the diagnosis by means of the glands; and I believe that frequently glands that are causing no trouble will show, by culture, some bacterial growth. Hence, while that suggestion is helpful in cases that we believe represent toxemia rather than definite bacterial infection of the joint, yet I do not think it is of a great deal of use in cases of definite bacterial infection. I was much struck with Dr. Stern's valuable observation of an arthritis of the hip caused by the ingestion of veal.

THE SYNDROME OF ADRENAL INSUFFICIENCY *

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To the neurologist many cases are referred with the diagnosis of neurasthenia. Many of these are psychologic, being in reality a fixed idea of incapacity derived from the suggestions of medical men or friends, or, perhaps, because of some internal mental conflict which makes the motives for invalidism paramount over those for normal active life. Such patients often actually do become weak, either from mere inaction, or from the malassimilation induced thereby and the worries they permit themselves; this is a familiar picture in a traumatic neurosis,¹ so-called. But among those labeled neurasthenics, there is a certain proportion of patients in whom hysteria is not the factor at all; I do not here refer to psychasthenic patients, in whom anxiety and other features of psychic genesis dominate the picture; nor do I include the *formes frustes* of such psychoses as cyclothymia (manic depressive insanity), hebephrenia, etc. I refer to cases in which definite somatic disturbances are ascertainable, and in which any psychologic symptoms present are dependent on these. Among such cases of "neurasthenia" are persons with latent abdominal or pelvic inflammations, *petit Brightisme*, arterial hypertension and the metabolic disorders which precede it, early stages of cerebrospinal lues, especially that called paresis, and quite often perversion of function of the glands, more especially the thyroid.

Among such cases, I have encountered several in which none of the foregoing conditions were present, but in which the patients were suffering from a profound depression of the neuromuscular functions, quite different from that which is induced mentally or from disturbances of the brain. These are characterized by great asthenia, with lack of concentration, by low blood-pressure, sometimes by psychologic peculiarities, and sometimes by changes in pigmentation. I select a few as paradigms:

Cases may be divided into three classes:

1. Those in which there was improvement or recovery.
2. Those in which there was not.
3. Those which ended fatally.

CASES WITH IMPROVEMENT OR RECOVERY

CASE 1.—*History*.—A man holding a high position under the federal government was brought to me by his friend, Dr. Gerrish of Portland, Maine, in 1911. He complained that he

was totally unable to bring himself to deal with the responsibilities of managing the situations with which he had to deal, besides which he was greatly depressed mentally and believed that his usefulness was ended. He "can do work if it does not demand responsibility or the handling of men," for he "finds that his judgment one day takes a certain course only to be deflected the next day, even though the facts may be the same." He can make up his mind neither to accept a yachting invitation to Europe he has received, nor to take a professorship he has been offered for next year. He was pale, languid, had flabby muscles and subcutaneous tissues. He had typhoid at 18, and pleurisy at 20. Two years before he had a rise of temperature and a rapid and irregular heart, the cause of which was unknown. He has always taken his work responsibilities very hard. He is a bachelor of a somewhat retiring disposition, which his need for long inspection trips in the West has accentuated.

Physical Examination.—This was negative, except that there was a very slight tremor, the heart sounds were feeble, the systolic pressure was 100 and diastolic pressure 70.

Treatment and Result.—The psychologic situations were entered into with the patient very thoroughly, and it was explained that a simple physical depression from want of adrenal juice prevented the brain from accomplishing the processes necessary for the complex psychologic adaptations which had always caused stress on account of his over-conscientious way of regarding his relations with others. He was told that worrying would only aggravate the distress, and that his mental incapacity did not arise from what he feared, impending dementia; it would disappear on rectification of his physical state, the nature of which was explained to him. His diet was regulated and he was ordered much rest along with active exercises in short periods. He was given dried adrenal gland tablets, 2 grains thrice daily. The following week there was an improvement, the systolic blood-pressure was 98, diastolic 70; ten days later the pressures had risen to 114 and 80, respectively, he felt better and looked fresher. The following week after sleeping much, he felt better, but still had no spring; the blood-pressures were 112 and 70, respectively. He was staying with friends, worrying less and clearing up his work preparatory to a vacation in the Maine woods. Just before leaving, two weeks later, his pressures were 113 and 80, respectively; he was now more hopeful and more comfortable in mind; the pulse rate remained 70 throughout.

