A REVIEW OF CASES MANIFESTING
PAIN AT THE HEART,
OR
MORBID ACCELERATION OF THE HEART'S CONTRACTION
(TACHYCARDIA),
SUBSEQUENTLY TO INFLUENZA.

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IN this communication I propose to submit to review and analysis a series of cases, all of which have been under my own observation, wherein pains in close relation with the heart or disturbances of the cardiac rhythm in the sense of morbid acceleration have been manifested subsequently to attacks of influenza. In some of the cases the symptoms occurred in immediate sequence to the attack, in others more or less considerable periods elapsed before they were manifested, but in all the chain of evidence appeared to indicate the relation of cause and effect.

Reviewing 100 cases observed by myself, in which affections of the heart were initiated by influenza, I found them thus distributed :—Pain referred to the heart, 23 cases ; morbid acceleration of the heart's contractions (tachycardia), 37 cases ; pronounced irregularity of the

heart's action (arrhythmia), 25 cases ; abnormal retardation of the rate of pulsation (bradycardia), 5 cases ; organic diseases of the heart, 10 cases.

In this paper I propose to deal only with the first two sections of cases (and that from the point of view of clinical observation), to consider the questions of pathological causation, and briefly to indicate the treatment which has seemed to be the most efficacious.

I. Pain referred to the Heart.

In a short communication published in the 'Lancet' of January 2nd, 1892 (p. 14), I gave a summary of the cases I had observed until that date in which, after attacks of influenza, pain had been referred by the patients closely to the region of the heart. The pain was in some instances paroxysmal, in others more or less constant. In certain of the cases manifesting paroxysmal pain the symptoms closely approached those of angina pectoris. In a typical athlete, five months after influenza there occurred attacks of intense præcordial pain, as of a "grip" or "screw," which in a moment caused the patient to fall prostrate and, for a brief period, completely unconscious. In a lady aged forty-one, attacks of intense pain, localised in the second left intercostal space—where was a tender spot—were initiated by moderate exertion. In a gentleman aged thirty-three, paroxysms of pain at the heart of much less severity than those in the former instances occurred at intervals ever since an attack of influenza, and in these seizures the patient had the feeling of impending death. Such feeling was graphically described by another patient "as if his heart were a pendulum suddenly stopped at one swing." In others the pain was long persistent ; in three cases it was described as a dull aching referred to the area occupied by the heart, accompanied in one case by a tingling felt down the left arm.

In the series of cases that I am now about to review pain

was referred to the heart region in twenty-three instances. Of these the pain was of *paroxysmal* character in six. In a lady aged twenty-six, intense pain at the heart occurred one week after an attack of influenza; the attacks were many times repeated, and, according to reliable evidence, were attended with loss of consciousness. In a gentleman aged fifty-four, sudden and intense pain at the heart occurred after a second attack of influenza; the pain was also felt down the left arm, the neck, and the back. A feeling of deadness down the left arm was experienced in one case; and in another, at the time of the attacks, which were very severe, pain was felt in the throat. That the loss of consciousness observed in some of the cases could be independent of the severity of the pain was shown in the case of a gentleman aged twenty-three, in whom a "dead pain" at the heart was noted, but who lost consciousness on two occasions. There were no convulsions nor epileptiform symptoms.

Although the phenomena of angina pectoris were closely simulated in some of these cases, I met with none in which there was good evidence of an abnormal tension within the arteries, either at the time of the paroxysms or during the intervals. In all the cases there was nothing to show any change in the conditions of the myocardium. In those which manifested the most intense paroxysms, the conditions of the heart both in rhythm and in integrity of structure, so far as could be determined by physical examination, were quite normal. None of the cases were fatal.

With regard to the *sites* of pain, the patients referred the suffering to certain portions of the area occupied by the heart itself in nine instances, and to the sternum in eight. In a few cases the areas in which pain was felt could be mapped out with considerable precision, and these are indicated in the chart.

