

**PROGNOSIS.**—It is always grave because of the fundamental disease. The fluid in the pericardium adds an extra impediment to the already weak heart and thus hastens the fatal issue. In rare cases, as in the effusions associated with acute nephritis, there may be recovery.

**TREATMENT.**—This consists, in the majority of cases, in the treatment of the primary disease, with cardiac tonics and diuretics. Usually paracentesis only delays the fatal issue a short time. However, in rare cases it may be distinctly useful—*e.g.*, when the patient seems to be dying as a result of great local obstruction in the pericardium, which is overwhelming the heart. The operation is not difficult, but must never be undertaken, unless the diagnosis be certain. For a description of the operation see the article on *Pericarditis*.

James Rae Arneill.

**HYDROQUINONE.**—Hydroquinone, or *hydrochinon*, as it is called by German authors, is chemically *paradioxybenzene*,  $C_6H_4(OH)_2$ , one of a trio of isomeric diatomic phenols, of which resorcin and pyrocatechin are the other two members. Hydroquinone appears in transparent, colorless, rhombic plates or prisms, fusible at  $169^\circ C.$  ( $336.2^\circ F.$ ), and subliming without decomposition. The crystals dissolve readily in alcohol, ether, and hot water, but in not less than seventeen parts of cold water. The reaction is neutral and the taste slightly bitter.

Hydroquinone has been proposed as an antipyretic. It is capable of producing convulsions and other derangements in the lower animals, but in therapeutic doses, in man, operates as a speedy, but transient, antipyretic in fever. In such operation the medicine is remarkably well borne, even so large a dose as forty grains producing no derangement worse than a very transient feeling of fulness in the head and slight giddiness, and ordinary doses being free from even this effect. The fall of temperature begins, as a rule, within half an hour after administration of a single dose, reaches its maximum in from two to two and a half hours, and the ensuing rise attains the original temperature in from one to two hours additional. For a transient impression such as described, a dose of from 1.00 to 1.33 gm. (from fifteen to twenty grains) suffices, while for a continuous one, three or four such doses should be given during the twenty-four hours. During continuous medication with hydroquinone the urine may appear of a dark-brown color, due to the presence of products of decomposition of the medicine.

Eduard Curtis.

**HYDROTHERAPY.**—In the present enlightened era of medicine the chief aim of the physician is to aid the inherent powers of the human organism to eliminate morbid agents and reinstate the disturbed equilibrium of the economy, by all means which enhance the patient's capacity to resist the inroads of disease. In the accomplishment of the latter water plays an important part. The simplicity of this remedial agent and the neglect of precision in its application have been the chief obstacles in the way of its more universal acceptance. The fact that water is one of the few remedies which has survived since the day of Hippocrates and has been advocated and used by the most eminent physicians of every time, was the writer's incentive to its investigation twenty-five years ago. The clinical results obtained by him have won his highest esteem, especially since he discovered that its action is based upon recognized physiological principles. The latter must be clearly understood before the real value of hydrotherapy can be appreciated.

The action of water upon the human organism is derived from its physical and mechanical effects.

The physical qualities of water are utilized in hydrotherapy because it is an excellent vehicle for conveying the thermic and mechanical effects aimed at. Water absorbs and gives up heat readily; it may be used in solid, liquid, or gaseous form, it may be applied to any limited part of the body or to its entire surface. Hence its physical property alone makes it a most flexible therapeutic agent.

Thermic agents affect living tissues in the most pronounced manner. Smooth muscular fibre contracts under cold and expands under heat, and its contractility may be entirely destroyed by an excess of either. By the conveyance of cold or heat by means of water we are, therefore, enabled to produce striking effects upon vital processes which depend upon muscular activity. As cold and heat are irritants, their reflex effects conveyed through the nervous system also become valuable therapeutically. Applying these axiomatic principles, we find that circulation, respiration, tissue change, and heat production may be positively influenced by the application of water as a medium of conveyance of cold and heat, and that abnormal conditions of the functions may be remedied and their healthy equilibrium restored. That such effects are really produced, laboratory experiment as well as observation at the bedside has again and again demonstrated.

