JOHN HARVEY KELLOGG (1852-1943)

Lectures, Speeches, Notes, and Articles, ca. 1890-ca. 1943
(undated by topic)

Arthritis
CHRONIC ARTHRITIS

In reading a late work on arthritis by Russell L. Cecil, M.D., Professor of Clinical Medicine at Cornell University, I have been impressed by the fact that the general method of treatment consists essentially of physiotherapy. With the exception of salicylates and aspirin for rheumatic fever and two or three other drugs, reliance for therapeutic effects is placed upon physical therapy.

This is a transcript of the notes I have made to which I have added an outline of the methods of treating arthritis which we use substantially as indicated at the Miami-Battle Creek and have in large measure made use of here for many years.

It is encouraging to see most of the hundreds of drugs that have been recommended for rheumatism are not even mentioned in recent works on the treatment of arthritis.

I have confined the notes to chronic forms of arthritis as it is very rare that we have occasion to deal with the acute forms of the disease.
Rheumatoid arthritis, also known as atrophic arthritis, chronic infectious arthritis and arthritis deformans, formerly called organic gout. This name is now obsolete. The most common of all forms of arthritis. About two-thirds of all cases are of this type.

**CAUSE.**—An infectious disease due to a specific microorganism which produces chronic granular tissue in the synovial membrane. The round masses, so-called cutaneous nodules, differ from the enlargements of bones in the hypertrophic forms of arthritis in the fact that they are movable and not due to bony changes. These are not found in any other form of arthritis. They are not found in all cases.

Pemberton considers the streptococcus hemolyticus and streptococcus viridans, common causes of rheumatism.

Agglutinins for streptococcus hemolyticus are found in many cases.

**Rheumatism may be caused in rabbits by streptococci.**

There is some evidence that some cases of rheumatism may be due to allergy with a reaction to skin tests of streptococcus hemolyticus.

**PREDISPOSING CAUSES.**—A definite relationship has been established between foci of infection, tonsils, teeth, prostate, colon and cervix uteri.

Nervous shock, fatigue, injuries, sprain, fracture or a gunshot wound may start rheumatoid arthritis in a single joint which
may spread to others.

Exposure to cold and dampness, "living in the north temperate zone, Atlantic seacoast or lake region."

It is most common in lean folks.

Deficiency of vitamins A, B or C may be a predisposing cause by lowering resistance.

Patients show great improvement under large doses of vitamin B.

**COLON INFECTION.**--Fletcher and Graham showed in a large percentage of 60 cases of chronic arthritis atony of the colon, decreased haustral markings and extensive loops due to increased length, all definite causes of pronounced stasis.

Under large doses of vitamin B (yeast and wheat germ) the colon is shortened and redundancy "sometimes disappeared," the tone of the cecum improved and also the depth and regularity of haustral markings and the patient's arthritic symptoms also made great improvement. They attributed the improvement to "proper dietetic treatment."

**DIAGNOSIS**

**IMPORTANT FEATURES.**--Most common (75%) in young persons of 30 years or less.

The disease is migratory in the early stages, moving from one joint to the other.

The affected joints are swollen and tender.

In mild cases at first merely stiff and slightly sensitive, swelling appearing later (often first felt in fastening the clothing in the morning).

It most often begins with the middle joint of the fingers or the first joint, causing fusiform shape.
Focus of infection generally present. Tonsils, teeth, throat, sinuses (colon, prostate, cervix uteri).

Eventually more or less deformity.

**HISTORY.**—Often dates from an attack of rheumatic fever, tonsillitis or quinsy. History of colds and sinus infection.

It usually affects several joints, but sometimes is confined to the hip joint.

Likely to appear first in the fingers.

As the disease progresses, the muscles become weak and flabby from disuse and atrophy.

**PHYSICAL EXAMINATION.**—The patient is usually undernourished and anemic. Hemoglobin 75 or less.

Swelling of the joints with a doughy feeling to touch. Often some fluid in the joints.

Small joints more painful to movement than pressure. Large joints more painful

**COURSE OF THE DISEASE.**—Usually history of many attacks with more or less complete recoveries.

Attacks become more frequent and more prolonged.

Swellings disappear, leaving scar tissue. Stiffness or ankylosis of the joints. In late stages bony changes of joints.

Rarefaction of bone and hypertrophy of joint margins.

Peripheral neuritis, tingling numbness, burning sensations in extremities, movable subcutaneous nodules over patella, ulna, scapula, tendons of fingers and thinly covered bones. Sometimes painful.

Heart often affected in cases originating in rheumatic fever.
SKIN AFFECTIONS.—Erythema multiforme, erythema nodosum, psoriasis.

Psoriasis often develops before the rheumatism.
In advanced cases the skin becomes atrophied and glossy, especially the hands and feet.
Skin of hands cold and clammy.
Dryness of skin in general.
Muscular atrophy in old cases often very pronounced. May be neurogenic or due to inactivity.
Atrophy is sometimes rapid in actively progressive cases.
Muscular contraction, especially of flexor muscles, due to greater atrophy of extensors.

Characteristic ulnar deviation of fingers at metacarpophalangeal joints (ankylosis or partial limitation of motion due to fibrous contraction of capsular ligaments). May be caused by new bone formation. Most commonly affects the wrist joint first. May involve any or all of the large joints.

LABORATORY FINDINGS

URINE.—Few changes. Kidneys rarely involved.

BLOOD.—Usually anemia. Hemoglobin 65 to 75; blood count 3,000,000 to 4,000,000.
Leucocytes often normal; increased to 10,000 or 12,000 when the disease is active. Chiefly polymorphonuclear. Usually 100% increase of immature leucocytes.
Specific agglutinins of hemolytic streptococci in 95% of cases. Less frequently present in early cases.
Lower sugar tolerance in many cases. Basal metabolism usually normal or below normal.
Cultures from throat show hemolytic streptococci in many cases.

**X-RAY FINDINGS.**—Marked decalcification of the bones, especially hands and feet. Punched out areas similar to those found in gout and destruction of cartilage. Some atrophy or swelling of soft parts. If effusion in tissues, solid, often fusiform.

**DIFFERENTIAL DIAGNOSIS**

Rheumatoid arthritis differs from degenerative arthritis in the fact that degenerative arthritis is not migratory. Absence of inflammatory swelling. The disease does not spread. Stationary in a few joints. Absence of focal infection. Increase instead of loss of calcium in the region of the joints.

In rheumatoid arthritis anemia; none in degenerative arthritis.

In degenerative arthritis no increase in immature cells. Agglutinins absent. No increase of sedimentation as in rheumatoid arthritis.

Important to distinguish between rheumatoid and degenerative arthritis. Treatment very different.

Important to distinguish subacute rheumatoid arthritis from rheumatic fever. In rheumatic fever higher temperature and more sweating.

Prompt relief from salicylates. Opposite conditions in rheumatoid arthritis.
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<th>Hypertrophic Arthritis</th>
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<td>(Condition of bones)</td>
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<td>Joints involved</td>
<td>Any joint in body</td>
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<td>Type</td>
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<td>Appearance of joints</td>
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<td>Roentgen-ray</td>
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<td>Low Hb. and low RBC count</td>
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<td>Leucocyte count</td>
<td>Increase in WBC and in immature cells</td>
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<td>Serological</td>
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<tr>
<td>Termination</td>
<td>Ankylosis and deformity</td>
<td>No ankylosis. Usually no deformity</td>
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The electrocardiogram shows changes in 100% cases of rheumatic fever. Little or none in cases of rheumatoid arthritis.

