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ABSTRACTS OF COMMUNICATIONS

The First Ordinary Scientific Meeting of The Nutrition Society was held in the Bearsted Theatre of the London Hospital, Whitechapel, London, E. 1 on Saturday, 22 February 1947, at 11 a.m., when the following papers were read:

The Requirements of Insects of Known and Unknown Members of the Vitamin B Complex. By G. FRAENKEL and M. BLEWETT, *Imperial College of Science and Technology, London, S.W. 7*

All insects investigated by us, altogether ten species, have been found to require eight of the known members of the vitamin B complex, viz. aneurin, riboflavin, nicotinic acid, pyridoxin, pantothenic acid, choline chloride, biotin and folic acid. *i*-Inositol and *p*-aminobenzoic acid are not required. The five first named vitamins are of relatively greater importance than the other three. The minimum optimal requirements, for *Tribolium confusum*, are: aneurin 1, riboflavin 1-2, nicotinic acid 8-16, pyridoxin 0.5-1, pantothenic acid 4, biotin 0.05 and folic acid 0.125 µg./g. dry diet. The quantitative relationship of these requirements is of the same order as that found for the chick and in what is considered a good human diet.

Tenebrio molitor requires also a factor which is contained in a charcoal filtrate of yeast or liver. This factor has been provisionally named vitamin B_T. In the absence of B_T most of the larvae die when reaching the age of 5-6 weeks, and with suboptimal quantities growth becomes inferior.

Tenebrio and *Tribolium* also require a factor present in the water-insoluble part of yeast. In the absence of this factor, which appears to be neither water- nor fat-soluble, growth of both insects becomes slower.

The Nutritional Importance of a Mixed Diet. By OTTO KESTNER, *Animal Nutrition Institute, School of Agriculture, Cambridge*

The classification of proteins as proteins of high value or of low value has been based chiefly upon experiments with growing rats which show normal growth only with proteins that contain all the necessary amino-acids. Rats have been fed with a mixture of two different low-value proteins, i.e. with bread and potatoes to which the necessary vitamins and salts have been added. Growth on a diet of a mixture of bread and potatoes was the same as that with the addition of horse meat, i.e. maximum normal growth. Because the food of man and agricultural animals contains as a rule more than one protein, one has to be very cautious about designating any protein as a 'low-value' protein.

The relation between proteins and calories is of more importance, particularly as regards digestibility. If one feeds rats with bread alone, from 5 to 6% of the dry substance is lost in the faeces. If one adds 1 ml. or so of meat extract, then only about 3.5% of the dry substance is lost in the faeces.

Nutritive Value of Food Served in the R.A.F. during the War. By T. F. MACRAE and G. A. CHILDS, *R.A.F. Institute of Pathology and Tropical Medicine, Halton, Bucks*

During the war, the R.A.F., like the other fighting Services, in order to maintain high efficiency, was accorded a fairly good mixed dietary, probably comparable with that consumed by the skilled artisan or lower middle-class before the war.

To discover whether this dietary supplied various nutrients in adequate amounts, the nutritive value of the food as consumed was estimated. In the messes under investigation, the food served to five individuals was taken at random at all meals during the course of one week. It was carefully weighed, quantitatively removed from the plates to containers, and stored at -20° . These containers thus held the total food available to five men during this one week. The food was ground in frozen condition, dried either by freeze-drying or in a current of hot air, and reground to yield a homogeneous brown powder. Care was taken that the processing procedures neither contaminated food with nutrients such as iron or copper, nor led to marked destruction of the labile vitamins. All procedures were carried out quantitatively, and thus the weight of the homogeneous powder which represented the individual's average daily intake could be calculated. The dried material was tinned in nitrogen and stored at low temperature to prevent deterioration. The material was analysed for a very large number of nutrients, and in many instances this work was kindly carried out for us by experts in the assay of particular nutrients. The results given in the table indicate the general adequacy of the diet, particularly when it is remembered that Service personnel, mainly for social reasons it is true, patronized various canteens, and hence consumed additional food.

