Gulstonian Lectures :

ON

DIABETES AND SACCHARINE CONDITIONS OF THE URINE.

DELIVERED AT THE ROYAL COLLEGE OF PHYSICIANS,
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LECTURE III.

MR. PRESIDENT AND GENTLEMEN,—Towards the close of my last lecture, I endeavoured to bring under your notice the principal theories which have been advanced in explanation of the real nature of saccharine diabetes, and gave the various arguments which have been employed in support of and in opposition to each. I likewise endeavoured to present a short sketch of the important researches of M. Bernard upon the subject of glycogenesis: I showed you that sugar was constantly generated in the animal economy, and that the *liver* was the organ destined to perform this function; that this sugar-formation was entirely independent of the *nature* of the food, and even, for a time, irrespective of its exhibition. The experiments I then mentioned were, I believe, quite sufficient for the demonstration of this fact. I also stated that the function of the liver was completely under the influence of the nervous system; and that, when the latter was cut off, it entirely ceased, and sugar could no longer be detected in the organ. I likewise mentioned that irritation of certain portions of the nervous system, as the floor of the fourth ventricle, by exalting this influence for a time, led to an increased formation of sugar by the liver, and the consequent impregnation of the whole of the blood with this principle, thus causing its subsequent elimination by the kidneys; or that, in fact, artificial diabetes could be thus induced in any animal, even in one living on a purely azotized diet.

Before proceeding with this part of the subject, I should state that, in health, sugar is always found in the blood of the hepatic veins, and in that portion of the inferior vena cava between the entrance of these veins and the auricle, also in the right side of the heart, and in the pulmonary arteries; that, in the intervals of digestion, the remainder of the blood is free from this principle; but that, during full digestion, the amount of hepatic sugar is so much increased that the blood, even after it has passed through the lungs, still contains a notable quantity, yet insufficient to cause its excretion by the renal organs (for it has been shown experimentally that a certain amount is necessary in order that this should ensue). In diabetes, however, the case is altered, and sugar can be distinctly detected in the blood from the arterial and venous systems, although sometimes it exists in most minute quantities when digestion is not going on; and my friend Dr. Parkes has in one instance found it altogether absent under these circumstances.

From the experiments of Dr. Pavy, it would seem that the liver sugar is chiefly destroyed or converted into some other body (possibly lactic acid) in the *pulmonary* organs; but that that which escapes into the arterial and venous systems gradually undergoes change, which in the portal system becomes rapidly completed; and that the presence of oxygen is not essential for the transformation, as it is found to occur when an animal is made to respire hydrogen gas in place of atmospheric air.

M. Bernard has, within the last few days, proceeded a step further in his investigations upon this subject, and has obtained from the livers of animals a substance which, by a species of fermentation, is convertible into sugar; and this glycogenic principle possesses properties which give it peculiar interest both to chemists and to physiologists.

It will be remembered that, when a liver is thoroughly washed, so as to remove all traces of sugar from it, saccharine matter is again formed after a short time, simply by exposure to the air, and totally independent, therefore, of the influence of vitality. It has now been shown *how* this occurs; that it is from the presence of a peculiar matter in the substance of the liver, which is not removed by washing with *cold* water, and which, under the influence of the animal ferment in the organ, gives rise to the production of sugar; and that it is this ferment, and not the peculiar sugar-forming principle, which be-

comes injured or destroyed by heat; the latter being simply dissolved by the agency of boiling water, which can be made use of for the purpose of extracting it.

