while, the first need is for greater efficiency in the commercial production of dyes in actual demand, and the second for the conservation of resources during an abnormal period. That is work for which men of business training are of greater value than men of scientific attainment, and the moment would not appear opportune for any change in the constitution of the board of directors.—*The London Times.*

SCIENTIFIC BOOKS

The Laws of Life: Principles of Evolution, Heredity and Eugenics. By WILLIAM M. GOLDSMITH, A. M., Ph.D. Boston, The Gorham Press, p. 441.

A LARGE, well-written and useful volume dealing particularly and most successfully with the problems of heredity in man and the conclusions based on our solutions of these problems.

Very many topics are treated by the author, in general sanely and accurately, with a wealth of illustrations and apt quotation. Much of this material ought to be part of the common knowledge of educated men and women, though at present this is far from the case. The main elements of eugenics especially should become as much a part of everyday knowledge as the causes of the succession of seasons—or even the multiplication table.

In the discussion of evolution, Dr. Goldsmith gives scant recognition to the theories and discoveries of Darwin. The conception of the formation of species largely, by abrupt mutation and Mendelian hybridizing, is not borne out in nature, and in nature our species exist. A species of animal or plant is a definable type of organism which has run the gauntlet of the ages and has *endured.* The extrinsic facts and factors of evolution should not be ignored or minimized. We know nothing of evolution *in vacuo,* and the even flow of life is modified, obstructed or split by conditions of environment. Separation and selection are elements in the formation of every species, the one preserving adaptations, the other permitting, by new conditions of selection, the persistence of variations.

In spite of the researches of mechanistic experimenters, our author does not believe that all phenomena of life can be summed up in terms of chemistry or physics. It may be that he takes too much pains to reconcile religious conceptions with the facts of nature. Science deals with truth so far as we can understand it, and it is one of its basal principles that we can never know the answer to any question until we find it out.

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SPECIAL ARTICLES

THE REST PERIOD OF SOLANUM TUBEROSUM IN RELATION TO AVAILABLE NITROGEN

EXPERIMENTAL evidence has been secured that the slow growth of potatoes planted during their rest period may be due in part to the deficiency of available nitrogen in the tubers.

On September 28, 1922, seed pieces, 25 grams in weight, from tubers in the resting condition were planted in pure silica sand. One half of the cultures were treated with a complete nutrient solution containing equal molal (.007 mol.) proportions of the following salts, KNO_3, $MgHPO_4$ and $CaSO_4$. The other half were treated with a solution of the same total molal concentration, but which was altered so as not to contain nitrates, the KNO_3 being replaced by KH_2PO_4. Six weeks later tubers which had passed through their rest period were planted in the same kind of medium. These cultures were treated like those above, *i.e.,* half received a complete nutrient solution and the other half a solution containing no nitrate. The cultures of both series, resting and non-resting tubers, that received a complete nutrient solution appeared above ground during the first week in December. The cultures from resting tubers that did not receive nitrate appeared above ground a week later than the cultures of the same series that received nitrate. An examination before the appearance of the first sprouts showed, however, that the time of sprouting was approximately the same in both cases. All the cultures of this series produced single sprouts. The outstanding feature of this series, however, was the rapid development of the sprouts in the cultures that received nitrate as compared with those that received no nitrate. At the end of several weeks the difference was still more striking, the cultures that received nitrate were large and healthy plants, while those that received no nitrate were barely above ground. The cultures of the second series, non-resting tubers, differed from the above in that four to six sprouts developed instead of one. There was no significant difference in the dates the sprouts appeared above ground due to the presence or absence of nitrate, and, furthermore, the plants grew equally well during their early growth phase whether or not they received nitrate.

It is evident that on germination the physiological condition of tubers planted during the rest period is not the same as in normal non-resting tubers. The results obtained suggest that the breaking of the rest period in potatoes may depend at least in part on the

presence of a readily soluble nitrogen supply. In the first series (resting tubers), this has been supplied in the form of nitrates. In the second series (non-resting tubers) this has been supplied by the tuber itself. This presumably may take place by the hydrolysis of the proteins by enzymes in the tuber. The presence of a proteolytic enzyme in expressed juice of potato tubers has been demonstrated by the writer, using centrifuged milk as a substrate. A survey of the literature available shows no record of the existence of proteolytic enzymes in the potato, although the assumption is general that they are present.

