procaine, a derivative of *p*-aminobenzoic acid which also interferes with the formation of the thyroid hormone[1].

In the second series, male and female mice of the same body-weight and age as those in the first series, and female rats of 55–60 gm. body-weight, were treated with sulpha drugs on eleven consecutive days in the same dosage as in the first series, that is, 5 mgm. per 20 gm. body-weight per day. The rats received *B*2, the mice thiouracil, *B*2 or *B*8. The series contained an additional mouse, the only survivor of an unsuccessful attempt to treat mice and rats in the same way with 2-methyl-2-thiouracil, which was found to be exceedingly toxic, whereas 4-methyl-2-thiouracil, in the dosage used, was practically non-toxic. On the twelfth day the treated animals and the untreated controls were killed, the thyroids fixed in Bouin's solution and serial sections stained with hæmatoxylin–eosin or with Heidenhain's azan.

In the mice, with the exception of those treated with *B*8, the drugs caused thyrotrophic stimulation, especially in that individual which received 2-methyl-2-thiouracil. But the effect was smaller than that which is known to be produced by thiouracil in rats[1] and was mainly restricted to the height of the epithelial cells. The response seems to differ with the species of the experimental animal, for in the rats treated with *B*2, the thyrotrophic stimulation was much more pronounced than in the mice. The contrast with the untreated controls was striking when both treated and untreated rats were kept in surroundings at about 27° C. on the last three days of the experiment, showing that the anterior pituitary, the thyrotrophic activity of which is normally inhibited by a warm environment, was stimulated to increased activity under the influence of the sulpha drug.

The results suggest that the inhibiting influence of sulpha drugs on the formation of the thyroid principle is not regularly combined with an antagonistic action on the secreted hormone, but that some of them may exert this effect in certain circumstances.

The thiouracil and 4-methyl-2-thiouracil were prepared by the Organon Laboratories, Ltd., *B*2, *B*8 and 2-methyl-2-thiouracil by Dr. S. Pickholz (Blenkinsop and Co., Ltd.); a report on the chemistry of *B*2 and *B*8 will be published elsewhere.

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Lipoid Morphology of the Tubercle

The characteristic lesion of tuberculosis—the tubercle—consists of epithelioid cells and of one or more giant cells, both derived[1] from the mononuclear phagocytes, and tubercle bacilli may be found within the giant cells and in or between the epithelioid cells. The knowledge of the chemistry involved in this formation can be dated back to Unna and to Sata (see ref. 1), who showed that the tubercle bacilli possess a fatty or waxy envelope. The lipoid of cultures of *M. tuberculosis* was found by Anderson and colleagues[2] to include a phosphatide fraction with which Sabin and her co-workers[3] could produce tubercle-like nodules, with epithelioid and giant cells, on injection into experimental animals. Until recently, the actual chemical sequence in the spontaneous or experimental lesion had not been considerably enlarged upon since Miller noted that the organism was not coloured by osmium tetroxide in Flemming's fixative immediately after injection into the rabbit, although after four days the lesions contain bacilli which are blackened by the osmium. As Miller said, ". . . the bacilli undergo degeneration inside the epithelioid and giant cells"; and Gomori[4] has described one mechanism for this showing that the enzyme lipase in the tubercle was found as granules in the epithelioid and giant cells.

Using a method developed for the demonstration of the structural lipoid[5], it was possible to study the lipoid distribution in the tubercle; and this note describes the appearances in a lesion fourteen days old.

2 c.c. of a thick suspension in saline of a culture of bovine type *M. tuberculosis* were injected into the mesenteric vein of a rabbit, anæsthetized with ether. Fourteen days later, the animal was killed by a blow on the back of the head and small portions of liver immediately placed in the cobalt–calcium–formol fixative. After twenty-four hours, the tissue was transferred directly to 3 per cent potassium dichromate at room temperature for twenty-four hours, and then washed in tap water for ten hours. Paraffin imbedding was carried out by an alcohol–toluene routine. Sections were cut at 4–6 μ and stained for the organism with pyridine–fuchsin, which allows an acid fuchsin–aniline blue counter-stain, or coloured with Sudan black for the lipoid.

