CRITICAL REMARKS

ON

SIR ANDREW CLARK'S THEORY AND TREATMENT OF "RENAL INADEQUACY."

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IT must be well known to the readers of the BRITISH MEDICAL JOURNAL that the late Sir Andrew Clark has described, with the copiousness and clearness of diction which he always had at his command, a class of cases to which he gave the name of "renal inadequacy." His first public statement on this subject was made in a paper read at a meeting of the Medical Society of London; an abstract of which, with the discussion thereon, was published in the medical papers (1879); a more complete and detailed account of the distinguished author's views is contained in an address delivered before the Metropolitan Counties Branch (Hackney District), and published in the BRITISH MEDICAL JOURNAL of February 24th, 1883.

The cases of so-called renal inadequacy are described as those "in which the kidney, without any sensible alteration of structure that our modern means of investigation will enable us to determine, cannot produce a healthy urine. Such kidneys produce a urine which, assuming the quantity to be a quantity of health, is low in density and is deficient in solid constituents, principally the constituent of urea and its congeners." "I call this state," he says, "renal inadequacy." He goes on to explain that "people who have this renal inadequacy are characterised by three things particularly." They have a curious inability properly to repair damages done to them by accident or by disease. They cannot repair the injury inflicted by a common accident, or recover satisfactorily from an attack of pneumonia. Then they are peculiarly vulnerable; they often catch cold, from which they do not quickly recover. "They are people who, without apparent reason, get pneumonia, pleurisy, pericarditis, and the like. Then, thirdly, you can never be sure of the result of the performance of an ordinary surgical operation upon them." They may die from hæmorrhage after a simple operation, or become pyæmic after the opening of an abscess. It is further remarked that these patients are made worse by a liberal diet, and that they usually improve, while the density of the urine is increased, on a restricted dietary. This is the description of this class of cases, given, for the most part, in the author's own words. It should be added that the urine is free from albumen and tube casts, and two cases are mentioned in which after death no structural change in the kidneys was discoverable.

Now the theory of renal inadequacy implies that kidneys which are structurally sound are unable to discharge their excretory function. The result of this should be that "urea and its congeners" being formed as usual, accumulate in the blood; there should be a uræmic condition identical with that which is known to occur in the last stage of renal degeneration. The blood, however, appears not to have been analysed. At any rate, although Sir Andrew Clark tells his patient that his "chimney is choked," and that he "must not put too many coals on the fire," there is no evidence that the scanty excretion of urea has for its result an accumulation of that material in the blood.

Another invariable result of an accumulation of urinary excreta in the blood is high arterial tension with increased cardiac impulse, and in prolonged cases the physical signs of hypertrophy of the left ventricle are present. These conditions appear not to have been observed in cases of renal inadequacy. In addition, then, to the *a priori* improbability of structurally sound kidneys failing to discharge adequately their excretory functions, there is an absence of those physical conditions which invariably result from the retention of urinary excreta in the blood. What, then, is the explana-

tion of the enfeeblement of body and the derangement of health which Sir Andrew Clark has quite accurately described?

During the discussion of the paper at the Medical Society of London Dr. Routh said: "There was no proof that the author's dictum was correct, and he inclined to believe the ailment was due to defective assimilation, and therefore lessened amount of salts in blood and urine rather than to renal inadequacy." This gives in a few words the probable explanation of the phenomena.

Dr. Saundby, in a letter criticising Sir Andrew Clark's theory, says:² "He asks us to accept the doctrine that these patients possess kidneys which, although free from structural change, are functionally far inferior to most kidneys in a very advanced stage of chronic organic disease."

Sir Andrew Clark mentions amongst "the symptoms and signs most commonly associated with renal inadequacy" those of "flatulent dyspepsia." In these symptoms we have an indication that the earlier stage of the digestive process is defective, and it is reasonable to suppose that this defect extends through the successive stages of the imperfectly understood processes by which the food is so assimilated as to repair and nourish the various tissues, and to take the place of materials which by disintegration and metabolism become waste and excrementitious products; and it is conceivable that a defect in the process of assimilation may be associated with a diminished formation of urea and other metabolic products of nitrogenous food and tissues³. It is agreed by all physiologists that the function of the kidneys is not to form urea, but to separate that which is formed elsewhere and conveyed to the kidneys by the blood.