The following is a sketch of the mode of proceeding in order to obtain this sugar-forming substance. The liver should be perfectly fresh, and still warm and bleeding, and taken from a healthy animal immediately after death. It is of no moment whether the animal has been fed on an exclusively animal diet or not: in fact, the nature of the food does not influence the result. The organ should be cut into thin slices, and immediately thrown into water which is kept constantly boiling, in order that the tissue may be at once coagulated, and the sugar-forming substance therefore not left in contact with an active ferment for a sufficient time to cause its change into sugar. The pieces of liver should be afterwards bruised in a mortar, and the whole kept boiling for about three-quarters of an hour or an hour; the quantity of water being just sufficient to cover the substance. By this means, a concentrated decoction of the glycogenic principle is obtained. By afterwards straining through a linen cloth, and pressing the boiled tissue, and then passing the whole through a filter, an opaline-looking liquid is obtained, which, on the addition of four or five times its volume of strong alcohol, gives rise to an abundant flocculent precipitate, of a yellowish white colour, consisting of the glycogenic substance, with traces of sugar, bile, and some unknown nitrogenous matters. This precipitate, when thrown upon a filter, frequently washed with alcohol, to separate the above mentioned impurities, and afterwards dried, has the appearance of a greyish gummy substance, possessing the property of redissolving in water, and of being again entirely precipitated by strong alcohol. This matter can be further purified by being dissolved in a boiling concentrated solution of potash for a quarter or half an hour; afterwards thrown down by the addition of a large quantity of alcohol, and subsequently washed with cold water; and the trace of adhering carbonate of potash can be got rid of by redissolving in hot water, saturating the carbonate of potash with acetic acid, and again precipitating with alcohol, and drying.

The properties of this substance are the following:—It is starchy in appearance; without odour or taste; impressing the tongue with a sensation similar to that produced by starch; it is neutral in reaction; it dissolves or becomes suspended in water, to which it imparts an opaline appearance; it gives, with iodine, a tint varying from a dark violet to maroon red, seldom quite blue; under the microscope, it exhibits nothing characteristic; heated with soda-lime, it emits no ammoniacal fumes, showing the absence of nitrogen; its solution does not affect the copper tests, nor does it undergo the vinous fermentation with yeast; it is precipitated from its watery solutions by subacetate of lead, by animal charcoal, and by alcohol, in the latter of which it is completely insoluble. The substance has been found to possess other properties which closely ally it to hydrated starch, as all the circumstances which operate in converting this latter into dextrine and glucose sugar are able to produce the same change in the former; such as prolonged boiling with weak mineral acids, the action of vegetable diastase and analogous animal ferments, as the pancreatic juice, saliva, or blood. After such change, the solution is readily acted upon by the copper tests, and also by yeast. The modification in the principle produced also by torrefaction, and by the limited action of ferments and mineral acids, resembles in all respects the dextrine obtained from starch, being insoluble in alcohol, not affected by iodine, incapable of reducing the salts of copper, and of fermentation with yeast, and turning to the right the plane of polarisation of a beam of polarised light.

From these experiments of M. Bernard, it appears perfectly established that the livers of all animals, even those of dogs, fed *exclusively* on meat, possess the power of forming a substance analogous to vegetable starch, which is capable of being afterwards changed into dextrine and sugar. The *formation* of this substance would seem to be a vital act, slow but constant in its operation, as is the phenomenon of nutrition. The *change* into dextrine and sugar appears a purely chemical act, and able to be accomplished quite independently of vitality.

Having given a short account of the principal facts recently brought to light, as far as they pertain to our subject, I will now endeavour to show what, if any, support they receive from morbid anatomy and clinical observation.

The liver has often been noticed, at the *post mortem* examinations of diabetic patients, to be full of blood; the congestion hepatic in character. Sometimes the weight of the organ is much above the average: for example, M. Bernard relates one case in the practice of M. Rayer, in which the liver was found

much hypertrophied, almost twice the average normal weight. I am not aware, however, that any constant and characteristic change in this organ has been observed; for it is not uncommon to discover the alterations I have now mentioned in subjects who have died of other diseases, unattended with saccharine urine.

The amount of sugar in the livers of diabetic patients who have died suddenly has not been found greater than after similar deaths occurring to previously healthy subjects. I allude to the percentage amount: of course, where the organ is hypertrophied, the total quantity will be increased.

With regard to the existence of this principle in other tissues and fluids, I may remark that, after sudden death, all the tissues and fluids of the body give evidence of the presence of sugar, and not unfrequently in large quantities. I have obtained it from the brain, and from the fluid of the ventricles, also from the blood, as well as from the liver. When, however, death takes place slowly, we may be unable to discover its presence in any of these organs or fluids.

