

as formerly, and necessarily we have better results. Then, too, the resisting power of the structures is correspondingly great as they are less manipulated and exposed, or brought under the influence of trauma.

With reference to the material used for drainage, I have used for the last six or eight years properly prepared wicking, which I have found far superior to gauze. It can be used in large quantities. Its threads are continuous and very easily removed. The capillary action is better and it is easier to introduce and remove. This ordinary lamp wicking is prepared very much the same as iodoform gauze, and it can be made antiseptic with any of the germicides. The advantage of this material in the abdominal cavity means simply more than drainage; it protects abraded surfaces and prevents adhesions of the intestines. I think we are learning to do away with the drain through the abdominal wall and shall soon use it exclusively through the vagina. The bugbear of vaginal infection is fast fading away.

DR. WARD—We are mostly agreed that we should not use drainage if it is not absolutely necessary. Gauze does not drain after twenty-four hours. A glass tube does not drain after twelve hours, therefore, we have gained twelve hours after that method by the gauze. Gauze will carry away all the material thrown out in the abdominal cavity. The portion on the outside will be filled with clotted blood. I believe that we should drain through the vagina where it can be done. The gauze must not be packed too tightly if we expect good drainage.

### HOW TO CURE RHEUMATISM.

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BY ELMER LEE, A.M., M.D., PH.B.

Vice-President American Academy of Medicine; Chairman Section on State Medicine American Medical Association. Chicago.

The names of diseases are determined, principally by the prominence of a certain group of symptoms. The disease under consideration follows the general rule. Special names are attributed to particular groups of symptoms, all of which, however, constitute merely varieties of one disease.

Rheumatism is acute when it is recent, and chronic when the disease has extended over a longer period; articular, when the manifestation is chiefly in the joints; inflammatory, when the whole body exhibits the symptoms of inflammation and pain; muscular, when relating to the striated and non-striated tissues; sciatica and lumbago belong to the same family; even gout is itself closely related in its origin, differing only in its symptomatology.

The present paper is concerned with a practical review of the author's system of managing this disease in its various forms.

Disturbance of nutrition with consequent impairment of the solids and fluids of the body, always precede rheumatism. Invasion of the soft tissues can not take place unless the functional activity of both structures is impaired. It is impossible to name the first symptom in the series of alterations of the elementary forms. But in almost all cases which have come under observation, certain functions are almost uniformly abnormal. Variation in the volume as well as the nature of the fluid elements of the body, and changes in the quality and proportion of the solids, are constant factors in the pathology of rheumatism. The influencing or producing causes of these changes in the body are, indeed, hard to exactly discover. But fortunately, they are not indispensable to successful treatment of the condition that requires remedial aid.

Whenever there are functional changes they consist for the most part, of abnormal muscular action in some portion of the body, principally with reference to the capillaries and small arteries. The same condition may be an exciting cause of other diseases, the peculiar symptoms determining the character of the affection, being dependent upon the state of the general system of the individual. Thus a given influence may produce in different individuals quite contrary symptoms. With disturbed nutrition, alteration of the fluids and solids of the body are accompanied by obstructions in the circulatory and excretory systems. Lowered vitality is the necessary result, which is the basis upon which rheumatism is determined. If functional activity remains normal, the vital resistance of the soft structures prevent retention of the impurities. There is no one portion of the economy which suffers alteration so readily as the circulating fluids. Upon the relative maintenance of the normal proportion of the fluids and solids, the health of the body depends.

It has been found by examinations of the blood that there is a loss of balance between the fluid and solid ingredients. It has also been determined by scientific investigation, that the origin of diseases lies largely in the imperfect circulation of the fluid elements of the body through the capillaries, altering in turn the functional activity of the lymphatic vessels. Congestion is a disturbance, or, an obstruction in capillary circulation, whether it be in the surface of the body or in some internal organ. The consequent result, which follows even a slight interruption in these minute passages, produces obstructions which in turn, undergo changes that are fatal to the life of the elementary cell. If the harm done is slight, and the balance of the circulation is quickly regained, the symptom of this disturbance may not be even appreciable to the central nervous system. If, however, a great number of slight disturbances in the capillary circulation occur, the resulting evidence is determined by symptoms which are noticeable. There are many causes which may produce impeded vascular circulation in the minute spaces, the chief of which is some form of exposure of the body to external influences.

