an advance in physical understanding of an observed world.

The claims sometimes made for the "Mach principle," on the other hand, are misleading. We have *not* reached any further understanding of inertial effects per se; Einstein's metric is still "Euclidean in the small"; a Foucault pendulum still mysteriously honors the distant configuration of Newton's fixed stars. Here indeed we have real physical facts, as unexplained now as when Ernst Mach was writing. So might not our "younger cosmologists," as they peruse the history of science, profitably also contemplate the mystery of absolute rotation, and search for the illuminating principle, yet to come, that will explain accelerative "forces," and relate the great, small, and distant in our universe? This must surely be a problem for physical insight, with mathematical ingenuity only of accessory use.

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29 October 1954.

Acclimatization?

Carroll B. Nash has presented some very interesting data on heat death temperatures and exposure times for *Goniobasis livescens* [*Science* **119**, 773 (1954)]. For this he deserves commendation. I seem, however, to perceive some important implications in his data that are not brought out clearly in the text.

Reference to Table 1 of his paper shows that greater mortality occurred among the slowly heated snails than among the quickly heated ones when the time of exposure to the *maximum* temperature was short. As this exposure time was extended to 30 min and longer, the rapidly heated snails died just as often as the slowly heated ones. It appears as if this were direct evidence that heat penetration was forcing an increase of internal temperature during the longer exposure periods.

Evidently most *G. livescens* will die if they are exposed for 60 min to a temperature of 36°C, that is, if their internal temperature is elevated to this point. Consider, then, what happened to the "acclimatized" group, which, having been held at 36°C for 5 min, was heated to 37°C for 5 min, then to 38°C and so on, and was finally warmed to 41°C for 1 min and then cooled. Their complete mortality simply suggests that they were heated through, and, as is the case with many creatures, their "constitution" simply could not stand that. The rapidly heated group, however, suffered very little from their 1-min exposure because they were clearly not heated through in the time allotted.

It is unfortunate that Mr. Nash has not presented the weights of the individuals that died or survived in each test. Since the weights varied from 0.3 to 1.1 g, and the volumes, therefore, varied in this same ratio, it is clear that the smaller individuals underwent a much more severe test than the larger ones because of their much larger surface area/volume ratio. It would be interesting to know whether the individuals that died when rapidly heated for 5 and 10 min were the small ones of their respective groups.

The data, therefore, tell nothing about "acclimatization" except that it is dubious. The pertinence of "rate of heating" can be established by simple relationships between thermal conductivity and size of the individual snail.

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24 November 1954.

With the exception of the presumed relationship between the size of the snail and its rate of heating, I find no implications in the data cited by Dingle that are not apparent in the original article. The snails were divided into groups of "large," "medium," and "small" individuals, with the same ratio of individuals of these three groups in each of the 87 sets of snails. Because of this, it is unlikely that the surface area/volume ratio significantly contributed to the differences of mortality rate in the several sets of snails. No correlation between mortality rate and body size was apparent from the data, and the individuals that died when rapidly heated for 5 and 10 min were not disproportionately representative of the "small" snails.

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Relationship of Motive to Author and Statement

The question of how beliefs and feelings are changed has been a persistent problem in social psychology. Clearly, the question is important, for an answer would also provide information on such related problems as conformity, uniformity of ideas, and persuasion.

It has been known all along that people change their ideas, not necessarily all at once, but subtly and unconsciously. It was once felt that these changes were brought about in a mechanical, thoughtless, and irrational fashion. However, Asch (*1*) showed experimentally that changes in beliefs and ideas are not mechanical and irrational, but that cognitive factors are involved.

As an example, one finds a higher degree of acceptance for the statement "There is nothing sacred about the American Constitution. If it doesn't serve its purpose it should be changed as often as necessary" when it is attributed to Franklin D. Roosevelt instead of to Earl Browder. Asch's contribution was to show clearly that, with the change in attribution,

the entire context changes and therefore the cognitive content of the statement changes as well. In other words, the statement *means different things* when different people say it and, therefore, is not actually the same statement.

An additional variable that has not received experimental investigation is motive. How is motive related to the acceptance of a statement and to the acceptance of an author? This communication describes a study that was designed to answer this question.

