men? He certainly has his reward as matters stand at present. Immense fortunes have been made and are being made in virtue of the most unblushing falsehoods. I certainly think our Government is also much to blame for allowing these secret so-called remedies to be sold.

Another form of cheating the doctors is that adopted by certain newspapers which, in answer to correspondents, prescribe for all kinds of ailments. I presume such papers employ a legally qualified medical man to give these advices and prescriptions. I mention these cases in order to point out that I believe the only way to put a stop to such practices is to adopt something on the lines which I have suggested. If a system of health insurance were generally adopted, quack medicines and newspaper prescriptions would soon come to an end, for then the doctor would become a teacher as well as a physician. His duties would lie more in the way of teaching the people how to keep well than in the way of curing them when ill. And then a grateful public would come to appreciate the benefit of good health, and would not grudge to pay well the man or woman who kept them on the pleasant highway of health. For the public the present system is most wasteful. I hold strongly (and every medical man does the same) that the great majority of illnesses is preventable. If every man were to pay a yearly premium for his health he would soon come to value it. He already insures his life against loss by death as a provision for his family or for himself in old age, and all people of sense see that it is a wise thing to do. He insures his house and furniture against loss by fire, and only foolish and improvident people neglect it. Even the lower animals and our crops are insured. Most wonderful of all that health, that which makes life worth living, should be almost forgotten. By a recent Act of Parliament houses must be built in such a way as to prevent, as far as possible, their taking fire; and in every large town a well-organised fire brigade, with telegraph and telephone at hand, is constantly on the watch to hasten to extinguish fire at the first alarm. But, alas for the poor human tabernacle, how often the alarm is given when it is ready to tumble into its grave!

As I have said, the poorer classes have taken the first step in this health insurance movement; and, as was natural in a commercial age, a conflict has taken place between them and the profession. To come off victorious in that conflict you must not fight the clubs, but foster them. "Heap coals of fire upon their heads." They are friends in disguise. With the profession fully organised, there should be no difficulty whatever in extending the club system to the whole community. Taking rental or income as a basis of fees, the arrangement of details should be an easy matter. The agreement should be for a year only. The health premium should be paid in advance, as in fire insurance; and should any be foolish enough not to insure his health, a year's premium should be charged for the first visit in the event of a doctor being called. A man should be at full liberty to consult or call in as many medical men as he pleases for an ordinary fee, provided he is insured, and at the end of the year he will be free to insure with anyone he pleases. As a proof that this system is perfectly practicable, I may mention that for many years it has been carried out in China and Japan among the European populations in these countries, where it has been found to work admirably, to the great benefit of doctor and patient alike. If medical men are true to themselves, they will soon be able to dictate their own terms to the public, for in the matter of medical attendance they will hold a monopoly. But let me point out that, in a well-regulated State, whenever a private enterprise becomes a monopoly it should be taken over by the State, or at least should be regulated by the State, such, for instance, as the Post Office and Telegraphs, and, by-the-by, our railways. Even municipal corporations do the same in the matter of police, gas, and water supply, for the benefit of the community at large. Hence it will follow as a natural and final step that the medical profession will become a great department of the State, when the present system of Public Health will become merged in the still greater one of National Health. Then let us hope that instead of spending many millions every year in such a barbarous pursuit as the science and art of how to destroy human life, our rulers will come to see the sweet reasonableness, not to speak of the Christian expediency, of

spending it on saving human life. All will then realise that

The wise physician skilled our wounds to heal,
Is more than armies to the public weal.

Then every medical man and woman will be a medical officer of health, and the present holders of that office will soon be allowed to retire on a well-earned pension. Then at last we shall have a Minister, of Cabinet rank, not only of Public, but of National Health, whose duties, responsibilities, and honours will be the most important in the Government of these realms. I hope we, the members of the Northern Counties Branch, will share the glory of this great victory.

A THIRD REPORT ON THE SUPRARENAL GLAND AND THE CAUSATION OF ADDISON'S DISEASE.

By A. G. AULD, M.D.

(From the Conjoint Laboratories of the Royal Colleges of Physicians and Surgeons.)

