be possible to separate the –SH containing activator component from urease in a manner analogous to that employed for aginase and cathepsin by Waldschmidt-Leitz.[5]

It is of interest to note that while the activity of deamidizing enzymes, arginase and urease, is enhanced or conditioned by the presence of certain reducing groups, Salaskin and Krivskii[6] have observed that synthesis of urea in the perfused liver from ammonium carbonate required the presence of an abundant supply of oxygen in the form of oxyhemoglobin. It is thus evident that the direction as well as the relative activity of an enzymic process may well depend upon the oxidation reduction potentials of the system.

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FERROUS IODIDE AND LINOLEIC ACID IN VITAMIN A DEFICIENCY. A REPLY TO CERTAIN CRITICISMS

TO those students of vitamins who have not read our brief reports it may appear that Reed, Mendel and Vickery, in SCIENCE for September 30, 1932, have actually repeated our experimental procedure with ferrous iodide and supplemental linoleic acid and that their negative findings cast some doubt on the studies reported by us. This is not the case, for neither the authors cited nor the other workers who have similarly failed to repeat our work have duplicated our experiments.

We have been too busy in evaluating the rôle of Vitamin B in our diets and in studying the influence of iodin added to various oils and fatty acids, and even to oxygenated cod-liver oil, to report our findings in detail. Then, too, we have had a certain reticence, born of experience about attempting to furnish advice to those so long in the field as some of the critics of our work. It would seem, however, that perhaps a few very elementary facts regarding dosage of depleted animals might have been gratuitously offered in our summaries.

(1) We administered our ferrous iodide and supplemental linoleic acid, *indirectly,* in small amounts of food. All the persons who have reported negative results with ferrous iodide gave the medicine directly, syringing it into the mouths of highly depleted rats, without added food. No medical adviser, such as our critics consulted regarding xerophthalmia, would countenance such drastic treatment. It is to be noted that in the experiment listed (*loc. cit.*) cod-liver oil was not thus offered.

(2) But, even if ferrous iodide and linoleic acid are given in food, one can not expect recoveries when only 5 per cent. of yeast is used, as in the diet of Reed, Mendel and Vickery. We used 10 per cent. yeast (Vitavose), of a brand recommended highly by those who had tested several kinds. This Vitavose contains .0125 per cent. of iron and is quite rich in yeast fats. Reports on the yeast fats have appeared from time to time in the *Biochemical Journal,* and we have had a considerable discussion of the significance of different sources of Vitamin B in the *Journal of Biological Chemistry.* For example, Norris and Church (*Jour. Biol. Chem,* 89, 589, 1930) showed that several failures to recover rats, depleted of Vitamin A, with cod-liver oils were due to the amount of Vitamin B used. When 15 per cent. to 18 per cent. of the yeast vitamin was added, recoveries ensued. This is also in line with the report of Honeywell, Dutcher and Ely (*Jour. of Nutrition* 3, 491, 1931), who evaluated yeasts in their Vitamin A studies and who concluded that Vitamin A probably consists of two factors. Personal communications from a friend at Harvard University and from a worker in one of the Yale laboratories, regarding the value of yeast as an appetizer in Vitamin A recoveries, caused our group to test added Vitavose with our medicinal treatments. We extracted the Vitavose with ether for safety, and found that the animals attacked our mixture with greater avidity. But the crucial test came when, last year (1931), we split 16 litters of rats into four requisite groups and learned that with low Vitamin B, our linoleic acid and ferrous iodide combinations were of very slight benefit, and that the recoveries of our cod-liver oil controls were not as numerous as before. Perhaps low Vitamin B may account in part for the difference in results reported. But the fact that we ran our animals down on the deficiency diet, then added ergosterol, is also an important difference. Of course, ergosterol accentuates the mineralization of the animals, and with no added fats, and relatively little yeast fats, the digestive functions are much impaired. It has long been known by physiologists that fats and oils will facilitate the optimum absorption of minerals. Evidently the vitamin students have been getting their peculiar effects, largely by a mineral imbalance and by fat-starvation.