Ten controversial statements ranging from political (for example, the preceding statement) and economic through social and biological (for example, "Intermarriage between whites and Negroes should be forbidden") and general (for example, "The 'facts of life' should not be taught in public schools"), were attributed to two groups of 10 different authors deemed likely to be generally held in either high or low esteem (*2*). For one group of testees, the authors listed were Bernard Baruch, Robert A. Taft, Ernest Hemingway, Adolph Hitler, Earl Browder, Herman Talmadge, Westbrook Pegler, Andrei Vishinsky, Geoffrey Fisher, and Woodrow Wilson. For another group, they were Klaus Fuchs, Joseph McCarthy, Dimitri Shostakovich, Donald Blanton, Franklin D. Roosevelt, Joe Louis, Dorothy Barclay, John Cabot Lodge, Hewlett Johnson, and Nicolai Lenin.

Each item consisted of the statement and its supposed author. The testee was asked to rate on one nine-point scale his degree of agreement or disagreement with the statement and on another nine-point scale his degree of respect and admiration or lack of it for the author of the statement; finally he was asked to describe what he thought were the author's motives.

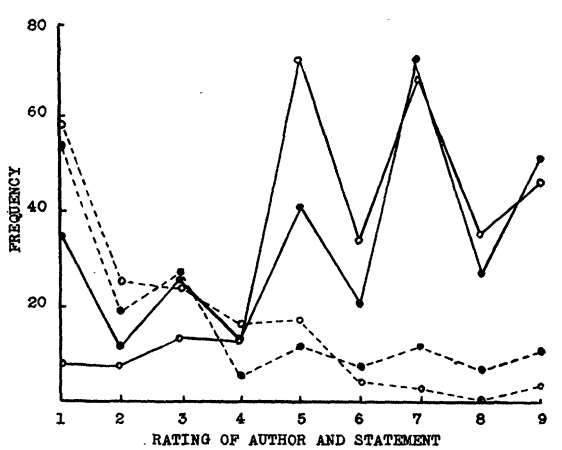

Fig. 1. Frequency of attributed praiseworthy and condemnable motives as a function of the rating of the author and statement. ○——○ denotes the frequency of attributed praiseworthy motives as a function of the author; ●——● denotes the frequency of attributed praiseworthy motives as a function of the statement; ○ - - - ○ denotes the frequency of attributed condemnable motives as a function of the author; ● - - - ● denotes the frequency of attributed condemnable motives as a function of the statement.

With 57 college students, each rating 10 authors and 10 statements and each attributing motives for 10 statements (30 students had the first set of 10 authors; 27 had the second set), 570 motives resulted. These motives were put in three categories: *praiseworthy, condemnable,* and *cannot evaluate.* Of the 570 items, 23 were arbitrated by a third judge because our classifications of them did not agree. The main results are summarized in Fig. 1 and may also be stated as follows (*3*):

1) The greater the esteem with which an author is held, the greater the tendency to attribute good motives to what he says, regardless of what he says.

2) The more one agrees with a statement, the greater the tendency to attribute good motives to the author, regardless of who he is.

3) The less the esteem with which an author is held, the greater the tendency to attribute bad motives to what he says, regardless of what he says.

4) The more one disagrees with a statement, the greater the tendency to attribute bad motives to the author, regardless of who he is.

Clearly, statement and author are not independent, and the facts shown by Asch are, without question, also present in these data. In this regard, it is of interest to note that, when good authors and liked statements (ratings 6 to 9) are coupled, out of 133 attributed motives only four were negative. On the other hand, it is somewhat easier to find good motives when bad authors and disliked statements (ratings 1 to 4) are coupled (out of 138 attributed motives, 19 were positive). Furthermore, the author, as one would expect, has more pulling power than the statement; that is, a good author (ratings 6 to 9), irrespective of statement, produced only eight negative motives. A good statement (ratings 6 to 9), irrespective of author, produced 36 negative motives. A bad author (ratings 1 to 4), irrespective of statement, produced 42 positive motives, but a bad statement (ratings 1 to 4), irrespective of author, produced 82 positive motives.

Further studies already in progress are designed to show not only the relationships between motive and other variables but also to explore the degree of "pulling power" that motive itself has over these variables.

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References and Notes

1. S. E. Asch, *Psychol. Rev.* **55**, 5 (1948).
2. The testees were told after the experiment that the statements were not made by the author specified and that in one case (Blanton) the author was a fictitious person. All testees agreed, however, that the statements *could have been made* by the authors given.
3. The large differences between the frequencies at 2, 4, 6, and 8 in contrast with those at 1, 3, 5, 7, and 9 are an artifact of the rating scale itself. This, however, does not invalidate the results obtained.

10 September 1954.