In most cases the constant (as distinguished from the paroxysmal) pain was of a dull aching character, but subject to exacerbations. The parasternal pain was exceptionally as of a knife cutting; in a small minority a

tender spot was found close to the sternal border. The pain extended down the left arm in three instances, in one of these the disturbed sensation being described as a

Figure indicating the positions of pain referred to the heart in eight cases.

deadness ; in another case it was severely felt in the back. In many cases the suffering was so precisely felt in relation to the heart, that the patients could not be convinced that there was no organic disease. The pulsations were accompanied by pain and by most uncomfortable sensations, though the rhythm was normal and tranquil, and the heart-sounds well pronounced and in their due relations one to the other.

As to the pathology of the painful affections referred to the heart in sequence to attacks of influenza, I said in my former essay that it seemed to me probable that though the cardiac crises during the acute stage of the disease might be due to involvements of the nerve elements in the bulb, the remote symptoms should be ascribed to a neuritis affecting the sympathetic ganglia, the vagus, and the sensori-motor nerve-trunks.

Abundant evidence has accumulated to prove that multiple neuritis may occur at various periods after attacks of influenza. I have observed several cases in which there

has been distinct clinical evidence of neuritis affecting the brachial plexus, and in some of those in the category we are now considering numbness and tingling were manifested for long periods in the forearm and fingers (see also cases by Remak ('Berlin. klin. Wochenschr.,' February 24th, 1890), Henoch (*ibid.*), Althaus ('On Influenza,' p. 187, *et seq.*), Church ('Journal of American Medical Association,' November 1st, 1891), Westphalen ('Petersburg. med. Wochenschr.,' 1890, p. 48), Draper ('New York Medical Record,' 1891, p. 9), &c.).

I have said in the paper to which I have made allusion that it is probable that the ganglia of the sympathetic may in some cases be involved in inflammatory changes. This has been proved in the case of the ganglia within the abdomen by Ferguson ('Alienist and Neurologist,' October, 1890), who found in a case which, after an attack of influenza, manifested agonising pain in the abdomen, and ended fatally, inflammatory exudation about the ganglia and degeneration of some of the nerve elements. I have not met with any instance in which there has been post-mortem evidence of neuritis affecting the cardiac ganglia, but there seems reasonable probability that in some of the cases manifesting agonising pain in the situation of the cardiac plexuses this might have occurred. In most cases there might be a greater probability of a visceral neuralgia, analogous to that of the pleuræ or of the stomach and intestines, and due, perhaps, to a disturbance of the nerve-cells within the cerebro-spinal axis. That there may be a disorder of the vagus at its origin or in its course is rendered very probable by some of the symptoms observed, for example those of a sense of impending death, of arrest of the heart's action, and associated dyspnœa.

In the majority of cases the pain at the heart began to be manifested from one to four months after the attack of influenza, but some came under observation at much later periods, and it was clear that such pain could be experienced at least eighteen months after the initial disease.

In the treatment of the cases manifesting agonising

paroxysms rest was of course of paramount importance. Neither inhalations of nitrite of amyl nor the administration of nitro-glycerine seemed to give any satisfactory results. In the case of the most acute suffering, the attacks causing syncope, a course of bromide and iodide of sodium with aromatic spirit of ammonia was prescribed, and at the time of the paroxysms a draught containing pure ether (m℥) and tinctures of lavender and sumbul (of each ℥xx) in chloroform water (℥j). Subsequently five grains of sulphate of quinine were given daily—once in the twenty-four hours. The attacks diminished in severity, and at the end of four months' treatment all pains had ceased. The patient has written to me stating that at rare intervals he had pain, though of slight intensity, after omitting the treatment, but now he is in perfect health. In other cases of severe pain the hypodermic injection of hydrochlorate of morphine (gr. $\frac{1}{4}$ to gr. $\frac{1}{3}$) was employed; but in order to obviate, if possible, any tendency to syncope, diffusible stimulants (ether, ammonia, valerian, or sumbul) were administered at the time of the injection. As a general rule opiates were not well borne.