In my book on hydrotherapy\* many experiments are detailed showing the influence of hydiatric procedures upon the calibre of blood-vessels, the action of the heart, and even upon the composition of the blood, the respiration, and the secretions. All applications of cold involving the entire surface of the body, or a considerable part thereof, result in an increase of the number of blood cells; the percentage of hæmoglobin and the specific gravity of the blood are also increased when reaction, manifested by cutaneous hyperæmia, ensues. When reaction fails, the erythrocytes, and often the leucocytes also, are diminished.

That these effects may be utilized to explain the rationale of cold applications in disease has been often demonstrated. For instance, Thayer, of Johns Hopkins University, observed that the blood drawn from the lobe of the ear of a typhoid-fever patient after a Brand bath, contained three times the number of leucocytes, ascertained by actual count to be present previous to the bath. This has been confirmed by Winternitz, Breitenbach, myself, and others, in chronic cases and in healthy persons. Since this enormous increase could not be the result of new production during the fifteen-minute bath, the conclusion is inevitable that the increased activity of the circulation, induced by the changing anæmia and hyperæmia of the cutaneous surface resulting from the cold bath and friction, has driven these cells from their hiding-places on the outskirts of the blood stream and elsewhere, and has brought them into active service.

Cold improves the muscular tone of the vessels, *i.e.*, it increases tension; warmth relaxes, causing passive dilatation and loss of tone. Although both produce a hyperæmia, one is the result of reaction and is tonic, while the other is the result of relaxation and is atonic. This trite fact is sadly disregarded in practice. Its more general recognition will do much to neutralize and remove the fear of shock from cold applications in atonic conditions.

The reflex effect of cold and heat conveyed from the skin to the central and sympathetic system, thence to organs and tissues, is an important therapeutic factor, and demonstrates that the thermic action of water upon the human organism is capable of influencing its every part and function in the most pronounced manner.

By guiding and directing these well-ascertained effects of cold and heat, as conveyed by water to the skin, we may evoke changes in the circulation, remove stasis in one and fill another vascular area, deplete others, and thus aid powerfully in removing pathological states.

Water may be applied with accurate dosage by varying the temperature, duration, and pressure. A very high or a very low temperature produces destruction of tissue, while cold and moderately hot water produce a rubefacient effect. Water driven under high pressure destroys tissues, and under moderate pressure causes rubefacient or stimulating effects.

There are also various modifications in hydiatric tech-

\* "The Principles and Practice of Hydrotherapy," William Wood & Co.

nique which must be clearly understood before we employ hydrotherapy in disease.

**Technique.**—It is the aim of this article to simplify hydrotherapy and render it accessible to the general practitioner. Minute attention to details is the first essential for the successful application of all hydiatric procedures; without this, failure is sure to ensue. The following procedures are best adapted for the application of water in disease: Ablution, affusion, sheet bath, drip sheet, compresses, wet pack, tub bath, douche. Their application in various diseases will be shown.

**Ablution** consists of the application of water by the hand, or with a wash cloth, over successive parts of the body. The method and the temperature of the water vary with the object in view. In febrile conditions the chest, the back, the abdomen, and the lower extremities as far down as the knees are successively bathed every two or three hours, beginning at  $75^\circ$  and reducing the temperature by one degree at each application until  $60^\circ F.$  is reached. It is important to avoid chilling and to bear in mind that reaction is aimed at.

In chronic affections the ablution is a useful preliminary to the more active hydiatric procedures. The patient is first warmed by being snugly wrapped nude, in two long-haired woollen blankets, like a mummy, for one hour. The face is bathed in water of  $60^\circ F.$ ; the blankets are successively opened over his chest, abdomen, back, lower extremities to the knees, and these are bathed with the hand, each part being immediately dried and replaced under cover. A general dry rubbing with a woollen cloth, or the hand, follows.

For the **General Ablution** the patient stands in twelve inches of water at  $95^\circ$  to  $100^\circ F.$ , and is rapidly washed down with the hands, while water—of a temperature of  $80^\circ F.$  at first, but on each succeeding day of a little lower temperature until  $60^\circ F.$  is reached—is poured upon him with the hand or from a vessel. Afterward he should be subjected to gentle friction. Reaction must always be produced.

