MARK WEST SPRINGS.—Sonoma County, California. Hotel and cottages.

This resort is situated eight miles from Santa Rosa, near the famous "Petrified Forest" on Mark West Creek. It is reached by rail to Calistoga or Santa Rosa, and thence by carriage or stage over a picturesque drive to the springs. The mountain region along the road is coming under a high state of cultivation, and beautiful villas and private mountain retreats are springing up in all directions. The springs are beautifully located at an elevation of 800 feet in a small valley formed by the junction of four canyons. The hotel and grounds are at the bases of three venerable mountains known as Mount Washington, Mount Lincoln, and Mount Grant. The air is clear and dry, the temperature ranging from 80° to 90° F., with cool, bracing sea breezes. There are excellent hotel accommodations and several cottages for family use. Hot sulphur and mud baths have been constructed, with all facilities for the comfort of the visitor or invalid. There are several springs on the place, one of them a sulphur spring, yielding about 200 gallons per hour. The temperature of the water is 82° F. It contains: Sulphate of sodium, sulphate of magnesium, salts of potassium (trace), chloride of sodium, carbonate of sodium, carbonate of potassium, carbonate of lime, silica, alumina, free carbonic-acid gas, sulphureted hydrogen gas.

There is also a strong chalybeate spring, yielding 600 gallons of water per hour, having a temperature of 65° F. The largest spring has a flow of 5,000 gallons hourly; this is a sparkling carbonated water, very palatable, and gently aperient in its action. The water at these springs has been found useful in a considerable variety of affections. The baths are sulphurous. *James K. Crook.*

MARSHMALLOW.—Althæa. "The root of *Althæa officinalis* L. (fam. *Malvaceæ*)" (U. S. P). The Marshmallow is a tall, perennial salt-marsh herb of temperate European sea coasts. It is also largely cultivated, sometimes for ornament, but chiefly for its root, in Southern Europe. The root of commerce is from six inches to nearly a foot long, usually about half an inch in greatest thickness, simple and regularly tapering. It is nearly white, from the removal of the outer bark, and marked with several broad grooves and numerous small, brown, slightly elevated spots. It is more or less fuzzy with long, hair-like, partly detached bast fibres. It snaps readily, owing to its large amount of starchy parenchyma, but the parts still cling together by their tough bast fibres. It has a sweetish and strongly mucilaginous taste. It is about one-third gum and another third starch, with about ten per cent. of pectin, eight per cent. of sugar and one per cent. of asparagin. Its properties are wholly nutritive and demulcent. There is no pleasanter adjuvant than the official *Syrupus Althææ*, of five-per-cent. strength.

The leaves and flowers are also rich in gum, and both are much used in domestic practice in Europe for poultices and demulcent drinks. *Henry H. Rusby.*

MASSAGE.—Definition.—Massage (from the Greek, *masso*, I knead or handle; Arabic *mas'h*, press softly; Sanskrit, *makch*, to strike, to press, to condense) is a term generally accepted to signify a group of procedures which are best done with the hands, such as friction, kneading and manipulating, rolling and percussing the external tissues of the body in a variety of ways with either a curative, palliative, or hygienic object in view. In many cases massage should be combined with movements, passive or active, assistive or resistive, as may be required, and these are often spoken of as the Swedish movement cure. Most scientific men prefer to have the word massage embrace all these varied forms of manual therapeutics, for the reason that the word cure attached to any form of treatment whatsoever is often misleading.

History.—Massage, in some crude form or other, has been used from time immemorial by savage and civilized people, because it is founded on instinct. The history of massage is coeval with that of mankind, and those who have thought it worth while to record their appreciation of it have in almost every instance been men of eminence either as physicians or as philosophers, poets, or historians. The aphorisms of Hippocrates embodied the wisdom of the past and presaged the developments of the future to a greater extent than most ancient or modern writers on massage have shown any evidence of understanding. He says: "The physician must be experienced in many things, but assuredly also in *anatripsis*, the art of rubbing up; for things that have the same name have not always the same effects. For rubbing can bind a joint that is too loose and loosen a joint that is too rigid. Rubbing can bind and loosen; can make flesh and cause parts to waste. Hard rubbing binds; soft rubbing loosens; much rubbing causes parts to waste; moderate rubbing makes them grow." The results which he has predicted will follow when the necessary previous conditions have existed.

Amongst the old Greeks and Romans massage in some form or other was patronized by people of widely different classes, from the patricians, the wealthy and the learned down to poor decrepit old slaves; and for the most diverse purposes: with some as a means of hastening tedious convalescence, with others as a luxury in conjunction with the baths, and with still others to render their tissues supple and enduring preparatory to undergoing feats of strength, so that there would be less likelihood of sprains and ruptures.