Rheumatoid arthritis of the hip joint improves by treatment. Chronic senile arthritis does not improve.

Syphilitic arthritis is associated with syphilis.

Tuberculous arthritis is almost always non-articular. Rheumatoid arthritis affects several joints.

Gonococcal arthritis may closely resemble rheumatoid arthritis, especially in chronic forms of gonorrhea in women without vaginal discharge. Distinguished by gonorrhea complement fixation test.

Treatment of rheumatoid arthritis must be systemic and thorough and the earlier taken the more successful.

The patient must live in a dry, warm climate and avoid exposure to cold and dampness. Live out of doors in fresh air and sunshine and endeavor in every possible way "to attain a condition of robust good health."

Focal infections must be removed. All tonsils should be distrusted. Not necessarily all devitalized teeth, the latter only when giving trouble.

Sinus infections must receive attention. As harmful as tonsils.

Four or 5 per cent of cases have diseased gallbladders.

Says Cecil, "A number of investigators believe that the large bowel may act as a focus of infection for rheumatoid arthritis. Burbank has been an advocate of this theory, and more recently Traut and Smith have supported such an idea."

Operations on tonsils must be complete. If partial may aggravate the condition.
REST. — Complete and prolonged rest is necessary in severe cases. In early stages six months or a year's rest may produce complete and permanent cure.

"If a real rest cure can be taken away from home it is far preferable. There should be long sleeping hours at night."

VACCINE THERAPY. — Streptococcus vaccine given in small intravenous doses can do no harm and in many cases appears to have real therapeutic value.

FOREIGN PROTEIN THERAPY. — "Foreign protein therapy in its various forms has been widely used in the treatment of rheumatoid arthritis and in many cases it is of distinct value, especially when the injections are followed by febrile reactions.

"The swelling of the joints is diminished and pain is decreased. In the majority of cases, however, relapse occurs, sometimes in a few days.

"In chronic well-established cases the benefit received from foreign protein therapy usually has been only temporary. Of 13 cases treated all but one relapsed within six months, 4 were better and one was completely cured."

FEVER THERAPY. — Fever caused by foreign proteins and malaria has been displaced by an artificial fever caused by (1) water baths, (2) diathermy, (3) radiothermy or inductothermy, (4) electrically heated cabinets, (5) electric light cabinets, infra-red, (6) steam heated cabinets.

Coulter used hot water baths with an initial temperature of 106° to 110°. When the patient's temperature reached 104° the bath temperature was reduced to 104. Duration of bath from beginning to end is one hour. After the bath the patient is wrapped with dry
blankets and surrounded with hot water bags and the fever temperature is maintained for several hours.

Radiant heat from electric lights or electric heaters (infra-red) "at the present time appears to be the method of choice for producing artificial fever because it is simple, safe and cheap." In a large number of cases treated, the results were 10% reported cured, 35% much relieved and the remainder moderate or no relief.

(A fatal error in dealing with these cases is neglect to change the patient's habits and thus removing the principal cause.)

**PHYSICAL THERAPY AND EXERCISE.** -- "The more common types of physical therapy, such as dry heat, diathermy, massage and exercises all have a place in the treatment of rheumatoid arthritis. Their chief function is to increase circulation in the affected joints and to preserve as far as possible the tone of the skeletal muscles.

"Heat is perhaps the most important form of physical therapy and can be applied either locally to the joint or to the entire body." Diathermy often increases pain.

"One of the simplest ways of applying heat is by means of the infra-red light.

"The advantage of generalized heat is that in addition to stimulating the circulation, copious perspiration is induced in the patient. We are not certain of the rationale of perspiration in therapy, but we do know that acid substances, including carbon dioxide, are excreted through the perspiration.

"Alternating hot and cold baths, or contrast baths as they are usually called, have the advantage of stimulating the sympathetic system in addition to the local circulation in the joint.

"Massage.--Complements heat in that both have more or less the
same object, the improvement of blood and lymph flow through the joints. Massage has been well called the lazy-man's exercise."

Manipulation of painful joints must be avoided.

**EXERCISE.**—It is necessary to prevent ankylosis and to promote muscular tone. "Every arthritic should have some exercise, and one of the most important factors in the treatment of arthritis is to determine just the right balance between rest and exercise in the patient's routine."

Patients unable to walk without pain must have bed exercises.

(There are four forms of exercise of great value in rheumatics which Dr. Cecil does not mention but which we are prepared to give to our patients, namely:

1. **Automatic exercise.**

2. **Water exercises** in which the weight of the body is carried by the water and the pain is lessened by the temperature of the water.

3. **Psychic exercise** in which muscles are flushed with blood by imagining exercise without taking it.

4. **Exercise of the muscles** by increasing their tonus by exposure to fresh air and sunshine. Practiced by Rollier of Leysin.)

"The tendency of the arthritic muscle is to undergo atrophy. The tendency of the arthritic joint is to ankylose. Both of these tendencies must be overcome by regular exercises. The writer instructs every patient with arthritis as to the type of exercises suitable for his particular case. The rhythm of the exercise should be slow. Rapid movements may induce stiffness on the following day. First the small joints of the hands and feet are flexed and extended; then the wrists, elbows, shoulders, ankles, knees and hips in order. Perhaps the most
important of the exercises are those that have to do with maintaining posture, especially in those patients who have spondylitis. For these patients neck-stretching exercises and the usual group of exercises recommended for straightening the lumbar spine are advised. In advanced arthritida passive exercises may be necessary or a combination of passive with active exercises. This type of treatment usually is provided in institutions and is difficult to describe in a treatise of this kind inasmuch as the exercises must be adapted to the particular case in question."

**COLON IRRIGATION.**—Snyder and others have stressed the value of colon irrigations in rheumatoid arthritis.

**DIET.**—Pemberton's claim that a high carbohydrate diet is harmful has been disproved by Bauer and others who conclude "there is no evidence to prove that a low carbohydrate diet is indicated in rheumatoid arthritis nor is there any proof that it is efficacious in curing the disease." He recommends a properly balanced diet high in vitamins.

**FOOD HYPERSENSITIVITY.**—Both Bauer and Cecil say they have "never seen a patient with rheumatoid arthritis due to food sensitivity."

Arthritis may be produced by allergy, but this is not rheumatoid arthritis.

Says Cecil, "Drugs play a comparatively minor part in the treatment of rheumatoid arthritis."

Transfusion of blood has proved useful in the early subacute stages, infectious jaundice and pronounced secondary anemia.

**CLIMATOTHERAPY.**—"The climate cure is particularly beneficial
for arthritic patients who are also suffering from chronic sinus disease.

"Various forms of heliotherapy (sun baths) constitute the major portion of specific climatotherapy.

"If every case of rheumatoid arthritis could receive prompt and efficient medical treatment comparatively few of them would need orthopedic measures."

SURGERY.--Synovectomy offers relief in advanced cases in which the knees are affected as in so-called villous arthritis. The synovial membrane is removed. A new membrane forms. Good motion is restored. Cases of hydrosp with much accumulation of fluid in the joint may be relieved by the same operation.

Sympathectomy has not proved of any value except in some very extreme cases.

STILL'S DISEASE.--Modern studies of this disease seem to indicate that it is essentially the same kind of infection as that which produces rheumatoid arthritis. It is influenced by the age of the patient. It is a polyarthritis occurring in children, developing rapidly and producing great deformities. The lymphatics are generally enlarged. The disease is more intense than rheumatoid arthritis. It usually begins before the sixth year.

