again, P., whose lightning-pains had affected both knees and ankles, had not suffered more in the left than the right knee; and for a year before any signs of mischief presented themselves in the knee-joint he had experienced much less of the pains than before. On the other hand, Henry H. told me that the pains had been exceedingly severe in the left shoulder-joint, which was the seat of the changes. Another of my patients also (Worcester) described the occurrence of an unusually severe shock of pain in the affected limb immediately before the joint-changes began.

Now the gastric crises appear strongly to point to irritation of the roots of the vagus nerve in the medulla oblongata. The character of the retching, vomiting, and pain resembles remarkably that of the symptoms of this class which I have seen to occur in hydrophobia. In that disease (as far as it is possible to prove it), as we know by the microscopical observations of Coats and Gowers, vascular changes are often found affecting the pneumogastric nuclei. The lightning-pains of tabes, which depend upon irritative lesions of the posterior root-zones of the cord, are paroxysmal in character. We cannot explain the reason of this. All we know is, that they tend, after a few hours, days, or weeks, to pass off, and leave the patient absolutely free till another attack occurs. The *crises gastriques* are ordinarily characterised by a precisely similar tendency, and we have only to imagine the inflammatory changes of the posterior root-zones of the cord extending upwards into the medulla oblongata, and irritating the roots of the vagi, to see a complete explanation of the peculiarities of the gastric crises. Such an invasion of the roots of the vagi has not, so far as I know, been demonstrated; indeed, it has probably never been looked for. It is not easy to see any other reasonable explanation of the mode of origin of the gastric crises.

Supposing, then, that this be the cause, I suggest that the frequency of the coincidence of gastric crises with the osseous lesions gives reasonable ground for the hypothesis that the latter may depend upon an invasion of a part of the medulla oblongata closely adjacent to the roots of the vagi. It is only as a working hypothesis that I make the suggestion. Is there something which we may call provisionally a trophic centre for the osseous and articular system in the immediate neighbourhood of the roots of the vagi?

As I have suggested on a previous occasion, the discovery of such a centre would materially help us to explain the remarkable association of cardiac complications with the joint-affection of acute rheumatism, as well as the sweating characteristic of this disease, and the occasional hyperpyrexia which occurs in it. And it might also help to throw light upon the obscure pathology of arthritis deformans.

ON THE USE OF OPTOMETERS FOR THE EXAMINATION OF SOLDIERS AND WORKMEN EMPLOYED ON THE RAILROAD.

By E. WARLOMONT, M.D., Brussels.

I.—SOLDIERS.

1. In order that a man may be fitted to discharge all the duties inherent to the profession of a soldier, he must possess certain physical qualities. For example, as regards the faculty of sight, he must at least be able to distinguish at a distance a battalion of infantry from a troop of cavalry; to occupy the position of patrol, vedette, or scout; to penetrate through a fog or through the darkness of the night, etc. For these purposes, his degree of visual acuteness must be at least a third in proportion to his normal acuteness, and his refraction must not exceed five diopters of myopia (one-seventh of the old reckoning) in the right eye, the accommodation being paralysed, or six diopters of hypermetropia (one-sixth of the old reckoning), apart from all element of accommodation by the use of mydriatics.

These are the limits prescribed by the ophthalmological department of the Medical Congress of Brussels in 1875,* in armies where the use of spectacles is permitted. In other cases, the degree of myopia must not exceed three diopters (one-twelfth to one-thirteenth of the old reckoning); and, in the case of hypermetropia, six metrical diopters. The Congress of 1875 went no further; it committed to future Congresses the task of giving an opinion on the formation of committees of medical examination, and the manner in which they were to exercise their functions.