Nutritive Value of Food Served. Average Values for Eight R.A.F. Stations

Crude protein	91.4 g.	Phytic acid phosphorus	192 mg.
Fat	96.7 g.	Chloride	6278 mg.
Crude fibre	5.6 g.	Sulphur	1247 mg.
Total ash	20.8 g.	Vitamin A	1968 i.u.
Nitrogen-free extract	354.4 g.	$\alpha + \beta$ -Carotene	3400 μ g.
Available energy	2664 Cal.	Total carotenoids	4654 μ g.
Calcium	724 mg.	Aneurin (biological)	1690 μ g.
Iron	45.3 mg.	Aneurin (chemical)	1144 μ g.
Copper	3.8 mg.	Riboflavin (microbiological)	1950 μ g.
Magnesium	322 mg.	Nicotinic acid	17.4 mg.
Sodium	4078 mg.	Biotin	40.7 μ g.
Potassium	3025 mg.	Pantothenic acid	4220 μ g.
Total phosphorus	1330 mg.	*Ascorbic acid	26.1 mg.
Inorganic phosphorus	665 mg.		

* Ascorbic acid was estimated by indophenol titration of the food consumed at time of serving.

The Form of Vitamin A in Cow's Milk. By J. GANGULY, S. K. KON and S. Y. THOMPSON, *National Institute for Research in Dairying, University of Reading*

About 0.5 g. fat extracted from milk by the method of Olson, Hegsted & Peterson (1939) was chromatographed in *n*-hexane solution on a column (3.5 × 1 cm.) of aluminium oxide (Savory and Moore or B.D.H.), when necessary suitably weakened previously by putting through it 1 ml. of 8% ethanol in hexane. Vitamin A ester together with α - and β -carotene and fat was eluted from the column with 2% acetone in hexane. Vitamin A alcohol was held firmly on the column and was subsequently eluted with 8% ethanol in hexane. The ester fraction was saponified, chromatographed if much carotene was present, and vitamin A determined in the photo-electric spectrophotometer of Thompson (1942). Under these conditions the separation and recovery of alcohol and ester were almost quantitative.

Examination of samples of mixed colostrum, mixed milk from the Institute's herd and of samples from individual cows showed that vitamin A alcohol, if present at all, contributed not more than 3% of the total vitamin A, the bulk of which was apparently in the ester form. Less clear-cut results were obtained with mastitis milk and it is possible that this contains more appreciable quantities of the alcohol.

Example

Vitamin A	Colostrum fat	Milk fat
	(i.u./g.)	
Total	182	27.4
Ester	182	26.0
Alcohol: by difference	0	1.4
by measurement	5	1.3

REFERENCES

- Olson, F. R., Hegsted, D. M. & Peterson, W. H. (1939). *J. Dairy Sci.* **22**, 63.
Thompson, S. Y. (1942). *Chem. & Ind.* **61**, 170.

Stimulation of Growth and Fattening of Pigs by Synthetic Oestrogens.

By R. BRAUDE, *National Institute for Research in Dairying, University of Reading*

In two small preliminary trials diethylstilboestrol was fed to growing pigs with the idea of increasing the rate of growth and fattening of the animals by means of stimulating the pituitary gland and causing an increased release of a growth or other metabolic hormone.

Ten pairs of castrated male litter-mates were used. Half of them received as a supplement to their normal diet 50 mg./head daily of diethylstilboestrol for periods varying between 89 and 108 days, while the other half acted as controls. The results indicated that the body-weight of the stilboestrol-treated hogs increased faster, and that they utilized the food more efficiently than the control animals.

At the same time three boar pigs were given 50 mg./head of diethylstilboestrol daily for 89 days with the aim of testing an additional possibility that the synthetic oestrogens inhibit the androgenic activity of the testis, i.e. cause a 'hormonal castration', and thus affect the rate of growth and fattening of the animals concerned. At slaughter the reproductive organs of the treated boars were removed, examined histologically and compared with similar material from untreated boars of exactly the same age. While the effect on live weight gain of the treated boars was similar to that recorded for treated hogs, there was no marked difference between the reproductive organs of the treated and untreated boars. Spermatogenesis was present in all cases.