Since the remarkable experiment of the artificial production of saccharine urine by irritating the floor of the fourth ventricle has been made known, many observers have sought in their *post mortem* examinations of diabetic subjects to ascertain whether this portion of the nervous system exhibits any morbid appearance. In two or three instances, I have been unable to detect any; but I have heard of others being more successful. In one case related to me, there was increased vascularity of the floor of the ventricle, but not corresponding to the supposed root of the eighth pair of nerves; in a second, there was likewise a similar condition. We have, however, as yet far too few reliable data to offer any opinion on this point; but I think we may fairly conclude that, although morbid anatomy has shown nothing which would appear to militate against M. Bernard's view of the origin of diabetes, still, at the same time, it has not elicited any facts which can be looked upon as strongly in its favour.

Is there any evidence in support of this view derived from clinical observation? Diabetic patients often suffer from some hepatic derangement, as indicated by the want of biliary colouring matter in the fæces, and also by some fulness over the right hypochondrium, with tenderness, and sometimes pain; not unfrequently distinct enlargement of the liver can be ascertained to exist; but these symptoms are by no means constant, and, in fact, are not unfrequently absent during the whole course of the disease. The same may certainly be said with regard to such phenomena as are referrible to the nervous system, with the exception of the condition of the mental faculties referred to in my first lecture, and which I consider to be secondary to the morbid condition of the blood, and to the general exhaustion produced by the affection.

The chief arguments in favour of Bernard's view are derived from the investigation of some of the causes of the disease, and more especially from the physiological researches we have already detailed. That *injuries* of portions of the nervous system will produce saccharine urine I have already stated; and in support of the opinion that diabetes appears to be occasionally caused by mental influence, I have also brought some evidence. Dr. Prout laid stress on this point; for, in alluding to the immunity which the lower animals are supposed to enjoy, he remarks: "Can the exemption be referred to the absence of that fertile cause of bodily disorder in human beings, the influence of *mind*?" If the influences which I have classed under the third head in the etiology of this affection can really be proved to be exciting causes of the disease, it would be much in favour of the opinion that it is, at least sometimes, due to an over-exalted sugar formation in the liver; but, as yet, there is no very great amount of proof of their real efficiency, though the probability that they are at times operative is very great. I have already mentioned that a gentleman has assured me that he can produce saccharine urine at will, by inducing a fit of indigestion; and I may also remark, that my friend Dr. Harley, several years since, when residing in France, published a short paper, demonstrating that saccharine impregnation of the urine occurred in animals when irritating substances were injected into the vena portæ. The substances employed by this gentleman were irritants, such as alcohol, ether, chloroform, and ammonia; with all, the effect was the same. From the results of his experiments, Dr. Harley is led to believe, that diabetes may be produced artificially by the introduction of stimulants into the vena portæ, and that they act by irritating the branches of the pneumogastric nerves, whence the impression is transmitted to the nervous centres,

and again to the liver through the splanchnic nerves. More recently, I believe, M. Bernard has produced a similar result by injecting these matters into the duodenum itself.

If we regard diabetes as depending simply upon an increase of the glycogenic function of the liver, then it becomes easy to understand why a diabetic patient, even on a purely animal diet, may still pass a considerable quantity of sugar in the urine; a fact we shall soon prove to be well established, but difficult to explain on most of the other hypotheses which have been offered. But if M. Bernard's idea of the liver possessing the power of converting all the saccharine matters received by the portal blood into fat, be correct, then a simple increase of the sugar-forming property of the liver would not account for the great increase of this principle when a diabetic patient is allowed amylaceous substances in his food.

Lastly, on carefully examining all the facts which have been brought forward, we may, I think, be able to form some idea of what diabetes really is, and assuredly of what it certainly is not. In the first place, we have abundant evidence to prove that it is not a *renal* affection, and that any alterations found in the *kidneys* are simply secondary to the great increase of their function which the morbid state of the blood calls forth. The same applies, in an equal degree, to the opinion of diabetes being primarily an affection of the stomach; for we have had complete demonstration that the liver in health is the great sugar-forming organ of the body, a fact *unknown* at the time when the disease was referred directly to the stomach.