Since 1875, this question has made a step in advance; the use of spectacles has been authorised in several countries, and amongst others in Belgium, and the result of investigation appears to have been in

favour of the extension of instrumental means for determining ametropic defects and those of visual acuteness. Was this extension to be desired? and is the preference given to optical instruments over direct observation to be approved? In a scientific point of view, the answer would certainly be in the negative; in a practical sense (considering that the persons appointed to examine these questions are often wanting in sufficient experience to fit them for being accredited organs of objective science), the opposite conclusion may be formed. It may be objected, perhaps, that optometers are passive instruments, from which no absolute judgment can be obtained; but it must be borne in mind that the mathematical precision indispensable in scientific laboratories is not of such great importance in the councils of conscription, in which an approximate calculation, by means of a good optometer, will be sufficient. One thing is certain: the use of the optometer has found favour in several countries, Belgium included, where it has been adopted by the Government for the examination of volunteers, conscripts, and their substitutes. In accordance with a proposition made by a commission over which I had the honour to preside, this Government has adopted the Loiseau optometer (special model). This instrument, adapted to special and limited purposes, is the same we presented to the Academy of Medicine in Belgium, in the name of the inventor, in the meeting of the 25th January, 1879 (see *Annals of Ophthalmology*, January, February, 1879, page 40), but simplified by him, on account of the limited degree of services required in the commissions of conscription and medical examination.

The instrument consists of a single copper tube, three centimètres and a half in diameter, and eleven centimètres long (Fig. 1), having at its

Fig. 1.

front end a spring catch for the introduction of the lens, and a rod terminated by a blunt knob, which, coming into contact with the inferior orbital region, fixes the position of the eye observed at thirteen milli-

Fig. 2.

mètres from the lens. At one centimètre from the other extremity of the tube—viz., ten centimètres distant from the lens—is a board or

* With the exception of a very small fraction, the Congress of Brussels admitted, as a rule, provisionally, an acuteness varying from one-fourth to two-fifths.

tablet on which are represented four rows of signs like those on playing-cards—crosses, diamonds, hearts, and spades: they are placed horizontally and vertically. These signs have been chosen, as being universally known even to the most ignorant. They are measured according to a scale of $d'_{\frac{1}{2}}$ of acuteness. The subject must be able to read these characters without the least hesitation in following the four transverse series, and then the four vertical ones, naming those signs indicated at random by the examiner, such, for example, as the first and third of either row, vertical or horizontal. During the examination, the expert holds in his hand a specimen-sheet of the board, on which he inscribes notes of the answers which cannot be committed to memory. Twelve glasses accompany the instrument—viz., a plane-glass corresponding to 0, and eleven convex spherical ones corresponding to the metrical numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and a duplicate of No. 10.

The theory of the Loiseau optometer is explained in a work published in the *Annals of Ophthalmology* in 1878 (July, August, p. 6). We will mention briefly the following principles established by it. *When the sign-board is at ten centimètres (3.9 inches) distance from the eye-piece, it transmits rays which, after having passed through the eye-piece, intersect each other on the retina—(1) if this eye-piece is a convex lens of 10 D; (2) if it is placed in ϕ' —viz., thirteen millimètres (0.5 inch) in front of the cornea; (3) if the accommodation is in a state of complete rest; and (4) if the inspected eye is emmetropic.*

The eye, being thus strengthened, is in possession of a refractive power derived from the natural refraction of the eye and the addition of 10 D. But if, under these conditions, it is necessary to add ten diopters to the refraction of the emmetropic eye, the same is not necessary to the myopic eye, of which the intrinsic refraction is superior to that of the emmetropic eye. One or several diopters less will be required; that is to say, the myopic eye will distinguish the sign-board, placed at ten centimètres (3.9 inches) distant, with an eye-piece of 9, 8, or 7 D, for example; this eye will vary in its degree of myopia from $10 - 9 = 1$, $10 - 8 = 2$, $10 - 7 = 3$ D, etc. Its character will thus be determined; and it will require for its amelioration a negative glass of 1, 2, 3 diopters, which will have the effect of neutralising an equal number of diopters in excess. In hypermetropia, the case is different.

These preliminary observations will suffice to throw a light on the following remarks concerning the application of the Loiseau optometer in the councils of conscription and medical examination.

