it seems justifiable to suppose that this is the part of the visual pathway which is affected, as the incongruity of the field defects would, on this assumption, offer no difficulty.

It is further evident that if cases can be found—and with the progress of intracranial surgery undoubtedly they will occur—in which the anterior part of the temporal lobe has been surgically removed, cutting through a large part of the temporal loop, definite and permanent upper quadrantal hemianopic field defects should be produced.

I have been able to obtain notes of two cases of this kind; one I saw in association with Mr. Dott, who will refer to it himself, the other was described by Kravitz. In this case the entire temporal and part of the frontal lobes on the right side were removed. Four months later an incomplete, irregular, incongruous, left homonymous hemianopia was found, which affected the lower as well as the upper left quadrants. Since the dorsal fibres of the radiation do not pass through the temporal lobe in Meyer's loop, the field, after such an operation, should exhibit a fairly clear-cut upper homonymous quadrant defect, and since the fibres were completely cut through the defects should be congruous, whether the fibres from corresponding retinal areas lie side by side at this level or not. No such field defect was present, and Dr. Kravitz, in a private letter, has informed me that he also doubts the existence of Meyer's temporal loop, at any rate as a portion of the visual pathway directly conveying visual impulses from the geniculate body to the occipital visual cortex.

In a recent study of the field changes produced by occipital tumours Horrax and Putnam showed that relatively congruous homonymous hemianopia with sparing of the central area was the characteristic feature. An upper quadrantal homonymous defect was not found in their series of occipital lobe tumours. The field changes in temporal lobe tumours differ greatly from these in the frequency of incongruity and of upper quadrantal defects, and the relative rarity of sparing of the central area.

These findings appear to me to afford considerable support to the view that it is the optic tract and not the optic radiation which is affected in temporal lobe tumours.

Turning now to the pathological interpretation of field defects, we have seen that anatomical interpretation has helped us considerably in this direction. A few examples will suffice. In disseminated sclerosis of the chiasma the predominant central position of the defects, their rapidity of appearance, variability, and spontaneous disappearance, agree with the symptomatology of disseminated sclerosis in general.

The slow, relentless development of hemianopic defects due to tumour pressure, the sudden or rapid appearance with possible spontaneous resolution of similar defects due to haemorrhage and thrombosis, are closely related to the development of the corresponding lesions. The presence of disproportion indicates activity of the lesion and progress either in the direction of increase or of resolution. The nature of the fields may be helpful in determining the best surgical approach, and the effects of surgical or radiological treatment may be gauged by repeated perimetric examinations.

The inconsistent and contradictory findings in hysterical and neurasthenic cases are sufficiently characteristic to indicate the true state of affairs.

The foregoing sketch is intended to illustrate the general principles on which the use of perimetry in connexion with intracranial lesions is based. Time does not permit of discussion in fuller detail.

SUMMARY

In the study of intracranial lesions perimetry is of value:

1. In locating the site of the lesion.
2. In assisting the determination of the nature of the lesion.
3. In affording guidance as to prognosis and treatment.
4. In throwing light upon the anatomy of the visual nerve path.

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A NOTE ON VITAMINS IN PRACTICAL EXPERIENCE

BY

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In my paper to the Section of Diseases of Children at the Dublin Meeting of the British Medical Association,* dealing with the practical significance of vitamins in day-to-day clinical experience, I have confined my attention largely to the anti-rickets vitamin D, which, of course, in this country, is the factor of pre-eminent importance. A list of conclusions is, however, included relating to vitamins A, B, and C and certain other practical issues; and it is the purpose of the present brief notes to summarize the evidence on which these conclusions are based.

VITAMIN A NOT A GENERAL ANTI-INFECTIVE AGENT

Week by week advertisers' announcements are sent to us all by post, or appear in the journals, which rather convey the impression that vitamin A builds up the general resistance to infection and is of value in the treatment of toxæmias and infectious diseases of all kinds. This is claiming far too much. Vitamin A is anti-infective in only a limited way. As I have shown, in collaboration with J. R. M. Innes,¹ the local infections to which vitamin A deficiency gives rise are of a quite special type, being caused by structural breakdown of membranes. There is no change in the general immunity. These scattered, localized infections are restricted in origin to the abnormal membrane, and are set up by chance micro-organisms which would normally prove to be non-pathogenic. There is no reason to suppose that vitamin A could exert any direct bactericidal or similar effect when given in definite cases of infectious diseases and septicaemias caused by the invasion of specific virulent micro-organisms. Dr. Griffith and I showed,² for example, that vitamin A had no effect on the spread of experimental tuberculous disease. Again, our colleague Dr. Thomas Moore³ has found that in human beings dead from the most varied types of infectious diseases there may be abundant reserves of vitamin A in the body, so that little could have been gained by its administration in such cases, and it is obviously no longer possible to

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regard the vitamin as an anti-infective agent indiscriminate in its scope. The original observation which held out the hope of wide positive therapeutic uses for vitamin A was that of Mellanby and Green⁴; it appeared to show that in puerperal septicaemia the mortality was strikingly diminished as a result of vitamin A treatment. Mellanby suggested that many common infective conditions might be due to vitamin A deficiency, including the common cold, acute rheumatism, phthisis, bronchitis, pneumonia, middle-ear disease, ulcerations of mouth and eyes, and inflammations of nasal sinuses. However, later clinical investigations by many workers have shown that vitamin A therapy has failed to have any effect as a prophylactic in respiratory diseases,⁵ in the common cold in infants,⁶ on the incidence of common infections generally,⁷ or in the treatment of pneumonia.⁸ As has been agreed by Mellanby, a difficulty in interpreting his original, apparently favourable, results in puerperal septicaemia is the great natural variation in virulence from case to case. Ellison⁹ claims to have reduced the mortality rate in measles in young children by treatment with vitamins A and D. In a group of 300 cases so treated there were eleven deaths, and in a similar control group of 300 given no extra vitamins twenty-six deaths. Further statistical evidence will, of course, be needed before the claim can be regarded as definitely established. Ellison points out how there often occurs after severe measles a metaplasia in the respiratory tract resembling that of vitamin A deficiency, and this might be regarded as providing a rationale for the treatment. We may certainly admit that it is in young children—the class studied by Ellison—that any liability to shortage of vitamin A seems most likely to occur (see below).

VITAMIN A REQUIREMENTS

Although we are satisfied that vitamin A is of no value as a general anti-infective agent for indiscriminate use in treating all kinds of infectious diseases it is still important to ensure that enough of the vitamin is given in the diet, as there is full evidence to show that a lack must lead to specific ill effect (including xerophthalmia, or night-blindness, often accompanied by tendency to respiratory infection.^{10 11} In many parts of the world avitaminosis A is widespread, while it will come as a surprise to most to hear that in this country it is not quite unknown, no fewer than seventeen cases of xerophthalmia being recorded in one year in a North of England hospital.¹² A recent report from America gives details of thirteen such cases in under-nourished children.¹³ As to the more difficult question of partial lack of this vitamin (hypovitaminosis) it is hard to speak with any certainty. The results of Moore³ for the British Isles and of Wolff¹⁴ for the Netherlands suggest that about 16 per cent. of the population might perhaps be considered to have "subnormal" reserves, but it is difficult to know how to fix the limit for normality. The reserves found vary immensely from one individual to another.

Work by my colleague Dr. W. J. Dann,¹⁵ in particular, has shown that the young of the species receive a surprisingly limited amount of vitamin A *in utero* and in their mother's milk, so that the need for ample provision of this factor *especially at weaning* becomes all the more apparent. Vitamin A is found in most animal fats (except lard) and fish oils; but carotene, which is of equal biological value and is converted to vitamin A by the animal (as shown by Moore at Cambridge), is as readily accessible in green vegetables, carrot, etc. We may sum up the matter of vitamin A dosage by drawing a contrast between it and its fat-soluble companion D. Whereas with vitamin D no common foodstuff contains an abundance, so that supplementary dosing is an absolute essential if the defi-

ciency (rickets) is to be averted, many common articles (any common greenstuffs) contain all that is needed of vitamin A, so that separate dosing cannot be regarded as being so imperative, but merely as an additional safeguard in cases of doubt.

VITAMINS B₁ AND B₂

Vitamin B₁ deficiency (beri-beri), including the infantile variety, is almost universal in certain parts of the globe, but there is little evidence of any serious lack of this vitamin in this country or in the U.S.A. True, the possibility of some partial want is suggested by experiments recently carried out in America,^{16 17 18 19 20} which showed apparently quite conclusively that when sources of extra vitamin B were added to the diet of large groups of infants the growth rate or weight curves, or both, were far ahead of those of the control groups. We must await further tests before dogmatic statements can be justified. Intestinal stasis and lack of alimentary tone is admittedly one effect of vitamin B deficiency, but in my opinion there is no compelling evidence for the widely advocated theory that the prevalence of constipation in this country is due to vitamin B shortage. Pellagra (vitamin B₂ deficiency) has an astonishingly high incidence in the U.S.A. (170,000 cases in 1917; 120,000 cases in 1927: mortality rate about 40 per cent.), but it is not a disease of children, and is therefore outside the scope of our present discussion.

VITAMIN C

It is nowadays the recognized orthodox practice to give all bottle-fed infants fruit juice for the purpose of preventing Barlow's disease (infantile scurvy—that is, deficiency of vitamin C, recently identified with *hexuronic* or "*ascorbic*" acid). This is an essential procedure, as cow's milk is a rather poor source of vitamin C, and pasteurization may destroy what little there is—this, to a greater or less extent depends on the conditions of the pasteurization, the presence of copper particularly inactivating the vitamin. This question is of much current interest and importance in view of the proposed legalization of compulsory pasteurization—a process which, it may be noted in parenthesis, is of commercial benefit to the dairying interests, since pasteurized milk "keeps" longer and can be sold when staler. We do not know at all accurately to what extent vitamin C underfeeding is current in this country; but the fact that definite outbreaks of scurvy tend to appear (as in Manchester, Glasgow, and Newcastle in 1917) whenever there is a failure in the potato crop suggests that many people must be near the borderline, and that they rely too exclusively on the potato as their sole source of the vitamin. The consumption of other vegetables and salads and fruit should be encouraged: a useful "rule" that has been advocated is to spend as much on fruit and vegetables as you do on meats and fish and, incidentally, the same sum again on *milk*. (Here, of course, we are speaking of children and adults, not young infants.) In Sweden Göthlin²¹ believes, from his tests on capillary strength, as measured by the liability to cutaneous haemorrhage under given pressures applied to the skin, that 18 per cent. of a group of country school children were suffering from hypovitaminosis C. E. W. Fish and I²² find that vitamin C deficiency in experimental animals leads not only to failure in function of odontoblasts (as had been previously observed), but also to faults in enamel formation of the type which precedes dental caries in man. It is quite likely that deficiency of vitamin C—no less than of vitamin D, which has been studied so fully by M. Mellanby—may often be a contributing cause of dental caries.

OTHER NUTRITIONAL FACTORS

I would not wish to close without making at least a cursory allusion to nutritional factors other than vitamins, lest I might seem to convey the impression that vitamins alone mattered. Among the most striking of recent work is that of Mackay,^{23 24} who has shown how surprisingly common is iron deficiency in infants, and has published a convincing account of the beneficial effects of its administration in such cases. The observations, too, of Corry Mann²⁵ on the unique nutritional properties of milk for school children, work which has since been amply confirmed up and down the country, call for special mention.

THEORY AND PRACTICE

In conclusion, we must realize that our problem cannot be divorced from economic realities. Calculation shows that the cheapest diet for bare sustenance costs about 5s. to 7s. a week for an adult, or about 3s. to 4s. for a child.^{26 27} This figure assumes a knowledge of how to choose food to the best physiological advantage, and also the opportunity of purchasing it in the cheapest markets. Yet it has been shown that even this minimal sum is beyond the reach of many of the unemployed, whose income falls short of that amount after deducting only for rent, and making no provision whatsoever for such necessities as clothes, heating, etc.²⁸ The fault here lies not with science, but largely in the mal-organization of society, and sometimes too in a failure to apply or to realize the knowledge which science has already won. In America it has been found worth while to employ whole corps of "nutritionists," whose function is to advise the public authorities as to nutritional conditions and local needs, and to instruct households on the outlay of their budgets.

A summary of these conclusions will be given in the previously mentioned paper.

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A CASE OF UNUSUALLY HIGH EOSINOPHILIA
OF OBSCURE ORIGIN

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As the case reported below presents several interesting clinical features and diagnostic difficulties it was thought worthy of being put on record.

CASE HISTORY

A male, aged 39, shopkeeper by occupation, early in May, 1932, noticed himself unusually tired when the day's work was over. Although he worked hard, he had never noticed any ill effects before. As time went on he found himself becoming more and more tired each evening, until early in October he decided to seek medical advice.

His father, aged 78, and his mother, aged 71, are in excellent health; five sisters and one brother are alive, and are all in good health; one sister died of meningitis at the age of 21. He has never been ill in his life except for whooping-cough at the age of 7. He has never been out of Ireland, is very abstemious in his habits, and lives an outdoor life.

When I saw him he complained of weakness, a feeling of nausea, and pains in his epigastrium occurring about one hour after food. He looked anaemic and his skin was sallow; he said he had lost weight. On examination I could elicit nothing abnormal in his abdomen. Liver and spleen were not enlarged. Lungs were normal, but his heart was enlarged and a mitral systolic murmur was present. Urine contained no albumin or sugar. There was no blood in the stools. Reflexes were normal. I gave him a bismuth mixture, and

asked him to come back in a week's time. Three days later I was called to see him, and found him in bed complaining of exhaustion and pain in the epigastrium. Examination of the abdomen was again negative, and I sent him into hospital for x-ray examination. A barium meal revealed no evidence of gastric or duodenal ulcer, but, on screening, his heart was definitely enlarged. A blood count was then done, showing an eosinophilia of 55.5 per cent. and a red blood count of 2,960,000 per c.mm. With this high eosinophilia I thought it most likely he had a tapeworm, but the usual treatment with ext. filix mas yielded no result. After an interval of three days I again gave him one drachm of ext. filix mas, followed one hour later by a similar dose, but his stools were negative. He was also given santonin, but there were no roundworms or threadworms. Urine and faeces were examined for ova, with negative results.

The report on a gastric test meal was as follows: "Free hydrochloric acid, 40 per cent.; total acidity, 65 per cent.; lactic acid test negative; occult blood reaction positive. There is a small amount of mucus containing flakes of blood. This effect could, I consider, be produced by straining, and if there was difficulty in withdrawing the specimen I would not attach importance to the presence of blood."

His general condition was gradually becoming worse, and, after about a fortnight's stay, he decided to leave the hospital and returned home. Whilst in hospital his temperature went up once or twice to between 99° and 100°. After a week at home his temperature varied each evening between 101° and 102°. He became increasingly restless, and complained very much of insomnia. His anaemia was very pronounced, and I gave him ventriculin by the mouth, alternating this with hepatex intramuscularly. He was now entirely confined to bed, and his liver could be distinctly felt almost a hand's breadth below the costal margin. The stomach symptoms, which had been so marked a feature in the early stages, had now disappeared, but his general condition was very much worse, and he complained of exhaustion