In cases of moderate severity, counter-irritation of the præcordia by mustard poultices sprinkled with tinctures of opium and belladonna gave relief. I also used local applications of a hot solution of salicylate of sodium, a piece of lint being soaked in a saturated solution of the salt mixed with an equal bulk of hot water, applied to the præcordia, and covered with a piece of lint soaked in olive oil, surrounded by cotton wool. I was convinced of the great comfort afforded by this method of treatment.

In some instances of long-continued pain I advised, as in cases hereafter to be noted, the use of the continuous galvanic current. A gentleman aged sixty-two, after two attacks of influenza, suffered severe pain of a protracted character localised in two areas, one about the apex of the heart (and especially the right ventricle), and the other a defined circle with its centre at the aortic cartilage. The pain was aggravated by any exertion. The ordinary medi-

cinal methods of treatment having after two months failed to give decided relief, I advised the use of a continuous current from four cells from the nape of the neck to the course of the vagus in front of the neck, administered for six minutes three times a day. There followed distinct though gradual improvement, and in one month the pain entirely ceased. Afterwards the patient expressed himself as being in perfect health.

II. *Morbid Acceleration of the Heart's Action* (*Tachycardia*).

I have considered as examples of a morbidly rapid heart's action those in whom the observed rate, which according to the evidence persisted for protracted periods, was, or exceeded, 100 per minute. In thirty-two cases the rate was from 100 to 120; in five it was above 120, the maximum being 128. The rapidity of the heart's action was maintained in the majority without any feelings of subjective discomfort on the part of the patient. In only nine cases were there paroxysmal palpitations; two of these manifested muscular tremors. In a considerable number of cases the already rapid heart was made yet more rapid by even slight movements on the part of the patient, and not infrequently there were periodic accelerations without assignable cause. The mere change of position from sitting to standing caused an increased frequency of pulse, of 40 in two cases, and of from 12 to 24 in six others. The lifting of the left arm increased the pulse-rate from 100 to 120 in one case. Several cases presented great variations, and the varying rate could be noted during the auscultation of the heart. In the case of a female aged thirty-five, in whom a pulse of 120 was generally observed during the day, it was said that the pulse became slower than normal during the night. In the case of a lad of eighteen, the pulse, which at an early period was slow (54), became habitually quick (108 to 120) later.

The quickened action of the heart was in very few

cases attended with subjective discomfort. The converse might be the case. For example, a gentleman who for a long period had a pulse-rate of about 112 per minute without cardiac distress came to me complaining of much pain in the heart region, and the pulse was regular, the rate 80 per minute, and the heart-sounds normal. I have noticed the coincidence of signs of pain with abnormal infrequency of pulse (bradycardia).

Many of the cases of post-influenzal tachycardia presented also other of the *signs of Graves' disease*. A girl of thirteen, just convalescent from influenza, manifested an increasing enlargement of the thyroid, with throbbing in its situation and a feeling of "lump in the throat." The enlargement was of both lobes, chiefly the right; much heaving pulsation was felt over the gland, and murmurs were loudly heard in its situation. The pulse-rate was noted as 100 to 120, and palpitations were severe. The additional signs were tremors, perspirations, and some abnormal pigmentations of the skin. There were, however, no lid signs nor exophthalmos.

In a second case (of a lady aged twenty-two) palpitations began to be noticed about eight months after an attack of influenza. The pulse-rate was generally about 120, sometimes 160. The right lobe of the thyroid was enlarged.

In other cases the *exophthalmos and the eyelid phenomena* of Graves' disease were observed. A lady aged fifty-nine manifested subsequently to influenza a pulse-rate of about 128; there was increasing exophthalmos, and some retraction of the upper eyelid (Stellwag's sign) was noticed, but no von Graefe's sign.

In a gentleman aged fifty-four, after a second attack of influenza, the pulse-rate was noted to vary between 96 and 112; there were sudden and severe pains referred to the heart region, the neck, and the left arm; outbreaks of flatulence also occurred. There was no thyroid enlargement, but both Stellwag's and von Graefe's eyelid signs were manifested.