In the fall of 1912 he returned very much better, the dose of adrenal substance having been reduced until finally he went without it; the blood-pressure runs around 118 and 80, and although he has never completely regained his spring and ambition, he is much better, "feels fit," and has undertaken all the work for the government which he had planned.

CASE 2.—A mechanic, aged 57, was referred in February, 1912, by Dr. Jackson; he had done no work after an attack of malaria the preceding September, because he had been very weak and dizzy and had a throbbing in the abdomen. Examination showed a tremor a little like that seen in paralysis agitans, but occurring only on spreading the hands, and a slight tremor of the hands and face; there was slight asthenia, and a hint of von Graefe's sign, especially when he was made to look down rapidly. The blood-pressure was systolic, 108; diastolic, 78; no other abnormalities were found. He was returned to his physician with a reserved prognosis, and a recommendation for massage, a proper standard dietary, and adrenal substance. These measures improved him so much that he returned to work and has been well ever since. His physician says that he has never seen such a transformation.

CASE 3.—*History*.—A professor of economics, aged 44, was referred to me by Dr. Newell in March, 1913, because of headaches for six years, especially when tired after using the eyes. Twenty-one oculists had failed to relieve him in this country and in Europe. An internist had found nothing the matter with him. He complains also that at times his whole body is sore, especially the neck, and he often awakes with a pain over the sacrum, dull and heavy, radiating and intermittent, which may be removed for a time by a bath; there

* Read before the Section on Practice of Medicine at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

¹ Because of lack of space this article is abbreviated in THE JOURNAL.
1. Williams, Tom A.: Idea and Emotion in Traumatic Neurosis, Jour. Abnormal Psychology, 1910; Psychic Effects of Accidents, Tr. Southern Soc. Ry. Surg., and Monthly Cyclopedic, 1912, v, 47; v, 650, 722.

is no neuralgia and he sleeps well. It is significant that though he says he cannot work because of the eyes, he easily tires also when read to. He was much worse since grip a month before.

The patient had scarlet fever when a sophomore, without kidney disease, followed by insomnia, which recovered while he was a school superintendent in the country. He has no cause for worry, his hygiene is excellent, he formerly exercised much, but now does not feel like it, and loafs a great deal; he lacks sexual desire.

Examination.—This reveals a tired voice, exaggerated reflexes, great tenderness to pressure, and atrophic state of skin and hair, which he says is a family character. Blood-pressure is 114 and 78; there are no morbid psychologic phenomena.

Treatment and Result.—He was ordered massage, active exercise in wood chopping, and adrenal substance, 4 grains twice daily. In a fortnight adrenal was reduced to 2 grains. The only change was the disappearance of hyperesthesia, which I attributed to the massage. After a month, the voice was less tired, thinking and talking were easier, the muscles were stronger. However, headaches were still easily provoked, and asthenopia was still marked; blood-pressure was practically the same. The dose of adrenal was increased to 4 grains again. After this, there was a general improvement, but the patient found that if he extended his work beyond four hours a day he was totally unfit the following day; he was, however, doing a great deal of work in spite of this, even to completing a valuable work on the tariff in time for an insistent publisher. In this respect, he reminds one of Herbert Spencer, who had to limit his work to about four hours a day.