To Peter Henrik Ling, of Sweden, credit is given for having instituted what is so well known as the "Swedish Movement Cure." In 1813 the Royal Central Gymnastic Institution was established at Stockholm in order that Ling might practise and teach his gymnastics, which were adapted to the well and the sick. The critics of Ling quickly brought forward testimony to prove that his method was but a revival of that of the ancients. But, however his genius and the claims of priority made for him may have been disputed, there was no doubt as to the merits of the system which he rescued from oblivion. In some of the large cities of this and other countries, institutions similar to the one at Stockholm exist where movements and stirring up of the external tissues of the body by hand and by machinery are employed. When they rely too much on machinery for this purpose their existence is generally brief.

The field of usefulness of massage has gradually been extending, so that now it has found its way into every general and special branch of medicine, frequently meeting with signal success after the apparent failure of every other means. He who would understand this art, its indications and contraindications in all their ramifications, ought to be a well-informed man. Dr. J. Zabludowski is a full professor of massage at the University of Berlin, and the force of circumstances requires that he should not be the least learned man of the faculty.

Mode of Applying Massage.—Vague generalities still exist as to the best manner of doing massage; and these are not rendered clearer by calling slow and gentle stroking, *effleurage;* or by speaking of deep rubbing as *massage à friction;* or by using the word *pétrissage* for manipulation or kneading without friction; or by calling percussion, *tapotement*. These and other subdivisions of massage can all be grouped under four heads: friction, percussion, pressure, and movement. Manipulation, malaxation, deep rubbing, or kneading is a combination of pressure and movement without allowing the hand to slip on the skin. It is of more value than all the other procedures, and constitutes the massage, properly so called, of the older writers and also of the later ones who know anything about it. Each and all of these may be gentle, moderate, or vigorous. Some general remarks will save repetition. 1. All of the single or combined procedures should at first be begun moderately, then gradually increased in force and frequency to the fullest extent desirable, and should end gradually as begun. 2. The greatest extent of the hands and fingers of the manipulator, consistent with ease and efficacy of movement, should be adapted to the surface worked upon, in order

that no time shall be lost by working with the ends of the fingers, or with one portion of the hands, when all the rest might be occupied. 3. The manipulator, if too near the patient, will be cramped in his movements; if he is too far away, they will be lacking in energy, indefinite, and superficial. 4. The patient should be in an easy and comfortable position, with joints midway between flexion and extension, in a well-ventilated room, at a temperature of 70° to 75° F. Any sensations of tickling will soon disappear when firm, steady, deep kneading is employed. 5. The directions of these procedures usually should be from the insertion to the origin of the muscles, from the extremities to the trunk, in the direction of the returning currents of blood and lymph, unless there be a plug in a vein. 6. What constitutes the dose of massage is to be determined by the force and frequency of the manipulations, and by the length of time during which they are employed, considered with regard to their effect upon the patient; in other words, the reaction must be studied. A good manipulator will do more in fifteen minutes than a poor one in an hour, just as an old mechanic working deliberately will accomplish more than an inexperienced one working furiously.

In using friction upon the limbs, after the strong upward stroke, the hand should return gently grazing the surface, so as to impart a soothing sensation; it should not press upon the parts so vigorously as to retard the currents pushed along by the upward stroke; and thus a saving of time and effort will be gained. The manner in which a carpenter uses his plane represents this to-and-fro movement very well. Six to a dozen or more of these up-strokes and as many returning may be used at a time, according to the effect desired. On the hands and feet the friction may be done in a rectilinear manner, parallel to the long axis of the limb, and on the arms and legs it can be used not only in straight lines but also by long oval strokes extending from joint to joint, the strong stroke up, the light one returning. It is well to begin these strokes on the inner side of both arms and legs so that the larger superficial and deep vessels may first be emptied, as this makes room for their tributaries to pour their contents into them. From the base of the skull to the spine of the scapula forms a well-bounded region for downward and outward semicircular friction; and from the spine of the scapula to the base of the sacrum forms another surface over which one hand can sweep in downward and outward strokes, alternating with those of the hand at work upon the shoulder, the patient for this purpose lying on the opposite side. The application of friction to the hip should be done in an upward direction with alternate strokes from the insertion to the origin of the glutei; to the chest, from the insertion to the origin of the pectoral muscles; and to the abdomen, from the right iliac fossa in the direction of the ascending transverse and descending colon. Friction over the stomach should be upward and inward from the left side, and over the liver, up and in from the right side.

For manipulation or kneading the same division of surfaces and direction of working should be made as for friction; and it is a very good rule, but not an absolute one, that stroking and kneading should alternate. Adapting as much as possible of hands and fingers to the part to be *massëed*, making three manipulations and passing three times over a surface, as from wrist to elbow, constitute a very good plan; then half a dozen strokes should be made, and so on. The grasps should alternate, one hand contracting as the other relaxes, and the advance on new territory should be such as to permit of the hand overlapping one-half of what was *massëed* at the previous grasp. For this purpose the two hands may encircle a limb, one slightly in advance of the other; or a single group of muscles may be *massëed* at one time by alternate squeezes with each hand.

