LAWRENCE COLLEGE dedicated the new library and laboratory of the Institute of Paper Chemistry on September 21, the eightieth anniversary of the matriculation at Lawrence of J. A. Kimberly, to whom the structure was dedicated. The building, which was erected at a cost of $100,000, was given by the late Mr. Kimberly's son. It constitutes the second unit of the institute. The first, which cost $250,000, was dedicated a little less than a year ago.

NEW YORK UNIVERSITY has purchased the buildings and equipment formerly used by Cornell University Medical College fronting Bellevue Hospital, with the prospect of developing in the future a large medical center in the Bellevue Hospital area. For the present the property will be utilized by University and Bellevue Hospital Medical College for laboratory and teaching space, but the undergraduate student body will not be enlarged. New York University now owns all the land necessary for its projected health center, including all the property between Twenty-Fifth and Twenty-Eighth Streets on both sides of First Avenue.

Museum News reports that a new botanical garden at the Hebrew University, Jerusalem, will be known as the Lamport Botanical Garden, the land on which it has been established having been given to the university by Solomon Lamport, of New York. The site of the new garden is the summit and part of the slopes of Mount Scopus. One section is to be left with its native vegetation untouched; other portions will be devoted chiefly to a collection of the floras of the Near East from Iraq to Sinai and into the deserts beyond the Jordan River.

UNDER a grant received by the Smithsonian Institution, a solar radiation observatory will be established on Mount St. Katherine on the Sinai Peninsula in Egypt. This mountain is 8,600 feet high, and the atmospheric conditions are reported to be very favorable.

IT is announced that the Rockefeller Foundation has made a gift to University College Hospital, London, of £48,800 "to constitute a fund for the permanent endowment of a post, the holder of which will devote his whole energies to the advancement of clinical research." The gift is made to encourage clinical research on lines which the Medical Research Council has been developing in conjunction with University College Hospital Medical School since 1916. The object is that there should be brought into existence a body of workers, free from ordinary hospital routine and teaching, who will devote their whole time to the investigation of special clinical problems.

THE Paris correspondent of the *Journal* of the American Medical Association reports that the new laboratory created at the Faculté de Pharmacie de Paris will be under the direction of Professor Perrot, member of the Academy of Medicine, and will be devoted to research on plant life. The laboratory has been equipped with the aid of a governmental appropriation, together with more than $24,000 contributed largely by the alumni of the Ecole de Pharmacie and the large manufacturers of pharmaceutic specialties and chemical products. The laboratory was opened by the minister of public instruction at ceremonies attended by the rector of the University of Paris, and by the present dean and former deans of the Faculté de Pharmacie.

DISCUSSION

BODY SIZE AND BODY PROPORTIONS IN RELATION TO GROWTH RATES AND NATURAL SELECTION

HALDANE[1] in his suggestive little book "The Causes of Evolution," discussing the action of natural selection, says:

"In the mouse a fair percentage, generally about a quarter, of the embryos die during pregnancy. There is not sufficient space or nourishment for them all, *i.e.*, they compete with one another. Hence, in animals producing many young at a birth, there will probably be selection in favour of rapid embryonic growth, and adult characters determined by genes causing rapid embryonic growth will spread through the species. We have here a cause of unfavourable adult characters."

[1] Harper and Bros., New York, 1932.

What Haldane had in mind as rapidity of embryonic growth was probably rapidity of differentiation rather than increase in absolute size, for he goes on to specify the development of man in contrast to that of other mammals as involving "a marked slowing down of the rate of development."

Yet his principle will apply with equal force to increase in size, irrespective of the rate of differentiation, and to postnatal as well as to prenatal competition.

Gregory and I[2] have recently shown that, in rabbits, increase in racial size is attended by (and presumably caused by) an increased rapidity of growth, both prenatal and postnatal, although the rate of differentiation and the initial size of the egg remain unchanged.