CASE 4.—History.—A woman, aged 38, was referred in February, 1914, by Dr. Cooper of Hinton, W. Va., because of a postpuerperal psychosis, which greatly accentuated spells of melancholy which she had had for some years. The analysis of these showed that she felt the burden of child-bearing, which she wished to cease; but her husband was a hard man, of rigid views. She was well-developed and nourished, but food had no taste and she had lost interest in life. Blood-pressure was 112 and 84, and there was brown pigmentation of the linea alba, palate and forehead. She was placed at rest in a hospital and massaged and given adrenal substance in a dose of 2 grains twice daily. In a week, blood-pressure had fallen to 106 and 86, and the following day to 90 and 64, respectively. Practically no rise occurred for ten days. Then the dose of adrenal substance was doubled, whereupon there was an immediate rise of blood-pressure until it reached 118 and 94, where it steadily remained for a week even after she left hospital. After this, she went home; and I am informed that she remains well, while the dose of adrenal substance was reduced. She was very difficult to manage, as she desired to leave the hospital and return to her husband, and was obstinately resistant to all reason to the opposite; this idea persisted even after her recovery.

CASE 5.—History.—A single man of 40 was referred to me by Dr. Bowen, in November, 1912. He was engaged for six months and was obsessed by a feeling that he was disqualified because of impotence. "Worrying about this had run him down so much that he lost his self-control," although he was no longer worried about that; the prospect of marriage in three weeks so horrified him that he no longer wanted to work; he wanted to go and hide; he had the belief that he "was down and out," and that he would lose his job as well. Telling his fiancée had not relieved him in the least, although she was most sympathetic. He had recovered from nervous indigestion some years ago until these troubles came. He had taken many drugs, including chloral hydrate. He was quickly fatigued after a short walk. His physician advised him to marry and go to Atlantic City, but he could not face it, being so "autosuggestible" as he put it; all he could do was to hang around his boarding house, where his fiancée lived.

Examination.—This showed exaggerated reflexes, small pupils, sunken eyes, very large, soft, weak pulse without cardiac dilatation, pigmented abdomen, and blood-pressure 102 and 80. Psychic examination was gone into most thor-

oughly, but it showed no important features, there being no night terrors, and the dreams, whether pleasant or unpleasant, not having pathologic significance. He was prescribed adrenal gland and wet packs to induce sleep. Three days later, the packs not having been taken, the blood-pressure was 100 and 80. The cooperation of his fiancée was enlisted, and his physician reports to me that he fully recovered and married; but I have not ascertained his present blood-pressure.

CASES WITHOUT IMPROVEMENT

CASE 6.—History.—An ethnologist, aged 30, was referred by Dr. Henning, in February, 1914, because, as he put it, "his mind feels as a shadow only, and for two years most of the time nothing seemed real." The condition had begun suddenly two years ago, from what was believed autotoxication. He first noted it while doing professorial work at Columbia University when he could not clearly focus his thoughts, and was very much alarmed at it. As a matter of fact, he was a good deal concerned about his physical health for some years, having intestinal flatulence especially after worrying, which he did much; now and then he would have a foul tongue, severe indigestion and dizziness, and headaches in the morning, and he had attributed his condition to disordered metabolism. A love affair aggravated his condition; but this was duly settled by his marriage, which, however, did not improve his health.

He consulted a New York neurologist, who laughed at him and said his nerves were disordered, and ordered a vacation, which he took without benefit. He had a weak, heavy feeling, especially in the arms, and sudden insomnia without cause. During field work among the Indians in Oregon he began to feel better for a while, but finally became so ill that he went into a sanatorium, where a diagnosis was made of a psychoneurasthenic. There he gained 20 pounds, and felt practically well for a few weeks. Returning East in the train, he caught cold, and lost 8 pounds in ten days. Since then, three months before, he has felt out of sorts a great part of the time.

Examination.—The reflexes were slightly exaggerated, the frontal reflex very markedly (this is obtained by tapping over the zygomatic ridge just in front of the antitragus, when a sharp twitch of the eyebrow occurs). The tongue was flabby and white, except just at the tip. The blood-pressure was 102 and 78; the patient was very swarthy, as he said he had always been. Moderate smoking and some constipation were the only other features noteworthy.