1. *Myopia.*—In the case of volunteers or substitutes desirous of proving their aptitude for service, it is unnecessary to paralyse their accommodation by the instillation of atropine. The subject being placed in the light of a window, and holding in his hand the optometer-tube, must place the knob of the terminal rod in contact with the inferior orbital region, and look through the various glasses that will be placed before him. His degree of aptitude will be decided by his answers. In the case of conscripts who are, on the contrary, interested in exaggerating their defects of sight, which they can do by means of their accommodation, this resource must be paralysed, and the medical man must instil into the eye, previous to applying the test, by aid of a drop-glass, three or four drops of a solution of atropine (five centigrammes to fifteen grammes of distilled water), and defer the examination to the end of the meeting, and *after having remarked a considerable dilatation in the pupil of the eye.*

2. *Hypermetropia.*—This defect must attain to six metrical diopters to authorise an exemption from service. Now, as there can only be a question of total hypermetropia, it must be isolated from all elements of accommodation, in order to determine its degree; and one must begin, therefore, by the mydriatic instillation. Without this preliminary operation, the man would not be fairly dealt with, being unable to prove the whole extent of his ametropia. In the cases of volunteers and substitutes, the paralysis of the accommodation is also useful; for, without it, the subjects would dissimulate, voluntarily or involuntarily, a part of their ametropia; and, should they become tired of the service afterwards, could make it a plea for being invalided.

It now remains to indicate the different tests. They are as follows, according to the instructions furnished with the optometer placed by Government at the disposal of the Council.

Test A.—The medical man introduces one of the two glasses No. 10 into the spring catch of the optometer. He adds in turn to this glass the eleven other glasses, which he takes care beforehand to dispose without reference to any order in their numbers.

Conclusions.—1. From the moment the subject can read the signs on the board with the aid of one of the following combinations—10 and 10, 10 and 9, 10 and 8, 10 and 7, 10 and 6—there is reason to pronounce his definitive exemption, on account of hypermetropia of at least six metrical diopters. 2. If the subject, being incapable of reading with the aid of any of the above-mentioned combinations, can

succeed by means of the following ones—10 and 5, 10 and 4, 10 and 3, 10 and 2, 10 and 1, 10 and 0—he will be judged fit for service. He is hypermetropic, but in a degree inferior to that which is necessary to warrant an exemption; or he is emmetropic. 3. Should he be unable to read according to either one or the other of these combinations, the Test B must be resorted to.

Test B.—The glass No. 10 must be removed from the lyre, and replaced in turn by the Nos. 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9, chosen, not in their order, but at random.

Conclusions.—1. If the subject can read the sign-board with the help of one of these glasses, 9, 8, 7, 6, 5, he will be considered apt for service; his myopia is not six diopters. 2. If he cannot read with the help of the preceding glasses, but can do so with one of the glasses 4, 3, 2, 1, 0, his decided exemption must be pronounced for myopia reaching at least six metrical diopters. The above-mentioned tests, although subjective, answer to every requisite, provided that those who are examined are sincere. In cases where they are desirous to prove themselves capable (volunteers or substitutes), there can be no doubt of their good faith, as it is necessary to their success. With regard to conscripts, this may be doubted; but all deception may be easily baffled. Truth must be either spoken or disguised. In the former case, the glass or combination of glasses by means of which he is to decipher the characters on the board will give the measure of his ametropia. There is but one resource that remains to him—that of protesting his inability to see through any of them. Such subjects, as well as those who oppose themselves to mydriatic instillations, must be treated like the worst sort of deaf people—those who will not hear; they will be declared efficient. They may resist, and will then be sent before the councils of revision, and from them handed over to the military ophthalmic institution, to be watched, and to be submitted to all the means of objective investigation which science affords—ophthalmoscopes, refracting ophthalmoscopes, ophthalmoscopes, perimeters, and the like—and where their fate will be decided after a thorough appreciation of their case.

It will probably be objected that, in seeking to determine the degree of myopia, one may be led into error, as formerly, though less so, by the previous overtaxing of the accommodation, which may not have been entirely conquered. There may be some truth in this supposition; but, if one considers that the experiments are made monocularly and through convex glasses (which are, for the most part, sufficient in themselves, and without having recourse to mydriatics, to neutralise the accommodating power), it will be quickly seen that errors of this nature can never be of sufficient moment to have any sensible influence on the results.

Let us add that the discovery of new and more active agents, such as, for example, the quite recent one of homotropin, may do away with this objection. It appears clearly proved that a watery solution of one per cent. of this new production occasions a pupillary dilatation and a maximum paralysis of accommodation, which begin both to diminish after several hours, and cease completely at the expiration of twenty-four hours.