The first impression upon the system is necessarily received by the nervous system, and through it the influence is carried to the muscular structures. If the vitality is sufficiently strong the evil influence is scarcely appreciable, for it is the natural tendency of the system to recover from disturbed equilibrium. Few individuals there are whose physical condition is normal; consequently, the result of even a slight cause of physiologic disturbance is often productive of disaster. The point of my argument, at this time, is to establish the value, in the maintenance of normal health, of the part which is performed by preserving the quality and the volume of the circulating fluids.

The capillaries are so exquisitely small, that even the red cells themselves are unable to enter them. The watery element of the blood alone finding its way through the millions and millions of these diminutive channels. The ultimate cell depends for its nutrition upon the albumin, the fibrin and the salts which are held in solution by the water of the blood. Ever so small a disturbance in capillary circulation interrupts the processes of nature, and, if these instances occur sufficiently frequently, morbid products are retained in the lymphatics and the intercellular spaces. The efforts of physiologic action to remove and expel these products when retarded, constitutes the first

element in inflammatory processes. The accumulation of these minute centers of interrupted action, establish an appreciable area of disease, which spreads more and more according to the state of the tissues. When the area of inflammation is sufficiently large, and destruction of cells is advanced, the heat of the body is augmented, both by the decomposition of the morbid products, and by the physiologic disturbances produced throughout the system, constituting an inflammatory fever. With the determination of the fever, other symptoms appear which hitherto were not present in our picture of pathologic changes.

The exact pathology of rheumatism is undetermined. The analyses of the blood indicate no chemic or organic changes. The cellular structures are identical with those of usual conditions found in health. Lactic acid and uric acid and other chemic substances are not found to prevail to a greater degree than at other times. The only change that is discoverable, is the diminution of red corpuscles. The various theories concerning the cause and origin of rheumatism, in the light of the exact knowledge, determined by physis and chemic analysis of the blood, are not satisfactory. The exact knowledge on the subject consists in the single, positive statement that there is alteration in the number of red cells of the blood. In addition to this it is also able to be definitely stated that there is diminution in volume of the fluid element of the blood. These facts would seem to throw the responsibility upon the capillary circulation rather than upon change in the blood chemistry. It is upon recognition of the foregoing physical alterations of the blood that my practice in the treatment of rheumatism is founded.

Postmortem examinations reveal no changes not found in other diseases. Chemic analysis of the fluids and the solids of the rheumatic body are also negative in showing the origin of this disease. The flow of urine is greatly diminished and through this condition, it is able to determine that the volume of the blood is also diminished, corresponding precisely to the symptom of scanty urine. The average number of cases, in which the urine has been calculated as to the quantity, shows a uniform decrease as well as an increase in color and specific gravity.

After very careful examination of the extensive literature on the subject of rheumatism, my conclusions are as follows: that rheumatism is, so far as the conditions of the solids and fluids of the body are concerned, a disease not dependent upon chemic changes of the fluids; nor is it due to any particular chemical that may be found, either in the fluids or the solids of the body. The only definite knowledge that is irrefutable, is that there is a change in the physical character of the blood, consisting of an alteration of the relative proportions of fluid and solid elements.

The inflammatory processes which take place are similar to those in other diseases, under similar conditions. The differences in the forms of rheumatism are produced by variations of the intensity of the disease, and the state of health at the time of attack, of the individual. The three principal symptoms of rheumatism, namely, pain, fever and swelling are able to be explained by my hypothesis. The condition of impaired nutrition, and functional derangement of the bowels, either constipation or diarrhea, is almost constant.

Clinical experience teaches me, therefore, that the

first indication in the treatment of this disease is the supply of proper and sufficient nutrition. The next indication is attention to the processes of elimination by which the system is relieved of dead matter. Nature is the greatest remedial influence in the cure, and whatever introduces new strength and saves the vitality is the safest therapeutics. Next in order in the line of remedial measures, is to restore and preserve the normal volume of the blood. If there is a reduction in the number of red blood corpuscles, that reduction, it is found, is only relative, for there is a consequent loss of serum. This condition is exactly determined to be true, by quantitative estimation of the urine of each twenty-four hours. The high specific gravity of urine, which is referred to as a prominent symptom in febrile diseases, is evidence that there is deficiency in the liquid element of the blood. Nothing could be more natural than a waste through the kidneys in proportion to the volume of blood serum, so that this symptom is so slight in importance, relative to the ease with which it can be corrected, that it is a surprise, that so much is made of it in referring to the symptoms of disease.