In a third case (a lady aged fifty-one) the pulse varied

between 104 and 128, the heart was made uncomfortable by any exertion, there was some muscular tremor, and distinct exophthalmos was noted.

In two other cases of tachycardia (in males) Stellwag's lid sign was noted. In a lady aged thirty-one both Stellwag's and von Graefe's signs were present, there were gastric disturbances, and abnormal pulsation was felt within the abdomen.

Phenomena frequently associated with Graves' disease were observed in many cases. Palpitations, flutterings, flushings, perspirations, and faintnesses were noted in seven instances; pulsations were experienced in the carotids and subclavians, in the abdominal aorta, and in the splenic artery in three others. Systolic murmurs, considered to be independent of organic disease, were found over the pulmonary artery in four and over the aorta in two cases. Paroxysmal attacks of dyspepsia (flatulence, nausea, gastralgia, and diarrhoea) accompanied by dyspnoea, attacks which I have termed "vagus storms," occurred in five instances.

I cannot doubt, from the evidence of the cases which I have observed, that Graves' disease can be brought about by influenza. Although I have not met with a case in which the complete "ensemble" of phenomena has presented itself, it is clear that so many of the signs have concurred in some cases, and those which have been missing in some have been evident in others, that I cannot doubt that the condition of disease produced is identical with that of exophthalmic goitre.

Colley ("Ueber Morbus Basedowii nach Influenza," 'Deutsche medizinische Wochenschr.,' August 28, 1890) described the case of a woman in whom exophthalmos occurred during an attack of influenza, and was followed by bilateral bronchocele and by tachycardia (pulse 150 to 180). In this case, therefore, all the cardinal phenomena were initiated (cf. Althaus, 'On Influenza,' London, Longmans, 1892, p. 199).

As to the question of the mode of pathogenesis of the

condition of rapid heart in this series of cases, I do not think that there is any reliable evidence of the intervention of myocarditis, or any discoverable change in the cardiac muscle. In none were there signs of enlargement of the heart, nor of the usual phenomena of cardiac failure; in many, during the period of abnormal acceleration of the heart's action, subjective discomfort was completely absent.

I consider also that the evidence in no degree supports the theory that a morbid activity of the thyroid gland could be the cause of the tachycardia. In the great majority of the cases the thyroid seemed to be of strictly normal dimensions, or even subnormal.

In two cases presenting the associated signs of Graves' disease enlargement of the thyroid took place at an early period (perhaps the earliest) in the evolution of the symptoms, and in one of these application of ice-bags over the gland seemed to control the cardiac tumult, and to contribute in no small degree to the recovery of the patient. On the other hand, in the bulk of the cases—even of those manifesting, besides the tachycardia, many of the associated symptoms of Graves' disease—there was no evidence whatever of enlargement of the thyroid; and in many the gland was quite undetectable, so that the view might be advanced that it was even smaller than normal.

The series of cases of post-influenzal tachycardia would seem to me to rank in all respects with those of rapid heart from various causes, of which I have made a previous study ('Transactions of the Medical Society of London,' 1890, p. 467, *et seq.*); and I submit that the conclusions which I deduced from the evidence afforded by the latter can be in like manner legitimately derived from the former. These conclusions are that the ætiological factor in cases of tachycardia, when there is sufficient evidence to establish any, is overstrain, physical or mental; that such tachycardia may continue for long periods as the chief or only notable morbid pheno-

menon, or may be associated in greater or less degree with the other well-known phenomena of the completely developed Graves' disease; that it is only in a small minority that any enlargement of the thyroid is observed at the earliest period of the affection; that in a larger proportion such enlargement is to be detected at later periods of the evolution of symptoms; and that in a majority there is no evidence of an abnormal condition of the thyroid at any stage.