3. *Visual Acuteness.*—The Congress of Brussels had admitted, as necessary for men entering the army, a visual acuteness comprised between $\frac{1}{4}$ and $\frac{2}{3}$. The Belgian Commission has fixed the minimum limit of $\frac{1}{3}$ of normal acuteness for the right eye, admitting a lesser degree for the left.

This measure is easily determined. The ametropia, if necessary, being corrected by an appropriate glass, the subject, be he conscript, volunteer, or substitute, must be able to read the signs on the board of the Loiseau optometer, measured according to this scale. If he cannot do so, then his acuteness is a third below par. But, as the good faith of the conscript (we do not speak either of volunteer or of substitute whose invalidity has been already proved) is at least doubtful, the conscript, thus provisionally judged, must be sent to the ophthalmic military institution, like those doubtful subjects already mentioned, to undergo a close examination.

The method I have now explained, and which, ratified by the royal decree of January 11th, is actually in force, is suited to every necessity. In a preliminary test, before the councils of militia, no subject can be sent away or invalided if he has not proved his disability, as regards his faculties of sight, by a positive test. This test is decisive. Whether myopic or hypermetropic, he has deciphered characters that a person myopic or hypermetropic of six diopters or more can only recognise by means of glasses which have been imposed upon him. Should there be either doubt or dissimulation in the case, the rights of science must be invoked, as well also as the interests of society. The deceiver must undergo, at the hospital of observation, the tests borrowed from objectivity, from which he can never come forth with honour. Thus the desire expressed at the congress that no exemption

on the score of defective sight should be pronounced but after the investigations of special and competent medical men (and which it seemed impossible to satisfy but on the condition of the presence of an oculist in every council of militia or revision—a thing impossible), is now accomplished.

OPHTHALMOSCOPTOMETER.—The Military Ophthalmic Institution, which is installed in the outhouses of the Military Hospital at Louvain, and which admits subjects for the purpose of serious examination, is placed under the direction of Dr. Loiseau. All the men who are sent there for observation undergo the ordinary inspection by objective optometry, to which is added that by ophthalmoscopy, by means of the instrument which we have devised together, and which may be thus described.

The ophthalmoscopymeter consists of two copper tubes, sliding one upon the other very easily.

The external tube is 15 centimètres long; it is 4 centimètres in diameter; its hinder opening is free; the front one is closed by a lens, C, having focal length of 71 millimètres (square = $\frac{1}{2}$ centimètre) or 14 D. From the anterior part of the tube arise two rods, between which is suspended a concave meniscus, B, of which the two faces have the same radius of curvature, *i.e.*, they are parallel, and which can be inclined so as to act as a reflecting mirror. Its radius of curvature measures 14 centimètres, and 21 centimètres in diameter; and it is placed $1\frac{1}{2}$ centimètres in front of the lens, so as to be capable of a sufficient inclination. One of the two rods passes only 22 millimètres beyond the level of the lens; the second, 9 centimètres long, and exceeding in length by 7 centimètres the plane of the lens, is terminated by an ivory button, A.

The inner tube, of the same length, and a little less in diameter, as it is intended to slide into the outer one, is, like that one, open behind. The front aperture is half closed by a rough glass

Fig. 3.

in the form of a half-moon. This tube is furnished with a graduation in half centimètres, which acts in the same way as that of a thermometer. The 0 is determined by aiming at a distant object, sending out parallel rays (emmetropia), and in sliding the interior tube from behind to the front, until the object is represented clearly on the screen (photography), which is then at 7 centimètres' distance from the lens. One may also mark the 0 by placing it simply on the point of the tube corresponding to the distance. These two means control each other. From zero, the graduation progresses in the two directions by half centimètres, representing each 1D hypermetropic; 0 towards the lens, myopic in the other direction.

To determine more easily the Point of Contact of the Image on the rough Glass. This glass occupies only one-half of the interior movable tube; it is a screen in the form of a half-moon. This disposition permitting a direct view of the image through the half-moon, which remains free of all diaphragm, one is assured by this means that it is represented correctly, and that one does not run the risk of looking in the mirror for an object that is not yet reflected in the tube.

