4 rats. The tumors seemed to regress 19–20 days after transplantation. A transplant of a bronchogenic carcinoma investigated 21 days after transplantation showed marked fibrosis and only a few degenerating tumor cells. Also, no inflammatory reaction was seen around this transplant. Two other transplants of the same tumor were found persistent in rats killed 8 days after the transplantation. Transplants into one group of rats not treated with cortisone was unsuccessful.

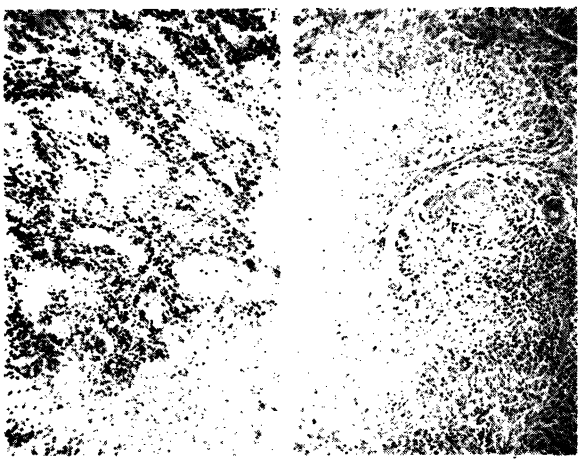

FIG. 1. Ependymoblastoma: Left, original tumor, ×70; right, transplant 12 days old. Note mitosis.

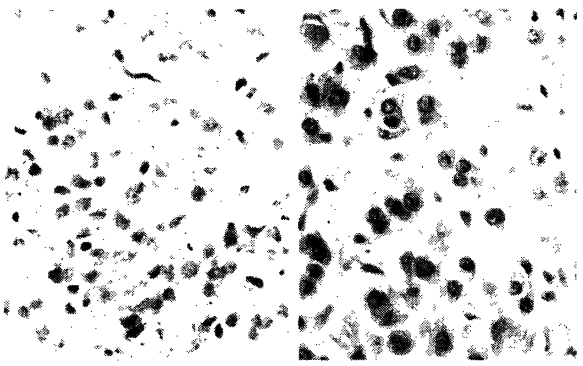

FIG. 2. Bronchogenic carcinoma: Left, original tumor, ×300; right, transplant 12 days old. Note mitosis.

In two rats with successful grafts, blood counts of the heart blood were made at the time each animal was sacrificed. The total blood count in one rat was 1900 leucocytes, with 10% lymphocytes; in the other, the count was 1900 leucocytes and 7% lymphocytes. The number of leucocytes in normal rats is 12–15,000, with 65–75% lymphocytes. The red blood cell count was about normal.

Other changes found in cortisone-treated rats were the reduction in the size of adrenals, spleen, and thymus. In the spleen a very marked increase of the giant cells was observed. An increase in the number of splenic giant cells after transplantation of chemically induced tumors in mice was studied by Parsons *et al.* (*11, 12*). In 4 rats, killed 9–14 days after transplantation, marked dilatation of the pelvis of the kidney was found, and in the histological preparation a corresponding dilatation of the collecting tubules was observed. In all rats, a marked development of the mammary tissue was found. The ovaries contained ripening follicles, but no corpora lutea.

It is as yet impossible to state whether the survival of human tissue transplants in rats is directly connected with the disappearance of lymphocytes of the circulation or whether a disturbance occurs in the whole cellular metabolism of the cortisone-treated animals. It was not attempted to establish in which percentage of all tumors heterotransplantation might be successful, or which kind of tumors are more suitable for transplantation. The aim of this study was to show that cortisone changes the inner environment of an animal in such a way that its resistance to heterotransplantation is greatly diminished.

References

1. MURPHY, J. B. *J. Am. Med. Assoc.*, **62**, 199 (1914).
2. HARRIS, T. N., *et al. J. Exptl. Med.*, **81**, 73 (1945).
3. DOUGHERTY, T. F., CHASE, J. H., and WHITE, A. *Proc. Soc. Exptl. Biol. Med.*, **57**, 295 (1944).
4. KASS, E. H. *Science*, **101**, 337 (1945).
5. MURPHY, J. B. *J. Am. Med. Assoc.*, **62**, 1459 (1914).
6. TOOLAN, H. W. *Proc. Soc. Exptl. Biol. Med.* **77**, 572 (1951).
7. HEGNER, C. A. *Münch. med. Wochschr.*, **60**, 2722 (1913).
8. GREENE, H. S. N. *Science*, **88**, 357 (1938).
9. FOLEY, E. J., and SILVERSTEIN, R. *Proc. Soc. Exptl. Biol. Med.*, **77**, 713 (1951).
10. HOWES, E. L. *Yale J. Biol. Med.*, **23**, 454 (1951).
11. PARSONS, L. D. *J. Pathol. Bacteriol.*, **40**, 45 (1935).
12. PARSONS, L. D. and WARREN, F. L. *Ibid.*, **51**, 305 (1941).