A mutation tending to increase the growth rate would, in such cases, tend to increase the size at birth

[2] *Jour. Exp. Zool.*, 59, 1931.

and at maturity. It would favor the most rapidly developing zygotes, not only in the embryonic period—where crowding might occur, as Haldane points out, but also during lactation, and even subsequently. I have sometimes tried to rear, with the aid of a common foster mother, rabbits born on the same day to large race and small race mothers, but usually without success, because the large race young are so much heavier and stronger that they push the small race young away from the nipples and monopolize the milk supply. But if the two sorts of young are put to separate foster mothers, both lots thrive. Similar considerations make it impracticable to pen large race and small race rabbits together, after they are weaned.

There can accordingly be no doubt that large body size is an advantage to the individual in competition with other individuals in early life. Whether it would remain such in adult life would depend upon numerous environmental agencies. It might turn out, under some conditions, to be a positive handicap, as when hunters kill only animals above a minimal size.

Students of paleontology record the observation that the earliest mammals were small, and that in various lines of descent the size of the individual has increased, and that the attainment of maximum size has usually preceded extinction. This has been true, not alone in the case of mammals but also in that of birds and reptiles. This has been regarded by some as evidence of an orthogenetic tendency quite apart from fitness. Haldane rightly emphasizes the point that the final stage may be positively disadvantageous and so lead to extinction, though it is only a consequence of a prenatal or juvenile contest, in which larger size assured victory.

Another supposed orthogenetic tendency, involving a change in proportions, has been shown repeatedly to be only an indirect consequence of change in absolute size. This fact is emphasized (though it was not first discovered) by Julian Huxley in his recent book on "The Principle of Relative Growth."[3] A rabbit (or any other mammal), as it grows, increases in *length* of body, tail, ears and legs, faster than it grows in *width* of the same parts. Thus its skull, leg bones, etc., become steadily more slender in their proportions, as the absolute dimensions increase. The same relation holds between the final or adult stages of races of different body size. The larger race has the more slender form. And we need not confine the comparison to races within a single species. Compare, for example, the huge jack rabbit with the little cottontail which lives on the same prairies. Or compare the long-headed modern horse with the small-bodied species which flourished in Eocene times.

[3] The Dial Press, New York, 1932.

A supposed orthogenetic tendency to change the proportions in a certain direction is probably, in reality, only a consequence of increased body size, which, in turn, may be a consequence not of orthogenesis but of the competition, within the same species, between embryos with slightly different developmental growth rates.

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THE TUBERCLE BACILLUS

IN a recent note in SCIENCE,[1] Professor Hastings and Dr. McCarter protest the use of the term "tubercle bacillus" as applied to an organism used in recent studies in this laboratory and in two American laboratories. At the same time they present a description of the species they consider will permit only the inclusion of the true bacillus of Koch. While the description is in many respects a conventional one, it appears unwise at the present time to exclude, by definition, organisms which many students of the group regard as tubercle bacilli and at the same time to make the limits so narrow as to deny the application of the dissociation phenomenon to the species. The description of the species suggested by Professor Hastings and Dr. McCarter appears to do both.

Several features of this definition of the species is out of line with recent work. Probably the authors intend it to be controversial. Exception may be taken particularly to the defined pathogenicity. It seems quite reasonable to "regard as tubercle bacilli only those which, when introduced into the body of a susceptible animal, such as the guinea pig produce tuberculous lesions inoculable in series." Professor Hastings and Dr. McCarter quote this from Calmette, and yet such a limitation will exclude from the species the important bacillus of Calmette and Guerin (BCG) since, in its most characteristic form, it can not be regarded as inoculable in series. For the same reason this portion of the definition will exclude R forms of tubercle bacilli from the species, notwithstanding the fact that such experienced workers as Petroff, Medlar, Kahn in America, Begbie in Britain, Uhlenhuth, Seiffert in Germany advance many evidences of the origin of such forms as variants of the more characteristic types.

This definition excludes another important variant of the tubercle bacillus when it states that growth occurs "only on the surface of liquid media and the inoculum must be floated on the surface." Dreyer and Vollum[2] have recently shown that variants, in

[1] E. G. Hastings and J. McCarter, SCIENCE, n. s., 75: 512, 1923.

[2] G. Dreyer and R. L. Vollum, *Lancet*, I, 9, 1931.