For manipulation of the back we have the patient lie on one side as for friction, and then, while steadying the head with one hand pressed against the temporal region, we make the fingers of the other work vigorously from the median line upward and outward toward the insertion of the muscles at the base of the skull. The direction of the manipulations on the rest of the back should generally be downward and outward from the spine in graceful curves, and on the hip upward and outward, the two hands alternating in the same direction. On large people with very firm tissues, one hand should often be reënforced by placing the other upon it, the *massëing* thus being done with all the strength that can be put forth. The force used here and elsewhere must be carefully graduated so as to allow the patient's tissues to glide freely over each other; for if it be too great the movement will be frustrated by the compression and perhaps bruising of the patient's tissues; if it is too light the manipulator's fingers will slip; and if gliding with strong compression be used the skin will be chafed. In order to avoid this last objection, which is almost a universal error, greasy substances are employed, so that would-be masseurs may rub without injuring the skin. When the skin is cold and dry, or cold and moist, and insufficiently nourished, as in certain fevers and other morbid conditions, there is no doubt of the value of inunction; but no special skill is required to do this. Removal of hair is also unnecessary; for massage can be done as effectually on the head as on any other part.

On the chest and abdomen the same general direction will be observed for manipulation as for friction, but the pressure will be more gentle than on the back and limbs, as the tissues here will not tolerate being so strongly squeezed. On the chest, alternate circular kneading may be done with one hand on each side; or one side may be done with both hands, one at the upper, the other at the lower part, the direction of the circular kneading being down, in, out. On the abdomen, firm, deep kneading is usually best in the direction of the colon, the greatest force being used with the heel of the hand on the side of the abdomen next the operator, and on the other side the strongest manipulation being made with the fingers, care being taken to avoid the frequent and disagreeable mistake of pressing at the same time on the anterior parts of the pelvis.

Percussion, often useful for relaxed muscles, may be done in a variety of ways. In the order of their importance they are as follows: 1. With the ulnar borders of the hands and fingers. 2. The same as the first, but with the fingers separated. 3. With the tip ends of the fingers united. 4. With the palms of the hands. 5. With the ulnar borders of the fists. 6. With the palms of the hands held in a concave manner so as to compress the air while striking. The blows should be smart, quick, and springy, and usually with the ulnar borders of the hands directed transversely to the muscular fibres; except in the case of the back, which may not only be percussed with the hands at right angles to it while the patient lies face down, but also still more effectually when the patient stands slightly bent forward so as to put the dorsal muscles on the stretch. The hands of the percussor are then most easily held parallel to the spinal column, and can rapidly strike the muscles on each side of it, causing, we have every reason to suppose, a vibratory effect as when the string of a bow is struck. Moreover, in this position, the muscles, being tense, protect the transverse processes from the impact which the blows communicate to the roots of the nerves as they emerge from the intervertebral foramina, and the vibratory effect of this upon the distribution of the nerves is perceived as a peculiarly delightful and agreeable thrill.

Remedial movements, wrongly called medical gymnastics, have been more fully than clearly described in books on "Movement Cure." According to the descriptions of them which I have read the patients would have to be made for the movements rather than the movements adapted to the patients. Passive movements should be given to parts which the patient cannot move; assistive movements when the patient can do but a part and not the whole of a movement; resistive movements, when the patient is strong enough to oppose resistance for the purpose of cultivating increase of strength. Much learned nonsense has of late been written about various move-

ments and these have been given the names of their advocates. The truth simply amounts to this: find out what the patient can do and gradually increase this in such a manner as to invigorate and not fatigue. The inventive genius of any one may thus be called into play. Except in the case of relaxed joints passive motion should be employed in the treatment of joints which have been too long at rest until a degree of resistance is exerted by the patient which is perceptible to the manipulator; for this is the only way in which we can know that the natural attachments of the joints are being acted upon. Resistive movements are of two kinds: those which the patient can make against the efforts of the operator, and those which the operator overcomes while the patient resists, as when a group of muscles is voluntarily contracted and then pulled out into extension against the patient's resistance. The former have been called double concentric, the latter double eccentric by some eccentric individuals. When muscles are very weak, and it seems desirable to exercise them, it is better that they should first be contracted to their utmost, for then they can put forth much more strength in resisting extension than they could in passing from relaxation to contraction. Most frequently, however, it will be necessary to make resistance against the contraction of the patient's muscles, and then the opposing force should be kept carefully and instinctively within the limits of the patient's strength, so that he may not recognize any weakness; and this, with all the other procedures, should stop short of fatigue, at least such fatigue as is not soon recovered from. To resist alternately flexion and extension is the *pons asinorum* of manipulators, and in a long experience of teaching massage I have found but few who could learn to do this well, and many who could not learn to do it at all. Many a patient who has recovered from an old injury is still as much incapacitated as ever, from the fact that his latent energies can be discovered and cultivated for greater use only in this manner.