Treatment and Result.—The patient was given a standard dietary, massage and adrenal substance, 2 grains per day. In ten days the blood-pressure had become 108 and 86; he was irritable, had sinking spells in the chest, felt presentiments, started in his sleep at times, his eyes ached, and his feet became cold. He was sent to bed. Two weeks later, after being up two days, the blood-pressure was 90 and 68, and he felt very tired; his mind was not clear and there was pigmentation of the palate. The dose of adrenal substance was doubled; he was given one tablet of thyroid substance daily in addition. Three days later, the pressure was 104 and 78, and he was found to have increased 5 pounds in weight. Wood chopping was prescribed, and later on the blood-pressure was 117 and 88; but he felt bad. Four days later the blood-pressure was taken by Dr. Lemon, whom I had asked to cooperate in his care, when it was reported to be 112. The next day, after a sleepless night and a day of work, it was 98 and 68, and he had lost 2 pounds. I found he had taken no adrenal substance for five days because he had vomited after taking a decomposed portion. Eight days later the blood-pressure, taken by Dr. Lemon, was 100; three weeks later, 110; the next day, 110 and 78. The patient had been at work typewriting some notes, for he could do no thinking. A week later, blood-pressure was 100 and 82, and the pulse was very weak; he was prescribed 14 grains of adrenal substance per day. He thought it made him feel ill and gave it up; four days after, the blood-pressure, taken by Dr. Lemon, was 110. A week later, blood-pressure was 100 and 65, respectively, since when it has varied between this and 110. Meanwhile a blood examination was made by Dr. John Nichols, which was as follows: Red corpuscles,

5,900,000 per cubic millimeter; hemoglobin, 85 per cent.; corpuscular hemoglobin ratio, 0.72; leukocytes, 13,300 per cubic millimeter; proportion of white to red corpuscles, 1:440; small lymphocytes, 33.3 per cent.; large lymphocytes and large mononuclears, 8.3 per cent.; polymorphonuclears, 43.7 per cent.; eosinophils, 13.7 per cent.; mast cells, 1 per cent. The large proportion of eosinophils caused us to look for intestinal parasites. The examination of the feces was negative, and we are at a loss to account for this phenomenon.

The only result of the treatment is that the patient is now worrying a good deal less, and I am in hopes that he will learn to content himself with a good deal less output of work, that his functional inadequacy will not increase, and that a slight improvement may occur from the large dose of adrenal substance that we are now giving.

CASES ENDING FATALLY

CASE 7.—History.—The 17-year-old daughter of a Boston physician, a brilliant girl, began to tire easily both in study and in play. She was recommended a long rest; so her father took her a trip to Europe, during which, however, she became more and more unable to respond to the interests of the visit; finally she was brought to visit an old friend in England at a private institution where I was making some psychologic studies; there I was asked to see her in consultation with the superintendent. By this time the asthenia was extreme, the pupils were dilated, and the bronzing of the skin most decided, so that the diagnosis of extreme hypoadrenalism was manifest. The psychologic history was imperfect, as we were exceedingly anxious to improve the condition we found. Adrenal substance was given, both in the mouth and under the skin; but there was no response, and within a week the little girl died. Of the blood-pressure, I have no note; I do not think there was an instrument at that time, 1907, in the institution. The adrenals were taken out post mortem, and were found almost free of gland substance, nothing but some medulla and the capsule being left. A careful histologic examination showed no sign of inflammation, and we had to conclude that we were dealing with either a simple dystrophy or an autolysis of toxic origin.

DR. SCOTT'S REPORT

"Paraffin sections from two pieces were cut, and stained originally with eosin and Ehrlich's acid hematoxylin, more recently by hematoxylin and Biebrich scarlet method (Scott, 1912).

"Microscopically, the capsule is relatively thick, and surrounds a central region infiltrated with lymphocytes, and in some parts engorged with blood. Among the lymphocytes are large cells of irregular shape, with basophil cytoplasm and nuclei of variable size. These cells are frequently arranged in strands. In some places are a few cells whose cytoplasm is somewhat oxyphil (really amphophil with oxyphil preponderance), and whose nuclei are on the average smaller than those of the basophil cells. In some of the more recent sections an accessory cortex whose cells are like those of the second group is visible, lying in the capsule.