Manuscript received August 25, 1952.

Conformity to Social Norms in Stable and Temporary Groups[1]

Everett W. Bovard, Jr.[2]

Department of Psychology, University of Toronto, Canada

When members of small face-to-face groups, whose structure had facilitated verbal interaction, were confronted with a green rectangle and asked to estimate its length anonymously, the dispersion of their perceptual judgments was significantly greater than the dispersion of estimates from groups whose structure had tended to inhibit such interaction (*1*). Further, when the individual estimates and their average or norm were presented to each group, respectively, and members were asked to re-estimate the length of the rectangle anonymously, a significantly greater reduction in dispersion of estimates compared to the initial

[1] This work was undertaken in the summer of 1949 as part of the Conference Research Project at the University of Michigan, sponsored by the Office of Naval Research (Contract N60nr-232. T.O. 70), under the general direction of Donald G. Marquis, chairman of the Department of Psychology.

[2] The writer is indebted to Dr. Marquis for the original suggestion which led to this study, and to Harold Guetzkow, project coordinator, for further advice and assistance.

dispersion was obtained in those groups with more experience of interaction (*1*).

These results suggest that modification of individual perceptions of an objective stimulus in the direction of a group norm is a function of group structure, more particularly of the amount of verbal interaction among group members facilitated by such structure. To further explore this latter proposition, two small group populations representing extremes in interaction experienced were selected for experimentation at the University of Michigan.

The first of these populations was made up of six so-called stable groups, ranging in size from 6 to 14 persons, who had met together voluntarily in their respective groups for an average of 231 hr and were extremely likely to continue meeting together. These groups totaled 55 persons. Included in this population were a group of teaching fellows from one of the university departments, tested while attending a dance together; a group of girls living in one of the university's international houses, tested while attending the same dance; a Quaker organization; a church baseball team; a graduate outing club; and a Fundamentalist group.

The second of the populations was made up of seven so-called temporary groups, ranging in size from 6 to 11 members, who had met together for an average of 2.47 hr and were not likely to continue meeting voluntarily. There was a total of 53 persons in these groups. One of the groups consisted of volunteers from an elementary psychology class who had known each other for an average of 14 hr and who, according to their instructor, were not likely to meet again in the absence of external compulsion. The other six groups in this population were made up of individuals arbitrarily selected by the experimenter as they walked across the campus and asked if they would like to participate in a brief experiment in social psychology. None of these persons had met before. The average existence of the six groups was about 20 min.

In the first experiment conducted with these two populations, each subject was asked to estimate the number of dots in a square enclosing 500 dots that had been presented to him, within a time limit of approximately 30 sec. Following this initial estimate, the group was informed of the individual estimates by its members (but not who had made each one) and their average or norm, as computed by the experimenter. A second anonymous estimate, within the same time limit, was then requested of the group members.

Results indicated a significantly greater dispersion of initial estimates of the number of dots from the stable groups. The standard deviation of estimates from this population of small groups was 889, compared to 386 for the temporary groups. This difference yielded a critical ratio of 5.56, and hence the probability that it could have occurred by chance is less than .0000006.

The results also indicated a significantly greater reduction in dispersion from first to second estimates for the stable groups, compared to the temporary groups. Following presentation of the individual estimates and their average, the standard deviation of the stable group estimates was reduced by 440 units, whereas the standard deviation of the temporary groups was reduced by 58 units. This difference in shrinkage of the original dispersions yielded a critical ratio of 4.88, indicating that the probability it could have happened by chance is less than .000002. The statistical formula used here was developed by McNemar (*2*).

When initial dispersions of the stable and temporary groups were mathematically equated by expressing the absolute change in standard deviation for each population as a proportion of the initial standard deviation for that population, greater relative shrinkage or convergence of estimates was still obtained for the stable group population. Percentage of change with respect to the initial standard deviation of estimates was 49 for the stable groups and 15 for the temporary groups. It should be noted that in the case of every group tested the standard deviation of the second estimates was smaller than the standard deviation of the initial estimates.

When, however, in a second experiment immediately following the first, the same experimental procedure was repeated for each group, using as a stimulus a green rectangle the length of which was to be judged, no statistically meaningful differences of any sort were found in regard to initial dispersion or shrinkage of such dispersion following presentation of the group norm, between stable and temporary group populations. This finding is in direct contrast to results of a previous experiment with the green rectangle, mentioned above (*1*). It is possible that the negative result found in this instance was due to the fact that the experiment with the green rectangle directly followed the experiment with the dots, and hence by analogy the subjects were able to guess in advance what the experimental procedure would be, as suggested by Guetzkow (*3*). Another experimental study had indicated that the obtained phenomena of differences in initial divergence of estimates and in convergence following presentation of the group norm, between groups who had and who had not had extensive experience of verbal interaction, did not obtain when subjects were sophisticated in regard to the experimental procedure (*1*).