The tonsils should be removed as well as every other focal infection. The treatment is essentially the same as in rheumatoid arthritis.

HYPERTRPHIC ARTHRITIS (DEGENERATIVE ARTHRITIS AND OSTEO-ARTHRITIS).--This disease differs from rheumatoid arthritis in several ways. The bony changes are permanent, not migratory. Lime is deposited instead
of being absorbed. The joint never becomes ankylosed. The cartilage may be worn off and the synovial membrane damaged.

The characteristics of hypertrophic arthritis are more or less present in practically all aged persons.

The changes produced differ from those found in any other disease. They are described as being due to senility.

A person suffering from hypertrophic arthritis is physiologically old. It might be properly called senescent arthritis. It almost exclusively occurs in middle aged and elderly people. It is apparently due to impairment of the circulation. Overweight and overeating are important causes. There is usually decreased sugar tolerance.

Faulty posture causes the disease by putting extra strain on joints. Incorrect sitting and standing cause this disease of the lower joints. Improper attitudes in walking cause unnatural tension of the joints of the leg, particularly in ankle joints. Nearly all of these patients have bad posture. The lower abdomen is prominent, upper back rounded, feet turned out and a tendency to knock-knees. This causes strain on the lumbar spine.

A woman whose left arm was paralyzed developed Heberden's nodes in the right hand, but not in the left.

Postural defects lead to rheumatism of the joints under strain.

CLIMATIC CAUSES.--The same weather conditions that produce rheumatoid arthritis produce hypertrophic arthritis.

Several clinical forms of hypertrophic arthritis:

1. Non-articular. It may be mistaken for tuberculosis of the hip.
2. Hypertrophic arthritis of the terminal joints of the fingers, so-called Heberden's nodes.

3. Hypertrophic arthritis occurring at the menopause in women.


In arthritis of the menopause the patient's postural attitudes are quite characteristic,—dropping shoulders, round back, lordosis of the lumbar spine, abdomen bulging forward, abducted feet, knock-knees, flat foot, brawny thickening of the skin and subcutaneous tissue of the outer surfaces of the upper arm and thighs.

Apparently adhesions produced by panniculitis.

Crating of the knee joints on flexion.

Heberden's nodes usually present.

Terminal finger joints tender to pressure.

**TREATMENT**

Treatment of hypertrophic arthritis essentially the same as infectious arthritis.

Physiotherapy is highly effective.

Much attention must be paid to proper adjustment of all the weight bearing surfaces.

Hot baths, sun baths and general and local applications of heat relieve pain and improve the general health and improve the blood supply of the joints.

Posture treatment highly necessary.

Proper shoes must be worn. The services of an orthopedist are required.

A dry climate is necessary.

Elimination must be encouraged.

Institutional treatment is advised.
THE BATTLE CREEK PROGRAM FOR RHEUMATISM

1. Removal of causes by attention to focal infections of the nose, throat, teeth, duodenum, gallbladder, colon, and genitourinary organs.

2. Rest in bed, equable temperature, air conditioned room if necessary. Proper clothing. Complete rest for a prolonged period when necessary.

3. Removal of causes must include correction of diet. Such adjustment of the bill of fare as will encourage elimination, lessen the burden upon the eliminative organs, correct obesity when present, build up the blood, and supply an abundance of all the vitamins, B, C, E and G as well as A and D. The intake of vitamins should be 25,000 to 50,000 Sherman units of A, 500 B and G, 1,000 of D and plenty of E.

4. The flora must be changed by the use of soy acidophilus milk, Lacto-Dextrin and L. D. Lax.

5. No salt, avoidance of acid ash foods, copious water drinking, at least three or four pints a day or more when prolonged sweating baths are taken. The amount should be sufficient to keep the quantity of urine at least 1,500 to 2,000 cc. The liquid taken may include fruit juices, broths and other liquid foods.

TREATMENT

Sun bathing daily, natural when possible and artificial on other days.

Sunshine 20 to 60 minutes according to the intensity of the sun. Skylight as many hours as possible.

Artificial sunshine 15 minutes.

Air baths one to two hours daily in room at temperature to suit
the individual case, preferably about 70 degrees, the affected joints being warmly wrapped at the time to avoid chilling. The skin surface should be rubbed during the exposure often enough to maintain circulation and comfort and prevent chilling and gooseflesh. The skin should be gradually accustomed to the cool air, beginning with exposure of the whole body at 86 degrees and lowering the temperature one or two degrees from day to day and increasing the length of time of the exposure or exposing small portions of the skin at a time, with rubbing during the exposure, making successive exposures over small areas similar to the method used in partial rubbings as with the wet hand rub or mitten friction, all the body being covered except the part under treatment. By exposing a larger area of the skin each successive day and gradually increasing the length of the time of exposure, the skin circulation and the tonus of the muscles may be gradually increased with excellent effects upon the sympathetic system whereby appetite, bowel action and digestion will be improved.

EXERCISES

Bedridden patients should have exercises of some sort every hour. Very feeble patients whose muscles are much deteriorated and have painful joints will begin with psychic and automatic exercise. In this the patient fixes the mind upon a group of muscles, say the flexor muscles, and executes mentally the movement of flexion and extension, thinking and even speaking the command to flex the fingers and then to extend the fingers, but without moving them and hence without producing any pain in the affected joints. These psychic exercises may be repeated every hour for three to five minutes. Psychic exercises should be performed with rhythm as when the movements are actually executed.
Massage should be applied daily, but care being taken to avoid hurting the affected joints.

The next step is the application of automatic exercise. The current should be adjusted so as to produce muscular contraction, but without sufficient vigor to produce enough joint movement to cause pain. Care must be taken, however, to make the vigor of the treatment as great as possible without causing pain. Heat must be applied at the same time so as to lessen the sensibility of the joints.

Care should be taken to note the effect upon the patient's pulse, temperature and frequency of respiration.

Patients should take a glassful of warm water before beginning the treatment to encourage perspiration and to replace water which may be lost through the skin. If the skin is dry and perspiration does not occur, the use of thyroid may be indicated and special studies should be made of the metabolism.

Changes in the skin about the joints are such as to indicate a diminished blood supply and resulting lowered resistance, tissue degeneration and pain.

The increased supply of blood to the muscles induced by exercise will increase the blood supply to the joints which will also be encouraged by other features of the treatment program.

When the pain of the joints diminishes, a series of bed exercises consisting of movements of the arms and limbs may be employed two to four times daily. Deep breathing exercises should be taken at least once every hour for two to five minutes. Two minutes twice an hour will be of greater value than five minutes once an hour.

Posture in Bed. -- Special attention must be given to the patient's
posture in bed. Lying flat upon the back puts a strain upon the costovertebral ligaments of the whole spine, particularly in the lumbar region which often gives rise to a pain or ache in the back. It should be prevented by lumbar support. Properly constructed cushions or sandbags may be used for the purpose. In many cases, especially those in which the chest is flattened, support between the shoulders, when the patient is lying in the dorsal position, relieves the strain upon the ligaments of the upper spine, holds the chest up in proper position and encourages the normal ventilation of the lungs. A folded bath towel may be used for this purpose or a cushion specially made for the purpose. The thickness of the cushion should be about an inch and a half, the width four inches and the length 12 to 16 inches.

