

ing whether it is the intention of the committee that the results of researches obtained by the expenditure of national funds should be kept secret, as most scientific men would regard this as short-sighted.

The second ground is that, where results are to be patented, delay in publication is in the interest of the investigator. This is scarcely relevant. It is surely in the highest degree dangerous to delay applying for a provisional patent until the results have been communicated to the committee and its consent obtained, for any person who, by lawful or unlawful means, gets the information is then in a position to prevent the real discoverer from protecting himself.

The third ground is that it is the object of the department to secure to the discoverer a fair share in any profits that may accrue from his discovery. Admittedly, the class of inventors and discoverers is in very great need of being protected from the sharp practises that have sprung up under the shadow of the patent law, and primarily from the government itself. But why should a small part of them, who receive government funds, be singled out and protected? If the discoverer prefers to secure for himself the legal ownership of his discoveries, rather than from the committee, I do not think he should be debarred from participating in this money. The most, I think, the committee has a right to stipulate is that its interest is limited to the amount it has contributed, and that, in the event of a dispute, the matter shall be referred to an impartial arbitrator for settlement.—Frederick Soddy in *Nature*.

SCIENTIFIC BOOKS

Zoologica. Scientific Contributions of the New York Zoological Society. Volume I., 1907-1915, 436 pp. 8vo, with 138 illustrations. Published by the Society, The Zoological Park, New York.

In 1906, after the New York Zoological Society had advanced its two primary objects, namely, the establishment of a great zoological park and aquarium, it entered more seriously upon its third chief object—the pro-

motion of zoology through exploration, research and publication. Two volumes have already been published, namely "Tropical Wild Life," studies from the Tropical Station of British Guiana, and "A Monograph of the Pheasants," Volume I., by C. William Beebe. The present volume is the third to be issued; it contains twenty bulletin papers which have been published by the society beginning in 1907, and here brought together in permanent form.

The members of the scientific staff of the park and of the aquarium did not enter the well-trodden field of the lifeless cabinet or museum animal, nor of the older systematic or descriptive zoology, nor even of the newer field of experimental zoology and Mendelism; they sought the inspiring field which has been relatively little entered in this country or abroad, namely, observation of the normal living bird and the living mammal, wherever possible in its own living environment, not from the standpoint of the older naturalists or systematists, but from the standpoint of the newer problems raised in modern biology. This is a path partly pursued by certain of the older naturalists and travelers, and especially by such wonderful observers as Darwin, Wallace and Bates, which has been abandoned for a time through the lure of artificial experiment and of the breeding pen, but which may now be followed with the new ardor of a larger knowledge of the problems and of a deeper insight into the search for natural causes. These causes are sought either in the experiments which nature herself is constantly trying, or in a close imitation of the actual experiments of nature, as in Beebe's studies of the causes governing the changes of plumage and of color in the scarlet tanager (*Piranga*) and the Inca dove (*Scardafella*).

The work of Beebe, contained in the opening article of the volume, entitled "Geographic Variation in Birds," describes his initial experiments and observations, which are continued in a later paper, "Postponed Molt in Passerine Birds." In brief it is the normal and natural phenomena which are being investigated. In midsummer he placed several

scarlet tanagers and bobolinks under careful observation. Little by little the supply of light was cut off and the amount of food was increased. In about a month, when the time for the normal autumn moult arrived, the tanagers and bobolinks were living the "simple life" in a dim illumination, and, although consuming a fair amount of food, were exercising but little. As the winter gradually passed, it was evident that the birds had skipped the autumn moult entirely and appeared to suffer no inconvenience as a result. In the following spring individual tanagers and bobolinks were gradually brought under normal conditions and into their seasonal activities, with quick result. The birds moulted into the colors appropriate to the season; there was no exception; the moult was from nuptial to nuptial, not from nuptial to winter plumage; the dull colors of the winter season had been completely suppressed. Of an entirely different character is Beebe's second paper, "A Contribution to the Ecology of the Adult Hoatzin," a bird which presents a most remarkable survival both of habit and structure in the presence of claws on its wing phalanges and in its tree-climbing habits.

Interspersed with the biological papers are some which are partly biological and partly systematic, such as Beebe's third paper, "An Ornithological Reconnaissance of Northeastern Venezuela." It was learned in the zoological researches of Venezuela and in the more recent work in British Guiana, at the Tropical Research Station, that a systematic survey of the zoology and botany of any region is absolutely essential for broad and intensive biological and experimental work. Thus there also appear in this volume the first series of systematic papers on the "Insects of British Guiana," by Kellogg, Caudell and Dyar; also "Notes on Costa Rican Birds," by Crandall. These will be followed in Volume II. of *Zoologica* by very complete check-lists of the birds and mammals of British Guiana, to which the Zoological Society observers have made very extensive additions.

