

Winds are more moderate away from the coast, but exposure to drought and frost may be greater, since much of the interior country is denuded and fire-swept. Efforts to drain the Everglades undoubtedly have increased the fires and the local frost hazards in recent years, though the danger of further denudation is being recognized, and facilities of irrigation and fire control may be established to protect and develop the tropical region.

Many of the tropical crop plants have the ecological status of hylophytes, that is, they are specially adapted to forest undergrowth conditions where the sun and wind do not reach the soil surface, which explains why so many tropical seeds, like coffee and cacao, are viable only in the fresh state and do not withstand drying. Also the hylophytes may be considered as shade-tolerant plants, contrasting with *agrophytes* as plants of open country, requiring full exposure to the sunlight. For the forest undergrowth vegetation the protected cultures undoubtedly provide more normal conditions than the open cultures that are customary in temperate climates, as well as affording more shelter from frost.

Cacao is more delicate than coffee and more likely to suffer from local frosts, though in some respects easier to grow, the seeds germinating in a few days while coffee takes several weeks. Plantings in different districts are desirable, so that local supplies of seed may be at hand to facilitate tests and replacements. Cacao, like the Hevea rubber tree, tolerates wet lands and periods of flooding. Farmers who begin by raising a few trees and find pleasure in preparing their own product and supplying their own households have the best prospects of utilizing new crops. New methods and systems of tropical farming may be worked out in Florida, very different from the contract-labor plantations of the East Indies and with greater promise of human satisfactions.

Coffee competes with rubber as our most valuable agricultural import, though having only a beverage use, while chocolate is a rich food. Extensive cultures of coffee and cacao in several tropical countries have been destroyed by pests and diseases, and continued absence of these in Florida may stimulate interest in local experiments. A fungous disorder of cacao in Ecuador, Venezuela and Guiana is responsible for the recent shifting of the centers of production to Brazil and West Africa, thus repeating the history of previous transfers, first from southern Mexico and Guatemala to Nicaragua, Costa Rica and the West Indies, and later to the South American countries.

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## THE SIMILARITY BETWEEN THE MECHANISM OF THE RENNIN AND PECTASE (PECTIN-METHOXYLASE) REACTIONS

ATTENTION has been called recently in these pages<sup>1</sup> to the fact established by Hammersten<sup>2</sup> in 1875 that the coagulation of milk by rennin occurs in two distinct reactions, *viz.*, enzyme action and the subsequent formation of the coagulum. It is our purpose to note the striking similarity between the mechanism of this reaction and the gel formation from pectin by pectase. In both cases the enzyme causes a slight degradation of the molecule, which also is the first step in the enzymic decomposition of the substrates. In the absence of calcium (Sr, Ba, etc.) no visual evidence of the enzyme action occurs. In the presence of or upon the addition of calcium, however, the paracasein in milk and pectic acid produced from pectin both form insoluble salts; and a coagulum or gel appears.

One of us recently made a detailed separate study<sup>3</sup> of the two reactions involved in the gel formation by pectase, *i.e.*, the enzymic de-methoxylation and the formation of the gel. The two reactions have different pH optima, that of the gel formation depending greatly on the experimental conditions.

The changes in the relative velocity of the two reactions cause the appearance of the pH optimum for the diphasic visible change at a varying pH value. It will be of great interest to see whether similar conditions exist in the case of the rennin reaction.

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## IODINE IN GOITER TREATMENT

DR. MCCAY, in his interesting article<sup>1</sup> on the work of Boussingault, closes with the proposition, "One can only speculate concerning the human suffering that might have been evaded if some eminent physician had noted this contribution of the French chemist at an early date."

The following quotation from a treatise a century old serves to quiet any speculation on this question.

It may not be amiss to observe here that the author of the present volume first employed the hydriodate of potash, as a remedy for goitre, in the year 1816, after having previously ascertained, by experiments upon himself, that it was not poisonous in small doses as had been represented. Some time before the period stated, this

<sup>1</sup> A. G. Smith and H. C. Bradley, *SCIENCE*, 82: 467, 1935.

<sup>2</sup> See a review of this problem in "Fundamentals of Dairy Science," A. C. S., Monograph series, 1935.

<sup>3</sup> Z. I. Kertesz, in "Ergebnisse der Enzymforschung," Vol. 5, in press.