Every one of these pathologic and physiologic changes which have been enumerated in the paper, are directly amenable to control by the proper use of hydriatics. There is no question as to the fact. It has been so many times proven in my clinical work during the past period of six years, that it is no longer subject to the least doubt in my mind. It is not altogether an easy matter for those not acquainted with hydriatics, to give full credence to such positive statements, unsupported by clinical demonstrations in hospital wards. Neither is it an easy matter to learn the various processes which constitute intelligent and common-sense use of water, pertaining to the cure of this disease.

Before detailing the plan which is regularly followed in my practice, it is my wish to lay before you some therapeutic measures which were recently employed in the treatment of a case of acute rheumatism in one of the Metropolitan hospitals. The recital of this list of remedies may be instructive, as it furnished me many points for thought and criticism of the prevailing measures in vogue to-day, in the treatment of rheumatism. The list comprises the following drugs and remedies used upon one and the same patient, the result of which was the fatal termination of the patient:

Here it is: Salicylic acid, salicylate of soda, gaultheria, salol, salophen, antipyrin, iodid of potassium, wine of colonicum, iron, arsenic, strychnin, bicarbonate of soda, epsom salts, bromid of sodium, morphin, turpentine, lanolin, lard, digitalis, cod-liver oil, whisky, and menthol in alcohol. Great stress was placed upon the fact that 15 grain doses of salophen, combined with 15 grains of bicarbonate of soda, were borne by the patient at intervals of every two hours. The patient grew steadily worse from the inception of the treatment, and it would be strange indeed, had it been otherwise.

The criticism of this plan of treatment is not owing to a lack of an orthodox education, or to ignorance on my part of the recommendations of the *materia medica*. The practice of therapeutics has been going on for a period of, perhaps, over three thousand years, and while the list of remedies presented above does not represent the sum total of our ability in the treatment of rheumatism, neither does it reflect creditably upon the education and the intelligence of a learned

profession, and it is not strange that odious comparisons are instituted by the laity between the advancement of surgical treatment compared with that of medicine. There is some excuse in the allied sciences of electricity and other departments of physics, for imperfect processes, and room for further scientific development, but it seems to me there is hardly the same excuse for a class of highly educated, broad-thinking men who have had so many centuries during which to work, and in which to perfect the treatment of diseases of the human body.

We must remember that steam and electric energy are discoveries of comparatively recent years, and that further improvements are in order and perfectly natural; but we must also remember that the human body with its physiologic and pathologic nature has been known and practiced upon for more than thirty centuries. What hope for the future would there be if the foregoing list of remedies should be taken as the total of our ability in the treatment of this disease? If our science was no older than steam or the telephone, our mistakes would be but natural and pardonable. It is not wholly the fault of the physician that such an incongruous and contradictory collection of substances should be used in the treatment of rheumatism. The education of the people and the use of drug remedies from childhood, almost force physicians to employ them in the treatment of their cases. Beside this, the circulation of enormous quantities of spurious medical literature by commercial agents, advocating and urging the use of their patented and proprietary preparations, has a harmful and misleading influence upon the younger members of the profession, who are eagerly seeking, and ready to receive information which purports to represent the very latest ideas in therapeutics. It is not my purpose to condemn or to harshly criticise any one in particular, but rather, in a sympathetically critical attitude to point the way to the truth.

The treatment of rheumatism by hydriatic processes is based now upon an experience in practice during a period of six years. The plan which is pursued is satisfactory to the highest interest of the patient and the physician. It is something that is definite; it is reliable, and the gains that are secured in the progress of the treatment are real, and can be determined with an accuracy approaching true science. The only difficulty that is experienced in pursuing the hydriatic plan, lies in the fact that it is considered by the patient and friends as novel and, therefore, to be guarded against. Besides, the support of the profession, is withheld, owing to misunderstanding, by reason of clinical inexperience, lack of actual knowledge, and doubt, which operates to the disadvantage of both the physician and his patient. It takes a great many clinical experiences to establish the courage of one's own convictions, and until belief is based upon many carefully conducted experiments, there is always room for a question whether it is right or wrong. The disposition is, among clinicians, to prove each point in practice and to lean toward conservatism. For my part, my courage is established, and the practice of hydriatics, according to my experiences, is now approaching a definite and scientific system of therapy.

