in another mouse. He regained aggressiveness after being isolated for four months.

Generalizing from a considerable extent of such experience, we have found that it is relatively easy to condition a mouse downward in its social scale, and that the longer and more severe the conditioning, the more lasting the results. We have found that it is also possible to so train a less aggressive mouse that it will become more dominant. This can be done even with low-ranking mice in the most pacific strain. But while it is possible, it is difficult to arrange social contacts such that a mouse at the very bottom of the group organization will show increased social aggressiveness. The training toward aggressiveness goes exceedingly slowly and must be modified to meet the nuances in the behavior of each individual. As in causing mice to lose social status, it is much easier to train intermediate mice to be aggressive than those which are low in the social scale.

One example must suffice. I choose this particular case since we have a motion picture record of the final battle of such a long conditioning series.

Br 6 was at the bottom of the social order among the agouti mice. He was almost completely non-aggressive. Finally Br 6 was mated; and low-ranking, passive white mice were introduced into his home cage. Br 6 had never before made an attack, but now, in the presence of his mate, he threatened and fought off the mild invaders. Even this show of aggressiveness did not carry over in the absence of a female, and it took six weeks of careful social manipulation combined with a judicious use of isolation, which in these mice helps to build aggressiveness, before Br 6 finally attacked one of the whites when the two were alone together in a neutral cage. After this he was made to encounter several low-ranking whites daily in the fighting cage, and as a result of the total build-up he became definitely aggressive.

The extent of his aggressiveness is indicated by the fact that within an hour after a defeat by B 1, the fightingest mouse we had, he vigorously counterattacked and defeated his immediate superior in the social scale among the agoutis. He also won from other superiors after we had taken the precaution to have these fights staged soon after the latter had been defeated.

Meantime we wanted a good hard fight for the motion picture record. B 2, the dominant black, had just suffered two of his rare defeats and was nursing a lacerated shoulder. Even so, he was an aggressive, hard-fighting mouse. Somewhat optimistically we matched Br 6 against him. It is fortunate that we have a visual record of one of the most decisive inter-strain combats seen in this laboratory. Br 6 lost but only after fighting so hard that he died a few minutes later. There can be little question of the efficiency of the upward conditioning in this case.

And now a few final paragraphs. The socially dominant animals we have been discussing may or may not be the leaders in their groups. The *alpha* hen in a penned flock does not necessarily lead in foraging expeditions when the hens are turned out into an open lot. In fact, in such a foraging flock leadership changes frequently and the bird at the apex seems always more or less dependent on her followers. With certain other birds, in the flying flocks of which the different individuals can be recognized, the one in front is at times merely the fastest bird in the flock. So far as true leadership is concerned, it is only following along ahead of the main flock. A somewhat similar relationship between leader and followers has been observed among other animals, notably with ants and with men.

In the female herd of cows the dominant animal is the leader. With certain species of deer the female also leads, even when males are present; with other species the male is the leader.

The final point I have to make is a disappointingly negative one: I have said that group organization with a dominance-subordination pattern occurs among a wide variety of vertebrate animals, but the bearing of these patterns on leadership is another matter. While we now know how to study the problem of leadership in an objective and comprehensive way, actually very little progress has been made in such studies upon non-primate animals.

We do know, from experimental analysis, that the dominance-subordination pattern of group behavior may be influenced by environmental factors and may have its foundations in (a) heredity, as shown by different degrees of aggressiveness in different genetic strains; (b) in the physiological state of the individual, one phase of which is illustrated by studies on the hormonal control of dominance; and (c) on experience which with hens and mice may be recent, or remembered from the relatively remote past.

OBITUARY

JOHN ALEXANDER McGEOCH

IN the prime of his career, occupying a position of leadership in American psychology, the life of Professor McGeoch was cut short by his untimely death in Iowa City on March 3, 1942. He died of a cerebral hemorrhage after a short illness.