Lesions, which were known to be tuberculous by the presence of the typical cellular picture and the organisms, contained aggregations of lipoid in the epithelioid and in the giant cells, the greater concentration being in the latter. In both these situations a diffuse staining of the cytoplasm was seen as well as fine and coarse lipoid granules. The coarse cytoplasmic granules correspond to the description by Gomori of the sites of lipase activity in these cells, and it seems probable that the present method shows in the tubercle the substrate for the enzyme lipase. This has not previously been demonstrated.

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Effect of Vitamin E in Coronary Heart Disease

While studying the effect of high-dosage vitamin E (*α*-tocopherol acetate) on purpura[1], the good influence of this factor upon coronary heart disease became apparent. A study of a series of cardiac patients, carried out with the help of Mr. Floyd Skelton and Dr. Wilfrid Shute, has suggested: (*a*) vitamin E in large dosage (200–600 mgm. Ephynal–Hoffmann–LaRoche) has no apparent effect upon normal hearts, even after administration for many months on end; (*b*) its effect upon patients having congestive heart disease and the anginal syndrome is marked; it increases exercise tolerance and diminishes or abolishes anginal pain during the period of its administration; its diuretic effect[2] is pronounced.

The effect of vitamin E upon coronary pain may be produced by a direct action on the coronary vessels or by influencing the metabolism of the heart muscle. The first possibility is suggested by an older observation[3] on the effect of vitamin E in dilating the local capillaries in senile vulvitis. Our work on the purpuras raises another possibility, too. Small hæmorrhages into the walls of the coronaries[4] or into the heart muscle itself may produce such pain. It is now clear that such extravasations may be either prevented or reabsorbed by means of vitamin E.

When vitamin E was given in large doses over long periods of time, some patients complained of cardiac irregularities. These were relieved by reducing the medication to low levels.

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Practical Control of Wireworm with 'Gammexane'

In their letter on the result of field trials with 'Gammexane', Messrs. Thomas and Jameson[1] claim that, as a result of the application of this insecticide, reductions in wireworm population of up to 65 per cent have been noted. This appears to us to be a somewhat misleading statement unless fully supported by the actual data of the sampling on which the claim is based.

Ten fields in Northumberland, which originally had high populations when in grass, showed in the course of routine sampling for the Wireworm Survey, after one arable crop had been taken in each case, reduction in population as high as 67·73 per cent, with an average reduction of 52·48 per cent. No treatment of any sort save that of good cultivation had been given to the fields.

It should be noted that these figures do not necessarily represent the true reduction, as variation in sampling errors must be taken into account, and this most probably applies to the claim made by Thomas and Jameson.

In the course of trials with 'Gammexane' which are being carried out by us in Northumberland, as yet incomplete, we find that so far the 'plant stand' is approximately 25–30 per cent greater in the treated plots.

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If further work establishes the effectiveness of 'Gammexane, against wireworms[1], the problem in future will be to decide which fields are to be treated with this substance. Unless it is to be applied to every field containing wireworms (this would mean most of the cultivated land in Britain) it will be necessary to be able to predict in advance which fields are likely to be attacked. I am convinced, as a result of experiences as a member of the wireworm advisory team stationed at Cambridge during the War, that such predictions are more difficult to make than is commonly believed. The assumption that wireworm damage increases with rising population must be used with reservation in making such predictions.

In the first place, estimates of populations can only be useful as a guide to probable damage when they are based on accurate methods for sampling fields and recovering wireworms from the samples so obtained[2,3]. Ordinary methods of counting wireworms picked out from soil by hand are still in use, long after they have been proved totally inadequate for estimating populations. Fortunately, considerable progress has been made in developing methods suitable for this work, and further progress is expected.

Secondly, even when the population has been determined accurately, it is not possible to predict with certainty what the crop result will be. Data on this aspect of the problem now being prepared for publication show many discrepancies between the actual crop results and those expected from the estimated populations. Although failures occur more frequently on fields with high populations, they also occur in disquieting numbers on fields with low populations. On the other hand, fields with high populations frequently show little wireworm damage.

An attempt to examine this aspect of the problem was made in 1945 by comparing the wireworm populations in damaged and undamaged plots in single fields. Of thirteen such fields investigated, only seven showed significant differences in population between the damaged and undamaged plots. Moreover, in comparing the different fields it was evident that there was no level of population at which failures consistently occurred. The undamaged plots on some fields maintained a population several times as high as the damaged plots on other fields. These results support the view that infestation is