relation. As a consequence, observation on this system can be carried over to man at the equivalent ages. This removes an objection which is often made to studies on animals, namely, that the results can not be directly applied to the human case, since for the rat the contrary is true.

The best food for the rat is that used by well-nourished men. It has no dietary idiosyncrasies, thus differing from other laboratory mammals and furnishing the investigator with a test animal whose nutritional chemistry is similar to that of man.

Sugita showed that the number of cells in the cerebral cortex is a species character and made it highly probable that the difference between large and small brains in a given species is normally due to the fact that the constituent neurons vary in size rather than in number. The Kochs followed the chemical differentiation of the brain from birth to maturity—a record which still remains unique and has yet to be fully utilized. By partial inanition the growth of the brain can be diminished and the proportional weight of its divisions changed. Dr. King has shown that the rat thrives when most closely inbred even for fifty generations.

Critical periods in growth at puberty and before have been noted by Hatai and by Hammett. Finally, in the course of this work, the significance of temperament in the rat has been revealed. Rats stop growing when their familiar caretaker is absent; the isolated intestinal segment is untrustworthy as an indicator, unless the rat was at ease before being killed and was quietly anesthetized. When the thyroid apparatus is removed from rats which still show defense reactions, the mortality is 79 per cent., but when they have been made gentle and fearless through personal care before the operation, it drops to 13 per cent., as shown by Hammett's records. What appears here in the case of the rat is undoubtedly true for other laboratory animals as well, so that these observations have a general application. In this sketch of our research, I have limited myself to those results which appear to have the most general bearing at the moment, though it must be remembered that results not included here may, almost any day, reveal an equal value.

I have been speaking as though research was a pursuit which could be followed for the wishing, but such is hardly the case. Funds, facilities, and endless time-saving devices must be gathered, contrived and kept going. Some one must bear this burden, and if we have succeeded, in a measure, in carrying out our research program, it has been largely accomplished through the constant cooperation of the director of the institute—Dr. Greenman—a natural investigator temporarily engaged in administering a scientific institution. To him much is due.

The report that has just been made is a "report of progress," but the committee does not "ask to be discharged," for the future is most enticing. In response to the initial impulse, which came from the study of Laura Bridgman's brain, the foundation course of our pyramid has been in a large measure laid down. We have some notion of the gross structural composition of the rat and growth records for many of the organs. The way is open now to a more extended examination of the growth of the nervous system against this background. In one direction this means histology; in another, physiology, represented by studies of the relations of the several ductless glands to this growth process—studies like that already made on the thyroid and parathyroid—and then a study of combined deficiencies, all of these directed to the same end: a determination of the modifications in the growth of the nerve tissues which may follow. Not only is the histology of the nervous system during growth waiting for further study, but also that of the more important organs, for, with their change in weight, structural modifications must occur, and thus a series of alterations is taking place which can be followed both by histology and chemistry. So much at least is in the near foreground. We can only hope, as we do with full assurance, that the research at the institute will progress in the future under as favorable conditions as those which have surrounded it during the nineteen years just elapsed.

HENRY H. DONALDSON

THE WISTAR INSTITUTE
OF ANATOMY

SCIENTIFIC EVENTS

THE REPORT OF THE LONDON ZOOLOGICAL SOCIETY

FELLOWS of the Zoological Society, London, received, on April 14, the report of the council and auditors for the year 1924, issued in anticipation of the annual general meeting held on April 29. According to an abstract in the London *Times* it showed success in every direction. The gate-money was £69,219 for the gardens and £23,059 for the aquarium; the total number of visitors was 2,057,146, and the income from fellows' subscriptions was over £15,000, all these figures being "records" in the history of the society. The council attributes these results partly to Wembley, which brought an increased number of visitors from the provinces and from abroad, but also partly to the general improvement in the gardens and the collection and to the new aquarium. If the Zoological Gardens

were a commercial undertaking it would be in a position to declare a good dividend, although it has to pay many thousands of pounds in rent, rates and taxes. But it is debarred by tradition and by its charter from distributing "profits" and devotes any surplus to improvements in the gardens and the collection and to further scientific work.