Whatever the mechanism by means of which the group influences the perceptions of its members, even their perceptions of objective stimuli, it should be noted that the individual is not always aware of its operation. In the case of the first experiment with the green rectangle (*1*), some individuals reported seeing the rectangle as smaller or larger the second time they had to judge its length. Anonymous reports from one group, whose members were asked to explain why they had changed their estimates from the

first to second judgment situations, included "It looked larger," "It appeared smaller," "It appeared larger the second time," and "It was held slightly closer to me." None of these conditions was, of course, objectively true.

An adequate theoretical explanation would have to take into account not only the above phenomenon, but also the means by which the group situation, *before* individual estimates and their average had been presented to members, had operated to yield a substantially smaller initial dispersion of estimates in those groups with little experience of interaction among their members.

References

1. BOVARD, E. W., JR. *J. Abnormal Social Psychol.*, **46**, 398 (1951).
2. MCNEMAR, Q. *Psychological Statistics*. New York: Wiley, 78 (1949).
3. GUETZKOW, H. Personal communication.

Manuscript received August 21, 1952.

Comments and Communications

Phosphorylated Hesperidin

IN AN article published in SCIENCE (**115**, 402 [1952]) we reported preliminary results indicating the production of an antifertility effect in rats by the oral administration of phosphorylated hesperidin. Experiments designed to check these findings, in which mice, as well as larger numbers of rats have been used, have given inconsistent results. Negative results have been obtained with samples of material synthesized at different times and under slightly different conditions from that originally reported on.

Phosphorylated hesperidin as first prepared (*1*) was known to be a mixture. Subsequent chromatographic work (*2*) has shown the presence of several different components; the number of these and their identity (as determined by the position of the spots) will vary with slight changes in the method of synthesis of the sample being examined. Finally, it has been found (*3, 4*) that changes in the method of synthesis that will not affect the degree of phosphorylation will affect the antihyaluronidase effect of the substance *in vivo* and *in vitro*.

It would appear, then, that the antifertility effect of phosphorylated hesperidin is a function of one component of a mixture of different phosphates. Work on the isolation and identification of this substance is now in progress.

GUSTAV J. MARTIN

The National Drug Company
Philadelphia, Pennsylvania

References

1. BEILER, J. M., and MARTIN, G. J. *J. Biol. Chem.*, **174**, 31 (1948).
2. SULLIVAN, M. J., and MARTIN, G. J. Unpublished data.
3. BEILER, J. M., *et al. Abst.*, 122nd meeting, Am. Chem. Soc., Atlantic City (Sept. 14, 1952).
4. PRESTON, R. K., *et al. Exptl. Med. Surg.* (in press).

A Type of Large-Volume Vacuum Ampul

LARGE-VOLUME ampuls, as containers of dextrose solution or normal saline injections, are still commonly used in the Far East. They are better than bottles from the standpoint of air leakage, as has been observed among some carelessly stored goods in Taiwan. They are simple and cheap in comparison with bottles of other types. Because of the weakness of glass, ordinary ampuls cannot withstand pressure, and break easily during sterilization. Actually, in the empty space of an ampul during sterilization at 100° C the partial pressure of air is $1 \times \frac{333}{293}$ atmospheric pressure

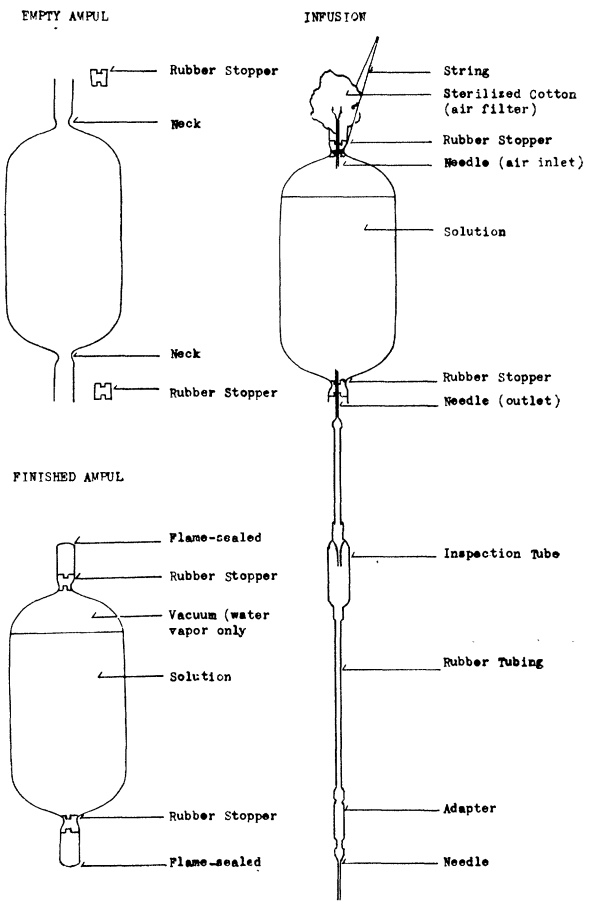

FIG. 1.