"Originally, before I had seen the accessory cortex, and being also more ignorant than I should have been, I was unable to determine the origin of the cells described above. At the present time it is quite clear that the first group is medullary and the second cortical, for by my method the cytoplasm in the medullary cells is predominantly basophil, and in the cortical cells predominantly oxyphil. Everywhere some of the cells have a degenerate appearance, even in the accessory cortex. To sum up, the cortex is practically all gone, but the medulla is much less destroyed.

"The process appears to be centripetal degeneration of the suprarenal cells, accompanied by lymphocytosis and patchy engorgement with blood. Unless pure lymphocytosis be inflammatory there are no signs of inflammation. Certainly there was no fibrosis going on at the time of death, in spite of the thick appearance of the capsule. This relatively thick capsule must be the original capsule and the scanty connective tissue of the cortex collapsed together after disappearance of the cortical cells; for if new formation of white fibrous tissue were going on, young fibroblasts would be

present, and their cytoplasm would be obvious, being basophil. As it is, the connective tissue cells have unstained cytoplasm. I should like to emphasize this characteristic of fixed connective-tissue cells, namely, that when they are young, as in the fetus, granulation tissue and spindle-celled sarcomata, their cytoplasm is basophil enough to stain with Ehrlich's acid hematoxylin; but when they are mature they appear as naked nuclei, the cytoplasm being no longer sufficiently basophil to stain as before, nor sufficiently oxyphil to take up the acid dye."

CASE 8.—History.—A married woman of 34, formerly a schoolteacher, was referred to me by Dr. Wilson on account of a nervous breakdown thought to be the result of twelve years of overwork, during which her weight had fallen from 114 to 97 pounds. She had been worse since her marriage three years before; she had not benefited from residence in a sanatorium or a removal of a uterine polypus. She had been anemic, and although she ate well she did not seem nourished. The heart was feeble. She was a woman of extraordinary good sense and did not worry; she had suffered all her life from inherited menstrual headaches which had prevented her rest; she used to have numbness in the leg; now even massage tires her.

Examination.—This showed feebleness of the reflexes, the abdominal and plantar being hardly perceptible; dilatation of the stomach, râles in the chest, pale mucous membrane, sunken eyes, and with it all a calm psyche. Weight was only 83 pounds; there was earthy brown pigmentation on the face, linea alba, a splotch below the xyphoid, and a faint discoloration on the arms and legs, while the coccyx and buttocks were very dark. Hemoglobin was 80 per cent., red cells $4\frac{3}{4}$ million, leukocytes 3,000; the systolic blood-pressure was 86 or less and the diastolic 66; it was difficult to measure. A week later, the pressure was 80 and 64, the reflexes needed reinforcement and her weight was 81 pounds. She went into the care of Dr. Marbury, and some weeks later she died. Necropsy was refused. It is impossible, therefore, to say whether the failure of adrenal secretion which caused her death was due to tuberculosis, as is often the case, or was a simple atrophy, as in the preceding case.

DIAGNOSIS, DIFFERENTIAL AND PSYCHIC

From conditions of physical causation characterized by great fatigability and feeble circulation the diagnosis would of course be made by the current procedures of clinical medicine, on which I need not enlarge here.

PSYCHASTHENIA

But the diagnosis from certain neurotic states requires specification. Patients of the type I have described are often labeled psychasthenics because of their feeling of inadequacy, the most prominent feature in psychasthenia. But the genesis of this feeling in hypo-adrenalism is a real physical tire occurring only during exertion, while the genesis of the inadequate feeling in psychasthenia is from a besetment or apprehension; and it always passes off while the patient is actively exerting himself with muscles or mind. If there is any feeling of panic because of the dread of his incapacity in a hypo-adrenal patient, this is a purely secondary and normal reaction to physical fact; and it is very easily dealt with by enlightenment, as my cases illustrate. Furthermore, psychasthenics present a vast series of intellectual, emotional and often motorial symptoms, the combination of which is characteristic, and the source of which can be detected by analysis of the psyche.