If the patient is able to sit up great care must be taken to maintain the normal lumbar curve and to support the spine between the shoulders. Interscapular support may at first be found difficult because of the extreme degree of the posterior prominence and the rigidity of the tissues. By persevering effort this rigidity may be greatly lessened or completely overcome in the majority of cases unless actual bony consolidation has taken place. Daily applications of heat in some form and massage and passive movements calculated to correct the curvature should be given daily by an expert orthopedic technician.

**THERMOTHERAPY IN RHUMATISM.**—The pain and the degenerative joint changes which take place in infectious arthritis as well as the senile changes which occur in hypertrophic arthritis are undoubtedly due to lack of blood supply which results from the spasm of blood vessels produced by toxins either produced locally or brought in the blood stream.

The blood circulation in the joint structures is less vigorous
than in muscle structures, glands and other soft parts on account of the density of the structures. This fact doubtless accounts for the peculiar pathological changes which develop in rheumatism. Since a diminished blood supply is the chief immediate cause of all the morbid manifestations, this is naturally the chief aim of treatment.

An increase of blood movement may be encouraged by an application of heat which causes dilatation of the blood vessels and hence an increased movement of blood through the parts.

Exercise produces an increase of the blood supply by increasing the amount of blood brought to the neighboring tissues. Exercise of the muscles with simultaneous application of heat to the joint increases the movement of blood through the parts to a still greater degree. By an alternation of heat and cold it is possible not only to dilate the blood vessels but to increase the activity of the arteries and arterioles. Under the influence of heat alone the vessels are dilated, but their activity is diminished.

By an application of cold a vasomotor reaction occurs in the arterioles which greatly accelerates the blood movement. By careful use of this principle in various ways, the increase of blood supply to the muscles through thermic applications may be very greatly increased.

Heat may be applied to the joints most effectively either by diathermy, inductothermy or the infra-red light. This method, which has been used at the Sanitarium since 1890, is, I believe, the most effective of all means of applying heat to the body, especially when employed in connection with means for controlling the temperature of the skin, the so-called intensive method. By this means the amount of heat passed into the deeper tissues may be doubled and tripled over
the amount received when no attention is given to the skin temperature and consequently the amount of heat transmitted to the deeper tissues is limited by the temperature which the sensory nerves of the skin will tolerate. The infra-red rays pass more readily through the skin when it is cool and hence contains little blood than when it is heated and its bloodvessels distended with blood.

An error very commonly committed in connection with the application of heat to the joints is neglect to thoroughly protect the joints after the application. For the substantial help required, the application of heat to the joints should be as nearly continuous as possible. The beneficial effects of an intense hot application may be to a very degree considerable continued by the application of a protected moist compress or what is sometimes known as a water poultice.

Local applications should be employed several times a day, at least two or three times, and in the intervals between the joints should be thoroughly protected against even a momentary chill. It is important not only that the joints but the entire limb should be protected. The aversion most women have for warm clothing of the limbs is a real obstacle in the treatment of arthritis in women.

The average patient suffering from arthritis, either rheumatoid or hypertrophic, should be given daily or every other day a general hot application which may consist of the high intensity or low intensity type. The high intensity type may consist of an ordinary hot water bath, electric cabinet bath (infra-red) or a thermal automatic exercise bath. The bath should quickly raise the temperature of the patient to 104 degrees where it should be maintained for an hour or an hour and a half. After removal from the bath the patient should be wrapped in blankets.
surrounded with hot water bags or an electric blanket and covered with mackintosh.

The patient should be given water or light fruit juices to drink at intervals of 15 or 20 minutes.

The patient's comfort may be much enhanced by cool applications made to the head and face.

The patient himself produces heat at the rate of a thousand calories an hour, sufficient, if it were all retained, to raise the temperature of a 150 pound patient several degrees an hour, so that it is very easy to maintain the maximum temperature desired for as long as his condition demands or at least as long as the patient is able to endure the discomforts of the procedure.

The horizontal electric light cabinet is much more comfortable than the pack. The portable horizontal half cabinet is almost equally as effective.

The thermal automatic exercise is a highly efficient means of applying fever therapy because of its great influence upon metabolism which it is able to increase to eight times the normal rate.
THE BATTLE CREEK PROGRAM FOR THE TREATMENT OF ARTHRITIS

1. **Removal of causes** by attention to focal infections of the nose, throat, teeth, duodenum, gallbladder, colon, and genito-urinary organs.

2. **Rest in bed**, equable temperature, air conditioned room if necessary. Warm clothing. Complete rest for a prolonged period when necessary, carefully avoiding cold and the causing of pain in the affected joints.

3. **Correction of diet.** Such adjustment of the bill of fare as will encourage elimination, lessen the burden upon the liver and kidneys, correct obesity when present, build up the blood, and supply an abundance of all the vitamins, A, B, C, D, E and G. The daily intake of vitamins should be 25,000 to 50,000 Sherman units of A, 500 B and C, 1,000 of D and plenty of E. Little salt, avoidance of acid ash foods.

4. **The flora** must be changed by the use of soy acidophilus milk, Lacto-Dextrin, L. B. Lax and colon treatment.

5. **Copious water drinking**, at least three or four pints a day or more when there is much sweating. The amount should be sufficient to keep the quantity of urine at least 3 or 4 pints. The liquid taken may include fruit juices, broths and other liquid foods.

**TREATMENT**

*Sun bathing* daily, natural when possible and artificial on other days. Sunshine 20 to 60 minutes according to the intensity of the sun. Skyshine as many hours as possible.

*Artificial sunshine* 15 minutes.

*Air baths* one to two hours daily, out of doors if possible, and as many hours as possible. In a room at temperature to suit the individual case, preferably at about 70 degrees, the affected joints being warmly
wrapped all the time to avoid chilling. The skin surface should be rubbed
during exposure often enough to maintain circulation and comfort and to
prevent chilling and gooseflesh. The skin should be gradually accustomed
to cool air, beginning with exposure of the whole body at 85 degrees and
lowering the temperature one or two degrees from day to day and increasing
the length of time of the exposure or by exposing small portions of the
skin at a time, with rubbing during the exposure, making successive expo-
positions of small areas similar to the method used in partial cold rubbings
as with the wet hand rub or mitten friction, all the body being covered
except the part under treatment. By exposing larger areas of the skin
each successive day and gradually increasing the length of the time of
exposure, the skin circulation and the tonus of the muscles may be gradu-
ally increased with excellent effects upon the sympathetic system whereby
appetite, bowel action and digestion will be improved.

**EXERCISE.**—Every rheumatic patient needs exercise of his muscles
daily. The amount of exercise should be sufficient to cause gentle fatigue.
General fever or rise of temperature is a contraindication for exercise.
Bedridden patients profit by exercises of some sort every hour to avoid
stiffness.

**Psychic Exercise.**—Very feeble patients whose muscles are wasted
and have painful joints should begin with psychic exercise. In this the
patient fixes the mind upon a group of muscles, say the flexor muscles
of an arm, and executes mentally the movements of flexion and extension,
thinking and even speaking the command to flex the fingers and then to ex-
tend the fingers, but without moving them and hence without producing pain
in the affected joints. These psychic exercises may be repeated every
hour for three to five minutes. Psychic exercises should be performed
with rhythm as when the movements are actually executed. Accompanying
music, phonograph or radio, is an important aid.

**Massage** of the whole body should be applied daily, great care being taken to avoid hurting the affected joints, stroking joints when painful and flexing and extending limbs as fully as possible to prevent limiting of movement.

**Automatic exercise.** The current should be adjusted so as to produce muscular contraction as vigorous as possible without causing pain. Heat should be applied at the same time so as to lessen the sensibility of the joints.