The **rationale** of the action of ablutions may be found in the gentle shock and reactive stimulus, which is refreshing. The superficial capillaries are dilated, as evidenced by the rosy hue of the skin following ablution with friction, the inspiration is deepened, and cardiac action is bettered.

**Affusion.**—Having a wet cloth around the head, the patient, sitting or standing in a tub containing twelve inches of water at  $100^\circ F.$ , receives a broad stream of water poured with force from a basin, bucket, or pitcher. According to the height from which the water is poured and the lowness of the temperature will be the stimulating effect. The affusion is useful in coma and in stupor-

ous delirium, indicating adynamia and nerve prostration. By this method Currie made his remarkable cures in typhus fever, using chiefly sea water, the patients lying on the deck. In *scarlatina*, when the system is overwhelmed by the poison, the circulation embarrassed, the skin pale or marbled or cyanotic, the respiration shallow, temperature high, pulse rapid and feeble, truly marvelous results may be obtained by the judicious use of brief affusions. Reaction occurs rapidly, and with it come an improved peripheral and general circulation, deepened inspiration, bright countenance, and roseate skin. Rapid affusions of water at a temperature of from  $70^\circ$  to  $60^\circ F.$ , have, in my experience, saved lives in these desperate cases.

**Sheet Bath.**—A rubber sheet covered by a blanket is laid upon one-half of the bed. A linen sheet is now dipped into water having a temperature of from  $60^\circ$  to  $70^\circ F.$ , according to the effect desired, and, *without being wrung out*, is laid upon the blanket; the patient, whose face has been bathed with ice-water, and upon whose head a wet cloth is placed, is moved over to the wet sheet, which is wrapped snugly around him. The first impression will be a surprise—called shock—to the cutaneous nerves. Reaction ensues from the patient's own temperature, and its establishment is aided by

the manipulations of the nurse, who, with out-stretched hands, gently but firmly sweeps over the wet sheet, omitting the legs and forearms. So soon as one part of the body becomes thoroughly warmed, water from  $50^\circ$  to  $60^\circ$  is poured from a cup or squeezed from a sponge over it, until it again cools. These passes, or frictions, are alternated with the pouring on of small quantities of cold water, until the entire body feels cooled or the patient shivers. Rigor must always be avoided, because it is an evidence of contraction of the vessels. As the friction prevents this objectionable feature of all cold baths we have in the sheet bath an admirable roborant antipyretic, the effect of which may be greatly enhanced by allowing the patient to remain in it, after wrapping him in the blanket, for half an hour. Its mildness as compared with the full cold baths, for which it is an excellent substitute, renders it more acceptable to the patient and his friends, and it may thus be utilized as a valuable initiatory antipyretic measure. It is applicable in all acute diseases in which an elevated temperature is a leading manifestation.

**Drip Sheet** (Fig. 2756).—In chronic cases the sheet bath is a useful adjunct, and in many cases an important element of the treatment—as, for example, in phthisis, in neurasthenia, and in chlorosis. Here it is called a drip sheet, and is applied while the patient stands in water of  $100^\circ F.$

The flexibility and simplicity of the method commend it especially. By wringing the sheet well out (cold rub),



FIG. 2756.—Drip Sheet Mode of Friction.

or by using a coarser sheet, or a lower temperature, for a short time, or by slapping with the wet sheet, instead of simply rubbing the hand over it, the local excitation of the cutaneous nerves and vessels may be enhanced. By saturating it with more water, the antipyretic effect is increased, and this may be still more intensified by a more prolonged application.

The compress is made by cutting four folds of old linen to fit the part. The cloth is more or less wrung out of water at or a little above 60° F. and secured by a flannel bandage wider than the cloth. For tonsillitis it is very useful if applied, not around the neck but from ear to ear and secured by a flannel bandage pinned on top of the head. For articular rheumatism a compress snugly secured by a thin flannel bandage of one layer hastens recovery. In pneumonia the compress, surrounding the thorax like a vest and secured over the shoulder and around the chest by pins, is of paramount value. The abdominal compress is useful in all fevers, as is the trunk compress, enveloping the entire trunk. Compresses are usually renewed every hour in acute cases, and always covered by one layer of flannel to permit evaporation—never covered by oiled silk, which would convert them into a poultice.