HYSTERIA, NOSOPHOBIA AND HYPOCHONDRIASIS

The seeming exhaustion and asthenia so often found as a result of a patient's belief in the malfunctioning of a stomach, heart, intestine, limb or brain is a phenomenon of mental attitude induced in the same

way as is the case in the little child who suddenly becomes tired when his work or play is no longer to his liking. It is merely a lack of the toughening of psychologic fibers necessary to social welfare. It is a phenomenon induced by suggestion, and its name is hysteria. The real physical exhaustions which may occur after long continuance of hysteric attitudes like this are secondary to the depressing emotions sometimes induced in the patient's mind.²

From *melancholia* the incapacity of hypo-adrenalism is distinguished by the absence of the retardation of thought and movement always present in the true melancholic, in whom, furthermore, the responsiveness increases in speed and effectiveness as the day goes on and when the stimuli are augmented and longer continued, whereas in hypo-adrenalism the patient is at his best early in the day and the more work he does the worse he becomes.

Concerning *neurasthenia*, it should be evident that I have ceased to recognize any such nosologic rubric, regarding the term merely as a convenient cloak for failure to investigate a case sufficiently, and placing all the patients who were thus formerly diagnosed in categories corresponding to the etiologic factor which has determined their condition.

PATHOGENESIS

That prolonged hyperfunction may play a part in the etiology of hypo-adrenalism may be inferred from the facts furnished by posthyperthyroid myxedema (Wilson) and posthyperpituitary adiposity (Cushing and others). That hyperfunction of the adrenals may be induced psychologically is certain from the experiment of Cannon, which shows that the adrenal vein after fright contains a greatly increased amount of the secretion of the gland. The work of Crile too tends toward the belief that the form of prolonged fright known as anxiety may produce the same over-secretion as it undoubtedly does in the case of the thyroid gland.

Now both fright and anxiety are psychologic in induction; they are derived from ideas, an attitude of mind, which may be maintained from within by cogitation by animals with memory long after the disappearance of their initial cause. So that the conditions for the maintenance of that which makes for adrenal hyperfunction are ready in human beings to be called into action at all times, in those persons whose early training has increased fears and scruples about conduct and life.³ It is only by proper, which means profound, analysis of the features which lead the clinician to penetrate to the foundations of human feelings and behavior that these patients can be understood, and the responses of their organism can be thereby "reconditioned" into health-bringing reactions. The way of doing so, true psychotherapy, is only an elaboration of the method employed by Pawlow to condition the vegetative reflexes of dogs.⁴

CONCLUSION

The cases reported, and the considerations involved, are far from completely presented, and I am well

aware of this; but a consulting neurologist without the hospital facilities for research on a large scale is not well fitted to elaborate what is a very complex problem, namely, pathogenesis, complete clinical syndrome, and treatment of hypo-adrenalism. Although it would seem that prolonged psychic strain plays a part in the induction of the condition, yet on the one hand, thousands of individuals undergo long psychic strain and retain their adrenal sufficiency; indeed, perhaps, functionate excessively in that respect, while on the other hand, it is hardly credible that the adrenal inadequacy from which the Boston physician's daughter died was due to any excessive strain. We are reduced, then, to the hypothesis of the general inadequacy of the chromaffin system to explain cases of this kind. It may, indeed, be that inherent inadequacy is responsible for the failure of the adrenals in all cases in which there is no inflammatory or toxic process damaging the glands. I commend the problem to the resources of some large clinic. My paper is presented mainly in the hope of again drawing attention to the need of differentiation, even in a group of cases most typically neurasthenic.