This disposition permits one also, as soon as the image of the papilla is formed in the tube, to direct the rough screen towards it, instead of seeking to bring towards the screen by changing the direction of the eye, which would certainly be more difficult. To obtain this, the inner tube must be moved in the outer one with a slight friction from the back to the front, as if round its axis.

Method of Employment.—Things are disposed as for an ordinary ophthalmoscopic examination, where the object is reversed. The observing party seated a little higher than the person observed, the lamp being at the side and level with the eye, and holding the apparatus in the left hand, places the terminal button of the long rod, which extends beyond the front of the outer tube, against the inferior orbital region, and projects the reflecting meniscus so as to give light to the back of the eye; he then looks into the tube, moving, with the right

hand, the inner tube, until the half-moon encounters a clearly-defined image of the papilla. There remains now only to consult the graduating scale, which, indicating exactly the distance of the image from the lens, gives the correct measure of the refraction.

The state of refraction of the eye of the observer has nothing to do with this method of investigation any more than his accommodation. All that is required of him is to place himself near enough to be able to distinguish clearly the details of the object represented; for this purpose, the myopic eye of from four to five diopeters is the most favourable. The observer, whatever may be his sight, has only to make choice of an appropriate glass to enable him to arrive at this degree of myopia. This contrivance will prevent the observer from being obliged to extend too much the arm which holds the instrument, thus sparing him unnecessary fatigue.

The use of this instrument does away with all the difficulties inherent to such decisions as may be obtained by refracting ophthalmoscopes; the relaxation of the accommodation which is often difficult, the necessity on the part of the observer to make allowances for the refraction of his own eye, and the distance which separates him from the observer's eye—all these being impediments to favourable results from the ophthalmoscope. It gives, in short, the most absolute and decidedly objective results, with an incontestable mathematical accuracy. This apparatus, in order to be properly managed, requires naturally an apprenticeship from which no other system of ophthalmoscopic examination can be exempted. The management of it once acquired, it will answer every expectation. Perhaps, in order to render its management more easy, the instrument might be mounted on a stand. Of this we shall make a trial.

The ophthalmoscopymeter must not have the pretension of superseding refracting ophthalmoscopes. One must not omit remarking, however, that indications furnished by means of these instruments are open to dispute. If the measures employed are objective, as regards the subject under observation, they are subjective on the part of the observer. He is obliged to relax his accommodation, and sometimes, only succeeding partly, has only subjective means at his command, of which he is not himself certain. The ophthalmoscopymeter will at least be a means of control that is not to be neglected.

The measures I have indicated as necessary for securing at the same time the interests of the army and of society, in countries where conscription is in practice, are by no means indispensable where armies are only composed of volunteers. These minute details concern only those who wish to elude the law, men who pretend defects in sight in order to be rejected. But, in the case of volunteers, we must also be guarded against another kind of dissimulation; they are apt to conceal their infirmities, so as not to be excluded from the profession.

This must be the case in England. We will not now inquire into the system employed there to discover whether a volunteer possesses the necessary visual powers. We suppose only that a perfect sight, that is, a normal visual acuteness ($S=1$), and a physiological refraction, are not to be exacted. There must exist a certain degree of tolerance, and in that case also many abuses enter the door left open to them. We are of opinion that, if recruiting officers were supplied with the optometer of Loiseau, it would greatly facilitate their mission, and furnish them with the means of obtaining an absolute precision. It would suffice to possess a signboard, with characters according to the scale of regulation acuteness ($\frac{1}{2}$ or $\frac{3}{4}$ per cent.), the conditions perhaps being severer in armies composed of volunteers than in those recruited by conscription, and accompanied by glasses answering to the degree of myopia or hypermetropia admitted. The characters on the board may be placed in a manner to preclude their being studied, which is very easy; one has only to make choice of a square, and make use only of signs which have the same shape, in whatever sense they may be turned—circles, crosses, stars, etc.; in placing certain lines of these signs sometimes up, sometimes down, or right and left, they cease to preserve the same relative position, and all deceit becomes impossible.

II.—PERSONS EMPLOYED ON THE RAILROAD.