Of more general zoological character of the older kind are Townsend's observations on the

"Northern Elephant Seal," describing his discovery of a previously unknown herd on Guadalupe, an uninhabited island lying in the Pacific Ocean 140 miles off the northern part of the peninsula of Lower California. There is also a series of morphological papers, such as those of Beebe, on the "Supernumerary Toes in Hawks," and of Gudger, on "The Whale Shark." One pathological paper has found its way into this volume, namely, that of W. Reid Blair, entitled, "Common Affections among Primates." Other papers of this character, however, will be placed in the special pathological series to be issued by the Zoological Society. It is not intended to continue in these volumes of *Zoologica* such papers as MacCallum's "Ectoparasitic Trematodes," not because they are not of interest and value, but because they belong more properly with other series of researches.

Quite germane to this volume, however, are Ditmar's observations on the "Feeding Habits of Serpents," and Beebe's careful studies on the "Racket Formation in Tail-Feathers of the Motmots," which describe the rare phenomenon of the apparent voluntary mutilation of plumage of birds with its well known bearing on Lamarckism. We have known absolutely nothing of the actual cause of this phenomenon; either how it arose, why it is so persistent, or what good is accomplished. For some reason totally unknown to us a certain portion of the central rectrices of these birds exhibits congenitally a decided degeneration of the barbs and barbules; the motmot, in the course of the preening to which it subjects all of its rectrices, breaks off the enfeebled barbs in the area most affected by this degeneration, and thus brings about the remarkable, symmetrically formed rackets. Thus an apparently purposive act is explained as being due to the weakness or hereditary degeneration in a certain portion of the tail.

The Zoological Society thus puts forth its first volume of collected contributions by younger men who have been trained chiefly within its staff and by its expeditions on land and sea, in the hope of striking the new and inspiring note which normal life always gives.

Since the materials for this first volume were collected, the same authors have found especially in the wild life of South America and of Asia materials for these and for more profound and exhaustive studies which from time to time will be published in succeeding volumes of *Zoologica*.

The present work contains 436 pages and 138 illustrations. These collected papers are handsomely bound, for free distribution to certain of the libraries which exchange with the library of the Zoological Park, and for sale to other institutions. The volumes appear under the editorship of Henry Fairfield Osborn, president of the society, with the assistance of Elwin R. Sanborn, and may be purchased by application to the secretary of the Zoological Society, New York Zoological Park.

HENRY FAIRFIELD OSBORN

May 29, 1919

SPECIAL ARTICLES

THE REASON MEAT INCREASES OXIDATION IN THE BODY MORE THAN FAT OR SUGAR

LAVOISIER¹ showed that the ingestion of food increased oxidation in the body. Rubner² found that of the food materials, the ingestion of meat increased oxidation most, fat next and sugar least. Several theories have been advanced in attempts to explain how food increases oxidation in the body. The one most generally accepted seems to be the theory, or some modification of the theory, of Voit, who claimed that the presence of increased quantities of food materials augmented the inherent power of the cells to metabolize. We³ found that the ingestion of food produced an increase in catalase, an enzyme possessing the property of liberating oxygen from hydrogen peroxide, by stimulating the alimentary glands, particularly the liver, to an increased output of this enzyme, and that the ingestion of meat, in keeping with its greater stimula-

ting effect on heat production, increased catalase more than fat or sugar. It was found that the amino acids, the essential constituents of meat or protein, were responsible for the stimulating effect of the proteins, the simple sugars for the stimulating effect of the starchy foods and the neutral fats for the stimulating effect of the fats. We found, also, that by whatever means oxidation was increased in the body, there resulted a corresponding increase in catalase. Hence, the conclusion was drawn that the increase in oxidation following the ingestion of food, as well as the increase in oxidation produced in other ways, was due to an increase in catalase.

TABLE I

Material Used	Protein Constituents			Fat Constituents			Sugar
	Glycocoll	Sodium Acetate	Acetamid	Olein	Glycerine	Potassium Oleate	
Percentage increase in catalase	56	36	48	40	43	31	24

The object of the present investigation was to determine why the amino acids, the essential constituents of protein, stimulate the alimentary glands, particularly the liver, to a greater increase in catalase, with resulting greater increase in oxidation, than does fat, and why fat produces a greater increase than sugar. The animals used were dogs. The amino acid, glycocoll, and two related compounds, acetamid and sodium acetate; the fat, olein and its constituents, glycerine and oleic acid; and the sugar, dextrose, were the materials used. Ten grams of the sugar and of the amino acid and five grams of the fat, per kilo of body weight, were used.

After etherizing the animals, an incision in the abdominal wall was made and the material to be used was introduced in about equal quantities, into the stomach and upper part of the small intestine, by means of a hypodermic syringe. The catalase in 0.5 c.c. of blood taken from the liver was determined before as well as at intervals after the introduction

¹ Lavoisier, *Mem. de l'Acad. des Sc.*, 1780.

² Rubner, "Energiegesetze," 322.

³ Burge and Neill, *The American Journal of Physiology*, Vol. 46, No. 2, May, 1918.