For the purposes of clinical practice the gross symptoms of rheumatism are sufficient in all cases to determine the line of treatment. It is only where experiments for scientific purposes are instituted that differentiating instruments and chemic tests are

employed. When first called to see a patient it is of course impossible in most cases to exactly determine, even to my own satisfaction, the precise nature of the affection. The first inquiries that are made of the patient refer to the general condition, followed by questions and examinations to determine the details concerning the physiologic functions. Inquiry is especially directed to the excretory system, with reference to the quantity of urine which is passed, the condition of the bowels, the appearance of the skin and the mucous membrane, and especially the state of the appetite, the kind of food taken, and the habits with reference to the nature and the quantity of fluids taken as drink. The temperature of the body, the movements of the pulse and the subjective symptoms of the patient, constitute a list of inquiries sufficiently to determine the treatment. The physiologic requirement of the system is two litres of water per day. In no single instance of a case treated has this quantity been consumed by the patient prior to his sickness.

The treatment is begun by prescribing regular, definite doses of pure, soft water at frequent intervals. Each dose of water contains some harmless remedy to satisfy the notions of the patient and his friends. The amount of water which is prescribed at each dose is scientifically determined by the whole weight of the body, the age of the patient and the degree of the fever. Starting upon the basis of an average man, two to four litres of pure water is prescribed every day, in properly apportioned doses, to avoid mistakes and excessive use of water at any one time. If the patient were of seventy-five pounds weight my estimate would be that one and one-half to two litres of water would be absorbed per day with comfort and advantage. The next process in the use of hydriatics is irrigation of the bowels if circumstances favor it. One teaspoonful of elixo, a liquid soap, is mixed with the water used for irrigations. Many cases have been treated by me, in which it was inconvenient or undesirable to practice irrigation of the bowels. It is therefore, established clinically that while irrigation is in all cases an aid to treatment, still it is not indispensable.

The third hydriatic process is the use of water upon the surface of the body. If the patient is agreeable to direction and conveniently located, the full bath is recommended. The temperature of the water should be a few degrees below the temperature of the body. When the toilet room is inaccessible or it is inconvenient to remove the patient, three bathing processes are followed in my practice: 1, sponging the body with water from a basin; 2, the wet pack; and 3, the use of my sprinkle-bath. The sprinkle-bath consists of cool water applied to the surface of the body, at intervals of two or three hours, during the day and evening, by means of a small sprinkle nozzle attached to the end of the tubing of a fountain syringe, which is suspended from a chandelier, bed-post or a nail in the wall. Swelled and painful joints are packed in a compress of cold water until relief comes. Briefly speaking, the foregoing measures have availed in the treatment of rheumatism. The precise detail work must necessarily vary in every case. The food is immaterial; whatever is the most simple, the easiest to provide and which is agreeable to the patient, is all that is required. Purposely the recital of cases has been omitted. Such recitals are tedious, and for this reason are omitted from this paper.

103 State Street.

## DISCUSSION.

DR. LOUIS FAUGERES BISHOP, of New York—I do not think we ought to pass over the subject of rheumatism without any consideration of the fact that in all probability acute rheumatism is of miasmatic origin. I think that any one who studies the whole literature of the subject will come to that conclusion.

Further discussion was interrupted by the lateness of the hour.

## MALARIA.

BY ELLSWORTH D. WHITING, A.B.

AURORA, ILL.

(The L. P. C. Freer Prize Essay, Rush Medical College, 1896.)

(Continued from page 123.)

Before entering upon a systematic study of the organism, a description of the manner in which specimens are obtained may be of advantage.

The technique of obtaining specimens for a fresh examination, though simple in theory, presents many slight, but annoying, difficulties in actual practice. The main points ever to be kept in mind are cleanliness, quickness and skill of hand and eye. The instruments necessary are a small lancet, two pairs of blood forceps, slides and cover slips. The site of puncture should be thoroughly cleansed, first with soap and water to remove dirt, secondly with alcohol to remove oily materials, and then allowed to dry.