In most countries, the attention has been long called to the accidents resulting from mistaking the signals, owing to the defect of sight known by the name of Daltonism. We do not intend alluding to this subject at present, for it has already been treated of here, except as regards its connection with the faculty of sight in general.

The power of distinguishing colours (chromatopsical acuteness) is neither independent nor absolute; it is connected with visual acuteness and the state of refraction. It does not follow, therefore, that, when a subject has successfully stood the classical wool-test, he should be judged *ipso facto* competent to occupy functions where coloured signals

are to be distinguished at a great distance; he must for that purpose possess a good visual acuteness, and be neither myopic nor hypermetropic, since an imperfect one or an ametropic defect may prevent him from distinguishing with the naked eye (and the use of correcting glasses must be interdicted in the case of a certain class of workmen, such as engine-men and stokers) the colours of the signals, except at distances less than those prescribed as necessary.

This truth has been admitted by the Medical Congress at Amsterdam, in the Ophthalmological Department, where the first article of their regulations is thus worded: "1. The experiments made on this subject on the lines of the railroad, prove that, to distinguish signals at the required distance, it is necessary to possess a sight perfectly normal."

The concomitant examination of the refraction and of the acuteness of sight is, therefore, indispensable; and the commission recently appointed by the Belgian Government, called "Committee of Daltonism", has not hesitated in considering it as the necessary complement to that of chromatopsical acuteness. This double experiment can easily be made by means of the Loiseau optometer, which has been already mentioned.

There are two classes of subjects to be thus examined: the one including men actually in the service, and desirous of being maintained; the other class is that of subjects wishing to enter the service. Both are equally interested in concealing their imperfections, and, in certain cases, pretend to qualities they do not possess. The Loiseau optometer (special model), modified according to the questions that are to be asked, and the conditions required in different administrations, will in certain cases be found of the greatest utility.

I did not intend to enter now on the question of Daltonism. It may, however, be useful to say a few words of the centric scotoma, which affects the eye for the most part when under the influence of intoxication, whether alcoholic or any other. The relative centric scotoma, so named because it surrounds the point of fixation (central), and because it often happens that the visual sensation is only altered in its relative chromatic properties (Nuel) with reference to the direct sight, may not be sufficiently proved by the wool-test; these may, however, be seen by the peripheral parts of the retina, which may still be healthy, in passing in front of them before exciting the direct point of vision. When subjects so affected look at a distance straight before them, it is the central point of the retina which must perceive the observed signals, and that point is exactly the one whose chromatopsic unfitness has been shown. Thence arises the danger of confusion in the interpretation of signals. To avoid this cause of error, we have adapted to the Loiseau optometer a system of discs in coloured glass. These can be slid in front of the apparatus in the place of the sign-board, which must be previously removed. Instead of the ocular lens, there is placed a thick opaque diaphragm perforated by a stenopaic aperture. The subject should be able to distinguish the colours of the disc in looking through that opening of the size of a pin's head, thus admitting only the intervention of the central vision.

BENZOATE OF SODA IN THE TREATMENT OF ACUTE RHEUMATISM.

By DAVID MACEWAN, M.D.,

Surgeon to the Dundee Royal Infirmary.

BENZOLIC acid is closely related to salicylic acid in chemical composition, and its physiological effects are in some respects similar; it is, therefore, a reasonable question for investigation, whether, like the latter, it possesses antirheumatic virtues. With the view of determining this point, I commenced to prescribe it nearly a year ago, in the form of benzoate of soda, for the treatment of acute rheumatism. On the first occasion on which I employed it, the relief of pain and subsidence of fever were so immediate, and the recovery was so rapid and complete, that I had no hesitation in adopting the same treatment in subsequent cases. The results have been favourable, as the following brief notes of some cases will show. The temperatures given were taken either about midday or early in the afternoon.

CASE I.—Jane S., aged 19. I saw her on May 19th, 1879, and was told that she had been suffering from slight pains in the joints for four or five days, but was able to go about till the 18th, when she had a rigor, and had to take to bed. The joints affected were the right shoulder, wrists, knees, and ankles. Pulse 120; temperature 102°. The tongue was coated. She was perspiring freely. The cardiac sounds were normal. She was ordered to have fifteen grains of benzoate of soda every three hours.

