

This whole matter of the contrasting methods of body support—internal for vertebrates, external for invertebrates—insures that “never the twain shall meet” on the field of equal size. For as the external-support system prevents the insects and other creeping things from becoming very large, so the internal-support system keeps the boned animals from becoming very small. Hummingbirds, mice and shrews are about as tiny as animals can be and still have strong enough internal skeletons to support them. Any bones smaller than a hummingbird’s would have to be made of something besides bone (aluminum, maybe?) to have the needed strength. We hear of the giant water-bugs killing small fish and frogs, of giant tropical spiders that murder small birds; but aside from exceptions like these we are not likely to have our blood chilled by any such encounters, so unnatural-seeming to us. Only the giants of the small world can overcome even the tiniest citizens of the large world.

#### Lack of Breath

Another factor in keeping the small creatures small would be sheer lack of breath. Falstaff (again!) puffed and panted enough after any exertion to which he was forced. But like all other vertebrates (for he had a vertebral column as well as an abdomen, even if Shakespeare will allow him neither “backbone” nor “guts”) he had a good pair of lungs, and red blood corpuscles to carry the oxygen from them to every cell of his huge body. But insects, spiders and the like do not have lungs. Insects have air-tubes that open through rows of little holes along their sides. These tubes branch out through all parts of their bodies, carrying the air directly to the tissues. Any increase in the thickness of an insect’s body would greatly magnify the difficulties inherent in this primitive method of oxygen transport. Even in the Coal Age, when there were giant dragonflies a foot long, the bodies of these winged terrors were no thicker than a lead pencil. Spiders’ breathing-arrangements are quite as primitive, so that they are in no better position than the insects to grow to superhuman size and terror-inspiring rapacity.

But even though such extremes can not come to pass without reversing some of the fundamental laws of physics and physiology, there are plenty of instances within both the little and the large worlds of animals where the customary



“WHEN A MAN BITES A DOG”

*So also when a frog undertakes to swallow a snake; for it is usually the snake that swallows the frog.*

roles of eaten and eater are switched.

We commonly think, for example, of snakes eating frogs. But on occasion a big frog does not hesitate to tackle a small snake. The photograph caught by Lynwood Chace looks rather like a case of a big frog having bitten off more snake than he could chew; but if the snake had been no bigger than a

large angleworm (and plenty of snakes are that small), down like a worm he would have gone. Frogs are cannibals; the big ones eat the little ones whenever they can catch them.

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PSYCHOLOGY

## Student of Twins Tells What Quintuplets Can Teach Us

PSYCHOLOGISTS can learn new things from a study of the Dionne quintuplets, says Dr. Frank N. Freeman, University of Chicago professor of psychology. Dr. Freeman has made studies of twins, but has not planned to make a study of the Dionne babies.

“Biologically quintuplets may be any one of several combinations of identical and fraternal twins or quadruplets,” Dr. Freeman stated.

This means that they may have come from one fertilized egg, in which case they would all be identical, or from five separate eggs, in which case they would all be fraternal and just like any five sisters born of the same parents. Two of them may be identical and the rest fraternal, or these relationships might be varied in other ways.

“Study of their similarities and differences in the light of the type of their relationship as determined by

biological diagnosis would be valuable,” Dr. Freeman said.

It would not be very different from studies of twins, but because of the greater numbers might be three or four times as interesting, it appears from Dr. Freeman’s statement.

How would it feel to be one of five sisters all exactly alike? Growing up in the same household, would they all be as alike in thought and feeling as in appearance, or would they develop into five different personalities, or would three of them be alike in this way and the other two different? Would they all want the same toy to play with or would they develop different tastes? These are some of the interesting questions that psychologists might be able to answer after studying the quintuplets, but it would require a long time for the study.

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