I submit, therefore, that the effect of influenza in those cases which present a morbid acceleration of the action of the heart is in strict accord with that of a sudden and severe shock to the nervous system. As to the proximate mode by which such morbid acceleration may be brought about, we may entertain the following hypotheses: there may be an inhibition of the action of the vagus, an overaction of the accelerator nerve-mechanism of the heart, or those two conditions in varying degrees combined.

It is well established that disease encroaching upon the trunk of the vagus or involving its fibres may induce abnormal rapidity of the heart's action. This may occur from the pressure of tubercular glands, as in a case recorded by Merklen, in which the right pneumogastric was compressed and the pulse-rate went up to 156 (cf. Huchard, "*L'Asystolie nerveuse*," '*Rev. gén. de Clinique et de Thérapeutique*,' 27 Septembre, 1893, p. 612). A like result has followed a compression of the vagus by thickened pericardium. Neuritis involving the fibres of the pneumogastric has produced the same symptom. Besançon records the case of a phthisical subject, aged thirty-three, in whom tachycardia became manifested; death occurred from heart failure, and neuritis of the left pneumogastric was demonstrated at the autopsy, the inflammation evidently spreading from the tubercular lesion. Instances of polyneuritis involving the pneumogastrics and inducing tachycardia as a symptom have been recorded by many observers as the result of alcoholic poisoning, and in sequence to many of the infectious diseases. A consider-

able number of such cases have been observed after influenza.

I have had under my care a female patient who suffered from an attack of influenza just previously to admission into the wards of the London Hospital for paralysis of the lower limbs. There were the typical dropped feet and other signs of alcoholic neuritis. There was a decided history of alcoholism. During my observation I noted the manifestation of quickened breathing, but there was not the slightest indication during respiration of any movement of the diaphragm. There was evidence of paralysis through the phrenics. Quite suddenly the pulse became rapid, so persisting for several days, and then coming down to the normal. I concluded that there was a temporary neuritis of the vagus. This is one of several cases under my care in which I came to the conclusion that influenza reinforced the morbid phenomena of alcoholic neuritis.

From these data I consider it very probable that post-influenzal tachycardia is due to a disturbance of the vagus, at its origin or at some part of its course, whereby its controlling power, as transmitted by its cardiac branches, is in more or less complete abeyance.

It may yet be considered whether an irritant lesion of the sympathetic may produce the symptom. It has been shown that Graves' disease may be initiated by influenza, and I have given evidence to render it probable (or even certain) that neuritis of the sympathetic ganglia may occur in the latter disease. Inflammatory changes have been demonstrated in their midst in Graves' disease. Dr. W. S. Greenfield found in the cervical sympathetic (especially the middle cervical ganglion) very marked changes indicating that the ganglia may become the seat of a subacute inflammatory process ('British Medical Journal,' December 9th, 1893, p. 1266). Drs. Cruise, Reith, Shingleton Smith, Virchow, Lancereaux, and Geigel had long previously recorded the organic changes which had been observed by them in fatal cases of

Graves' disease—changes indicating either inflammatory infiltrations or sclerous transformations. In Dr. Greenfield's cases, however, there were also morbid appearances in the central nervous system; these are stated to have been "closely analogous to those seen in the sympathetic ganglia," and, in addition, scattered hæmorrhages whose sites were the pons and medulla, and in one case the floor of the fourth ventricle. Dr. Hale White ('British Medical Journal,' March 30th, 1889) had previously observed like hæmorrhagic extravasations in a case after death from Graves' disease in the same situation, obviously close to the nuclei of origin of the vagus.

It seems probable that though the lesions of the sympathetic might be capable of inducing the tachycardia, these can only be regarded as concurring or reinforcing causes. It is scarcely likely that the inflammatory conditions capable of producing irritation should last for months or even years; whilst if sclerosis or calcareous degeneration could be invoked as a cause, the complete recovery which occurs in a large number of the cases would be improbable. It appears to me that a lesion impairing the power of the vagus, often slow in recovery, should be regarded as the chief cause, a neuritis of the sympathetic being in some cases a concurring factor. It is possible that the tract of the cardiac accelerator nerves within the spinal cord may in some cases be affected by an irritant lesion.