When we reduced the Vitamin B content of our diet, we found a high incidence of gallstones and urinary calculi. The presence of stones has been reported by several workers, using standard diets and without reference to the Vitamin B content. Since cod-liver oil contains fatty acids and some *iodin,* it may be significant in this connection that Seel and Creuzberg (*Archiv. exp. Pathol. p. Pharmak.,* 1931, 161, 674) have shown that iodin will improve the

[5] *Zeits. physiol. Chem.,* clxxxviii, pp. 17 and 31, 1929.
[6] *Zeits. physiol. Chem.,* cxcvi, 121, 1931.

conditions of rats that have had an excess of ergosterol, while *cholesterol* sclerosis is clearly bettered. We need only point to the studies of Evans and Lepkovsky (*Jour. Biol. Chem.,* 1932, 96, 157), to indicate their findings regarding the rôle of unsaturated fatty acids in deficiency diets.

(3) With our thesis that the effectiveness of cod-liver oil and other Vitamin A containing substances depend for their action on the relatively high content of unsaturated fatty acids, and the low but important content of iodin, it was scarcely to be expected that we would give linoleic acid and ferrous iodide in equal amounts, as did Reed, Mendel and Vickery. They did not know our dosage, hence could not repeat our experiment. We used 2 cc of the linoleic acid (sometimes 4 cc) and only .1 cc of a 300 to 1 dilution of syrup of ferrous iodide. We finally concluded, however, after all our preliminary studies with fatty acids, that we had "simply piled up evidence in favor of the more general uses of cod-liver oil in nutritional deficiences." (*Medical Times,* 59, 138, 1931.)

While our opponents have been studiously endeavoring to demolish our very early work, and, not knowing of our main thesis, have been producing iodization of depleted animals, we have progressed to the crucial experiment, run from February to June, 1932, in which we attempted to evaluate iodin added to oxygenated cod-liver oil, in A-avitaminosis. The results obtained were encouraging and we hope to have others repeat the experiments, for the evidence is now unmistakable, that part of the virtue of cod-liver oil in avitaminoses, as well as in various diseases is due to the iodin content of that oil.

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THE PAINTED DESERT

IN SCIENCE for October, page 319, there is a statement that "The Painted Desert" region was first discovered by Coronado in 1540, and was named by him "El Pintado Desierto."

The area called "The Painted Desert" in Arizona was named by Lieutenant J. C. Ives in 1858. This can easily be verified by reference to the report of Lieutenant Ives on his expedition to explore the lower Colorado River when he traveled overland eastward into the region in question and applied the name.

On page 76 of the geological part written by Dr. Newberry that report states under the heading, "Painted Desert":

> After crossing the Little Colorado at Camp 85, a detachment of our party struck northward. . . . Ascending the mesa wall which bounds the valley north of our crossing place, we entered a region to which the above name was appropriately given, as indicative of its barrenness and desolation, as well as of the peculiar scenery which it exhibits.

And on page 86 he writes:

> The erosion then reached the surface of the Marl series, and thence to the distance of forty or fifty miles we could see walls and pinnacles of red and white rising abruptly from the green plain, producing the peculiar scenery of the Painted Desert.

It would seem that Dr. Newberry was the real author of the name, Painted Desert, since Ives in his narrative does not mention it, but as it had his approval it may be accredited to his expedition in general. He placed it on his map between the Little Colorado and the "Moquis" (Hopi) towns.

There seems to be an obsession to attribute to the Spaniards the naming of the natural features of the Southwest, even of features they never saw. Major J. W. Powell, first explorer of the Grand Canyon of the Colorado, gave it that name, yet I have heard of some trying to ascribe that name to the "early Spaniards."

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PROBLEMS OF POPULATION

READERS of SCIENCE in which my address before the Third International Congress of Eugenics was printed (August 26, 1932) may be interested in the following letter from Dean W. R. Inge, written from the deanery of St. Paul's, London, under date of October 3:

> Many thanks for your address, with which I entirely agree. One great difficulty, I think, is that the population is so badly distributed. Every country ought to have as many people as it can feed, and not many more. There is overpopulation in England, because the conditions which stimulated an increase from 8 millions in 1801 to nearly 40 millions in 1901 no longer exist. We can only feed ourselves by underselling other nations in our export trade, which means a lower standard of living at home (apart from the tariffs which strangle our enterprise abroad). Of course we ought to colonize the empty places in our dominions—but you know the difficulties.
>
> I think the *rice* countries are a problem by themselves. Everywhere where rice is the staple food we find intensive cultivation, a congested population, and extreme poverty. (In Ireland before 1840 the conditions were the same, the potato taking the place of rice.) India and China have almost reached the stationary condition; both are supersaturated.
>
> I see no remedy for unemployment, the main causes of which seem to be permanent—labor-saving inventions and women as wage-earners. A revival of trade would diminish unemployment, but I fear only slightly.

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