Care should be taken to note the effect upon the patient's pulse, temperature and rate of respiration.

Patients should take a glassful of warm water before beginning the exercise to encourage perspiration and to replace water which may be lost through the skin.

When the pain of the joints diminishes, a series of bed exercises consisting of movements of the arms and limbs may be employed two to four times daily. Deep breathing exercises should be taken at least once every hour for two to five minutes. Two minutes twice an hour will be of greater value than five minutes once an hour.

Special exercises should be arranged for groups of muscles connected with diseased joints.

Muscles of unaffected limbs should be well exercised daily to maintain the general health, especially for good effects on heart and circulation, lungs, metabolism and elimination.

In general, the movements should be executed slowly, to avoid secondary fatigue and stiffness.

Such mechanical exercises as pedalling, mechanical horse riding are
useful in special cases. Swimming and the swimming bath are likewise useful even in some cases when walking is difficult or impossible.

The automatic exercise is available in all cases as a means of securing adequate use of the muscles.

Posture in Bed.—Special attention must be given to the patient's posture in bed. In the dorsal decubitus there is a strain upon the costo-vertebral ligaments, particularly in the lumbar region which often gives rise to a pain or ache in the back. This may be prevented by lumbar support. Properly made cushions or sandbags may be used for the purpose.

Interscapular Support.—Support between the shoulders, when the patient is lying in the dorsal position, relieves the strain upon the ligaments of the upper spine, holds the chest up in proper position and encourages the normal ventilation of the lungs. A folded bath towel may be used or a cushion specially made for the purpose. The thickness of the cushion should be about an inch, the width four inches and the length 12 to 18 inches.

When the patient is able to sit up great care must be taken to maintain the normal lumbar curve and to support the spine between the shoulders. Interscapular support may at first be found difficult because of the extreme degree of the posterior spinal curve and the rigidity of the tissues. By persevering effort this rigidity may be greatly lessened or completely overcome in the majority of cases unless actual bony consolidation has taken place. Daily applications of heat in some form and massage and passive movements calculated to correct the curvature should be given.

Thermotherapy.—The pain and the joint changes which take place in infectious arthritis as well as the senile changes which occur in hypertrophic arthritis are undoubtedly due to lack of blood supply which results from the spasm of blood vessels produced by toxins either produced locally or brought in the blood stream.
The blood circulation in the joint structures is less vigorous than in muscle structures, glands and other soft parts on account of the density of the bony structure. This fact doubtless accounts for the peculiar pathological changes which develop in rheumatism. Since a diminished blood supply is the immediate cause of most of the morbid manifestations, it is naturally the chief aim of treatment to increase it.

Exercise produces an increase of the blood supply. Contraction of the muscles with simultaneous application of heat to the joint increases the movement of blood through the parts to a still greater degree. By an alternation of heat and cold it is possible not only to dilate the blood vessels but to increase the activity of the arterioles. Under the influence of heat alone the arterioles are dilated, but their activity is diminished. By an application of cold a vasoconstrictor reaction occurs in the arterioles which greatly accelerates the blood movement.

Heat may be applied to the joints effectively either by diathermy, inductothermy or the infra-red light. The infra-red has been used at the Sanitarium since 1890, and is, I believe, the most effective of all means of applying heat to the body. Cecil prefers infra-red. Employed in connection with means for controlling the temperature of the skin, the so-called intensive method, the amount of heat passed into the deeper tissues may be doubled and tripled over the amount received when no attention is given to the skin temperature since the amount of heat transmitted to the deeper tissues is limited by the temperature which the sensory nerves of the skin will tolerate. The infra-red rays pass much more freely through the skin when it is cool and contains little blood than when it is heated and its blood vessels distended with blood.

An error very commonly committed in connection with the application
of heat to the joints is neglect to thoroughly protect the joints after
the application. The application of heat to the joints should be as
nearly continuous as possible. The beneficial effects of an intense
hot application may be to a very considerable degree continued by the
application of a protected moist compress or what is sometimes known as
a water poultice, or by dry bandaging.

Local hot applications should be made two or three times a day and
in the intervals between the joints should be thoroughly protected against
chilling. It is important not only that the joints but the entire limb
should be protected. The aversion most women have for warm clothing of
the limbs is a real obstacle in the treatment of arthritis in women.

Fever Therapy.--The average patient suffering from arthritis, either
rheumatoid or hypertrophic, may be given daily or every other day with
benefit a general hot application which may consist of the high intensity
or low intensity type. The high intensity type may consist of an ordinary
hot water bath (105° - 110° - 104°), electric cabinet bath (infra-red), a
thermal automatic exercise bath or diathermy, inductothermy. The bath
(105° - 110°) should quickly raise the temperature of the patient to
104° where it should be maintained for an hour or an hour and a half.
The temperature of the bath should be lowered to 105° when the patient's
temperature reaches 104°. After removal from the bath the patient should
be wrapped in blankets surrounded with hot water bags or an electric
blanket and covered with mackintosh and the temperature maintained at
104° F. for 2 to 3 hours.

The patient should be given water or very dilute fruit juices to
drink at intervals of 15 or 20 minutes.

The patient's comfort may be much enhanced by cool applications made
to the head and face.

The patient himself produces heat at the rate of a thousand calories
an hour, sufficient, if it were all retained, to raise the temperature
of a 150 pound patient several degrees, so that it is easily possible to
maintain the maximum temperature desired for as long as may be desirable
or at least as long as the patient is able to endure the discomforts of
the procedure.

The horizontal electric light cabinet is much more comfortable than
the pack. The horizontal half cabinet is almost equally as effective.

The thermal automatic exercise is a highly efficient means of apply-
ing fever therapy because of its great influence upon metabolism which
it may increase to eight times the normal rate.
THE BATTLE CREEK PROGRAM FOR RHEUMATISM

1. Removal of causes by attention to focal infections of the nose, throat, teeth, duodenum, gallbladder, colon, and genito-urinary organs.

2. Rest in bed, equable temperature, air conditioned room if necessary. Proper clothing. Complete rest for a prolonged period when necessary, carefully avoiding the resting of joints in affected points.

3. Removal of causes must include correction of diet. Such adjustment of the bill of fare as will encourage elimination, lessen the burden upon the eliminative organs, correct obesity when present, build up the blood, and supply an abundance of all the vitamins, B, C, E and G as well as A and D. The intake of vitamins should be 25,000 to 50,000 Sherman units of A, 500 B and G, 1,000 of D and plenty of E.

4. The flora must be changed by the use of soy acidophilus milk, Lacto-Dextrin, and L. D. Lax, and color treatment.

5. No salt, avoidance of acid ash foods, copious water drinking, at least three or four pints a day or more when prolonged sweating baths are taken. The amount should be sufficient to keep the quantity of urine at least 1,500 to 2,000 cc. The liquid taken may include fruit juices, broths and other liquid foods.

TREATMENT

Sun bathing daily, natural when possible and artificial on other days.

Sunshine 20 to 60 minutes according to the intensity of the sun. Skyshine as many hours as possible.

Artificial sunshine 15 minutes.

