ANALYTICAL EXAMINATION OF ACORNS AND HORSE CHESTNUTS.*(Continued from p. 355.)*

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*(Read at the Meeting, November 7, 1917.)***DISCUSSION.**

THE CHAIRMAN (Mr. A. CHASTON CHAPMAN), in inviting discussion, remarked on the high proportion of matter soluble in cold water in the sample of chestnuts No. 2. After allowing for reducing sugars and other known substances that would be soluble in water there would still be a large amount left unaccounted for, regarding which any available further information would be very acceptable. The direction of attention to the fact that the Lintner method for the estimation of starch was one to be adopted with very great caution was an important point in the paper. The method was a very convenient one, and was widely used; and for materials of fairly well-known composition, it possessed obvious advantages in regard to simplicity and speed; but with substances of more or less unknown composition, it might clearly be liable to serious error. This had been pointed out previously, but in these analyses of chestnuts and acorns the discrepancies were particularly striking. Although the authors had been unable to detect any starch-splitting enzyme in the acorn, it would be very strange if there were not some provision for converting the acorn starch into something soluble and assimilable. He hoped, therefore, that the authors might be able to continue their researches, and see whether there was not an enzyme capable of acting on the acorn starch, even though it might have no action on potato starch.

Colonel VERNON said that these analyses were particularly interesting from the point of view of the food value of these two products, the collection of which was being urged by the Government. The results of No. 2 of the horse chestnut analyses seemed to suggest in that case some germination had taken place, the reducing matter having increased and the starch diminished. As to the occurrence of an enzyme in the acorn, he thought that there must be something which would produce more feeding material for the young plant than was at present apparent. The acorn, however, was somewhat peculiar in its mode of growth. It grew from the surface of the soil, sending its roots down; if it got below the surface it would not germinate.

Mr. A. E. PARKES asked whether the authors had examined the acorns for tannic acid. He had recently made some partial analyses of chestnuts and acorns, with results differing slightly in some respects from those of the authors, and in the case of the acorns a considerable quantity of tannic acid had been found.

Mr. G. N. HUNTLY asked whether the authors could give any approximate idea of the amount of saponin that was present in horse chestnuts. It was known that its presence rendered the nuts unfit for food.

Mr. HULTON said that if acorns were germinated in water it would be noticed

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that there was very little visible depletion of the cotyledons, even up to the time at which the plant was able to grow independently, so that it would appear as if only a very small proportion of the original starch disappeared by the time that the leaves had reached the chlorophyll-bearing stage. They proposed to try the action of acorn diastase upon soluble starch prepared from acorn starch.

Mr. C. H. CRIBB asked whether there was any special difficulty in preparing starch from chestnuts or acorns; otherwise it seemed strange that such a source of starch—say, for laundry purposes—had been so long neglected.

Captain C. G. MOOR remarked that the use of acorns was being recommended for feeding poultry, and possibly, if alcohol were manufactured from them, the residue might be used for feeding purposes.

Mr. JOHN HUGHES said that he had found that roasting improved acorns a great deal for feeding purposes, the resulting powder having a sweet and biscuit-like taste instead of the acrid, disagreeable taste of the original acorns. It used to be imagined that acorns were only useful for pigs, and were liable to injure cattle, but if dried and ground as suggested they would form a valuable cattle food, and would certainly be useful for poultry.

Dr. J. A. VOELCKER remarked that the liability of cattle to suffer from acorn-poisoning was well known, though there was some mystery as to the exact cause. The main factor, however, seemed to be the quantity of acorns eaten relatively to that of the other food. In a season in which acorns were plentiful and grass was scarce the cattle might suffer, while under the opposite conditions the quantity of acorns eaten might not be sufficient to cause any trouble.

Mr. BAKER said that in France considerable attention had been devoted to the isolation of starch from chestnuts, though without much commercial success, mainly, he thought, for the reason that, while the crops ordinarily used for starch manufacture were collected in bulk at one spot, the utilisation of products which had to be collected in small quantities over large areas was commercially possible only in times like the present. In ordinary times it was unlikely that chestnuts or acorns would ever pay their way as sources of starch, having regard to all the other sources that were available. The large amount of unaccounted-for material in the cold water extract, particularly in the chestnut No. 2, was not confined to chestnuts or acorns. In cocoa, for instance, the matter soluble in water could not be fully accounted for by the determined constituents, and the same was true of malt extract. In chestnuts and acorns there would be some tannin, but not very much, and glucosides would also be present. Some observers gave the proportion of tannin in horse chestnuts at 10 per cent., but he should think that 2 or 3 per cent. would be more probable. He and Mr. Hulton hoped to do some more work on the subject of the enzymes of acorns. They had thought that some information might be obtained by allowing the whole material instead of its aqueous extract to act on starch, but the results were negative. Acorns allowed to germinate under favourable conditions for two or three weeks made great growth, but showed not the remotest trace of enzyme, either in the soluble or insoluble condition. He did not feel very hopeful about clearing the matter up, because if an isolated enzyme would not act

upon potato starch he should hardly expect it to act with any vigour on any other starch. Acorns had been largely used on the Continent for making a spurious kind of coffee. When roasted they developed quite an agreeable flavour, and it was possible that under some conditions they might form a valuable source of food.