Professor McGeoch was born in Argyle, New York, October 9, 1897. He received his A.B. degree from

Westminster College in 1918 and his M.A. degree from Colorado College in 1919. He received his Ph.D. from the University of Chicago in 1926, after having done part of his graduate study at the University of California and at Columbia University. In 1924 he married Grace Oberschelp, who died in 1927; and in 1939 he married Mrs. Frances Hady, who with her two children, and his mother, Mrs. Alexander McGeoch, survive him.

He came to Iowa as head of the department of psychology in the fall of 1939, and while here he has won high recognition for his scholarly activities in the pursuit and promotion of research, his excellence in teaching and administrative activities, his good judgment and winsome personality, and his trustworthy leadership in the department and in the university as a whole. His researches have centered around problems in the psychology of learning. He had just completed his magnum opus, a volume entitled "The Psychology of Human Learning," which is being published by Longmans, Green. He has served as editor of the *Psychological Bulletin* since 1935, and has published a number of papers, principally in the field of experimental psychology in education.

Professor McGeoch has been active in the American Psychological Association, the American Association for the Advancement of Science (secretary, Section I, 1934–1936), the Eastern Psychological Association, the Midwestern Psychological Association (secretary-treasurer, 1932–1934; president, 1935), the Society of Experimental Psychologists, the Southern Society for Philosophy and Psychology, and the National Institute of Psychology (president, 1941). He was a member of Sigma Xi, Phi Beta Kappa, Phi Delta Kappa and Phi Sigma. He served as instructor of psychology at Washington University, 1920–1922; assistant professor, 1922–1926; and associate professor, 1926–1928; professor of psychology, University of Arkansas, 1928–1930; professor and chairman of the department of psychology, University of Missouri, 1930–1935; research professor, Wesleyan University, 1935–1939, which position he left to come to the University of Iowa.

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RECENT DEATHS

SIR WILLIAM BRAGG, Fullerian professor of chemistry and director of the Royal Institution, London; director of the Davy-Faraday Research Laboratory; from 1935 to 1940 president of the Royal Society, died on March 13 in his eightieth year.

DR. ROBERT WILLIAM HEGNER, professor of protozoology and head of the department of medical zoology at the Johns Hopkins University, died on March 11 at the age of sixty-two years.

DR. KARL MCKAY WIEGAND, professor emeritus of botany, formerly head of the department at the New York State College of Agriculture at Cornell University, died on March 12 at the age of sixty-eight years.

DR. ROBERT WILSON SMITH, professor emeritus of biology, McMaster University, Hamilton, Ontario, died on February 22, in his eighty-second year.

SCIENTIFIC EVENTS

THE ROYAL OBSERVATORY AT THE CAPE OF GOOD HOPE[1]

THE report for 1940 of H.M. Astronomer at the Cape of Good Hope illustrates how astronomical work in the belligerent countries is being affected even though they may be far removed from the present scene of hostilities. Half the observing staff at the Cape is now engaged on non-astronomical duties, this at a time when so many observatories in Europe have perforce suspended work. Nevertheless, the depleted staff is doing its best to secure such observations as can not be replaced by any made at a later date. Meridian observations of the moon have been started in view of the possible loss of European observations, and volunteers have come to the rescue in observing occultations. Photographic work has been somewhat precarious owing to delays in the delivery of plates, but few photographs have been lost, and the position has been eased by a modification of the program of routine solar observations which supplements that still being carried on at Greenwich. Work on the Reversible Transit Circle continues on a somewhat reduced scale, and the photometric observations are now sufficiently far advanced to make possible the construction of a framework of stars of magnitudes between 7 and 10 to which the magnitudes of the zone stars can be referred. With the 1940 batch of parallaxes the observatory now enters the very restricted list of stations at which the distances of more than a thousand stars have been determined trigonometrically.

The section of the report which will be read with perhaps the greatest interest concerns the total solar eclipse of October 1, 1940. The main part of the program was to measure the gravitational deflection of light in the sun's field—the Einstein effect. The Greenwich expedition which was to have cooperated in this work was cancelled at the outbreak of war, and the entire program was carried through, as planned, by the Cape staff. It is disappointing to

[1] From *Nature*.