The condition which has been called renal inadequacy may, I think, be instructively compared with the state of the hepatic and renal secretions during the collapse stage of cholera. One of the most constant results of choleraic collapse is the almost complete suppression of bile and urine; yet however prolonged may be the collapse, jaundice never occurs and the blood contains no excess of urea. The reason is that the constituents of bile and urine are formed only in very minute quantities, and the explanation of this is not difficult. During the state of collapse the amount of blood which passes through the lungs is greatly reduced, and as the blood is the channel by which oxygen enters the system, the oxidation of the blood and tissues is reduced in proportion to the lessened circulation. The chief constituents of bile and urine are products of oxidation, and their diminished formation during the stage of collapse is a necessary and intelligible result of the defective supply of blood and oxygen. That this is the true explanation of the hepatic and renal "inadequacy" during the stage of choleraic collapse receives interesting confirmation from the fact that in a woman who is suckling her infant the secretion of milk continues, apparently undiminished, during the stage of collapse, and the breasts become painfully distended. This fact I have myself observed, and it has been recorded by various writers on cholera—from 1832 by Magendie, to 1866 by the physicians of the London Hospital. The explanation of this continued secretion is that the chief constituents of milk—casein, sugar, and fat—are not products of oxidation. Therefore the mammary secretion is abundant, while the hepatic and renal secretions are reduced to the scantiest proportions.⁴ That this is the true physiological explanation of the almost complete suppression of bile and urine during choleraic collapse is, I think, unquestionable, and that the condition is fairly comparable with Sir Andrew Clark's renal inadequacy can scarcely be disputed. We know from the history of cholera and the various modes of treatment which different theories have suggested, that calomel has often been given with the object of acting on the liver, and restoring the secretion of bile; and that it would help to restore that secretion is probable, not, however, by any direct influence on the liver, but by its evacuant action

¹ *Lancet*, vol. ii, 1879, p. 801.

² BRITISH MEDICAL JOURNAL, vol. i, 1883, p. 537.

³ Dr. M. Foster says, "The whole story of proteid metabolism consists at present mostly of guesses and of gaps."—*Physiology*, Fifth Edition, p. 760.

⁴ See the chapter on Epidemic Cholera in the author's *Medical Lectures and Essays*, p. 125, et seq.

on the bowels it would facilitate and quicken the elimination of the poison which is the primary cause of the arrested circulation, with the resulting defective oxidation to which I have just now referred.

During intrauterine life there is pulmonary, hepatic, and renal "inadequacy," but as soon as respiration is established the correlated work of the liver and the kidneys commences and continues.

It must be admitted, I think, on careful consideration, that the theory of defective digestion and assimilation satisfactorily explains not only the deficiency of urinary solids, but the leading characteristics of the patients so well described by Sir Andrew Clark—their imperfect repair of injuries the result of accident or disease, their proneness to contract disease, and the uncertain result of any surgical operation which they have to undergo. As a result of defective food conversion and assimilation, the tissues of these patients are imperfectly nourished, and the materials for repairing injuries the result of disease or accident, are faulty.

It is quite intelligible that these patients should be benefited and the density of their urine increased by a restricted diet. The nutrition of the tissues depends not upon the amount of food taken into the stomach, but upon the due conversion and assimilation of food materials, and an enfeebled digestive apparatus can more effectively deal with a comparatively scanty than with a too liberal dietary.

It is not without interest to refer to another class of cases of defective digestion and assimilation, in which the urine has characters the opposite of those found in cases of so-called renal inadequacy. The urine is of high specific gravity—1030 or more. It contains an excess of urea, as much as 3 per cent., and of other nitrogenous products, including uric acid and kreatinin; and the reducing action of these two substances upon alkaline copper solutions has sometimes led to the erroneous diagnosis of glycosuria.⁵ Now, in this class of cases, as in those in which the urine is of low density and deficient in its normal solids, the kidneys are not at fault, since their function is to separate the urinary excreta, whether scanty or superabundant, which reach them through their blood vessels. The term "renal inadequacy" is as incorrectly applied to the first class of cases as would be that of "renal superadequacy" to those in which the urine is of high density with an excess of normal solid constituents.