Air baths one to two hours daily in room at temperature to suit
the individual case, preferably about 90 degrees, the affected joints being warmly wrapped at the time to avoid chilling. The skin surface should be rubbed during the exposure often enough to maintain circulation and comfort and prevent chilling and gooseflesh. The skin should be gradually accustomed to the cool air, beginning with exposure of the whole body at 86 degrees and lowering the temperature one or two degrees from day to day and increasing the length of time of the exposure or exposing small portions of the skin at a time, with rubbing during the exposure, making successive exposures over small areas similar to the method used in partial rubbings as with the wet hand rub or mitten friction, all the body being covered except the part under treatment. By exposing a larger area of the skin each successive day and gradually increasing the length of the time of exposure, the skin circulation and the tonus of the muscles may be gradually increased with excellent effects upon the sympathetic system whereby appetite, bowel action and digestion will be improved.

Bedridden patients should have exercises of some sort every hour. Very feeble patients whose muscles are much deteriorated and have painful joints will begin with psychic and automatic exercise.

In this the patient fixes the mind upon a group of muscles, say the flexor muscles, and executes mentally the movement of flexion and extension, thinking and even speaking the command to flex the fingers and then to extend the fingers, but without moving them and hence without producing any pain in the affected joints. These psychic exercises may be repeated every hour for three to five minutes. Psychic exercises should be performed with rhythm as when the movements are actually executed.
Massage should be applied daily, but care being taken to avoid hurting the affected joints.

The next step is the application of automatic exercise. The current should be adjusted so as to produce muscular contraction, but without sufficient vigor to produce enough joint movement to cause pain. Care must be taken, however, to make the vigor of the treatment as great as possible without causing pain. Heat must be applied at the same time so as to lessen the sensibility of the joints.

Care should be taken to note the effect upon the patient's pulse, temperature and frequency of respiration.

Patients should take a glassful of warm water before beginning the treatment to encourage perspiration and to replace water which may be lost through the skin. If the skin is dry and perspiration does not occur, the use of thyroid may be indicated and special studies should be made of the metabolism.

Changes in the skin about the joints are such as to indicate a diminished blood supply and resulting lowered resistance, tissue degeneration and pain.

The increased supply of blood to the muscles induced by exercise will increase the blood supply to the joints which will also be encouraged by other features of the treatment program.

When the pain of the joints diminishes, a series of bed exercises consisting of movements of the arms and limbs may be employed two to four times daily. Deep breathing exercises should be taken at least once every hour for two to five minutes. Two minutes twice an hour will be of greater value than five minutes once an hour.

POSTURE IN BED. -- Special attention must be given to the patient's
posture in bed. Lying flat upon the back puts a strain upon the costo-
vertebral ligaments of the whole spine, particularly in the lumbar region
which often gives rise to a pain or ache in the back. It should be pre-
vented by lumbar support. Properly constructed cushions or sandbags
may be used for the purpose. In many cases, especially those in which
the chest is flattened, support between the shoulders, when the patient
is lying in the dorsal position, relieves the strain upon the ligaments
of the upper spine, holds the chest up in proper position and encourages
the normal ventilation of the lungs. A folded bath towel may be used
for this purpose or a cushion specially made for the purpose. The thick-
ness of the cushion should be about an inch and a half, the width four
inches and the length 12 to 16 inches.

In the patient is able to sit up great care must be taken to
maintain the normal lumbar curve and to support the spine between the
shoulders. Interscapular support may at first be found difficult be-
cause of the extreme degree of the posterior prominence and the rigidity
of the tissues. By persevering effort this rigidity may be greatly
lessened or completely overcome in the majority of cases unless actual
bony consolidation has taken place. Daily applications of heat in some
form and massage and passive movements calculated to correct the curva-
ture should be given daily by an expert orthopedic technician.

**THERMOTHERAPY IN RHEUMATISM** -- The pain and the degenerative
joint changes which take place in infectious arthritis as well as the
senile changes which occur in hypertrophic arthritis are undoubtedly
due to lack of blood supply which results from the spasm of blood
vessels produced by toxins either produced locally or brought in the
blood stream.

The blood circulation in the joint structures is less vigorous
than in muscle structures, glands and other soft parts on account of the density of the structures. This fact doubtless accounts for the peculiar pathological changes which develop in rheumatism. Since a diminished blood supply is the chief immediate cause of all the morbid manifestations, this is naturally the chief aim of treatment.

An increase of blood movement may be encouraged by an application of heat which causes dilatation of the blood vessels and hence an increased movement of blood through the parts.

Exercise produces an increase of the blood supply by increasing the amount of blood brought to the neighboring tissues. Exercise of the muscles with simultaneous application of heat to the joint increases the movement of blood through the parts to a still greater degree. By an alternation of heat and cold it is possible not only to dilate the blood vessels but to increase the activity of the arterioles and arterioles. Under the influence of heat alone the vessels are dilated, but their activity is diminished.

By an application of cold a vasomotor reaction occurs in the arterioles which greatly accelerates the blood movement. By careful use of this principle in various ways, the increase of blood supply to the muscles through thermic applications may be very greatly increased.

Heat may be applied to the joints most effectively either by diathermy, inductothermy or the infra-red light. This method, which has been used at the Sanitarium since 1890, is, I believe, the most effective of all means of applying heat to the body, especially when employed in connection with means for controlling the temperature of the skin, the so-called intensive method. By this means the amount of heat passed into the deeper tissues may be doubled and tripled over
the amount received when no attention is given to the skin temperature, and consequently the amount of heat transmitted to the deeper tissues is limited by the temperature which the sensory nerves of the skin will tolerate. The infra-red rays pass more readily through the skin when it is cool and hence contains little blood than when it is heated and its bloodvessels distended with blood.

An error very commonly committed in connection with the application of heat to the joints is neglect to thoroughly protect the joints after the application. For the substantial help required, the application of heat to the joints should be as nearly continuous as possible. The beneficial effects of an intense hot application may be to a very degree considerable continued by the application of a protected moist compress or what is sometimes known as a water poultice, made by dry bandaging.

Local applications should be employed several times a day, at least two or three times, and in the intervals between the joints should be thoroughly protected against chilling. It is important not only that the joints but the entire limb should be protected. The aversion most women have for warm clothing of the limbs is a real obstacle in the treatment of arthritis in women.

The average patient suffering from arthritis, either rheumatoid or hypertrophic, should be given daily or every other day a general hot application which may consist of the high intensity or low intensity type. The high intensity type may consist of an ordinary hot water bath, electric cabinet bath (infra-red) or a thermal automatic exercise bath. The bath should quickly raise the temperature of the patient to 104 degrees where it should be maintained for an hour or an hour and a half. After removal from the bath the patient should be wrapped in blankets.
surrounded with hot water bags or an electric blanket and covered with mackintosh. The temperature maintained at 101°F for 2 or 3 hours. The patient should be given water or light fruit juices to drink at intervals of 15 or 20 minutes.

The patient's comfort may be much enhanced by cool applications made to the head and face.

The patient himself produces heat at the rate of a thousand calories an hour, sufficient, if it were all retained, to raise the temperature of a 150 pound patient several degrees an hour, so that it is very easy to maintain the maximum temperature desired for as long as his condition demands or at least as long as the patient is able to endure the discomforts of the procedure.

The horizontal electric light cabinet is much more comfortable than the pack. The portable horizontal half cabinet is almost equally as effective.

The thermal automatic exercise is a highly efficient means of applying fever therapy because of its great influence upon metabolism which it is able to increase to eight times the normal rate.
1. **Removal of causes** by attention to focal infections of the nose, throat, teeth, duodenum, gallbladder, colon, and genito-urinary organs.

2. **Rest in bed**, equable temperature, air conditioned room if necessary. Warm clothing. Complete rest for a prolonged period when necessary, carefully avoiding cold and the causing of pain in the affected joints.