Midway between passive and resistive movements in the course of certain recoveries come assistive movements. They are but little understood and seldom used, the patient being credited with complete loss of the power of motion. For instance, in the absence of completely and permanently disabling injury or disease, let it be supposed that the deltoid has but one-half the requisite strength to elevate the upper arm. So far as any use is concerned, this is practically the same as if no power of contraction were left in the muscle. But if only the other half of the impaired vigor be supplied by the carefully graduated assistance of the manipulator, the required movement will take place; and in some cases if this be regularly persisted in, together with manipulation and percussion of the faulty muscle, more vigorous contraction will be gained, and by and by the patient will exert three-fourths of the necessary strength, and later the whole movement will be done without aid; and as strength increases, even resistance may be opposed to the movement. The importance of these measures can hardly be overestimated in cultivating the strength of weakened muscles, while at the same time we find out how much they can be used. Still another kind of movement deserves mention here, namely, vigorous passive motion with a view of breaking up adhesions in and around joints. It is the secret of success and of failure of people who call themselves "bone-setters."

Physiological Effects of Massage.—The pressure of massage exerts a simultaneous influence upon all the tissues within its reach—upon skin, fascia, muscles, blood-vessels, lymphatics, and nerves.

Skin.—Tough, flexible, and elastic as the skin should be in its natural condition, owing to the white fibrous and elastic tissues entering into its composition, it is rendered none the less so by a prolonged course of massage. While it becomes softer, more supple, and finer under massage, it also at the same time becomes more tough, flexible, and elastic, so that whereas at the beginning of massage it could scarcely be pinched and grasped without pain, later on, the patient will almost allow himself to be lifted up by the skin like one of the agile domestic animals; thus showing a marked change in the sensibility of these parts. The soothing effect of gentle stroking is familiar to every one, and the analgesic or agreeably benumbing influence which follows vigorous pinching is also well known. These peculiarities can often be utilized in gradually approaching painful places which could not have been directly pressed upon.

Muscles.—After massage muscles are more supple and comfortable, have greater power of endurance, and respond more readily to the will, to the faradic and to the galvanic current than they did before. When fatigued they recover more rapidly under massage than they do under the influence of rest alone, and are capable of doing about twice as much work as they can after resting for the same length of time. Dr. Zabludowski, professor of massage at the University of Berlin, found the effects of general massage on healthy people to be an elevation of the functions of life in general, and with an improved frame of mind were associated easier movements of body, increase of muscular strength, greater appetite, more vigorous and regular action of the large intestines, and more profound and refreshing sleep. Professor Maggiora, of the University of Turin, by an interesting and accurate series of experiments, has demonstrated the restorative effects of massage upon his own muscles when fatigued and weakened by physical or mental labor, by electricity, by hunger, by loss of sleep, and by slight fever. For this purpose the fatigue curves of the right and left middle fingers were taken in maximum voluntary flexion every two seconds, the weight employed being one of 3 kgm. The average results showed that the muscles concerned in this movement could do about twice as much work after a few minutes of massage as they could without. When, however, the brachial artery was compressed and the supply of blood shut off, massage had no effect at all. Of the three principal forms of massage, friction and percussion were much alike in the restorative effects produced by each, while *pétrissage*, or kneading, had a much greater influence than either of the others. When all three were used, the greatest effect was obtained. As to the effects gained by the length of time during which the massage was used, he found that a period of five minutes for the finger and for the forearm, brought forth a greater capability of work than when the massage was employed for either a longer or a shorter time.* I have always maintained that manipulation, kneading, or *pétrissage* is of more value than all the other procedures of massage put together.