As to diabetes being dependent, not upon any increased formation of saccharine matter, but on an imperfect destructive power existing in the blood, although most of the phenomena are explainable on this hypothesis, still it is by no means satisfactory, as at present there is no proof of this absence of power to effect the ulterior changes. And certain facts, besides those which I have already brought forward, appear to militate against the existence of this deficiency; for there is no marked difference in temperature between diabetic and other subjects; and, in certain experiments made some years since by Professor Graham, no peculiarity was discovered in the amount of carbonic acid which they expire. Upon the whole, I should be disposed, at present, to regard diabetes as due, in the first place, to an increased formation of sugar by the liver, produced by some alteration of function in the organ; and at the same time that its glycogenic power becomes abnormally increased, I should consider that it loses the property, which exists in health, of arresting and changing into new principles (as fatty substances, etc.) those saccharine matters which are brought to it by means of the portal blood. If we view diabetes in this light, we shall, I believe, be able to explain all the phenomena which the disease presents, at the same time I am aware of no facts which can be brought forward in opposition to it. It explains, for example, why sugar can generally be detected in the urine of diabetic patients, when subjected to the most rigorous animal diet, and, at the same time, why amylaceous matters usually so greatly augment this saccharine impregnation.

THERAPEUTICS OF DIABETES.

We have now to treat of the last division of our subject; namely, the therapeutics of diabetes.

As the nature of the disease was but ill-understood till within the last century, the treatment was necessarily very indefinite. Dr. Mason Good thus sums up: "The intentions in the early plans was to invigorate the debilitated organs, whether local or general, and to give firmness and coagulability to the blood. This was the practice of all the Greek physicians, and it regulated the practice to a very late period in the history of the disease." "The vital intention," says Dr. Willis, "is performed by an incassating and moderately cooling diet; by refreshing cordials, and by proper and seasonable hypnotics." Hence agglutinants of all kinds were called into use; as tragacanth, gum arabic, and the albumen of eggs; and these were united with astringents, as rhubarb, cinnamon, and lime water, with or without an anodyne draught at evening as might be thought prudent. Sydenham carried the tonic and cardiac part of this plan considerably further than Willis; for while the latter chiefly limited his patients to milk or a farinaceous diet, the former allowed them an animal food with vinous beverage. "Let the patient," he says, "eat food of easy digestion, such as veal, mutton, and the like, and abstain from all sorts of fruits and garden stuff, and at his meals drink Spanish wine." This plan continued in force until within a comparatively recent date; the principal drugs made use of being the various bitters and stimulants, as bark, simaruba, myrrh, assafetida, valerian, camphor, cantharides, and vege-

table and mineral astringents, as kino and catechu, opium, chalybeates, copper salts, and alum.

To attempt to detail the various plans of treatment founded upon the many opinions which have, from time to time, been held as to the nature of diabetes, would occupy the space of many lectures, and be, I fear, not only uninteresting, but unprofitable. I shall, therefore, confine my remarks to the most important methods which have been advocated, and more particularly to such to the real value of which I can personally bear testimony.

Those who have had experience in the treatment of diabetes at the present day must allow that the *diet* is the most important point to which attention should be directed; and that, when this is neglected, all our efforts may prove ineffectual even to relieve the sufferer. Before, and for a long time after, the discovery of the saccharine condition of the urine in cases of diabetes, no particular regard was paid to the composition of the diet, no knowledge existing of the easy conversion of one principle into another; hence we find even Willis recommending to his patients a milk or a *farinaceous* diet. It was only at the commencement of the present century that the dietetics of diabetes were at all insisted upon. For some years Dr. Francis Home had shown the value of an *animal diet* in this affection: but it is to Dr. Rollo that the medical profession is especially indebted for fully pointing out and insisting upon its importance; and since the publication of his treatise the plan of treatment by an animal diet, more or less exclusive, has been followed both in this country and abroad. After Rollo, the chief advocates who have published their opinions have been Drs. Bardsley and Christison, in this country, and on the continent Nicolas and Gueudeville, MM. Dupuytren and Thénard, and M. Bouchardat.

I shall at once proceed to point out the value of a strict dietetic plan of treatment, and show the amelioration of the subjective symptoms which the patient then experiences, as also the improvement which it effects in the condition of the renal secretion.