Blood for examination may be taken from any part of the body. In adults the finger tip or lobe of the ear is most satisfactory. The writer has had most success in taking specimens from the lobe of the ear. Here there is practically no pain; a very minute puncture only is required to obtain the necessary amount of blood; it is out of the sight of the patient; immobility is easily obtained and infection is not liable to follow. The puncture of the finger tip is painful; being in the sight of the patient much annoyance is caused in children and hysteric subjects and there is more danger of infection. In infants the most desirable site is the inner surface of the heel.

Great cleanliness should also be observed in the preparation of the slide and cover slip. Both should be thoroughly cleansed immediately before using. In preparing the cover glass it should first be allowed to stand in 25 per cent. sulphuric acid for one half hour. It should then be washed in alcohol and finally dried with a perfectly clean and dry silk or linen handkerchief. In the preparation of the slide such precautions are not necessary as cleanliness can be secured by brisk rubbing.

If it is convenient it is of great advantage to have the slide as near body temperature at possible. This may be obtained by the judicious use of the alcohol lamp or by friction at the hands of an assistant.

The site of operation and the necessary articles being in readiness, a slight puncture, directed upward, is made in lowest point of the lobe of the ear. The lobe is then turned upward and the blood allowed to flow without pressure. The first few drops are wiped away when a cover glass held in blood forceps is touched to the summit of the following drop as it emerges from the opening. The slip is then quickly transferred to the slide. In order to guide and steady the hand that the cover may not touch the skin, the following procedure may be followed. Let the left hand, which is holding the lobe of the ear, rest against the neck of the patient, then by placing the fingers of the right hand, in which the cover slip is held, lightly upon the left hand, steadiness and accuracy of tactile

sense may be acquired to a remarkable degree. It is also of advantage to hold the forceps as near the cover slip as possible.

If the cover slip and slide have been perfectly cleaned; if the operation has not taken too long and the cover glass has not touched the skin nor the drop been too large, the blood on touching the slide will immediately spread out between the slide and cover glass. No pressure should be applied. On microscopic examination the corpuscles will be seen to lie separate and distinct side by side and unaltered in the surrounding plasma.

Often in spite of the most careful preparations the drop of blood will not spread, a condition which the uninitiated will be at a loss to explain. This may be explained in four ways at least:

1. After immersing in sulphuric acid, the acid may not have been entirely washed away. Especially does this occur when a number of slips are washed at the same time. Long cleansing in water is necessary to thoroughly remove the acid. When the acid can not be tasted it will do no harm in the spreading, fixing and staining processes.

2. A raveling may be found lodged in between the slide and cover slip, which prevents the hugging of the slide by the cover glass.

3. The surface of the slide may be uneven.

4. The slip may be warped.

Blood prepared in this manner will keep from one and one-half to two hours without crenating and may be kept longer by anointing the edges of the cover slip with vaselin or glycerin. In the examination of blood for the organism of malaria a one-twelfth oil immersion objective with ocular number five is recommended. These high magnifications are not absolutely necessary. Laveran made his first observations with dry lenses of low powers.

The preceding methods are the simplest and most practical for clinical work. Some observers use methods much more complex. Hayem's slide is used to some extent. This consists of a hollowed out slide. The drop is placed in the depression and protected by a cover slip. Plehn describes a most elaborate method by which he keeps microscope, slide and specimen at body temperature. He mounts his specimens in paraffin and thus keeps them intact for three hours.

In the preparation of dried specimens for future staining the technique is the same except that instead of placing the drop collected on the slip upon the slide, it is placed upon a second slip, held likewise with blood forceps. The slips are left in contact from one to two seconds when they are drawn apart being continually held by forceps and the lines of force kept parallel. They are then set aside to dry with the clean side down. The drying process takes but a few moments.

When it is necessary to take dried specimens without aid, the operator is compelled to fall back upon devices which may best suit the circumstances. The writer has been very successful in the pursuance of the following plan. One cover slip is placed upon a clean piece of paper at the very edge of a table while the second cover when the drop of blood is collected is placed upon the first. As the blood cements the slips together both are raised by lifting the one in the grasp of the forceps when they may easily be separated.

Before specimens can be stained they must be