Nutritional Variation of Soils and Pastures on Scottish Hill Grazings. By G. DUNLOP, *West of Scotland Agricultural College, Auchincruive, Ayr, Scotland*

On Scottish hill grazings, it is frequently found that two or more soils of separate geogenesis are found within the area grazed by one heft* of sheep and, when sampling the herbage, pasture on the mountainside has to be grouped with a different floral type characteristic of waterlogged marsh areas. Apart from the varying mineral content of the soils and herbage which thus arises, all the animals of a heft do not graze over those sub-areas forming parts of the composite sample. The grazing activities of hill sheep are confined frequently to a single strip of the heft-grazing, running from the valley bottom to the high ground of the area.

From these considerations, therefore, it is clear that while a composite sample from the whole grazing may include mineral-rich pasture sub-areas and indicate that there is no deficiency of the mineral, a number of animals which graze mainly on one portion may show symptoms of gross deficiency of the element. The analyses of composite samples of soil and especially herbage from hill grazings appear to recognize neither the great variability in mineral content of the different sub-areas forming part of the composite sample nor the habits of the grazing animals.

To overcome this difficulty it has been found necessary to administer supplements of the supposed deficient mineral direct to the animals which feed on the grazing and retain a similar number untreated as controls. On many 'healthy' grazings the results have shown that while some animals show no need of cobalt therapy others exhibit a marked response to the treatment.

The Effect of High Protein Feeding on Marasmic Infants following Operation for Pyloric Stenosis. By E. M. HICKMANS, S. BISHOP and Y. WILLIAMS, *Children's Hospital, Birmingham, and the Department of Child Health, Birmingham University*

This preliminary communication deals with nineteen cases of pyloric stenosis, aged 3-12 weeks, and all at least 20% under their expected weight for age, who were given food containing 3.8% total protein or its equivalent in two stages:

* A heft is a number of sheep, usually 2-5 score, which graze within natural boundaries—a ridge or a stream—and which can be gathered separately from the remainder of the flock.

- (1) Modified lactic acid milk to which was added 2% casein hydrolysate.
- (2) Dried half-cream lactified milk.

A gradual change from the first to the second stage was made at about the end of the second week. Analyses of these feeds gave almost identical figures, but 2% of the protein was hydrolysed in the first stage. There was no evidence of intolerance to the hydrolysed casein supplement.

Some cases had mild infections, but their progress was not thereby impeded. There was a steady gain in weight starting immediately after operation, averaging 6 oz. per week. This compares favourably with similar cases on lower protein feeds.

Blood was collected not less than 2 hr. after feeds at weekly intervals, starting 24–28 hr. after operation, when the patient was fully hydrated. The initial total serum proteins were within the normal range. There was a gradual fall in the total protein, albumin, globulin and haemoglobin followed by a rise. Albumin reached its lowest level approximately at the end of 2 weeks, globulin in 3 weeks and haemoglobin in 5 weeks.

Vitamin A in Rheumatic Fever. By Z. A. LEITNER, T. MOORE and I. M. SHARMAN,
Dunn Nutritional Laboratory, University of Cambridge and Medical Research Council

Serial estimations of vitamin A and carotene were made on the blood plasma of 102 patients, mostly children, who suffered from rheumatic fever, in various stages of activity and convalescence. The mean values for all subjects for both vitamin A and carotene varied in an inverse direction to the body temperature and the erythrocyte sedimentation rate. The movements of these four variables, however, were not always co-ordinated in individual subjects. Similar decreases in vitamin A and carotene were found in fevers which were not of rheumatic origin. The possibility that repeated attacks of rheumatic fever may seriously impair vitamin A status was supported by a re-examination of previous data on the vitamin A reserves of children who had died from heart disease. Extremely low reserves were found in five cases of chronic or sub-acute rheumatic endocarditis.

The Second Ordinary Scientific Meeting of The Nutrition Society was held in the Barnes Hall of the Royal Society of Medicine, 1 Wimpole Street, London, W. 1, on Saturday, 31 May 1947, at 10.30 a.m., when the following papers were read:

The Intestine as a Possible Seat of Conversion of Carotene to Vitamin A in the Rat and the Pig. By S. Y. THOMPSON, J. GANGULY and S. K. KON,
National Institute for Research in Dairying, University of Reading

Glover, Goodwin & Morton (1947) have just reported their findings on the conversion of carotene to vitamin A in the intestine of the rat. Independent work at Shinfield fully confirms these observations.