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WHERE ANGELS FEAR TO TREAD: A CONTRIBUTION FROM GENERAL SOCIOLOGY TO HUMAN ETHICS¹

By Dr. W. C. ALLEE

UNIVERSITY OF CHICAGO

INTEREST in the social impact of science in general and of biology in particular has been growing steadily in the last few decades. The problems imposed by the present war and by thoughts of the coming post-war world have increased this interest. My own active concern with various phases of the sub-social and social life of non-human animals has revealed enough of the complexities of these simpler social systems to make me well aware of my limitations when confronted with the modern social problems of men. It is the drive of immediate necessity rather than a feeling of competence that impels me to undertake the present discussion of the biological foundations for some fundamental phases of the social behavior of men.

¹ Proposed address as vice-president and chairman of Section F of the American Association for the Advancement of Science.

I. THE BIOLOGICAL EVIDENCE

In our laboratory we are making two experimental approaches to the phenomena of biological sociology, and each yields its very different aspect of truth. On the one hand, we have been studying for over a decade the dominance-subordination relations that are characteristic of many social groups. We know from personal observations, as well as from the literature, of nip-orders in fish, peck-orders in flocks of several species of birds and fighting orders in mice. Usually there is one dominant animal which can bite, nip or peck others without being attacked in return. Below it the others are ranked in various degrees of subservience. Similar dominance orders occur among such mammals as rats, cats, cows and men. Social organizations have also been reported with certainty

The substance is obtained either as a light white powder or as amorphous granular material. It is soluble or dispersible in water, making a clear solution, syrupy in consistency. The viscosity of this solution can be varied by the amount of material added. PVA is not soluble in any of the ordinary fat solvents. The watery solution, upon drying, leaves a transparent, tough, thin film which adheres closely to a grease-free surface. This film is resistant to dampness, water (except immersion for a period of several hours), alcohol, ether, xylol, acetone and other solvents.

The stock solution is prepared by adding PVA (Grade RH-349) powder slowly to cold water, stirring it in thoroughly. The powder goes into solution with difficulty, but the process can be hastened by heating in a steam bath until the solution becomes about as viscous as thick molasses. At this time the solution appears milky, owing to the inclusion of small air bubbles. Upon further heating, or if left to stand for several hours, it becomes water clear. Any undissolved material can be strained off. The stock can be stored and preserved indefinitely and diluted with water to any consistency desired.

Several uses have been found for this stock solution. Giemsa stained blood films, both thin blood films and thick drops, have been preserved by spreading a thin film of stock solution over the stained portion and drying this quickly. Slight fading takes place before the solution dries completely, but after it has dried, such slides, placed even in direct sunlight or under ultra-violet lamp, will not lose any further color. The blood films are covered by a tough, thick film and after examination with oil the oil can be wiped off with a cloth with no possibility of damaging the smear. Slides examined two years after preservation by this method are still in excellent condition.

The stock solution has also been found useful for the examination of mosquito larvae. Live larvae are placed on two or three drops upon a slide. The larvae are quite firmly held by the viscous solution and can be examined most minutely for as long as half an hour. Upon completion of examination the larvae can be washed off into a container of water and soon recover. Smaller living organisms such as trematode cercariae may be placed in a drop of the solution and covered with a cover glass, following which they can be examined under oil immersion for twenty or thirty minutes before they die. This method also works well for detailed examination of motile microorganisms.

A clearing and mounting medium has been prepared by a modification of the original lacto-phenol medium which has the composition of glycerine 60 per cent., phenol 20 per cent., lactic acid 20 per cent. by volume. The original medium clears certain types of material satisfactorily but remains liquid and has to be sealed

in, a very time-consuming procedure. We have prepared a somewhat similar preparation which we call polyvinyl-lacto-phenol: PVA stock solution 56 per cent., phenol 22 per cent., lactic acid 22 per cent. by volume. The resulting medium readily clears small objects removed directly from aqueous solution. Mosquito larvae can be satisfactorily mounted by dropping live larvae on to slides, draining off the water, adding 4 to 6 drops of PVA lacto-phenol and covering with a cover glass. More mounting medium should be added if necessary, so that a small amount of the medium flows out on all sides of the cover slip. In two days the cover slip will be cemented firmly in place and the larvae well cleared. In some cases it is necessary to add more medium later if it recedes under the cover slip while drying. Such mounts preserve all details necessary for identification.

A very satisfactory technique has been worked out for the mounting of the terminalia of male mosquitoes. The terminalia, after being cleared in 10 per cent. potassium hydroxide and stained with acid fuchsin, are dissected in a drop of PVA lacto-phenol. The viscosity of the solution aids dissection. The dissected parts can be transferred to a very small drop of solution on a clean slide and arranged as desired. The slide can then be dried in an incubator or on a hot plate so that the parts are firmly held in place in the dried film. A drop of mounting medium is then placed on a cover slip and the preparation covered. This method is rapid and simple.

The method also offers a quick and satisfactory means of mounting pollen grains for measurement and detailed examination and gives a permanent mount.

I should like to thank the E. I. du Pont de Nemours Company for the supply of PVA used and for information about its properties.

WILBUR G. DOWNS,
1st Lieutenant,
Medical Corps, U.S.A.

OFFICE OF THE MALARIA SURVEY,
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BOOKS RECEIVED

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HELMMEYER, LUDWIG. *Spectrophotometry in Medicine*. Translated by A. Jordan and T. L. Tippell. Illustrated. Pp. xiv + 280. Adam Hilger Limited. \$8.75.
HOOVER, HERBERT and HUGH GIBSON. *The Problems of Lasting Peace*. Pp. ix + 303. Doubleday Doran and Company. \$2.00.
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