Though improbable as a chief cause, excessive secretion by the thyroid, the result of subinflammatory changes in the gland, may be looked upon also as in some cases a concurring agency.

In the treatment of patients manifesting post-influenzal tachycardia I have found the administration of digitalis, belladonna, and all the usual heart tonics ineffectual if not even harmful. This accords with my experience of tachycardia from all causes when unaccompanied by structural disease. M. Huchard states that digitalis has no power of control over morbid acceleration of the heart's action when

this is dependent on disturbance of the nervous mechanism, and not on organic disease: with this statement I entirely concur.

The bromides of potassium, sodium, or ammonium in moderate doses (twenty grains thrice daily) have been useful in some cases, but if persisted in for long periods they increase the lassitude and general enfeeblement. It is well to omit them for two or three days at the end of each week. In cases of insomnia and of restlessness at night it has seemed to me that chloralamide in doses of twenty or twenty-five grains is the safest and best agent. In some cases, however, it is inefficient, and in such sulphonal in twenty or twenty-five grain doses often procures the required sleep. This should not be administered every night, however, for some patients manifest a craving for the drug, and it may have some toxic action. In a small minority morphine (best administered subcutaneously) is a necessity, but it should be used with caution.

In the cases in which dyspepsia is a marked symptom—and it is so both as concomitant and result of vagus storms—alkalies with pancreatin have been administered with advantage. In some cases arsenic, given in the form of Fowler's solution in small (two-minim) doses, gradually increased to five or seven, has been very beneficial. Iron preparations have generally been ill borne.

Medicinal treatment alone has been, according to my experience, very unsatisfactory in the treatment of tachycardia. There may be relief of some of the symptoms and an improvement of the general condition, but the morbid acceleration of the heart's action continues uninfluenced.

I consider, however, that there is good evidence that much may be done by the use of the continuous galvanic current. I began to treat cases of Graves' disease by weak galvanic currents more than twenty years ago—in 1873. At that time the rheophores were placed over the spinal column in the cervical and dorsal regions. More recently they were arranged so that the current passed from the cervical spine to the region of the vagus in the

neck—the anode, a flat plate covered by moistened lint, being closely applied to the nape of the neck just above the seventh cervical vertebra; and the kathode, a button similarly covered and moistened, gently pressed in the groove between the thyroid cartilage and the sternomastoid muscle, and moved slowly downwards outside the trachea to the clavicle. The current should be weak—from two to four milliampères, such as may be obtained from four to six ordinary Leclanché cells. It is almost imperceptible to the patient, though I have known a sensitive lady who could not bear a current from more than two cells. It cannot be doubted that by this proceeding the medulla oblongata and base of the brain, as well as the trunk of the vagus, are in some degree influenced. It is the consensus of a considerable number of observers that the rate of the heart's contractions can thus be notably reduced. Eulenberg and Schmidt observed that the pulsations of the normal heart could be retarded by four to sixteen per minute, and that in pathological accelerations the reduction was more considerable. Beard and Rockwell found generally a diminution of two, three, or four beats in a minute, but in some cases there was an acceleration. I may parenthetically note that the currents which they employed were too strong. Damion has given many cases in which pathological acceleration was reduced and cure effected (Althaus, 'A Treatise on Medical Electricity,' 3rd ed., p. 165; Beard and Rockwell, 'A Practical Treatise on the Medical and Surgical Uses of Electricity,' London, H. K. Lewis, 1889, p. 620; 'L'Électro-thérapie,' January, 1889, p. 27).

Full details as to the employment of the continuous galvanic current in cases of Graves' disease have been given in a very practical paper by the late Mr. H. W. D. Cardew ('Lancet,' July 4th and 11th, 1891, pp. 6 and 64). My late friend and I worked together in our observations of many cases, and the communication embodies the conclusions of both. Suffice it to say here that we discarded the interrupted current as used by some Continental

physicians, and found our best results from the weak continuous currents.