Flow of Blood and Lymph.—When the contraction and relaxation of muscles no longer take place, the circulation languishes and then the assistance of massage may be invaluable; for by upward friction and deep manipulation the veins and lymphatics are mechanically emptied, the blood and lymph are pushed along more rapidly by the *vis a tergo* of the massage, and these fluids cannot return toward the extremities by reason of the valvular folds on the internal coats of their vessels. More space is thus created for the returning currents coming from beyond the region *masséed*, and the suction power induced at the same time adds another accelerating force to the more distal currents. The effect may well be likened to the combined influence of a suction and a force pump, and in people who are not too fat the superficial veins can be seen collapsing and filling up again as their contents are pushed along by the hands of the masseur. In this way the collateral flow in the deeper vessels, as well as the more distal stream in the capillaries and arterioles, is accelerated and the engorgement relieved. One would naturally suppose that the blood in the larger arteries would thus be interrupted. But herein comes an additional advantage to aid the circulation; for the compression being but momentary causes a dilatation of the arteries from an increased volume of blood above the parts pressed upon, and, as soon as the pressure is removed, this accumulation rushes onward with greater force and rapidity in consequence of the force of the heart's action and the resiliency of the arteries acting upon the accumulated volume of blood. Gentle upward stroking, though soothing, is a mild irritant, in a physiological sense, of the superficial vessels, causing a narrowing of their calibre and a stronger and swifter current in them by reason of its stimulating influence on their muscular coat and vaso-motor nerves. But let centripetal stroking, or any other form of massage, be continued for a sufficient length of time, or become stronger, and hyperæmia will result, indicating relaxation of the vascular walls due to over-excitation or exhaustion of the tone of their muscular coat and vaso-motor nerves. Retardation is, however, obviated by the mechanical effect of the massage pushing along the returning current. By reason of the fact that more blood passes through regions *masséed*, there will be an increase in the interchange between the blood and the tissues; and thus the work done by the circulation will be greater and the share borne by each factor less.

Dr. Brunton has shown by means of a glass tube inserted into a blood-vessel that the blood passes three times more rapidly through a part while it is being *masséed* than when it is not. The fact that the peripheral circulation is thus helped along in so appreciable a degree lessens the work of the heart in pumping it around, and makes it easy to understand why massage is so useful in nearly all forms of cardiac trouble. Dr. J. K. Mitchell has found that in many cases after massage there was a great increase in the number of red globules and of the hæmoglobin also. Dr. Oliver, of London, has pointed out that any influence causing rise of blood pressure would slightly concentrate the blood. In view of Mosso's discovery that when the blood of a fatigued animal is injected into another at rest, symptoms of fatigue are induced in the latter, it is not unlikely that when massage is applied to a fatigued person the blood of this individual resumes the condition of that which it has when he is rested, for massage certainly dispels fatigue, often very quickly.

In all the experiments which have been made in dogs for the purpose of determining the rapidity of flow of the lymph stream—by the insertion of a glass tube either into the thoracic duct or into the large lymph vessel which accompanies the saphenous vein—it was found that the activity of the flow was greatly increased by means of massage and passive motion, much more so than when galvanism was used; and it was also observed that in cases of inflammation the flow was much more abundant than it was from healthy parts.

Upon the nervous system as a whole, massage usually exerts a peculiarly delightful and at the same time decidedly sedative and tonic effect. While it is being done, and often for hours afterward, those who submit to it are in a blissful state of repose; they feel in a short time as if they were enjoying a long rest, or as if they had just returned from a refreshing vacation; it makes optimists of them for the time being. An aptitude for rest or for work generally follows. Those who submit to this treatment experience a sense of relief from the apprehensions which previously distressed them. No unpleasant after-effects ever follow the judicious employment of massage. Through the medium of the central nervous system the effects of even a local massage are radiated or reflected throughout the body, thus acting as a nervous and vascular revulsive. The transmitted and reflected influences of massage are as extensive as the distributions and connections of the sensitive nerves that are accessible to its impressions. From mechanical impressions like massage upon sensitive nerves in their connections with other sensitive nerves we may expect to get modifications of sensation; through the connections of sensitive nerves with motor nerves we may expect to see an influence exerted upon motion; and, finally, through the relations which the nerves directly affected by massage bear to secretory and inhibitory nerve fibres, we may also expect that this therapeutic procedure will cause changes to take place in the functions of secretion and nervous inhibition.

* Archivio Italiano di Biologia, tome xvi.

The Different Diseases in which Massage May be Employed to Advantage.

Neurasthenia.—If space permitted I could report cases sufficient to prove: 1. That massage induces sleep.

2. That even when it is applied in the forenoon the soporific effects may not disappear before bedtime; though in general the later in the day it is used for promoting sleep the better.

3. When massage is administered in the forenoon the development, at some later period of the day, of a disagreeable feeling of drowsiness and languor need not necessarily interfere with sound sleep at night. Aptitude for rest or for work generally follows massage. The mind is clearer and in a better condition for prolonged and effective work, and the muscles do not tire so soon.

4. When people are wakeful after massage they are not likely to be restless or to feel the loss of sleep on the following day.

5. Spinal irritation is relieved or disappears under massage.

6. For local neurasthenia there is no need of general massage, unless the whole system be secondarily affected.

7. When affections have come to a standstill under massage, improvement may yet go on after the manipulations have been discontinued.

8. As a means of improving the nutrition of nerves and muscles, and of restoring natural sensation and motion, massage may succeed when other means have failed.

9. Deep massage without friction has proved, in suitable cases, of more value in my hands than all other forms of massage put together.

10. Massage can be overdone; in which event the effects produced will be the opposite of those which follow a moderate use of this therapeutic procedure.