The reason why a strictly animal diet has been proposed and advocated is very simple; namely, that by such the patient is made to abstain from all substances which can *readily* be converted in saccharine matter; and, although we have seen that the liver most certainly possesses the power of forming sugar from azotised principles, yet it is only within the last ten years that chemists have allowed the possibility of such conversion. Notwithstanding that the principle upon which this plan is founded may not be altogether quite correct, still the practical result has been in the highest degree satisfactory. As far as my experience enables me to speak, I can state that the good effects which have resulted from following this treatment have always been of the most marked character, and far beyond the possibility of being attributed to mere chance or accidental circumstances. I say always; for I believe I can positively assert that in no one case have I found a patient who did not derive considerable benefit, although he may have subsequently succumbed from the occurrence of secondary diseases. The amelioration usually takes place within the first few days, and is manifested by the diminution of the thirst, usually of the appetite also, if previously voracious; the tongue assumes a more healthy character, the skin becomes less harsh, the strength and weight of the patient augmented, and the urine very much diminished in quantity. I have many notes which most forcibly illustrate the truth of this statement; and at the risk of being thought somewhat tedious, I must bring a few of these under your notice.

I may remark that these results have been obtained from cases under my charge within the wards of the Hospital, and that the greatest care has always been exercised in order to obtain accuracy.

In the first case, the patient, P. C., a man aged 32 years, before change of diet, exhibited the following symptoms: Dry and harsh skin; intense thirst; sweet and sometimes acid taste in mouth; tongue brown, furred at the back, and covered with a tenacious mucus; appetite often ravenous; uneasiness at epigastrium, with some little tenderness over that region; bowels confined, and faeces hard and dry in character; great fatigue on exertion; pulse 84, small, and easily compressed; weight eight stone four pounds; no cough. After he had remained in the Hospital several days, on the ordinary extra-full diet and a pint of porter, with other bread, etc., procured from different patients, and taking no medicine, saving a little camphor mixture, the quantity, specific gravity, and weight of sugar passed for five days were such as I enumerated in my first lecture, the average of the five days (there being no

great differences between the mean and extremes) being as follows:—

Average daily quantity of urine, 354 fluidounces.

Specific gravity of ditto, 1032.5.

Daily weight of sugar thrown out, 11953 grains, or 1lb. 11oz., 140 grains, avoirdupois.

The patient was then somewhat restricted as to amylaceous matters, being allowed meat, eggs, captain's biscuit (about three ounces), and a large bunch of greens, with a little whiskey. He was found, however, to procure some bread, although none was allowed. At the end of a week the note was: Some slight perspiration, less thirst, appetite not so ravenous, tongue cleaner, pulse 84.

Average urine of the last five days, 172 fluidounces.

Specific gravity of ditto, 1033.

Daily average of sugar, 4644 grains, or 10oz., 269 grains.

The patient was then placed nominally on a purely animal diet, and in a private ward: but being suspected of stealing small quantities of bread and vegetables, he was allowed two ounces of crust. The next four days gave the following averages:

Average quantity of urine, 191 fluidounces.

Specific gravity 1033.

Daily average of sugar 5484 grains, or 12oz., 234 grains.

The patient being next voluntarily placed under lock and key, as it was evident from the last result that he did not keep strictly to his diet (which, in fact, he himself confessed), and the two ounces of bread absolutely the only vegetable food allowed, the result was,

Quantity of urine 110 fluidounces.

Specific gravity of ditto, 1035.

Quantity of sugar, 2673 grains, or 6 oz., 48 grains.

The next five days, he being still under lock and key, and every one searched who entered the ward; and the diet being *purely* animal, consisting of meat, eggs, milk, beef tea, tea, and a little brandy, the result was,

Average quantity of urine, 114 fluidounces.

Specific gravity of ditto, 1029.

Quantity of sugar, 1901 grains, or 4 oz., 151 grains.

For the three following days after, he being released from his prison, but strictly enjoined to adhere to the prescribed diet, the average results were nearly the same; viz.,

Quantity of urine, 100 fluidounces.

Specific gravity of ditto, 1032.9.

Quantity of sugar, 1679 grains, or 3 oz., 367 grains.

In this individual, therefore, we observe that, within a few days, simply by means of dietetic treatment, we were able to diminish the quantity of urine from 354 fluidounces, to about 100 fluidounces, and the daily amount of sugar from 26 ounces to rather less than 4 ounces avoirdupois. We observe, however, that the specific gravity was not much altered, but on the whole a little decreased. Can anything be more conclusive than this result? Yet it is, I believe, one which can generally be obtained; and did time allow I could, from my note books, bring before you other evidence equally convincing, obtained from numerous patients, in whom I have made observations more or less similar to those just detailed. The note of the general state of the patient at the time when the last results were obtained, is as follows: Much improved in appearance; tongue clean, less red; not much thirst; perspires pretty freely; pulse 80; he can now lift up a hundred weight; not long since he could scarcely move a quarter.

To be more convinced that diet, and diet only, produces these results, let us look at the effect of a speedy return to mixed aliments in another case of this disease, where I purposely made the change.

G. B., aged 25, a man who had suffered from well marked symptoms of diabetes for about seven months, when taking the ordinary diet of the hospital, consisting of meat, bread, potatoes and milk, passed, as the average quantity of his urine, for seven days, 267 fluidounces, of specific gravity 1042. During another five days, with meat diet and bran cakes, taking also some cod liver oil and very small doses of tincture of opium, the average quantity of urine was 91.5 fluidounces, of specific gravity 1038. On a return, however, to the ordinary diet of the hospital, the oil and tincture of opium remaining the same, the average of seven days was as high as 216 ounces, of specific gravity 1036. In this patient the symptoms kept pace with the alteration in the urinary secretion; for at the end of the first period, the tongue was red and covered with viscid mucus, and the thirst intense. At the termination of the second period, the thirst was much diminished, the tongue more natural, and the appetite less ravenous, there was also a

distinct improvement in strength; but a few days after again partaking of the bread and potatoes, all the characteristic diabetic symptoms returned.

[To be continued.]

Reviews and Notices.

THE SANITARY REVIEW AND JOURNAL OF PUBLIC HEALTH: including the Transactions of the Epidemiological Society of London. Edited by BENJAMIN W. RICHARDSON, M.D., L.R.C.P. London: Richards. April 1857.

THIS is a continuation of the *Journal of Public Health*; the title having been altered in consequence of mistakes having sometimes arisen, from another periodical, of a different character, bearing a very similar name. The number before us is by no means inferior to any of its predecessors in interest.

The first article is on Medical Scientific Reform; in which the writer—the editor, we presume—points out the reforms needed (especially in the way of simplification) in our nosologies, in our physiology, in descriptive anatomy, in the *Pharmacopœia*, in therapeutics, and in pathology.

Mr. Alfred Haviland gives an interesting article on the Plague at Dunster, in Somersetshire, in 1645. During the prevalence of the disease, the inhabitants of a long street “made an attempt to shut the enemy out by making all their houses communicate, so as to avoid the necessity of going into the street.” Doors were made between the different houses, some of which still remain. The readers of Sydenham will remember that it was at Dunster that the cases occurred which are recorded by that writer as illustrating the good effects of copious bleeding in plague.

Three writers, Dr. Ayres, Dr. Hawksley, and Mr. Nicholas, expound their views as to the best method of solving the question—What is to be done with the sewerage of London? Dr. Ayres is for returning to a properly regulated system of cesspools; Dr. Hawksley proposes a plan for receiving the contents of water-closets into a receptacle from which the fluids should be drawn off, while the solids are retained and deodorised; and Mr. Nicholas is of opinion that a continuous and sufficient water-flow is what is wanted for the proper drainage of London.

The Report of Dr. Waller Lewis, on the Health of the London Postmen, has already been referred to in this JOURNAL. The remaining original communications are, Notes on Vegetable Poisons (Hemlock), by Dr. Pickells of Cork; the completion of Mr. W. I. Cox's paper on the Diseases of Colliery Operatives; a collection, by Dr. Winn, of Notes from Evelyn's Diary on the Meteorology and Epidemics of the seventeenth century; and the Graveyard Statistics of Warwick and Leamington, by Dr. John Webster.

In the department of Sanitary and Social Science is commenced an able and elaborate report on the sanitary condition of Huddersfield. The points here described in regard to this town are: its geographical and geological features; water supply; increase of population; and pauperism.

The occurrence of epidemic and endemic diseases in thirty-nine towns and districts is chronicled for the months of December, January, and February. It is satisfactory to notice that the number of observers goes on increasing, and that nearly all the original staff have continued their labours steadily. Much valuable information is contained in this part of the *Sanitary Review*; and, if they are continued as at present, the reports will hereafter serve as the basis of some important deductions.

The Epidemiological Society publishes this quarter an excellent paper by Dr. W. R. E. Smart, of the Royal Navy, on the Principal Features of the Climate of the Crimea, and its Effects on Health, as observed during the First Year of the Occupation by the Allied Forces.

This is a mere outline of the principal contents of the *Sanitary Review*: those who wish for further information on the various subjects must “inquire within”, where they will find much that will repay them for their trouble, and that will, we think, lead them to agree with us that this valuable periodical is not only keeping its ground well, but is steadily advancing in merit.

THE CHANGE OF LIFE IN HEALTH AND DISEASE. A Practical Treatise on the Nervous and other Affections incidental to Women at the Decline of Life. By EDWARD JOHN TILT, M.D., Senior Physician to the Farringdon General Dispensary and Lying-in Charity; etc. pp. 307. London: Churchill. 1857.

THIS is an expansion of a small work on the *Diseases of the Change of Life*, published some years ago by Dr. TILT. Having devoted his special attention to the subject, and having moreover enjoyed much experience, he now comes again before the profession with a work which is likely to be of some value. But, while we thus give a general verdict in favour of Dr. Tilt, we must say that in one of the phases in which he appears, he shines with a very obscure light. We allude to the physiological portions of his work. The science of physiology is already hampered enough with incorrect observations, and illogical deductions; and Dr. Tilt certainly goes farther than many will be disposed to follow him. For instance, he “takes it for granted that the solar ganglia are an important centre of nervous power, capable of reacting on the various parts of the body by some subtle invisible fluid analogous to electricity, which I shall speak of as ganglionic nervous fluid or aura”? and in describing a phenomenon which he calls “nervous heat” (as exemplified by blushing), and referring it to the operation of the ganglionic nervous system, he considers his observations to “confirm the assertion of the older physiologists; for Hippocrates noted shivering and an unusual development of caloric to be a sign of conception, Galen considered the reproductive organs to be a source of caloric for the system, and Brongniart discovered that even in plants reproduction is attended by an appreciable increase of their usual temperature”!

This is questionable physiology; but, beyond it, there is much to commend in Dr. Tilt. He is a laborious collector of the statistics of his subject; and hence his book is enriched with numerous tables relating to the periods of commencement and termination, and the duration of menstrual function, and to the relative frequency of various diseases in women at the change of life. In his description of the symptoms and treatment of the diseases occurring at the change of life, Dr. Tilt has judiciously commented on the observations made by other British and by continental physicians, so that his work may be regarded as an epitome of all our knowledge on the subject—the author's original observations forming the basis. The value of the work is increased by the carefully reported histories of above fifty cases.

Advising our readers to turn over rapidly the few pages containing Dr. Tilt's physiological fancies, we recommend the rest of the book to their careful perusal, as well calculated to afford them guidance in regard to a class of cases which are frequently troublesome to the practitioner.

A DICTIONARY OF PRACTICAL MEDICINE: comprising General Pathology, the Nature and Treatment of Disease, Morbid Structures, etc. Part xviii, being Part ix of Volume III. By JAMES COPLAND, M.D., F.R.S. London: Longmans. 1857.

THE recently issued part of Dr. COPLAND's *Dictionary* contains the termination of the article Tubercular Consumption, the articles Tympanitis, Urinary Bladder, Urine and its Deposits, Urticaria, Uterus and Appendages, Vaccination, and Vagina and Vulva (in part). We observe with much satisfaction an