PATHOLOGY

According to Scott,⁵ Addison's disease must be due to loss of cortex, for accessory cortical tissue is a variable quality; but with so much other chromaffin tissue in the body, loss of the medulla should not be particularly harmful. On searching through the literature it appears that several similar cases are on record, details of which will be found in the works of Simmonds,⁶ Karakascheff⁷ and Bittorf.⁸ Of these, some have the medulla intact, but the cortex gone, others have more or less cortex and medulla left, and yet others are merely fibrotic. Karakascheff,⁷ working in Marchand's institute on specimens very similar, was, I believe, the first to prove destruction of the cortex to be responsible for Addison's disease. That the medulla is not essential to life is seen from his case of a child, 5 to 6 months old, in which the cortex was intact, but the medulla had been destroyed on both sides by hemorrhages, but so long before death that calcification had taken place. During the patient's stay in the hospital no symptoms were observed which were referable to the suprarenals. To show the importance of the cortex, he also brings forward a case in which, after death from other causes, one suprarenal was found to have been destroyed by tuberculosis some time previously and the other was hypertrophied, but in the cortex only, thus corresponding with the results obtained by previous workers after removing one suprarenal in young rabbits and guinea-pigs. Wiesel⁹ studied ordinary tuberculous cases of Addison's disease, and found that the chromaffin tissue outside the suprarenals was also diminished in amount. He came to the conclusion that Addison's disease was due to deficiency of the whole chromaffin system; but it is hard to understand why tuberculous destruction of suprarenal medulla should be accompanied by simple disappearance of other chromaffin tissue, rather than by compensatory hypertrophy. His cases also all showed more or less destruction of cortex. In a second paper, Karakascheff (1906) is unable to confirm Wiesel's

2. Williams, Tom A.: Hysteria and Pseudo-Hysteria, *Am. Jour. Med. Sc.*, September, 1910.

3. Williams, Tom A.: Management of Juvenile Psychasthenia (Section of Children's Diseases, *Wash. Med. An.*, 's, 1913, xii, 31); *Am. Jour. Med. Sc.*, January, 1912; *Arch. Pediat.*, 1912; *Pacific Med. Jour.*, 1910, liii, 84; also in *Psychotherapeutics*, Badger, Boston, 1909.

4. Williams, Tom A.: False and True Mental Healing, *Tr. Brit. Med. Assn.*, and *Br. Med. Jour.*, 1913; The Practical Import of Recent Work on Hysteria, *THE JOURNAL A. M. A.*, Dec. 21, 1912.

5. Scott: *Proc. Path. Soc. Great Britain and Ireland*, 1914, xviii, 419.

6. Simmonds: *Virchows Arch. f. path. Anat.*, 1903, clxxii, 480.

7. Karakascheff: *Beitr. z. path. Anat. u. z. allg. Path.*, 1904, xxxvi, 401; 1906, xxxix, 373.

8. Bittorf: *Die Pathologie der Nebennieren und der Morbus Addisonii*, Jena, G. Fischer, 1908.

9. Wiesel: *Ztschr. f. Heilk.*, Part 1, *Path. Anat.*, 1903, xxiv, 257.

observations on general loss of chromaffin tissue, and deals with the well-known finding of destruction of suprarenals without Addison's disease. This he ascribes to the presence of a sufficient amount of accessory cortical tissue, and he further gives a detailed description of two such cases.

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ABSTRACT OF DISCUSSION

DR. FRANK R. STARKEY, Philadelphia: In dealing with conditions in which the organs of internal secretion are involved, we must remember three things; first there is no such thing as a syndrome of adrenal insufficiency or of thyroid or pituitary insufficiency. This condition is always polyglandular or multiglandular. Although any of the organs of internal secretion may be most conspicuously involved, including the sexual organs, whether the condition be one of lowered function or excessive activity, the condition is always multiple. When one of the group is not functioning properly, the equilibrium of the entire chain is disturbed and the delicate balance normally existing between them is destroyed. Adynamia, inefficiency, mental and physical asthenia and melancholia are the keynote of this condition no matter what name we give the syndrome. Secondly, because of the multiple nature of the condition we must treat the entire group. Thirdly, it is a mistake to administer extracts or other products obtained from spayed animals. The glandular products of commerce are all derived from animals which have been raised for food purposes and they have been castrated in their early youth to improve their flesh for food purposes and they are neurasthenic and inefficient themselves. I do not know just why the medical profession has not recognized this before, for the difference in the texture and flavor of the flesh as well as in the temperament of these animals is so well known. The change from the bull to the ox or from the cock to the capon are conspicuous and familiar examples. The change that takes place in their organs of internal secretion is just as marked, so that the chemical composition and the physiologic action of glands obtained from spayed animals is very different from that of those derived from unspayed ones. In melasma or exophthalmic goiter, it is good organotherapy to treat all of the glands of internal secretion. We must bear these points in mind if we are to be successful in organotherapy.