IN the present communication I desire to summarise some of the observations which I have been able to make since my last paper on this subject, which was submitted to the British Medical Association at the Bristol meeting in 1894.¹ On that occasion I endeavoured to demonstrate: (1) That the medullary portion of the suprarenal gland is its essential constituent, the cortex holding at best a subsidiary position; and (2) that the function of the medulla, or at least one of its functions, is to secrete a substance, "colloid" in character, which is transmitted to the blood. Considerations were also adduced relative to the rôle which this substance plays in the blood, its trophic influence on the sympathetic nervous system, etc.

These statements were in opposition to the views as to the functions of the gland which had until then generally held sway. The belief had been that the cortex was the secreting portion of the gland, and the medulla an excretory or depurative apparatus. But since my investigations, the experimental results of other workers have tended to confirm in all respects the conclusions at which I arrived.

It is right that I should mention, however, that contemporaneous with these observations, a German observer, Dr. P. Manasse, described certain appearances in a tumour of the suprarenal, which he took to indicate a secretion substance; and he also described, more particularly in the case of bovines, somewhat similar appearances within the blood vessels of the gland.² I did not see his paper until several months after publication, but have just to say here that while his views as to a secretory action on the part of the gland are in agreement with mine, his description of the appearance of the secretion is undoubtedly erroneous. This point will be considered further on.

First, the normal process of secretion will be considered, and afterwards certain sources of fallacy will be pointed out.

ON THE PRODUCTION OF THE SECRETION OF THE MEDULLA AND ITS PATH OF ENTRANCE INTO THE BLOOD.

After a long and varied series of investigations made chiefly on man, horses, oxen, sheep, dogs, rabbits, etc., I have arrived at certain definite conclusions respecting the mode of secretion by the epithelial gland cells, the transmission of this secretion to the blood, and certain other interchanges which take place betwixt the secreting cells and the blood.

In the first place, the most actively secreting cells are situated in that layer of the medulla which lies nearest the cortex, that is, nearest the zona reticularis. The arrangement of these cells and their appearances are very striking, more especially in the horse, in which they seem to form a special layer of branching tubes. Speaking generally, the glandular cells are arranged in solid cylinders, which occupy the meshes of the network of blood vessels. This meshwork forms elongated and branching spaces in the outermost part of the medulla (that is, the part next the cortex),

¹ BRITISH MEDICAL JOURNAL, October 4th, 1894. (The first paper was published in the JOURNAL of May 12th, 1894.)

² Virchow's Archiv, Band cxxxv, Heft 2, p. 263.

and more distinctly alveolar spaces in the central parts. In some animals—for example, sheep, rabbits—the alveolar arrangement obtains pretty much throughout, whilst in man it is more of a mixed character, but more distinctly alveolar than otherwise. As each cell is in contact with a blood vessel at one end, it follows that in the elongated cylinders the cells on longitudinal section will form double rows, having a blood vessel on either side. In the natural state these cells are absolutely colourless.

When about to become active the cells of the columns become highly elongated and their nuclei recede from the blood vessels to the very furthest point, until in this way the nuclei of any two opposite rows meet, forming thus a double row of nuclei. On either side the protoplasm of the columnar cells will be clearly seen stretching to the blood vessels (Fig. 1). In like manner in the alveolar arrangement of the cells, the nuclei will appear crowded together in the centres of the alveoli, while the columnar protoplasmic portions radiate out to the encircling blood vessel.

The protoplasm of the cells thereupon assumes a finely but

Fig. 1.—From the sheep. Shows the disposition of the secreting cells round a blood space. The blood has undergone homogeneous coagulation. The streaming disposition of the columnar protoplasm of the cells is seen, and the nuclei have receded to those of the opposite row. $\times 500$.

markedly granular character, and the granules become so disposed as to form frequently longitudinal streaks, perpendicular to the wall of the blood channel; simultaneously the ends of the cells become flattened against the delicate membrana propria, through which the secretion *streams directly into the blood*. (Fig. 1. Note that in this particular instance the contents of the blood vessel are in the form of a homogeneous coagulum.)

It sometimes happens that the secretion breaks down the membrana propria altogether, and the blood and cells come into direct contact. (Fig. 2. The blood is normal in this case.)

