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Biology and the Fur Trade.

DURING the last quarter of a century there has been an enormous increase in the demand for furs. In the United States alone, according to Mr. David C. Mills, the general director of the National Association of the Fur Industry, "the annual catch of fur bearers in the United States was roughly estimated at about twenty-five millions of dollars twenty-five years ago. We estimate it roughly at sixty millions to-day, with quantities fairly well maintained, on the whole, because of the impetus given to trapping by the higher returns to the trapper." But this impetus means more intensive slaughter. How great the slaughter is may be gathered from the lists of skins exposed for sale at the fur auctions during the winter of 1925. The total number of skins (excluding Chinese and Australian) greatly exceeded four and a half millions, and a few of the larger items included: skunk 652,293, American opossum 456,195, musquash 787,195, squirrel 837,097, mole 357,599.

Such destruction of fur-bearers could have but one result; it has involved the usurpation of the annual increase of the animals, and beyond that a trenching upon the capital stock itself to a serious degree. That the destruction has already gone too far in many areas is admitted on all hands. The officials in charge of the Fur Resources Division of the U.S. Bureau of the Biological Survey, from a detached point of view, state (September 1924) that "the fur trader of the past was interested chiefly in the quantity of pelts he could collect . . . and when the dressing of furs became well established as an industry in the United States, the fur trade began to appreciate the fact that some of the more valuable fur animals had almost disappeared from our forests and streams, and that the production of a large part of the most important fine furs was confined to the Canadian Provinces. While the musk rat, the skunk, and, in places, a few other species are left in considerable numbers, the remnants of this once rich heritage in this country are fast dwindling under present-day conditions." The director of the fur industry association, viewing the matter from a business point of view, is equally emphatic (April 1925): "certain species in some districts have been thoroughly trapped out or at least reduced to a point at which they are commercially unimportant. Broadly speaking, the future of the commercial supply of some of the fur-bearing species in all districts is problematical."

Efforts have been made to check the excessive destruction by means of legislation; but legislation labours under special difficulties in these North American territories. Each State frames its own State laws, with the result that there is often a lack of

co-ordination in adjacent regions, expressed in differences in the species of animals protected, in varying methods of protection, and, even when method and species agree, in serious variations in the period covered by the close season, when the protected creature is supposed to be safe from interference.

It is here that biology has a lesson to teach. Knowledge of the life-histories of fur animals and of the biological zones where conditions of livelihood are more or less uniform, should be able to bring order out of the chaos of legislation. It is to biology that both the fur-traders and the officials interested in animal resources look for rescue from the slough into which the fur industry is sinking of its own weight. It is impossible, and only a narrow outlook could regard it as desirable, to put a stop to those interferences with natural breeding grounds—the felling of woods, the draining of marshes, the tilling of the prairie—which are the accompaniments of agricultural progress and of the march of civilisation. The most that biology can do is to suggest how the stock of fur animals can best be conserved, and at the same time yield a full harvest, in these areas where food, shelter, and suitable haunts still exist.

In the first place it is found that trapping of animals is often carried on after the breeding season has set in. This obviously is biologically unsound; for the death of a breeding animal means the loss not only of an individual, but of a prospective adult progeny. Furthermore, it is uneconomic, since the breeding season marks a period when the pelt deteriorates in quality, to the loss of the trapper and the trader. Everywhere the onset of breeding time should mark the commencement of the “close season,” and the open season should not commence until the breeding season has ended.

Here another biological consideration comes into force, further to curtail the open season. At the close of the breeding period the pelts are in poor condition, and the fact that many poor pelts reach the market is a clear indication that in places the trapping season is too long. The casting of the old fur and its replacement by a fresh coat is a routine process influenced by specific idiosyncrasy and by climate, but for most animals the time for prime pelt is limited to a comparatively short period in the autumn. Let this, then, be the trapping season, and the markets would gain by a raising of the standard of quality, and the trapper would be better repaid for his labours during a shorter but more intense trapping season.

Lastly, variations in State-to-State laws should be regulated, first by the amount of the stock, upon the annual increase of which the trapper may safely trench without endangering the capital, and, secondly, by the climatic factors which regulate the routine of the

life-history. Broadly speaking, a maximum open season would exist uniformly among adjacent States ranged along a climatic, or more strictly a climatobiological, zone, the uniformity being broken here and there by shorter close seasons where the natural stock was at a low ebb.

Such are the biological considerations which the officials of the United States Department of Agriculture are endeavouring to work into the legislation of the States. It is matter for thought that while other countries are approaching this high pitch of perfection in the protection of their native animals, Britain has not yet taken even a first legislative step to protect the waning remnant of its land mammals.

JAMES RITCHIE.

The Chemistry of the Sugars.

- (1) *The simple Carbohydrates and the Glucosides*. By Dr. E. Frankland Armstrong. (Monographs on Biochemistry.) Fourth edition. Pp. xi + 293. (London: Longmans, Green and Co., 1924.) 16s. net.
- (2) *Zuckerchemie*. Von Prof. Dr. Hans Pringsheim. Unter Mitwirkung von Dr. Jesaja Leibowitz. Pp. xii + 322. (Leipzig: Akademische Verlagsgesellschaft m.b.H., 1925.) 18 gold marks.

THERE is at the present time no up-to-date treatise on carbohydrate chemistry. The last edition of Tollens's “Kurzes Handbuch” was published in 1914, the third edition of von Lippmann's “Chemie der Zuckerarten,” in two volumes, appeared in 1904, and Maquenne's “Les Sucres” in 1900. Neither of the books before us can claim to be a treatise on the subject, yet they both form useful additions to the literature.

(1) Armstrong's monograph has gone through four editions in fourteen years, a fact which is in itself a testimonial. Besides having been thoroughly revised and the subject matter to a great extent rearranged, the present edition has been enlarged by the addition to the text of some fifty pages, including two new chapters. The author acknowledges his indebtedness to Principal (now Sir James) Irvine and to Dr. T. P. Hilditch for giving him many valuable suggestions, as well as to Mr. Rex Furness for assistance in the compilation of the enlarged bibliography.

The opening chapter on glucose outlines the general character of this typical sugar and its derivatives, whilst other chapters are devoted to the chemical properties of the hexoses and pentoses as a class and to the carbohydrate alcohols. Stereoisomerism is most ably dealt with, and here the author refers to his own work and to that of Lowry and of Hudson. The disaccharides, the saccharides, and the one known tetra-