The value of the treatment becomes practically "nil" unless it can be applied by unskilled hands, for it should be employed at least three times a day for periods of from six to ten minutes. Much improvement must not be expected in less than four or six months. It is preferable, of course, that an expert should practically instruct the patient at the outset how to use the battery; but the proceeding is so simple that this is not essential. The usual medical attendant can always arrange this, and see that the poles are properly applied. He should caution the patient against carelessly short-circuiting the battery by allowing the poles to communicate when not in use.

A battery of four to six cells is very inexpensive, and can be made very portable. This slight expense to poor patients can be very much reduced by the use of the ordinary cheap Leclanché cells, properly coupled and furnished with covered wires and terminal rheophores, which can be bought for very little.

The following are brief notes of cases thus treated.

CASE 1.—A girl *æt.* 13 suffered an attack of influenza in January, 1892. There were severe pains, chiefly referred to the muscles, and the patient was in bed or in the house a whole month. She came under my notice in April following. I noted much enlargement of both lobes of the thyroid, especially the right; there was much throbbing, sometimes painful, of the arteries of the neck. The pulse was 120; occasionally there were severe palpitations. A loud systolic murmur was heard over the pulmonary artery, and a continuous murmur with systolic reinforcement in the neck. Some frecklings and maculations were seen upon the face. There were muscular tremors and occasionally profuse perspirations. Ordered continuous current (from four cells) from nape of neck to course of *vagus* in the neck, and to thyroid swellings for

six minutes three times a day ; ice-bags to be applied at intervals over the thyroid.

After one month there was slight improvement in the symptoms, the pulse-rate being generally 100, but palpitations were frequent. The treatment by galvanism (and the ice-bags occasionally) was continued, and ten-grain doses of sodium bromide with two minims of Fowler's solution were given in a mixture three times a day. Further improvement followed, till in October a second attack of influenza occurred, and the treatment was interrupted for about a fortnight. Then the thyroid swellings had again increased. The galvanism and the application of ice-bags were resumed. When I saw the patient in November the pulse-rate was 92 ; there were no tremors nor perspirations. In January, 1893, after nine months of treatment, there was almost recovery. The pulse was 88 per minute ; there were no palpitations, the thyroid swellings were much reduced, and there were no throbbings in the neck. I have heard since that there has been a restoration to good health.

CASE 2.—A lady aged 54 had an attack of influenza in January, 1892, and subsequently suffered from dyspepsia, uncomfortable sensations referred to the throat, palpitations, and insomnia. She was seen by me in October, 1892, when I found enlargement of the thyroid, especially of the right lobe ; the pulse 100 per minute, occasionally intermittent ; palpitations were said to occur frequently ; there was almost constant nausea, and headaches were distressing. After one month's treatment by bromides there seemed to be no improvement, and galvanism was commenced as in the former case. After one month of the treatment by galvanism there was much less palpitation, and scarcely any nausea was experienced. The pulse-rate was 92 per minute. Then, in January, 1893, sudden epigastric pain occurred, and all the symptoms became aggravated ; the pulse 120, with palpitations. The galvanic treatment was continued. At the end of February

there were no attacks of indigestion nor palpitations; the pulse-rate 96 to 100, the thyroid swelling much diminished.

In April (after five months of treatment by galvanism) pulse 76 to 80; palpitations at very rare intervals. Very little subjective discomfort at any time.

It is, of course, a legitimate question whether the good results in these cases were due to the galvanism only. It may be urged that the cases might have recovered in the periods mentioned without the treatment. I think that most observers who have seen much of Graves' disease will think this very unlikely. The influence of predominant idea—of suggestion—may be invoked as a probable explanation of the recoveries by some critics. I must record my own conviction that the use of the galvanic current in the manner I have indicated was a sure although a slow agency for good.

(For report of the discussion on this paper, see 'Proceedings of the Royal Medical and Chirurgical Society,' Third Series, vol. vi, p. 121.)