<sup>4</sup> *SCIENCE*, 82: 350, 1935.

substance had been found in certain marine productions; and it struck the author that burnt sponge (a well-known remedy for goitre) might owe its properties to the presence of Iodine, and this was his motive for making the trial. He lost sight of the case in which the remedy was employed, before any visible alteration was made in the state of disease; but not before some of the most striking effects of the remedy were observed. The above employment of the compounds of Iodine in medicine was at the time made no secret; and so early as 1819, the remedy was adopted in St. Thomas's Hospital, by Dr. Elliotson, at the author's suggestion.

The above quotation is taken from "Chemistry, Meteorology and the Function of Digestion," by William Prout, M.D., F.R.S. The book ran through three editions, the first of which appeared in 1834. Prout himself is best known for his intriguing hypothesis about the constitution of matter, but devoted most of his energy to medical practice and made several important contributions to the use of chemistry in medicine. John Elliotson, F.R.S., referred to in the above quotation, was "without doubt foremost among the eminent physicians of the day."<sup>2</sup>

Thus, the use of iodine in the treatment of goiter was known to at least two "eminent physicians." The speculations now in order are legion.

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### GENETICS, SULFHYDRYL AND CANCER

THE discovery that the -SH group is a naturally occurring chemical stimulus to cell increase in number<sup>1</sup> produced the suggestion that "... the potentiality for malignancy lies in the hereditary determination of lines of cells retaining the embryonic characteristic of a heightened sensitivity to ... sulfhydryl. ..."<sup>2</sup>

A critical point in this idea—which was not advanced as dogma but as a base from which exploration could be made—was the unproved concept that de-

viations in reactivity to or production of such an ubiquitous and environmentally sensitive chemical group as the sulfhydryl should be subject to or even determined by genetic factors.

Recently evidence has come from other laboratories than ours that genetic constitution does play a part in sulfhydryl matters. Thus Gregory and Goss<sup>3</sup> find positive correlation between potential racial size (which Painter<sup>4</sup> has shown to be correlated with rate of cell division) and glutathione (-SH) concentration in newborn Flemish and Polish rabbits and their hybrids. From their results they state "the data at hand indicate that a genetic constitution for a given adult size maintains a certain glutathione level which in turn regulates the rate of cell proliferation and growth by increase in cell number."

More recently Martin and Gardner<sup>5</sup> report results which indicate liberation of cysteine (-SH) from glutathione is also conditioned by genetic factors. Thus in the hairless rat neither cystine nor glutathione (R-S. S-R) as such produce reaction, while "Cysteine through the sulfhydryl group acts as a stimulant to the hair follicle, bringing about a trichogenic action in hereditary hypotrichosis of the rat."

Though in geometry "two things which are equal to the same thing are equal to each other," the same does not necessarily hold in biology. The mere fact that heredity plays a part in cancer potentiality, that cell proliferation is a large factor in malignant growth, that cell proliferation is enhanced by sulfhydryl, and that this may be genetically determined, may or may not mean anything with respect to the suggestion that inherited disturbance in productivity of or sensitivity of sulfhydryl may be a significant factor in malignancy.

Perhaps these correlations are not functional—but their appearance is provocative.

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## SCIENTIFIC BOOKS

### ATOMIC SPECTRA

*The Theory of Atomic Spectra.* By E. U. CONDON and G. H. SHORTLEY. Cambridge University Press, pp. 431, 1935.

A VERY useful summary of most of the calculations available at present on the theory of spectra. The subject is clearly and logically presented. The mathematical tools used are as elementary as possible and the book should be therefore readily assimilated by a

large circle of readers. Its main strength lies in a complete and careful compendium of most of the available results of calculations of energy matrices in various types of coupling. These are presented in Chapter XI for intermediate coupling, while in Chapter XII the transformations to various cases of pure coupling are thoroughly discussed. Chapter XIII is especially devoted to configurations containing almost closed shells and discusses the subject very thoroughly.

<sup>2</sup> Dictionary of National Biography, Vol. XVII, p. 265.

<sup>1</sup> *Protoplasma*, 7: 297, 1929.

<sup>2</sup> *Archives Pathol.*, 8: 575, 1929.

<sup>3</sup> *Jour. Exp. Zool.*, 66: 155, 1933.

<sup>4</sup> *Jour. Exp. Zool.*, 50: 441, 1928.

<sup>5</sup> *Jour. Biol. Chem.*, 111: 193, 1935.