3. **Correction of diet.** Such adjustment of the bill of fare as will encourage elimination, lessen the burden upon the liver and kidneys, correct obesity when present, build up the blood, and supply an abundance of all the vitamins, A, B, C, D, E and G. The daily intake of vitamins should be 25,000 to 50,000 Sherman units of A, 500 B and C, 1,000 of D and plenty of E. Little salt, avoidance of acid ash foods.

4. **The flora** must be changed by the use of soy acidophilus milk, Lacto-Dextrin, L. D. Lax and colon treatment.

5. **Copious water drinking,** at least three or four pints a day or more when there is much sweating. The amount should be sufficient to keep the quantity of urine at least 3 or 4 pints. The liquid taken may include fruit juices, broths and other liquid foods.

**TREATMENT**

Sun bathing daily, natural when possible and artificial on other days. Sunshine 20 to 60 minutes according to the intensity of the sun. Skyshine as many hours as possible.

Artificial sunshine 15 minutes.

Air baths one to two hours daily, out of doors if possible, and as many hours as possible. In a room at temperature to suit the individual case, preferably at about 70 degrees, the affected joints being warmly
wrapped all the time to avoid chilling. The skin surface should be rubbed
during exposure often enough to maintain circulation and comfort and to
prevent chilling and gooseflesh. The skin should be gradually accustomed
to cool air, beginning with exposure of the whole body at 86 degrees and
lowering the temperature one or two degrees from day to day and increasing
the length of time of the exposure or by exposing small portions of the
skin at a time, with rubbing during the exposure, making successive ex-
posures of small areas similar to the method used in partial cold rubbings
as with the wet hand rub or mitten friction, all the body being covered
except the part under treatment. By exposing larger areas of the skin
each successive day and gradually increasing the length of the time of
exposure, the skin circulation and the tonus of the muscles may be gradu-
ally increased with excellent effects upon the sympathetic system whereby
appetite, bowel action and digestion will be improved.

**EXERCISE**.—Every rheumatic patient needs exercise of his muscles
daily. The amount of exercise should be sufficient to cause gentle fatigue.
General fever or rise of temperature is a contraindication for exercise.
Bedridden patients profit by exercises of some sort every hour to avoid
stiffness.

**Psychic Exercise**.—Very feeble patients whose muscles are wasted
and have painful joints should begin with psychic exercise. In this the
patient fixes the mind upon a group of muscles, say the flexor muscles
of an arm, and executes mentally the movements of flexion and extension,
thinking and even speaking the command to flex the fingers and then to ex-
tend the fingers, but without moving them and hence without producing pain
in the affected joints. These psychic exercises may be repeated every
hour for three to five minutes. Psychic exercises should be performed
with rhythm as when the movements are actually executed. Accompanying
music, phonograph or radio, is an important aid.

**Massage** of the whole body should be applied daily, great care being taken to avoid hurting the affected joints, stroking joints when painful and flexing and extending limbs as fully as possible to prevent limiting of movement.

**Automatic exercise.** The current should be adjusted so as to produce muscular contraction as vigorous as possible without causing pain. Heat should be applied at the same time so as to lessen the sensibility of the joints.

Care should be taken to note the effect upon the patient’s pulse, temperature and rate of respiration.

Patients should take a glassful of warm water before beginning the exercise to encourage perspiration and to replace water which may be lost through the skin.

When the pain of the joints diminishes, a series of bed exercises consisting of movements of the arms and limbs may be employed two to four times daily. Deep breathing exercises should be taken at least once every hour for two to five minutes. Two minutes twice an hour will be of greater value than five minutes once an hour.

Special exercises should be arranged for groups of muscles connected with diseased joints.

Muscles of unaffected limbs should be well exercised daily to maintain the general health, especially for good effects on heart and circulation, lungs, metabolism and elimination.

In general, the movements should be executed slowly, to avoid secondary fatigue and stiffness.

Such mechanical exercises as pedalling, mechanical horse riding are
useful in special cases. Swimming and the swimming bath are likewise useful even in some cases when walking is difficult or impossible.

The automatic exercise is available in all cases as a means of securing adequate use of the muscles.

**Posture in Bed.**--Special attention must be given to the patient's posture in bed. In the dorsal decubitus there is a strain upon the costovertebral ligaments, particularly in the lumbar region which often gives rise to a pain or ache in the back. This may be prevented by lumbar support. Properly made cushions or sandbags may be used for the purpose.

**Interscapular Support.**--Support between the shoulders, when the patient is lying in the dorsal position, relieves the strain upon the ligaments of the upper spine, holds the chest up in proper position and encourages the normal ventilation of the lungs. A folded bath towel may be used or a cushion specially made for the purpose. The thickness of the cushion should be about an inch, the width four inches and the length 12 to 16 inches.

When the patient is able to sit up great care must be taken to maintain the normal lumbar curve and to support the spine between the shoulders. Interscapular support may at first be found difficult because of the extreme degree of the posterior spinal curve and the rigidity of the tissues. By persevering effort this rigidity may be greatly lessened or completely overcome in the majority of cases unless actual bony consolidation has taken place. Daily applications of heat in some form and massage and passive movements calculated to correct the curvature should be given.

**Thermontherapy.**--The pain and the joint changes which take place in infectious arthritis as well as the senile changes which occur in hypertrophic arthritis are undoubtedly due to lack of blood supply which results from the spasm of blood vessels produced by toxins either produced locally or brought in the blood stream.
The blood circulation in the joint structures is less vigorous than in muscle structures, glands and other soft parts on account of the density of the bony structure. This fact doubtless accounts for the peculiar pathological changes with develop in rheumatism. Since a diminished blood supply is the immediate cause of most of the morbid manifestations, it is naturally the chief aim of treatment to increase it.

Exercise produces an increase of the blood supply. Contraction of the muscles with simultaneous application of heat to the joint increases the movement of blood through the parts to a still greater degree. By an alternation of heat and cold it is possible not only to dilate the blood vessels but to increase the activity of the arterioles. Under the influence of heat alone the arterioles are dilated, but their activity is diminished. By an application of cold a vasomotor reaction occurs in the arterioles which greatly accelerates the blood movement.

Heat may be applied to the joints effectively either by diathermy, inductothermy or the infra-red light. The infra-red has been used at the Sanitarium since 1890, and is, I believe, the most effective of all means of applying heat to the body. Cecil prefers infra-red. Employed in connection with means for controlling the temperature of the skin, the so-called intensive method, the amount of heat passed into the deeper tissues may be doubled and tripled over the amount received when no attention is given to the skin temperature since the amount of heat transmitted to the deeper tissues is limited by the temperature which the sensory nerves of the skin will tolerate. The infra-red rays pass much more freely through the skin when it is cool and contains little blood than when it is heated and its blood vessels distended with blood.

An error very commonly committed in connection with the application
of heat to the joints is neglect to thoroughly protect the joints after
the application. The application of heat to the joints should be as
nearly continuous as possible. The beneficial effects of an intense
hot application may be to a very considerable degree continued by the
application of a protected moist compress or what is sometimes known as
a water poultice, or by dry bandaging.

Local hot applications should be made two or three times a day and
in the intervals between the joints should be thoroughly protected against
chilling. It is important not only that the joints but the entire limb
should be protected. The aversion most women have for warm clothing of
the limbs is a real obstacle in the treatment of arthritis in women.