11. Besides massage, carefully graduated exercises at regular times are valuable accessories in the restoration of motion.

12. Massage is not the only means of treatment for neurasthenia. Its selection is usually decided upon after the failure or the exhaustion of every other means.

Writer's Cramp and Allied Affections.—Overuse of nerves and muscles, especially in fine work requiring a high degree of delicate co-ordination of voluntary impulses and individual movements, as in writing, sewing, knitting, watch-making, playing the piano, harp or violin, gives rise, especially in those who are somewhat neurasthenic, to disorders similar to the affection known as writer's cramp. So does also, but less frequently, excessive use of muscles in heavier occupations, such as painting, telegraphing, tailoring, shoemaking, blacksmithing, and milking, occasion like disturbances of sensation and motion. The predominating symptoms may be of a spastic, tremulous, or paralytic form, accompanied by extreme fatigue, pain, formication, hyperæsthesia or anæsthesia, and thrills like electricity. There may be partial or total inability to perform the accustomed movements; if they be attempted for but a few minutes the symptoms named may arise. The spasm may affect either the flexors or the extensors; there may be rigidity or contraction of the muscles, local or general tremor. No two cases are exactly alike, as these symptoms are variously combined. As a rule, they develop only when an attempt is made to resume the work that brought them on, while for all other purposes the hands and arms are as good as ever. Recent and slight cases are almost invariably cured by massage and suitable exercises. But it is quite otherwise with those of long standing, unless the physician can discover some causal objective points—such as neuritis, a painful scar, or bad writing materials—the removal of which would expedite recovery.

Chorea.—Encouraging success has attended the systematic use of massage and gymnastics in chorea. It is generally agreed that the seat of the malady is for the most part in the brain, though the spinal cord and peripheral nerves may share in the disorder, which is of such a nature as to weaken the force of the nervous system without destroying it. Recent investigations seem to show

that the erratic movements are due to organic change in the brain and spinal cord. That these have been benefited or cured by massage is strong proof of its far-reaching and powerful influence, extending from periphery to centre. Rest, massage, and abundance of easily digested food have proved successful in the early or acute stage; and in the decline of the malady, when slight irregular movements still linger, massage, exercise, and calisthenics have done well. In 1847 Laisné, of Paris, treated one hundred and eight cases of chorea by means of massage with almost invariably good results. Drs. Goodhart and Phillips, of London, have treated a number of acute cases of chorea by massage, suitable nourishment, and rest, and the advantages proved to be that when the massage was carefully performed, flabby and thin muscles became plump and firm. Marked improvement was observed in every case in the rapid subsidence of all the more violent movements; in improved circulation and warmth of the extremities; in the pulse becoming more regular; in the patients sleeping soundly after the massage; and in their decided increase in weight. The massage was given for fifteen minutes, twice daily.

Neuralgia and Neuritis.—In neuralgias of mild form, and in what seem to be the incipient stages of more severe attacks, as well as in old cases, in which every other remedial measure has been tried in vain, massage often yields favorable results. Used between the paroxysms of severe neuralgic pains, it generally lengthens the intervals between these attacks and lessens their severity. Pain arising from disturbance in the central nervous system is frequently relieved by massage. In cases of peripheral neuralgia when the affected nerves can be reached, massage may be expected to produce still better results. In well-marked degeneration of nerves, and when pain is dependent upon mechanical pressure that cannot be removed, we should naturally not expect any result.

The late Dr. Symons Eccles, of London, has treated successfully a number of cases of acute sciatic neuritis occurring in previously healthy people by means of massage, position, and rest. The massage consisted of effleurage, kneading, and percussion, and in the intervals the leg was suspended in a Salter swing, as this was the only position that afforded rest. Prof. Max Schuller, of Berlin, prefers massage to any other means in the treatment of sciatica. Of fifteen cases that were dealt with from the first by massage, he found that the severe pains soon abated, becoming less even after a severe and painful massage. When they recurred they were less severe, and gradually they disappeared altogether. It required eighteen days on an average for cure. We seldom hear of massage being tried in acute neuritis in the United States.

