples, but many others exist. Often the union is much closer and more intimate than in the cases mentioned—so much so, indeed, that the consolidated individuals seldom if ever survive long after birth. Among the lower animals diphthera is, as might be suspected, far more common than it is among human beings, and it is quite possible that by persistent selection and breeding a race of double monsters might be established.

The most curious phase of the phenomenon perhaps, and one that seems to occur occasionally among human beings—though among mankind it is alternate and not simultaneous—is rather psychological than physiological, and consists in a double personality which to all appearances occupies the same physical organism. A case in point among the lower animals is the chameleon, long famous for its power of changing its color at will, a power which popular accounts have often greatly exaggerated.

It is certainly a remarkable animal in many respects, nearly allied to no other, and forming a genus entirely by itself.

To all appearances, and according to the researches of those best capable of forming an opinion on the subject, the nervous centers in one lateral half of this animal go on independently of those on the other, and it has two lateral centers of perception—sensation and motion—besides the common one in which must reside the faculty of concentration. Notwithstanding the strictly symmetrical structure of the chameleon as to its two halves, the eyes move independently of one another and convey separate impressions to their respective centers of perception. The consequence is that when the animal is agitated its movements resemble those of two animals, or rather perhaps two halves of animals glued together. Each half wishes to go its own way and there is no concordance of action. The chameleon therefore is the only four-legged vertebrate that is unable to swim; it becomes so frightened when dropped into water that all faculty of concentration is lost and the creature tumbles about as if in a state of intoxication. When a chameleon is undisturbed every impulse to motion is referred to the proper tribunal and the whole organism acts in accordance with its decrees. The eye, for example, that receives the strongest impression propagates it to the common center, which then prevails upon the other eye to follow that impression and direct its gaze toward the same object.

The chameleon, moreover, may be fast asleep on one side and wide awake on the other. Cautiously approached at night with a candle so as not to awaken the whole animal at once, the eye turned toward the light will open, begin to move, and the corresponding side to change color, whereas the other side will remain for a longer or shorter time in a torpid, motionless, and unchanged state with its eye fast shut.

Another most remarkable instance of the double animal is one in which two individuals are born separately and afterward become one indivisible being. This is the case with the *Diplo-*

zoon paradoxum. The little creatures begin life as two solitary and distinct individuals. When young they are called diporpa, a name given them by naturalists before the life history of the minute animals was known, and they were supposed to be adult specimens. Their appearance at this stage of their life is shown on the left of the illustration, a little while after they have left their strangely shaped eggs, each of which parts near the top into two sections, to the upper one of which is attached a long tangle of thread. One of these eggs is shown on the right of the accom-

pletely fused, but otherwise the twin animals remain independent. This double trematode well deserves its name of *Diplozoon paradoxum*.

Artificial Train Oil.

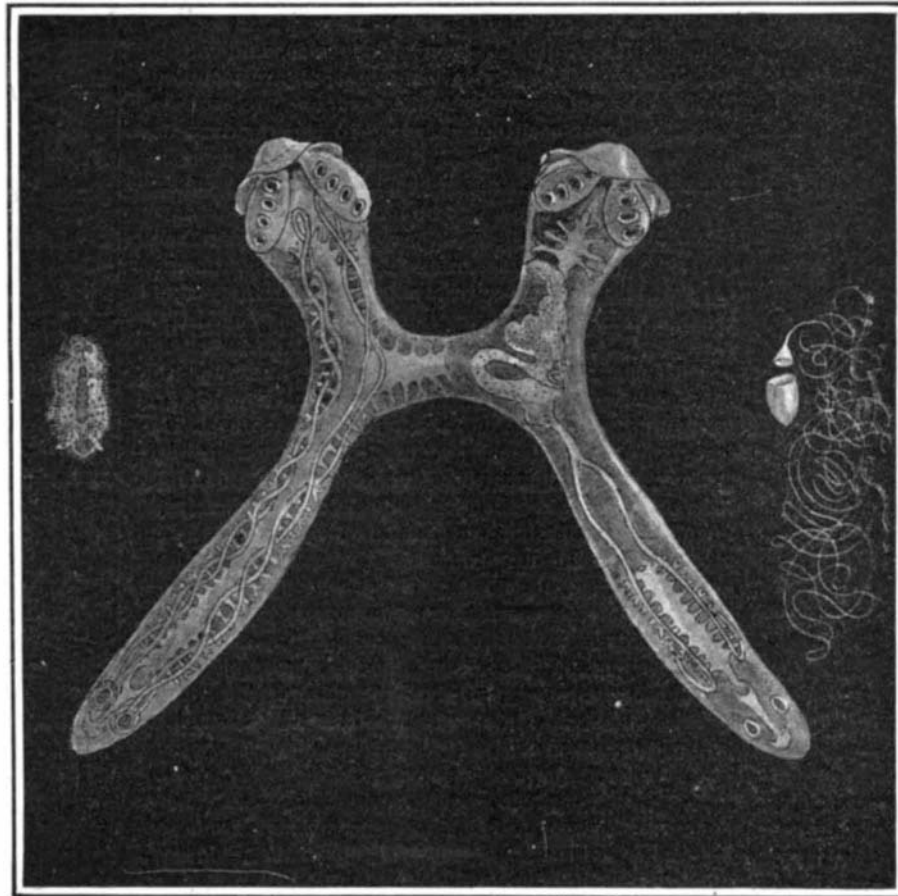
Under this descriptive title we understand a dark product derived from rosin-oil and one that is widely used in commerce playing at the same time no inconsiderable part in the smaller chemical branches of trade and industry, says *Chemische Revue*.