DR. WALTER L. BIERRING, Des Moines, Ia.: I will refer to a case of melasma, the patient being the wife of an Iowa physician. She is 37 years old, and the mother of two healthy children. The condition has been observed about two years, and at present the pigmentation and hypotension are marked. The systolic pressure is 70 and the diastolic 45 mm. Hg. She is fully conscious of her condition, and therefore observant of symptoms and the effect of different plans of treatment. She feels that she is entirely sustained, and in fact her comfort depends on the taking of adrenal extract in doses of 3 grains three times a day. When in a state of extreme weakness, with an absent radial pulse, a single dose will bring back a palpable pulse, raise the blood-pressure appreciably, and increase her general strength. I agree with Dr. Starkey's remarks with regard to adrenal insufficiency as but a single factor in promoting the condition usually referred to as Addison's disease (melasma), because as in the case referred to, while life is sustained and an improvement of symptoms takes place under the substitution therapy, a cure of the condition by this means alone is not to be accomplished.

DR. TOM A. WILLIAMS, Washington, D. C.: I wish to thank Dr. Starkey for his hint concerning the extracts from non-spayed animals; but I cannot agree with the generalization that all endocrinian disorders are pluriglandular, although I have had many such mixed cases. The cases reported in my paper were specifically chosen because they seemed to represent the syndrome of adrenal insufficiency in its purity. Furthermore, in the cases which did not improve, mixed-gland therapy was ineffective; but I cannot say why the extra

large dosage should prove conspicuously effective in one case while failing to assist others. I have brought the subject before this Section rather than that of neurology, in order that others may be encouraged to make more extensive and thorough observations than are possible for a neurologist without a large hospital service.

PAPILLOMA OF THE LARYNX *

HARMON SMITH, M.D.

NEW YORK

ETIOLOGY AND HISTOLOGY

Many papillomas spring from an inflammatory, syphilitic, tuberculous or even a malignant base, and histologically the malignant are but an exaggerated and continued form of the benign papilloma. A beginning hyperplasia on the vocal cord, irrespective of its underlying cause, may in due course of time assume proportions, varying from a small papular mound to a mass of epithelial growth filling the entire larynx. The proliferation in all cases is chiefly that of the epithelium, although there will be found fibrous thickenings occupying largely the posterior laryngeal wall and the posterior half of the vocal cords, which are seen quite frequently in habitual consumers of alcoholic beverages, also in newsboys, peddlers, hawkers and in those suffering from chronic or atrophic rhinitis. In singers, particularly those with soprano or tenor voices, these thickenings of the epithelium occur on the anterior third of the cord, and are the result possibly of muscle strain. From these hyperplasias spring pointed projections, which form the so-called papilloma. The surface may be papillary or may be smooth with but slight irregularities. The color may vary from a pale, dead white to a red or rose color; sometimes they are dark gray, at others the same color as the cord. Often they are mistaken for singers' nodules, particularly when located at the anterior third of the cord on its border; they may be single, broad-based, multiple or pedunculated with slender bases and vibrate with the respiratory current. They occur frequently in children as a mass filling the larynx, crowding one on the other, some with broad bases and others with pedunculated bases. The simple flat papilloma has but few branching projections, usually very white, with a surface cornification such as is seen in the hard, dry wart on the hand.

This type is observed in elderly men and should be regarded with suspicion, particularly if there is increased vascularity at the base. Often the microscope will reveal no indication of malignancy, as the bits of epithelium removed from the surface of the growth give no evidence of the character of the substratum; but later examination will define the malignant character of the underlying structure.

The frequency of papilloma as compared to other benign growths varies from 39 to 50 per cent. of all cases of benign laryngeal growths. When appearing singly, their most frequent locality is in the anterior half, while the multiple variety will be found most frequently in the posterior part of the larynx, but may also extend to the rest of the mucosa. In children, papilloma is the most frequent laryngeal growth and has been known to be congenital. Here they appear in the branching or budding form and may spring from

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