Affections of the Central Nervous System.—When paralysis of central origin has come on suddenly, I prefer to abstain from the use of massage until the perturbation in general has subsided and the patient has become somewhat accustomed to his unnatural condition. But in the mean time, while we are thus waiting to spare the nerve centres any supposed extra commotion, the peripheral pathological changes are gaining ground. These are: interference with the supply and return of the circulation owing to the accelerating influences of muscular contraction and relaxation being absent or diminished; and, as a result of this, variations of temperature, and passive hyperæmia and ischæmia; hypertrophy of interstitial connective tissue, with subsequent cicatricial retraction, giving rise to contractures and atrophy of muscular fibres; formation of adipose tissue and fatty degeneration; in a word, vaso-motor and trophic disturbances. These are all rational indications for the use of massage, either as a preventive of such changes or as a palliative of them when they have occurred. But if the nerve centres are impaired beyond recovery, or secondary pathological changes have already taken place, the prospect of recovery cannot be encouraging. My own experience with massage in a number of cases of paralysis may be briefly stated by saying that in the absence of severe pain, obstinate contracture, or tonic spasm this agent has proved useful in improving the circulation, temperature, and comfort of the parts affected. When, in paralysis of spinal or cerebral origin, recovery has followed under manipulation, I have always hitherto assumed that the central disturbance had entirely passed away and that the force of habit was the main factor in perpetuating the external manifestations of inaction. But the more recent experiences and opinions of Dr. Zabludowski, professor of massage at the University of Berlin, and of others well qualified to judge, teach us that it is possible by means of massage and gymnastics to educate other parts of the brain and spinal cord, by arousing psychomotor impulses in the formation of new associations and combinations, to take the place of the injured ones. It therefore seems no longer necessary to regard paralysis, of either central or peripheral origin, from the hopeless point of view that we formerly did.

However that may be, when the causative conditions have ceased, paralyzed muscles will not at once resume their former natural condition. Massage, passive and resistive movements, restore them to a sense of existence, enable them to recognize the power they still possess, and educate this to a higher degree, and at the same time such treatment affords the only means of judging of the capabilities of the patient and of telling him how to use them. Sometimes the patient will make better motion against resistance than without it. This seems to give a sense of support and consciousness of power. Interlocking the fingers of one hand with the other, so that the well arm can raise the paralyzed one, is a most excellent device, encourages the patient, and educates the unimpaired centres to supplement the deficiency of the injured ones.

Dry Symmetrical Gangrene.—This peculiar malady was first described by Maurice Raynaud, a medical student in Paris in 1862. Observations since then have confirmed his description of this disease, the theory of which is that it is a neurosis characterized by great exaggeration of the excito-motor energy of the parts of the spinal cord that control vaso-motor innervation,—the posterior and lateral gray substance, according to Oppenheim.

If space permitted, cases of my own and of other practitioners might be narrated (see "International Clinics," vol. iv., 1901) which would justify the following conclusions:

1. When massage is of benefit in Raynaud's disease, it shows its effects very quickly.

2. These effects are improvement of the circulation and an increased suppleness of the parts, with a corresponding increase of the sense of warmth and comfort.

3. Massage is competent not only to maintain and improve the vitality of the tissues, but it may even effect a complete restoration after destruction of tissue has begun.

4. As the beneficial effects of massage in Raynaud's disease are of a permanent character, this procedure must act not only upon the vaso-motor nerves of the affected parts, but also upon their central connections in the brain and spinal cord.

Sprains, Fractures, Displaced Semilunar Cartilages.—When massage is employed sprains of all degrees of severity get well in one-third of the time ordinarily required in cases of this nature. The sooner after the injury massage is begun the speedier is the recovery. Friction and manipulation should be used above and below the injured joint, which should be gradually approached in this manner, and finally worked upon at the same sitting. Fractures unite more quickly when the limb is *masséed* from the first. The immediate advantages are reduction of swelling, pain, and spasm; the remote are less weakness, pain, and stiffness after the bones have united.

Sprains of the knee are sometimes accompanied by derangement of its internal structures, known as displacement of the semilunar cartilages of the knee-joint. If space permitted I could recite cases (see *American Journal of the Medical Sciences*, March, 1896) which have occurred either in my own practice or in that of others, which would seem to justify the following conclusions:

That it is possible by carefully applied massage, resistive movements, home exercises, and electricity so to strengthen the muscles on the front of the thigh, the fasciæ, ligaments, and attachments of the knee-joint, that they will safely hold a previously dislocated semilunar cartilage without artificial support.

These conclusions do not apply to cases which require surgical operations, although the above-mentioned combination of therapeutic procedures might be safely tried in some cases before cutting into a knee-joint. The adoption of massage, however, is more especially called for after the operation, its purpose being to restore motion and strength. *Douglas Graham.*

MASSANETA SPRINGS.—Rockingham County, Virginia.

Post-Office.—Harrisburg. Hotel and cottages.

Access.—Viâ Baltimore and Ohio Railroad to Harrisburg, thence a drive of four and one-half miles southeast to the springs. This resort is located in the Shenandoah Valley, near the Massametten Mountain, at an elevation of 1,350 feet above the sea-level. The waters of the springs have been in use for upward of fifty years, and are still extensively resorted to in the treatment of a variety of affections. They have been analyzed by Professor Mallet, of the University of Virginia, with the following results:

One United States Gallon Contains:

Solids.	Grains.
Calcium carbonate	12.10
Magnesium carbonate	5.78
Iron carbonate	3.12
Manganese carbonate	.43
Sodium carbonate	.33
Lithium carbonate	Trace.
Ammonium chloride	Trace.
Potassium chloride	.13
Potassium sulphate	.09
Calcium sulphate	.35
Alumina	.13
Arsenious oxide (in salt)	Trace.
Phosphoric acid	Trace.
Silica	.94
Organic matter	.40
Total	24.40

Carbonic acid united to carbonates as above to form acid salts. 8.80 grains.
Temperature of water, 55.7° F.