May 20th. She had passed an uneasy night. The pain in the shoulder

was gone; the right elbow had become affected. [Pulse 108; temperature 100.8°.

May 21st. She felt greatly relieved. Both wrists and one knee were still slightly affected; the other joints were free from pain, but somewhat stiff. Pulse 96; temperature 99°.

May 22nd. She had no pain except in one knee. Pulse 74; temperature 99°.

May 23rd. She was completely free from pain. The pulse and temperature were normal. She made a good recovery.

CASE II.—Jane T., aged 21. I saw her for the first time on December 10th, 1879. Four years ago, she had an attack of rheumatic fever, which continued three months. She had had shifting pains in her joints for the past five days. She became worse yesterday, and had to keep her bed. The joints affected were the left shoulder, wrists, elbows, ankles, the left knee, and some of the metacarpal joints of the left hand. Pulse 104; temperature 101.2°. There was a loud systolic bruit, clearly due to chronic mitral disease. She was ordered fifteen grains of benzoate of soda every three hours.

December 11th. The condition of the joints was much the same. Pulse 96; temperature 100.6°. She was perspiring very freely.

December 12th. The pains were gone from the wrists and elbows; the other joints were still swollen and very painful. Pulse 96; temperature 103°. She did not complain of præcordial pain or uneasiness. She was ordered to have twenty grains of the medicine every three hours.

December 13th. The joints were nearly free from pain. Pulse 78; temperature 99°.

December 14th. There was no pain. The pulse and temperature were normal. Recovery was uninterrupted.

CASE III.—Wm. H. became ill about the beginning of January 1880, and was treated for a fortnight by salicylate of soda, but without much benefit. On January 14th, the elbows, shoulders, and knees were very painful and swollen. The tongue was coated with a white fur. He had profuse perspiration. Pulse 102; temperature 102.8°. The cardiac sounds were normal. He was ordered twenty grains of benzoate of soda every two hours. For three days the temperature ranged from 101° to 102°, and the joints continued more or less affected; the symptoms then gradually subsided; and in about a week from the commencement of the treatment he felt quite well, and was able to be out of bed.

CASE IV.—Ann H., aged 27, had been ill for five days when first seen on January 24th. The wrists, knees, and ankles were painful, tender, and swollen; pulse 108; temperature 101.2°. The heart sounds were normal. She was ordered twenty grains of benzoate of soda every three hours.

January 25th. Pulse 108; temperature 101°. The state of the joints was not much altered.

January 26th. The joints were not so painful; the pain in the ankles was quite gone; pulse 96; temperature 99.2°.

January 27th. Pulse 84; temperature 100°. The painful state of the knees was gone; the wrists were still affected.

January 28th. Pulse 88; temperature 100°. She still had pain in the wrists.

January 29th. The joints were free from pain. Pulse 88; temperature 99°.

January 30th. She was quite well.

CASE V.—Mrs. F., aged 50, was laid up with rheumatic fever for three months, thirteen years ago. The present attack began on February 13th. When seen for the first time on February 16th, she complained of pains in both hips, in one knee, and both ankles; the slightest movement caused great pain. Pulse 104; temperature 101.8°. There was mitral disease of old standing. She was ordered twenty grains of benzoate of soda every two hours.

February 17th. Pulse 96; temperature 100°. The pains were greatly relieved.

February 18th. Pulse 96; temperature 99°. She had no pain except in the left knee, which was still slightly swollen.

February 19th. She was quite well. The medicine was stopped.

She continued well till February 21st, when she was seized with pain and swelling in the left wrist; pulse 100; temperature 100°. The medicine was resumed in the former doses, and next day the painful state of the joint had subsided, and her pulse and temperature were normal. She made a good recovery.

In addition to the above, I have treated several other cases, of which I have no notes, in the same way, and with equally good results.

The cases here narrated, are, of course, too few in number to warrant any confident conclusions; but they are sufficient to show that there is a strong probability of benzoate of soda being a remedy of considerable efficacy in the treatment of rheumatic fever. In all of them, the symptoms passed off in periods varying from three