The effect of available nitrates upon potatoes planted while still in their rest period furnishes an explanation of the results obtained by Gericke,[1] who found that potato plants grown from resting tubers had a longer growing period than plants from non-resting tubers. The slow growth due to the possible inability of the young plants to obtain a sufficient supply of nitrogen during their early stages of growth would tend to lengthen their growing period.

Appleman's[2] conclusion is opposed to the above view. He found no significant evidence of the hydrolysis of the proteins during the rest period of potatoes. The experiments under way by the author to determine the relative proteolytic activity of potato tissue at various stages of the rest period and its effect upon the condition of the nitrogen compounds of the tuber, and the effect of the various treatments known to break the rest period, may furnish the required evidence. It is of interest to note that as early as 1890 Johannsen[3] found that ether treatment shortened the length of the rest period in bulbs and that the treatment seemed to increase the amount of amid nitrogen, although no other important chemical change appeared to occur. The experimental data on the above will be published at a later date.

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THE CANADIAN BRANCH OF THE AMERICAN PHYTOPATHOLOGICAL SOCIETY

THE fourth annual meeting of the Canadian Branch of the American Phytopathological Society was held in the biological laboratories and classrooms at MacDonald College, St. Anne de Bellevue, P. Q., December 7 and 8, 1922, in conjunction with the Quebec Society for the Protection of Plants. The address of welcome was given by Principal F. C. Harrison, and addresses were delivered by Professor William Lockhead, president of the Quebec Society for the Protection of Plants, and by G. E. McIntosh, Dominion Fruit Commissioner.

The following papers were read and discussed:

La campagne contre les sauterelles dans Quebec in 1922: G. MAHEUX.

Plant diseases of western Quebec in 1922: B. T. DICKSON.

The natural control of the green apple bug by a new species of Empusa: A. G. DUSTAN.

Control of the onion maggot in 1922: W. J. TAWSE.

The Dominion entomological service: A. GIBSON.

Disinfection et parcelles: O. CARON.

The pollination of certain vegetable plants by insects: R. C. TREHERNE.

Wood v. fungi (demonstration slides): R. J. BLAIR and J. D. HALE.

The past and future of plant pathology: MELVILLE T. COOK.

Report of the plant disease survey: F. L. DRAYTON.

Cultural characteristics of certain root-rot fusaria: T. G. MAJOR.

The present status of the white pine blister rust in Canada: A. W. MCCALLUM.

Red branch of conifers: J. H. FAULL.

Two plant diseases new to Ontario: J. E. HOWITT.

Control of oat smut: B. T. DICKSON, R. SUMMERBY and J. G. COULSON.

Five years' experiments in the control of oat smut: J. E. HOWITT and R. E. STONE.

Control of raspberry mosaic: J. F. HOCKEY.

Balsam rusts: H. P. BELL and J. H. FAULL.

Peony diseases: J. G. COULSON.

Root-rot and wilt of canning peas: R. E. STONE.

Distribution of ribes and cronartium ribicola in Ontario: G. H. DUFF.

Soft rot of iris: J. K. RICHARDSON.

Blue-stem of the black raspberry: J. F. HOCKEY.

Plant pathology in public schools: W. A. MCCUBBIN.

Smut control experiments with copper carbonate dust and other substances: P. M. SIMMONDS and W. P. FRASER.

Treatment of wounds in tree surgery: R. E. COSSETTE.

The bronze birch borer: C. B. HUTCHINGS.

Preservative treatment of farm timbers: J. H. CODERRE.

A contribution to our knowledge of the tree-destroying fungi of the Vancouver forestry district: N. L. CUTLER.

Abstracts of the papers dealing with plant diseases have appeared in a recent issue of *Phytopathology*. The address by Dr. M. T. Cook has appeared in full in the *Journal* of the Quebec Society for the Protection of Plants.

R. E. STONE,
Secretary-Treasurer

[1] Gericke, W. F., "Effects of rest and no rest upon growth in solanum," *Bot. Gaz.*, Vol. LXV, No. 4, April, 1918.

[2] Appleman, C. O., "Study of the rest period in potato tubers," Bulletin No. 183, Md. Exp. Sta., May, 1914.

[3] Johannsen, W., "Das Atherverfahren beim Fruhtreiben," 2 Auflage Jena, 1906.