These waters are said to be valuable in the treatment of chronic malarial poisoning, and the managers present numerous testimonials from physicians and others attesting their virtues. It is reasonable to believe, however, that the good effects observed have been in a large measure due to the excellent climatic and sanitary conditions about the springs. The water is an excellent chalybeate tonic, and also has diuretic properties. It is used commercially. *James K. Crook.*

MASSASOIT SPRING.—Hampden County, Massachusetts.

Post-Office.—Springfield. Restaurant at spring.

Access.—Trolley cars from Springfield run within two miles of the spring. The New York, New Haven and Hartford Railroad is within three-quarters of a mile, and the Boston and Albany Railroad tracks are about two miles away. The spring is charmingly located at a point about seven miles from Springfield, in a picturesque glen known as the "Bear Hole." It bubbles from the side of a bluff about 70 feet in height and at an elevation of about 250 feet above the level of the sea. The spring furnishes about 7,500 gallons of water per hour, having a uniform temperature of about 45° F. the year round. With the exception of a restaurant no buildings have been erected for the accommodation of guests, who consist largely of visitors from Springfield, Westfield, Holyoke, Chicopee, and other points during the summer months. The water has been analyzed by Prof. Charles Mayer, chemist, with the following result:

One United States Gallon Contains:

Solids.	Grains.
Sodium chloride	0.36
Lime carbonate	1.38
Magnesium carbonate	.48
Lime sulphate	.25
Silica	.24
Organic substances	.72
Total	3.43

Traces of potash, iron, alumina, phosphates, nitrates.

The water is remarkably free from micro-organisms and ammonia, and contains only a slight trace of nitrates. It closely resembles the waters of the Poland Spring in Maine. It meets all the requirements of a wholesome table water. It is said to be a great aid to feeble digestion and to assist in overcoming obstinate constipation. The water has an extensive sale, and no doubt in time a resort will be established at the spring.

James K. Crook.

MASSENA OR ST. REGIS SPRINGS.—St. Lawrence County, New York.

Post-Office.—Massena Springs. Hotel.

Access.—Viâ Rochester division of the Rome, Watertown and Ogdensburg Railroad, or viâ Massena Springs branch of Grand Trunk Railroad to Massena Springs Station.

This is one of the old-time resorts of the Empire State. The springs are delightfully situated on the banks of the Raquette River, a broad and rapid stream flowing into the St. Lawrence. The following analysis was made as long ago as 1850 by Prof. W. J. Craw:

One United States Gallon Contains:

Solids.	Grains.
Calcium bicarbonate	4.85
Iron bicarbonate	.49
Sodium hyposulphide	4.21
Sodium sulphate	.50
Calcium sulphate	60.00
Sodium phosphate	1.32
Sodium chloride	76.79
Potassium chloride	.51
Magnesium chloride	29.93
Magnesium bromide	.67
Sodium sulphide	1.40
Organic matter and Silicate of soda	11.18
Total	191.88

Sulphureted hydrogen gas, 5.30 cubic inches.

This analysis indicates that the water belongs to what may be termed the muriated-calcic-alkaline sulphureted variety, but for ordinary purposes the term saline-sulphureted is sufficient. The water resembles that of Eilsen, in the principality of Schaumburg-Lippe, but is much richer in chloride of sodium. It has been found decidedly useful in dartrous forms of skin disease, in renal and vesical calculus, in catarrh of the bladder, and in other affections. Bathing facilities are ample.

James K. Crook.

MASTERWORT. See *Umbelliferæ*.

MASTIC.—Mastiche. "A concrete resinous exudation from *Pistacia Lentiscus* L. (fam. *Anacardiaceæ*)" (U. S. P.). This is a graceful little tree with slender, brownish-gray branches, and evergreen pinnate leaves. Its flowers are very small, dicœcious, in erect axillary spikes; its fruit consists of little, dry, red drupes, about as large as cubebs. Large resin canals exist just beneath the surface of the thin bark, from which a certain amount of turpentine exudes spontaneously. It is widely distributed through the Mediterranean region.

Mastic is a drug of venerable antiquity, being mentioned by the early Greek and Latin writers upon medicine and natural history two thousand years or so ago. It has been kept in use ever since, and several hundred years ago it entered into the formation of numerous medicines and plasters, and was highly prized. It is now fast becoming obsolete, so far as medicine is concerned.