The report states that out of the surplus from 1924, after discharging the remaining capital expenditure on the aquarium, a scheme of improvements which will occupy several years has been begun. The first stage was the construction of a large out-door enclosure for hardy monkeys, consisting of rockwork with caves, separated from the public by a deep ditch, on the principle adopted in the Mappin Terraces. Adjoining this there is a small experimental house, in which more delicate monkeys will be given constant access to fresh air, radiant heat and ultra-violet rays from quartz electric globes. It is expected that these installations, which are placed on the ground to the west of the Mappin Terraces, will be complete and in occupation before Whitsuntide.

The next stage is the construction of a new reptile house on the site now occupied by the old ape house and the summer aviaries. This building must be elaborate and costly, but it is hoped that when completed it will be as beautiful and efficient as the aquarium and much in advance of any arrangements for housing reptiles that have yet been constructed. When the reptile house has been completed the present reptile house will be completely transformed to make it suitable for small birds, and extensive open-air aviaries will be attached to it. The final stage of the present scheme will be the construction of a large new monkey house on the site of the present monkey house and small birds' house. It will provide for all the apes and monkeys in the collection, except those sufficiently hardy to live on the monkey hill. In designing it the devices found successful in the experimental house will be adopted.

The report contains a list of the chief kinds of food and the quantities used in feeding the animals. In 1924 the walrus alone consumed 4 tons 15 cwt. of cod. The carnivores used 440 horses, weighing approximately 220 tons. Over 35 tons of herrings and whiting, 1,590 pints of shrimps, 343 gallons of fresh milk and over 14,000 tins of condensed milk, 128 lbs. of honey, 258 lbs. of ants' "eggs," 77 lbs. of mealworms, 150 bunches of onions, 108 heads of celery, 1 ton 17 cwt. of grapes and 213,085 bananas are items which show the variety of the feeding substances required. The total cost of food for the year was £11,637, fuel cost £2,014 and water £1,291.

RIVER SURVEY OF THE UNITED STATES

IT is stated in the *Electrical World* that to comply with the provisions of the new river and harbor act the corps of engineers and the Federal Trade Commission are gathering data as to the cost of a comprehensive survey of the rivers of the country and information which is expected to establish the need for such a study.

There was reason to believe the survey itself would be authorized in this act, but differences of opinion among those most interested in obtaining the legislation prevented that action. The law does provide, however, for a report setting forth the needs for and the expense of such a study. It is known definitely that a very strong report favoring these surveys can be written. While the need has been apparent for a generation, no exhaustive argument supporting such an endeavor ever has been prepared.

General Harry Taylor, chief of engineers, states that his first step in carrying out the mandate of congress will be to call for a report from each of his district officers which will cover the needs of that particular section. This preliminary report will set forth the data obtainable in the files of each office. When these reports have been examined such additional information as may be needed then will be called for.

The Federal Power Commission will confine its work to material which will bring out clearly the need for a nation-wide survey of rivers and streams. Because of lack of engineering data the Power Commission now is compelled to give rights for fifty years without knowing whether or not the proposed power development will fit into the maximum utilization of the stream's resources or the best plan to aid flood control and navigation.

It is not the object of these proposed surveys to go into such detail or to make so careful an economic study as now is in progress on the Tennessee River. That survey alone will cost in excess of $500,000. The idea now proposed is to get an accurate picture of the whole river, the detail to be worked out later as actual development is undertaken.

Congress already has specified its intention to use license fees and rental receipts for these studies. A simple enabling paragraph is all that is needed to make available $250,000 annually for this work. The report which now is being prepared is expected to be so convincing that little further delay will result in securing the necessary legislation.

A COURT OF CHEMICAL ACHIEVEMENT

ACCORDING to an article in *Engineering Chemistry*, chemical products, equipment and processes, in fact, all new developments of American chemistry of the