The light-colored train oils known in commerce under the name of fish oil or blubber are, as a rule, pure train oils, or, at the worst, somewhat adulterated, but rarely if ever purely artificial products. In the main the dark oils are derivatives of rosin oil and their production is attended with some difficulty because of the demands put forward by consumers, which are extremely strenuous.

As a criterion by which to judge the quality of the artificial train oil we are compelled to enumerate the following characteristics: Color, odor, viscosity, its feel on the surface, and, of course, absence of gloss; as for the color, it must show a light-brown shade when the light falls upon a thin film of it. It must also be perfectly clear and possess a consistency not greater than syrup. When rubbed between the thumb and fingers it must disclose a great degree of lubricity and yet not be sticky, such as, for example, any presence of mineral, sperm oil, or paraffine oil causes. In competition with the foreign oils it is very difficult indeed with the prices prevailing at present to produce an artificial train oil in Germany from domestic products which is capable of meeting all these demands. The chief ingredient in the production of artificial train oil is the so-called rosin stock oil. Conforming with the characteristics of the oil to be made this should be thick-flowing and possess the least possible odor and gloss. The lighter and clearer the rosin stock oil is, the better it is adapted for the manufacture of

train oil. A cloudy and for that reason also a darker rosin oil is less suited for the purpose. Blue oil constitutes the next most important raw material from which to make our train oil, of which the properties, properly speaking, are of more consequence for the purpose than those of the rosin oil. The very pungent odor and high fluorescence, particularly of the blue oil of Galicia, are as a rule so difficult to remove that we have at the start the fundamental reasons for the inferiority of the final product.

Less important as raw materials are nitric acid and molasses, by means of which nearly all the artificial train oils are made. First a mixture of two parts of rosin oil and one part of blue oil is prepared—these ratios varying according to the desired viscosity—to which is added only pure and rather concentrated nitric acid, which probably deprives the mixture of its natural fluorescence through the nitro compounds formed with the hydrocarbons of rosin oil, besides deodorizing it and turning it dark. From 1.5 to 2 per cent of nitric acid is sufficient for the purpose, viz., to deodorize it and kill fluorescence. The smell of rosin oil does not disappear entirely, which indeed is of little moment, for in the finished product it is not unlike that of the natural train oil. The addition of from 2 to 4 per cent of molasses also assists the color as well as in disguising the odor. During the whole process the temperature in the kettle—an open kettle and a direct fire are imperative—must be kept from 60 to 80 deg. C. When the product has the desired appearance the fire is drawn and contents of the kettle allowed to cool.



The Curious Double Animal Diplozoon paradoxum.

To the left appears the young animal or Diporpa before becoming double; the right, the egg of Diplozoon from which the single animal is hatched.

panying drawing. The diporpa is ciliated and free-swimming, and exercises its power of movement in roving about in search of a home which it finds, if at all, on the gills of some fresh-water fish—the bream, the gudgeon, or the minnow—from which it derives its nutriment. Meeting or being joined by others like itself, it selects a companion to which it is no figure of speech to say that it becomes greatly attached.

There is upon the back of each of the animals a sort of a knob, and opposite to it a sucking apparatus by means of which it is able to fasten itself securely to any surface to which it wishes to adhere. When two of the animals become a single individual, they do so by twisting over so that each seizes the knob of its companion with its sucker, and thus situated they actually grow together as shown in the center figure of the cut. The knobs and suckers are com-



Chameleon, Showing the Side That is Awakening and Beginning to Change. Its Other Side is as Yet Fast Asleep and Motionless.

DOUBLE ANIMALS.