Fever Therapy.--The average patient suffering from arthritis, either
rheumatoid or hypertrophic, may be given daily or every other day with
benefit a general hot application which may consist of the high intensity
or low intensity type. The high intensity type may consist of an ordinary
hot water bath (105 - 110 - 104°), electric cabinet bath (infra-red), a
thermal automatic exercise bath or diathermy, inductothermy. The bath
(105° - 110°) should quickly raise the temperature of the patient to
104° where it should be maintained for an hour or an hour and a half.
The temperature of the bath should be lowered to 105° when the patient’s
temperature reaches 104°. After removal from the bath the patient should
be wrapped in blankets surrounded with hot water bags or an electric
blanket and covered with mackintosh and the temperature maintained at
104° F. for 2 to 3 hours.

The patient should be given water or very dilute fruit juices to
drink at intervals of 15 or 20 minutes.

The patient's comfort may be much enhanced by cool applications made
to the head and face.

The patient himself produces heat at the rate of a thousand calories an hour, sufficient, if it were all retained, to raise the temperature of a 150 pound patient several degrees, so that it is easily possible to maintain the maximum temperature desired for as long as may be desirable or at least as long as the patient is able to endure the discomforts of the procedure.

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TREATMENT OF CHRONIC RHEUMATISM—ACUTE STAGE

Rest. Indications for—Pain on movement, as in arthritis of shoulder or knee, brachial, torticollis, lumbago, sciatica. In severe sciatica, complete rest in bed, arm in sling.

Tenderness, either in joint or soft tissues, especially when even slight fever is present, or general or localized temperature as much as one degree. Heat of the affected part, as shown by a skin thermometer.

Treatment: Either hot or cold applications; light, warm compresses, 95-105 degrees. Cover with flannel and mackintosh. Take temperature, general and local, twice a day.


Sweating baths twice a day, preferably general, Infra-red, by electric cabinet.

SUB-CHRONIC PHASE

If heat and fever are absent and severe pain, apply heat and joint movements. The heat used for hot packs and compresses; best of all, radiant heat. Apply heat to joints before movements. Movements should always follow hot applications.

Sun and air baths, especially in rheumatoid arthritis. Brief, hot baths.

Exercise. Begin as soon as heat and pain are gone. Voluntary movements by patients during hot bath. Rhythmic flexions and extensions of limbs; swimming bath.
Automatic exercise, exercise to music. Voluntary exercise, passing the heel of one leg along the outside of the other, from below, up.

Exercise of hand - rubber ball. Continue exercise for months.

Exercise for wrist, elbows and shoulders. Cross fingers above head, as near neck as possible. Push elbow forward and backwards as far as possible. Avoid exhaustion by exercise.

Massage and gentle movements. Apply gently, avoiding sore places by h.p. air douche to skin.

Climate. Avoid cold and dampness, seashore, moist ground, strong winds, especially northeast, sudden changes of temperature, chilly fogs. Avoid sea-bathing. Rheumatics should seek warm climates in winter. Equable climate necessary. Sudden extremes very harmful.

Heat-stimulating baths, whirlpool baths, bubble baths, salt baths, vapor douches, cold percussion douche, hot percussion douche.

Diathermy, hot tub baths, dry packs, pool bath, 93-98 degrees, electric light cabinet, arc light, low pressure douches, towel rub. Several types of baths. Hot vapor bath, with mechanical stimulation of skin.

Switching with birch twigs. Arrange an electric switch, the steel wires covered by rubber tubes, the tubes longer than the wire; fasten securely. Disinfect with Wyandotte. Also use hot percussion douche. Hot baths used in all northern countries, also in Turkey. Used by Romans and Mohammedans.
Automatic exercise, exercise to music. Voluntary exercise, passing the heel of one leg along the outside of the other, from below, up.

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Sedative bath - one to three hours in a warm pool or tub, temperature 93-98. Warm douche at 105 degrees, followed by long stay in pool or bath at 95-98, one to three hours.

Stimulating hot baths. Brine bath 100-105, for cases that have passed the acute stage, and in more chronic cases. Manipulations during the bath to muscles and joints and exercise by patient, bending of joints to full extent by assistant.

Solar stimulating applications for advanced, very chronic cases. Joints disabled, stiffened, very hot local applications, especially infra-red. Increase of pain in such cases favorable sign, due to reaction which will be curative. Avoid excessive reaction. Combine with prolonged stay in warm pool, 95-105.

Manipulation baths. Temperature 90 degrees. Patient and assistant both apply friction. Known as Winternitz bath.

Another form of manipulation bath - rubbing in a flowing water bath.

A third form of manipulation bath - a whirlpool bath. Temperature 105-113.

RULES FOR HEAT TREATMENT OF RHEUMATISM

1. Patients kept in sedative baths must be kept in a warm temperature; no exposure to cold; that is, limbs and body should never be chilled to the slightest degree. Well bundled up, patient may be exposed for brief periods for breathing cold air. Or the cold air may be brought in for the patient to breathe by air tube.

2. While the temperature of the joint is normal, avoid hot applications to the joints.
Sedative bath - one to three hours in a warm pool or tub, temperature 93-98. Warm douche at 105 degrees, followed by long stay in pool or bath at 95-98, one to three hours.

Stimulating hot baths. Brine bath 100-105, for cases that have passed the acute stage, and in more chronic cases. Manipulations during the bath to muscles and joints and exercise by patient, bending of joints to full extent by assistant.

Solar stimulating applications for advanced, very chronic cases. Joints disabled, stiffened, very hot local applications, especially infra-red. Increase of pain in such cases favorable sign, due to reaction which will be curative. Avoid excessive reaction. Combine with prolonged stay in warm pool, 95-105.

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A third form of manipulation bath - a whirlpool bath. Temperature 105-113.

RULES FOR HEAT TREATMENT OF RHEUMATISM

1. Patients kept in sedative baths must be kept in a warm temperature; no exposure to cold; that is, limbs and body should never be chilled to the slightest degree. Well bundled up, patient may be exposed for brief periods for breathing cold air. Or the cold air may be brought in for the patient to breathe by air tube.

2. While the temperature of the joint is normal, avoid hot applications to the joints.
1. The paper must not simply be a report of cases, but must have a definite aim to prove something.

2. Emphasis should be laid upon the diet, especially its biologic character.

3. The determination of liver efficiency, blood sugar, sugar tolerance, skin condition as regards reaction, capillary changes. Other tests should be made before and after shadowgraphs showing posture.

    Show the proofs of beneficial effects of automatic exercise.

4. Emphasize infra-red light in various forms...sitting up and horizontal.
TREATMENT OF CHRONIC RHEUMATISM-ACUTE STAGE

Rest. Indications for - Pain on movement, as in arthritis of shoulder or knee, brachial, torticollis, lumbago, sciatica. In severe sciatica, complete rest in bed, arm in sling.

Tenderness, either in joint or soft tissues, especially when even slight fever is present, or general or localized temperature as much as one degree. Heat of the affected part, as shown by a skin thermometer.

Treatment: Either hot or cold applications; light, warm compresses, 95-105 degrees. Cover with flannel and mackintosh. Take temperature, general and local, twice a day.


Sweating baths twice a day, preferably general, Infared, by electric cabinet.

SUB-CHRONIC PHASE

If heat and fever are absent and severe pain, apply heat and joint movements. The heat used for hot packs and compresses; best of all, radiant heat. Apply heat to joints before movements. Movements should always follow hot applications.

Sun and air baths, especially in rheumatoid arthritis. Brief, hot baths.

Exercise. Begin as soon as heat and pain are gone. Voluntary movements by patients during hot bath. Rhythmic flexions and extensions of limbs; swimming bath.