Many of the laity suppose that diabetes is a disease of the kidneys, and it is sometimes difficult to make them understand that the sugar, which is so abundantly secreted, is formed elsewhere than in the kidneys. This obvious error is, I venture to say, analogous to that which is implied in the term "renal inadequacy."

In the treatment of his cases of so-called renal inadequacy Sir Andrew Clark wisely insisted upon a restricted and carefully regulated diet, but, influenced by his theory of defective renal excretion, he appears to have attached undue importance to "get all the supplementary, complementary, excretory organs to do fully their appointed work; that they may, if possible, take some share of the defective work of the kidney upon their shoulders." On the other hand, he omits to mention any direct means for assisting the digestive organs to discharge their functions. This, however, is a class of cases in which great benefit is often derived from a combination of vegetable bitters—quinine and nux vomica or strychnine—with or without dilute hydrochloric acid, and with or without some form of pepsine, to be taken immediately after each meal.

Although I have ventured to criticise the theory of renal inadequacy, it is due to the memory of the late Sir Andrew Clark to acknowledge that he did good service to the profession and to mankind by directing attention to this class of cases, and by insisting upon the importance of a careful and systematic examination of the urine.

⁵ See a paper by the writer on Some Common Sources of Error in Testing for Sugar in the Urine.—*Lancet*, July 7th, 1894, p. 11.

PRESENTATION.—Dr. Brogden has been presented by the lady members of the Canton Branch of the St. John Ambulance Association with a handsome gold signet ring in recognition of his gratuitous services as lecturer.

PRESIDENTIAL ADDRESSES

DELIVERED AT THE

ANNUAL MEETINGS OF THE BRANCHES

OF THE

BRITISH MEDICAL ASSOCIATION.

ON DEATH-RATES.

Delivered at the Annual Meeting of the Worcestershire and Herefordshire Branch.

By G. H. FOSBROKE, M.R.C.S., D.P.H.CAMB.,

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In the first place, I desire to tender you my best thanks for having elected me as your President for the coming year, and in the next to express regret that the comparatively short notice I received of this meeting, coupled with considerable pressure of official work, has prevented me from preparing, or attempting to prepare, an address worthy of the occasion.

Having devoted the past twenty-two years of my professional career exclusively to the practice of State medicine, I trust I may ask your indulgence for a short time while I lay before you, in a superficial fashion, some ideas I have formed in relation to the branch of our profession with which I am intimately associated.

DEATH-RATES AND THEIR FALLACIES.

Crude death-rates are now so generally appealed to, as a test of local sanitation, that I think it is quite time we began to instil into the minds of the public that, unless checked in various ways, they often lead to fallacious conclusions. In drawing inferences from the rates of mortality presented by different localities, it should be said that no true comparison can be made unless the death-rates are considered individually and collectively, and, in addition to this, various other points should be carefully weighed.

Unfortunately, the actual enumeration of the population only takes place once in ten years, and the census taken in 1891 shows that great differences have been found to exist between the estimated and the enumerated populations of urban as well as rural districts. Until a quinquennial census is established the only fairly reliable method of checking such estimates is to obtain the number of inhabited houses from the assessment books for the year, and multiply this by the average number of inhabitants for each house as compared with the last census.

But even this method involves the fallacy that new houses which have been erected may be of different class from those previously existing, and may therefore contain a different average of inmates per house. In rapidly increasing localities, however, this method of estimating the population will yield more reliable results than the one usually adopted, which is based on the assumption that the same rate of increase will be maintained as in the previous intercensal period. On the other hand it is manifest that in many rural districts, where there has been an actual decrease in the population during recent years, this method of estimating the population from the rate books is the only one by means of which the number of the inhabitants can be approximately ascertained.

But granting that the estimated populations of different localities are fairly accurate, there are various fallacies to be guarded against in comparing the calculated rates of mortality. For example, in comparatively small districts there will be considerable fluctuations of the mortality rates from year to year, so that it is only by taking the averages of a series of years that any correct inference can be drawn.

With a small number of births there may be a high rate of infant mortality in any given year, and a few deaths from measles and whooping-cough may yield a high death-rate from zymotic diseases, even though the general death-rates may be much below the average. Or again the general death-rate may be exceptionally high for any given year, and the rate of infant mortality and zymotic death-rate may, one or