But this is not all. The cells not only discharge into the blood, but they likewise abstract from it certain materials which enter into their substance. They seem at any rate to absorb certain pigments which are subjected to the action of a ferment and transformed into a colourless substance.³ Sometimes, indeed, entire red corpuscles will be seen within the cells, rapidly becoming decolorised. This, however, is detected with difficulty, and not to be regarded as an ordinary or regular occurrence. Howsoever prepared, the colourless substance within the cells is now a chromogen, and is returned into the blood as part of the specific secretion. Both within the cells and in the receptive blood this

substance gives striking colour reactions with certain agents; whereas blood not receiving the secretion, in other portions of the gland, will give a negative reaction.

The secretion when first discharged into the blood is of a fluid consistence, but is apt, under certain circumstances, to assume the form of masses of colloid material. In a case of Graves's disease, alluded to by me on a former occasion,⁴ in which the medullary cells were in a state of hyperactivity, small, variously shaped coagula were frequently present in the vessels, and even appeared to block many of the smaller ones. These coagula are, however, not to be confounded with the homogeneous clotting of the blood *en masse*, as in the illustration (Fig. 1). In like manner we find that sometimes a local secretion occurs amongst groups of cells, undischarged into the blood, and then we have a mass of secretion lying amongst, and to some extent displacing, the cells (Fig. 3). This mass is apt to be confounded with the contents of blood vessels, but its shape, immediate contact with the cells, and especially its deep staining reactions, suffice to distinguish it from the coagulated contents of vessels.

Fig. 2.—From the horse. A blood vessel surrounded by secreting cells which have broken through the membrana propria. The blood and cells are in intimate contact. $\times 500$.

SOURCES OF FALLACY WITH RESPECT TO THE APPEARANCE OF SECRETION IN THE MEDULLA.

In persons dying under various conditions, but especially such as are characterised by a high bodily temperature, many of the medullary cells of the suprarenal gland will be found to contain, or else to be broken up into, spherical bodies of a colloid-like substance. The most striking example of this which I have come across was in a case of acute general tuberculosis wherein a few minute tubercles had invaded the suprarenals. These colloid globes were present in great numbers, and were frequently of a large size in the structurally healthy or non-tuberculous portions of the medulla. The secreting cells themselves were evidently in a high state of stimulation judging from the size and appearance of their nuclei. These bodies result from a transformation of the protoplasm of the cells, and show peculiar staining qualities. Photographs of some of them will be found in my last paper. It is to be stated, however, that they are occasionally to be found in conditions of apparently perfect health. It is certain that they escape into the blood vessels, and may be seen floating in the blood stream. Herein we have additional evidence of the passage of the secretion of the cells directly into the blood. Horne has noted similar bodies in the veins of the thyroid.⁵ While lying amongst the cells these bodies are sometimes tinted green, indicating that they become pas-

³ I hope to discuss this more fully in a subsequent paper.

⁴ BRITISH MEDICAL JOURNAL, January 25th, 1896, pp. 205, 206.

⁵ *Journ. of Anat. and Physiol.*, vol. vii.

sively impregnated with pigment absorbed from the blood in the manner described, and of which they thus also afford additional evidence. They are evidently connected with a morbid stimulation of the secreting cells.

Again, we have occurring, more especially in the freshly removed suprarenals of healthy animals (mammalia), and occasionally in man, hyaline or homogeneous thrombi adherent to and forming moulds of many of the blood vessels of the medulla, such as that represented in Fig. 1. Appearing as they often do in vessels into which secretion is evidently passing, it might be imagined that they represent the actual secretion itself. This is the error into which the foreign observer referred to at the beginning of this paper, has allowed himself to fall. It is true that these thrombi take on the characteristic brown stain when freshly treated with bichromate of potash which certainly shows that they contain the secretion, and likewise that they dissolve in alcohol. It is indeed clear that they are not identical with the hyaline thrombi described in particular by Recklinghausen,⁶ as

Fig. 3.—From the horse. In the centre a colloid-like mass is seen surrounded by cells which have shrunk and are apparently in a resting state. $\times 700$.

