clearly than another it is the compendiousness of the work. Hardly a question has arisen relative to advertising which is not referred to in the voluminous index. The answer is given if it can be truthfully stated. There are, however, many gaps in our knowledge, as Professor Starch would be only too willing to admit. And it is hoped that the excellent guidance which he has furnished in this book will stimultae workers in advertising to make the further investigations that are so greatly needed.

HARRY D. KITSON

LABORATORY APPARATUS AND METHODS

REMOVING JELLY FROM FROG OR TOAD EGGS

THE quantity of jelly surrounding the egg of the frog or toad is always a source of annoyance in laboratory study. The physical and chemical methods already in use are quite unsatisfactory and the writer has been trying for several years to find some process as free as possible from their defects. Professor C. I. Nelson, of the Department of Bacteriology of the North Dakota Agricultural College, suggested that "antiformin" as used in dissolving tuberculous sputum might be successful and it has proved wonderfully effective. It is inexpensive and sufficiently stable for a stock solution to last through the spawning period of the frog. For convenience the formula is given below.

Washing soda	2 pounds
Chloride of lime	1 pound
Water	1 gallon

Use the supernatant fluid from this mixture (or filter) and mix with equal parts of a 15 per cent. solution of sodium hydroxide. The egg masses in my experiments were first fixed in a 10 per cent. formalin solution.

100 to 125 cc is sufficient to dissolve the jelly on one clutch of eggs. The action is complete inside of ten minutes. The eggs are thoroughly washed in 8 or 10 changes of water and allowed to stand in water for a half hour or longer to remove any traces of the antiformin. The eggs are then passed through a series of alcohols to 70 per cent. where they are kept. After 12 or 24 hours they are slightly bleached to bring out the cleavage lines through the addition of a few drops of peroxide of hydrogen to each batch. If the eggs are subjected to bleaching before they have been hardened in alcohol there seems to be some tendency for disintegration. A few eggs tend to break up, but the majority remain in perfect condition. Three or four batches may be stored in an eight ounce bottle, whereas before the removal of the jelly a quart jar would be necessary to hold them.

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SPECIAL ARTICLES

CONDITIONS OF NATURAL SELECTION

OBJECTORS to natural selection seem only to have substituted variation or mutation for special creation and to hold that species were produced first and then dropped into the situations to which they were adapted. With them the origin of species is the same as that of distinctive characters. Species, it seems to me, are not dried things which may be separated by certain differences, but living things which occupy definite ecological positions, and that they separated first and got their differences afterwards.

Natural selection is an ecological theory. What it will account for must be ascertained by ecological investigation. Diversifications of food habits and of geographical and phenological ranges are its most important conditions.

Food habits.—One species of bee gets its pollen from flowers of one species, while another gets its pollen from those of another species. Two species are inquilines of different hosts. Of 182 local species of lower Aculeata whose flight is pretty well made out, 158 fly simultaneously, July 25-27. But for the fact that they provision their nests with different kinds of insects, so many species could hardly thrive in one place and fly at the same time.

Phenological range.—One species of bee flies in the spring, another in the fall. Of 296 local species, only 47.2 per cent. are flying simultaneously. Of 470 insect flowers, only 42.7 per cent. bloom at one time.

Geographical range.—It seems to be a general law that the most closely related species do not live in the same place. This is one of the most important facts in geographical distribution. In the case of 1,428 local species, mentioned in SCIENCE 48: 369, an average of only 1.7 belong to the same genus. The genera with more than one species are usually represented by the most divergent forms. The Bembicidae show only 10.4 per cent. of the North American species, but 83.3 per cent. of the genera. Of 79 families of insect flowers, compared with the same families given in Gray's Manual, 7th edition, the local flora shows 21.9 per cent. of the species and 44.1 per cent. of the genera. These estimates were suggested by the presumption that the most closely associated elements ought to be the most heterogeneous. The closer the competition is, the greater the generic diversification.

The early flora.—The composition of 159 species blooming before July and 162 blooming after June, shows the following percentages: