admitted, that tuberculosis of the udder exists in 2 per cent. of dairy cows in the United Kingdom; this means that some 20,000 cows with active tuberculosis of the udder are to-day contributing to our milk supply, and some 100,000 quarts of milk teeming with virulent bovine tubercle bacilli are consumed each day in the United Kingdom. As a beginning, surely it is not too much to ask that these 20,000 cows with virulent disease of the udder be removed now and at once.

When it is remembered that even one diseased udder is capable of disseminating a huge number of tubercle bacilli, the bare idea of the amount of possible human tuberculosis from the milk of so immense a number of diseased cows is appalling. I regret I am unable to place before you any statistics bearing upon the prevalence of tuberculosis in cattle supplying milk to Belfast, but the following figures, taken from the report of the Medical Officer of Health of Manchester, Dr. Nevlin, are interesting in this connexion: During the year 1904, 432 samples of milk were examined, the number of farmers represented in the total being 318. Of these 318 farmers, 188 reside in Cheshire, and 21 of them (or 11.17 per cent.) sent tuberculous milk; 83 live in Derbyshire, and 5 of them (6.02 per cent.) sent tuberculous milk; 14 reside in Lancashire, and 1 of them (7.14 per cent.) sent tuberculous milk; 8 reside in Yorkshire, and 2 of them (25.00 per cent.) sent tuberculous milk. Are we in Belfast any better off in regard to the number of diseased cows supplying milk than Manchester? My firm belief is we are not. I am confirmed in this opinion from what I have seen when visiting some of the dairies within the city, and that much tuberculous milk is purveyed in our midst I think admits of no doubt. It is clear, therefore, that a large amount of tuberculosis in cattle exists, and the connexion between the disease in cattle and tuberculosis in childhood having been established, it follows that, if we would prevent the disease in children, the first and most important step is to stamp it out in cattle. In considering how this may be done it is necessary to remember that in tuberculosis, before the formation of tubercles in any part of the body, there is a stage of the disease of unknown duration during which the bacilli multiply and circulate throughout the body. To regard the disease as beginning with and being localized in tuberculous formations is to fail to recognize the bacillary stage of the disease, and is, therefore, wrong. This pre-tuberculous stage can only be detected by means of the tuberculin test; therefore, it becomes imperative that this test be applied to all dairy cattle, and that every cow reacting to this test be withdrawn and the carcass destroyed. To ensure success, however, compulsory and universal application of the principle is necessary. Fair compensation for the loss to the stock owner should be granted, and probably the sum of money that would be required for this purpose is the main objection to the enforcement of the measure by the Government. In the year 1865-6 an outbreak of cattle plague occurred in this country which involved the death of 233,000 head of stock. And what took place? The first consideration was the stamping out of the disease as quickly as possible and at any cost. But tuberculosis in animals is more widespread than cattle plague has ever been; it is always present in our herds, whereas outbreaks of plague are few and far between; and, what is worst of all, tuberculosis causes a vast amount of sickness and suffering and death and despair, which cattle plague does not. Surely this most astounding condition of things will not be permitted to continue much longer. The public—and, more especially, we members of the medical profession—should now and at once insist, both on hygienic and economic grounds, that it is urgently necessary to stamp out this awful disease of tuberculosis in cattle. It is estimated that the disease in animals may be eliminated in a single year, and, if so, what a year of triumph that would be!

To protect children from the ravages of tuberculosis, the following rules may be formulated:

1. *The notification of all births within twenty-four hours.* This would enable health visitors to examine into the state of the child's surroundings; to have the child removed, or precautions taken, should any case of tuberculosis exist in the house; and to give suitable directions for the care of the child, and especially to encourage breast-feeding.

2. *Complete control of the milk supply by the State.* This should include the application of the tuberculin test to dairy cattle, and the removal of all such as react to this test; cleanliness in the collection of all milk, and in the transmission of it from the dairy to the consumer; the removal of dairies from the centre of large towns and cities.

3. *Medical inspection of school children and school premises.* First, to detect and remove children who are actually ill or unfit to attend school; and, secondly, to ensure proper ventilation and sanitary arrangements in the schools, and to prevent overcrowding. The elementary principles of hygiene should be taught to even young children; to older children the principles of domestic hygiene and economy should be added.

4. *Housing reform.* Dwelling-houses in the poorer districts should be made more sanitary, especially with regard to the free access to them of sunlight and fresh air. Ireland is behindhand in this respect—a circumstance which may, in part, account for its high death-rate from phthisis. A levelling-up of the social and domestic conditions of the poor is urgently required; for of the 1,200,000 children born each year in the United Kingdom, fully one-fourth to one-third of them are born to want and squalor.

5. *Segregation of advanced cases.* All advanced cases of phthisis should be segregated as far as practicable and treated in special institutions set apart for that purpose. Children who are allowed to live in the house with a consumptive are exposed to serious risk.

6. *Notification of the disease should be compulsory.* By this means health officers would know where the disease existed, and it would enable them to take suitable precautions against the spread of the disease, by disinfection and other means.

With the second part of the question—What can be done to cure the disease?—I need not detain you long. I have said that the large proportion of tuberculosis in childhood comes within the purview of the surgeons, and with them the treatment may safely be left.

Unfortunately, the profession still feel a want of confidence in tuberculin, or a dread of its reaction, but it should be remembered that its use at the present time is very different from what it was when first introduced. Formerly tuberculin was administered by rule of thumb, and often with disastrous results; now, thanks to the brilliant researches of Sir A. E. Wright, and the discovery by him of the opsonic index, the dose of tuberculin, its effects, and the most suitable times for injection, can be regulated with scientific precision.

This discovery has, in fact, brought treatment with tuberculin within the realm of safe therapeutics, and the clinical success which has attended the employment of this treatment has firmly established its position as a remedial agent of the first importance. In addition to the use of tuberculin, our efforts to cure tuberculosis, or stay its progress, must include good and wholesome food, healthy hygienic surroundings, an abundance of pure air, and such drugs as cod-liver oil in combination with the hypophosphites.

HAS A PURIN-FREE DIETARY ANY SPECIAL THERAPEUTIC VALUE?*

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In the course of the past year I have on several occasions been asked by practitioners as to the value of a purin-free dietary, and it appeared to me appropriate to make this subject the basis of my lecture this afternoon.

NATURE OF PURINS.

Purins are substances constructed on the base C_5N_4 . Those of chief clinical importance are uric acid, xanthin, hypoxanthin, adenin, and guanin. These purins are present in certain articles of diet, in the tissues, and in the urinary excretion, occurring either in a free state or combined with albumen in the form of nucleic acid.

* Abstract of a lecture delivered at the Medical Graduates' College and Polyclinic.

(a) Purins in the Food.

Meat and meat extracts contain a large amount of purins; similarly, certain glandular organs, such as the pancreas and liver, are rich in purins. They are also present, though in smaller amount, in many vegetable foods—for example, beans, lentils, and oatmeal—and they are relatively abundant in some accessory articles of diet, notably tea and coffee. Purins which are taken in the diet are spoken of as exogenous purins.

(b) Purins in the Tissues.

Purins in the tissues exist chiefly in combined form in the nuclei of cells and in the muscular tissues. Xanthin and hypoxanthin occur in muscle extracts, adenin is yielded chiefly by decomposition of nucleic acid present in thymus, and guanin is derived mainly from the pancreas. The purins in the tissues are spoken of as endogenous purins in contrast to the exogenous purins of the dietary.

(c) Purins in the Urine.

Purins exist in the urine chiefly in the form of uric acid, xanthin, hypoxanthin, and adenin. Roughly speaking, about one-half of the purins in the urine are derived from the ingested food (exogenous purins), the remaining half being derived from tissue metabolism (endogenous purins).

THE PHYSIOLOGY OF PURINS.

There is an intimate relation between the various purin substances, this depending chiefly on the process of oxidation. Thus it has been shown experimentally that it depends on the facilities afforded for oxidation whether the product obtained be uric acid or one of the xanthin bases. It is believed that the same holds good in the living tissues, the decomposition of the nuclei of the cells leading to the formation of xanthin and hypoxanthin, which are in part oxidized to uric acid and excreted as such. Our knowledge of this subject has been much increased of late through the researches of Jones, Partridge, and Schittenhelm, who have shown that some tissues contain specific ferments which are essential for the conversion of one xanthin base into another, and for the conversion of the xanthin bases into uric acid. Schittenhelm has also shown the existence in certain tissues of a ferment oxidase which has the power of oxidizing and destroying the uric acid, and changing it into urea and other compounds. It is clear from the foregoing that on a diet which is rich in purins, the excretions of purin in the urine will be relatively high; and, on the other hand, when the diet is purin-free—such as milk, eggs, white bread, rice, fats, fruit, etc.—the purin in the urine will be reduced, being then derived solely from the metabolism of the tissues.

THE PATHOLOGY OF PURINS.

This centres largely round gout and gouty disorders. From the clinical standpoint it has long been recognized that the etiology of gout is closely connected with nitrogen metabolism, and with the formation and excretion of certain compounds of which nitrogen is a component. For many years it was held that uric acid was the causal factor in this disease, but the view is now widely held that uric acid plays little or no part in the actual etiology of gout. In recent years attention has been largely directed to the purin bases, with the result that gout is now generally regarded as a disease of intermediary purin metabolism. The recent discoveries regarding the ferments alluded to above have a distinct bearing on the excess of uric acid in the blood in gout, for, as Fletcher points out, it is possible that this excess may be due to the inhibition of the uric acid destroying ferment as well as to an excessive activity of the ferments which lead to the production of uric acid. It is clear that for the tissues to function properly there must be a proper relationship between the amount of purins to be acted on and the various ferments present in the tissues. According to this conception we have in gout a defect in one or more organs, revealed by the inability to produce the ferment or ferments required, as a result of which proper oxidation of uric acid does not occur, and the latter consequently accumulates in the tissues in the manner observed in gout. With regard to the views now widely held as to the importance of the relationship between the purin bases and gout, Chittenden has recently written: "Enough has been said to indicate that in gout it is not so much a disturbance of purin

metabolism as a perverted function of one or more organs and tissues which is of pathogenic moment." The writer is in entire agreement with this view. The fact cannot be too clearly emphasized that at the present time there is no evidence whatever that the purin bases, *per se*, are in any way more intimately concerned in the actual causation of gout and gouty disorders than is their ally, uric acid, which has now by common consent been discarded. This fact is of practical importance in treatment.

THERAPEUTICS OF A PURIN-FREE DIET.

In accordance with the views generally held, as to the etiological significance of purins in the production of gout, there is a marked tendency among the writers on the subject to attach special importance to a restriction in the amount of purins in the dietary, the view being apparently that, over and above a coincident restriction in the amount of animal protein food, special value attaches to the administration of articles of diet which are purin free. Dr. Potts, in a paper on the advantages of a purin-free diet,¹ records an interesting series of cases of chronic disease in which recovery from symptoms occurred under the administration of a purin-free dietary. Some of his cases had previously been treated for a lengthened period on more conventional lines without marked benefit. Dr. Potts concluded that the relief from symptoms was mainly due to the diminution in the amount of purin in the diet. My own view, based on observation of a large number of cases, is that there is no special therapeutic value in a purin-free dietary in the class of case in which such a régime is often prescribed, but that the undoubted benefit that may follow the use of this régime in certain cases is to be explained along lines other than the purin-free nature of the diet.

The distinct value of a purin-free dietary in certain cases was first clearly brought before me some years ago in the case of a young lady who came under my care in 1902, suffering from rheumatic pains and frequently recurring nasal catarrh. She had twice been the subject of intranasal operations at the hands of recognized experts without permanent benefit. The only other noteworthy point in the history was the fact that she had been troubled for many years with severe dysmenorrhoea, and had on two occasions been operated on by a gynaecologist for the relief of this symptom without material improvement. The usual diet of the patient was a liberal régime containing a considerable amount of nitrogenous foodstuffs in the form of meat and other rich foods. The treatment I recommended was a general restriction in the highly nitrogenous foodstuffs, with increase in the amount of exercise and some extra attention to the functions of the bowels and skin. Under this régime, which I have reason to believe was only partially adhered to, the patient reported a slight, but not noteworthy, improvement in the symptoms, and I lost sight of her for eighteen months. The patient returned to Edinburgh in 1905, and came to report herself. She now informed me that on the advice of a lay friend she had for fifteen months been living on a purin-free dietary, with a highly gratifying result. The rheumatic pains had disappeared, the attacks of nasal catarrh were very few and far between, and she no longer suffered from dysmenorrhoea. The patient's general appearance was very greatly improved, and there was no reason to doubt the statement that her general health was now at a much higher level than it had been for a long time previously. She expressed herself as thoroughly pleased with the purin-free diet (no meat, no soups, no tea or coffee, and no peas, beans, etc.), and had no desire to return to ordinary diet. This improved state of health was still maintained eighteen months later. It was perfectly clear to me that the patient had derived very great benefit from the dietary, but I was not convinced that the explanation lay in the deficiency of purins, and in the course of the past two and a half years I have sought light on the subject by special observations on over 60 cases of chronic disease which have been under my care and whose later history is known. In this series the symptoms of which the patient complained were regarded by the patients themselves or by their medical men as of gouty or rheumatic origin, and in the absence of any precise knowledge as to the nature of "irregular gout" and "rheumatism" one has perforce to accept this diagnosis. The leading symptoms were rheumatic pains,

headaches, neuralgia, nasal and naso-pharyngeal catarrhs, and depression both physical and mental. In a few instances only there were distinct evidences of declared gout—tophi in the ears, or joint affections.

One of the difficulties in arriving at a correct estimate of the value of any system of diet in the treatment of chronic disease is the fact that in nearly all cases the physician finds that it is essential in the interest of the patient to have recourse to measures calculated to improve the functional activity of one or more of the tissues of the body, for example, the skin, bowels, liver or other organs. This difficulty is in private practice insurmountable, and therefore the conclusion one arrives at as to the part played by diet in such cases can only be stated as a general impression.

The method followed in my observations has been briefly as follows: Ten of the cases in this series of varying grades of severity were put on a purin-free diet, which was maintained for periods ranging from a few weeks to over ten months; in the remainder the amount of purins in the diet was notably reduced, but not out of proportion to the reduction in the total amounts of nitrogenous food-stuffs. In many instances daily observations were made for short periods on the urinary purins, which were estimated by the purinometer.

Accessory measures of treatment were relatively as much employed in the purin-free-fed subjects as in those in which less attention was directed to the purin content of the food. I have made a careful comparison of the result of treatment of these cases, and found that the rate of recovery and the proportion of cases of apparent complete recovery is no higher in the patients fed on a purin-free diet than in those in which the purins are less restricted. As a matter of fact the only instances in which the treatment employed was entirely unsuccessful were those of two patients in the purin-free group. Both of these were severe cases of paroxysmal headache, one being specially noteworthy. This patient had suffered from extremely severe headaches of a paroxysmal character for over twenty-five years. She had consulted numerous physicians in different parts, and tried many systems of treatment, both dietetic and medicinal, without material improvement. As she had never tried a purin-free dietary, the case seemed to be a suitable one for this régime. After ten months of this dietary the patient writes stating that her condition is practically no better, the severity of the headaches being unabated.

The conclusion I have come to from practical experience of this subject is that there is no special therapeutic effect in a purin-free diet. The benefit that is derived from such a régime in certain cases would, I believe, be equally attained by the use of a carefully-planned system of feeding framed without special reference to purin contents. In some cases the restriction in amount of animal protein food is of special value, in others the diminution in the carbohydrate, and especially the sugars, is equally efficacious, and in others the restriction of various alcoholic liquors will suffice.

The points which should guide us in framing the dietary can only be laid down after consideration of all the available clinical facts in each case. I frequently find that the dietary of the patients who consult me needs no modification whatever, experience having taught the patient the value of a diet in which the amount of nitrogenous food-stuffs, purins, or carbohydrates is not apparently in any way excessive. Complete relief from their gouty symptoms is attained in such cases by measures directed to increase the functional activity of the liver, kidneys, skin, or thyroid gland.

The teaching of clinical experiences is therefore in perfect harmony with the teaching of the laboratory in showing that in gout it is not so much a disturbance of purin metabolism as a perverted function of one or more organs of the body which is of pathogenic moment.

REFERENCE.
1 *Lancet*, 1905.

UNDER the will of the late Mr. William Lyon, of Wanstead, who died on October 4th, Saffron Walden Hospital receives a sum of £500.

THE late Mr. Thomas Berry, of Manchester and Chester, who died on August 31st, left £1,000 each to the Clinical Hospital for Women and Children, Manchester; the Altrincham Provident Dispensary and Hospital; Salford Royal Hospital; and the Ancoats Hospital and Dispensary.

A CLINICAL LECTURE ON A CASE OF CEREBRAL TUMOUR ASSOCIATED WITH SUBJECTIVE SENSATIONS OF SMELL.

DELIVERED AT MIDDLESEX HOSPITAL.

BY H. CAMPBELL THOMSON, M.D., F.R.C.P.,

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GENTLEMEN,—The patient of whom I wish to speak to-day is a woman of 33 years of age. She first complained of her eyesight, and on this account she went to the Western Ophthalmic Hospital. There it was discovered that she was suffering from a slight degree of weakness of the left external rectus muscle and from double optic neuritis of considerable intensity, though her power of vision was still fairly good.*

The fact that the eyesight was the earliest symptom of which this patient complained must not lead you to think that optic neuritis is, at any rate in its earlier stages, necessarily associated with failure of vision. It is, indeed, common to find patients with advanced degrees of optic neuritis who have no idea that their vision is impaired, and hence it is necessary in every case where there is a probability of the occurrence of neuritis to make a routine practice of using the ophthalmoscope.

After the discovery of the ocular signs I was asked to see the patient, and some of you here may remember her coming up to one of my weekly demonstrations on nervous diseases. Later on she was admitted under my care into the Hospital for Epilepsy and Paralysis, Maida Vale.

Further examination showed that, in addition to the optic neuritis, headache, nausea, and a subnormal temperature were present, all of which are "general" signs of a cerebral tumour; but the pulse-rate, which is often slow, was in this instance about normal. These symptoms, then, taken together justified a diagnosis of cerebral tumour; and the next step, therefore, was to try to determine its position. Now, the power of localizing intracranial tumours depends upon our knowledge of the disturbance of function of that area of the brain in which the tumour happens to be situated; hence it is possible to localize tumours accurately only when there is a disturbance of those parts of the brain the function of which is known, and growths in other parts, the so-called "silent areas," often give no indications by which their localities can be defined.

But even when "localizing" symptoms are obtained our difficulties are by no means at an end, for it is still necessary to consider whether such signs indicate the primary seat of the growth, or whether they are the results of pressure from a distance, or of secondary changes; such as hydrocephalus, meningitis, and metastatic deposits in parts of the brain which may be some distance from the position of the primary growth.

There must, of course, often be a good deal of difficulty in arriving at a satisfactory solution of this problem; but, broadly speaking, the earlier the localizing symptoms appear, the more value can be attached to them as indicators of the site of the tumour. In the case now under consideration there was throughout only one localizing sign of importance, namely, a sensation of smell. This sensation of smell, which was always of a disagreeable nature, and which occurred with great frequency, was regarded as the key to the position of the tumour.

Many years ago Dr. Hughlings Jackson drew the attention of neurologists in this country to the occurrence of a group of epileptics who suffered from crude sensations of smell, which were often accompanied by "dreamy reminiscences," and a masticatory movement of the lips, tongue, and jaw, and placed the probable seat of the initial discharge in such cases in the region of the uncinate convolution in accordance with the physiological localization of smell and taste as determined by Ferrier and others.

The accuracy of this localization has since been abundantly proved by records of tumours of the anterior part of the temporo-sphenoidal lobe, though tumours in this

* I am indebted to Mr. George Thompson for a note of the observations made at the Western Ophthalmic Hospital.