the result of certain pathological changes in the blood, which are insoluble in alcohol, but that they represent a blood clot presenting peculiar characters is undoubted. Moreover, they often contain blood in their interior in various proportions and in various areas. My explanation of them is simply this: The blood is mixed with a secretion which is of course rich in fibrinogen. It has already been shown that a disturbed or at least a peculiar relationship must normally exist between the hæmoglobin molecule and the stroma in the case of the red corpuscles, inasmuch as certain colouring substances are undergoing dissociation from the cells. These factors would be highly favourable to the production of a coagulum immediately preceding death. I may add that in persons dead of acute pneumonia, I have seen a widespread precipitation of fibrin in the medulla of the gland.

[In conducting these observations, some abnormal conditions of the gland were encountered. Of these, mention may be made of the occurrence of an adenoma (in man) circumscribed, and situated in the medulla, which it had expanded so as just to form a capsule round it. The proper tissue of the adenoma resembled that of the cortex, and was highly oleaginous. In the case of a Persian cat which died of suffocation on the eighth day from a rapidly-growing tumour in the larynx, the adrenals were converted into white structureless bodies, of cartilaginous consistence, a hyaline form of degeneration which I have not found described hitherto as occurring in them.]

⁶ *Handb. d. allgem. Pathol.*, pp. 134 473

MEMORANDA: MEDICAL, SURGICAL, OBSTETRICAL, THERAPEUTICAL, PATHOLOGICAL, ETC.

A METHOD OF CLOSING THE OPENING AFTER GASTROSTOMY AND ENTEROSTOMY.

I was interested in reading Mr. Harrison Cripps's description of a method of temporarily closing gastrostomy and enterostomy wounds, and should like to describe a method almost

India-rubber disc with sutures.

identical, which I have found useful in permanently closing the same wounds. In April, 1894, in a case of pyloric stenosis, after the failure of pyloroplasty, I established a communication with the stomach in order to dilate with bougies the strictured pylorus. Later on it was necessary to close this somewhat large opening. An oval disc of sheet india-rubber, larger than the fistula, was coiled up and inserted in the way Mr. Cripps directs; before passing it into the stomach it was pierced by a double row of plated wire sutures, six or eight in number, each suture completely going through the disc twice, and forming a loop on the back. The free ends were loosely held while the plate was let into the stomach, and after unfolding it was drawn up flat against the mucous membrane by the double row of sutures; the edges of the fistula were freshened, care being taken to cut away the coated mucous membrane. This can be best done by drawing it out and cutting it off all round, allowing it to shrink back again inside; then, by means of a handled needle with a suitable curve, each wire was threaded separately and brought through the coats of the stomach and the abdominal wall from within outwards, close to the edge of the opening. In this way one row of sutures passes through one side of the opening, and the other row through the other; the edges can then be brought together and the sutures tied externally; the opening is thus effectually closed against leakage by what is practically a button suture, with the button within the cavity. Each suture can be cut and drawn out whole, and the plate allowed to drop into the stomach or intestinal canal. In the case referred to the acid gastric juice dissolved the portions of wire in contact with the india-rubber, which was thus liberated and vomited a fortnight later.

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ANTICARCINOMATOUS TOXIN.

LAST June, a lady, single, aged 67, consulted me about a tumour in the left breast, which was undoubtedly scirrhus, and was removed by a surgeon in Bournemouth; some glands which were affected in the axilla were also removed. She made a good recovery, and returned home.

About the middle of March she returned, sent by her medical adviser in the country, who said the right breast showed a growth which, in view of her history, he feared was cancerous. It was fusiform, about $1\frac{1}{2}$ inch by $\frac{1}{2}$ inch; hard, painful, tender, with darting pains, which the patient said were exactly like those in the other breast at the commencement, and also several glands in the neck on the left side were enlarged, growing rapidly, painful, and causing pain, by pressure on the cervical plexus down the arm, and oedema of the hand and wrist. The surgeon, on seeing her, did not think it a favourable case for operation; the breast he did not think to be cancerous, but the glands he thought certainly were, and must have been affected before the operation, but being so small presented no symptoms.