The Ice Bag may here be referred to. This should always be covered with flannel and never allowed to remain continuously for a longer time than forty-five minutes. It should be replaced at the end of fifteen minutes. Its utility in internal hemorrhages is fallacious, because the blood is driven from the surface into the collateral circulation beneath. Its beneficial effect as an antipyretic for parts situated deeply is fallacious, as proved by the experiments of W. Gilman Thompson and others. The same remark holds true for the ice coil. As an application in feeble and irregular heart action the ice bag is invaluable, if reaction is permitted. The ice coil is a fallacious procedure in fevers, because it cools only the parts beneath it, making them cyanotic, and therefore retards the circulation.

**Wet Pack.**—A large woollen blanket is spread upon a mattress. Upon this is spread smoothly a linen sheet, wrung out of water of a temperature of from 50° to 70° F., according to the nature of the case; the blanket should be long enough to extend from the nucha to a foot or more beyond the patient's extremities. The patient, with a wet cap upon his head, places himself upon the sheet, with his arms raised from the body. One-half of the sheet is now rapidly folded around his body and pressed between the arms. It is snugly secured around the neck and beyond the feet. The blanket is now drawn firmly from the left and tucked under the right side of the body, the right border of the blanket being drawn over to the left in the same manner; then, finally, it should be secured firmly under the body and around the neck, and

should be folded over the feet (Fig. 2757). Success depends upon exclusion of the air by the blanket cover. If the latter has been skilfully applied, the patient will resemble a mummy, and will get warm in an hour or less.

The wet pack must be followed by some hyriatric method which restores tone to the cutaneous vessels which have been relaxed by it. A sheet bath or a cold affusion will serve this purpose.

The cold sheet produces irritation of the cutaneous nerves, and contraction of the peripheral vessels, and the latter state persists until reaction ensues. Inasmuch as no mechanical aid is given by the attendants, the reaction must depend entirely upon the vital powers of the patient.

As soon as the first shock is over—which lasts from five to twenty minutes, and sometimes produces shivering—the cutaneous vessels begin to dilate, and the temperatures of the skin and of the sheet approach equality. This equalization of the two temperatures occurs quickly in fever patients, and slowly in persons having a normal temperature. The sheet bath is, therefore, superior to the wet pack as an antithermic procedure. Many failures are due to the use of the wet pack in fever; it is far more useful in chronic cases.

In chronic diseases the patient is wrapped in a sheet wrung out of water at from 60° to 70° F. as indicated; the higher temperature being employed at first and this being gradually reduced by one or two degrees at each succeeding treatment. Lying for an hour in this pack the patient's body is enveloped in a vapor of its own creation. The reactive labor thus involved is a great benefit to the circulation, and it has been demonstrated to aid in enhancing tissue metamorphosis. The patient often falls asleep. The calming effect of an hour's sleep in the wet pack is valuable in functional neuroses, hysteria, and some heart troubles. It is superior to the hot pack in insomnia and excited mental states.

The therapeutic application of the wet pack is extensive, the procedure being valuable in all chronic cases in which defective tissue metamorphosis is a prominent element, as in diabetes, rheumatism, gout, anæmia, chlorosis, and some disorders of the digestive apparatus.

**The Full Bath.**—A tin tub six feet long, and filled to three-fourths of its depth with water at a temperature of from 80° to 65° F., is placed near the patient's bed in acute cases and shut out from view by a screen. A double blanket covered by a linen sheet is spread upon the side of the bed to be occupied by the patient after the bath, the pillow being covered by a towel. The patient now receives a cup of hot black coffee. He is undressed and a light napkin is applied over the sexual organs. His face is bathed with ice-water, and, if too feeble to step into the bath, he is lifted into it by two assistants, preferably on a small hammock, from which the sticks have been removed. With the greatest

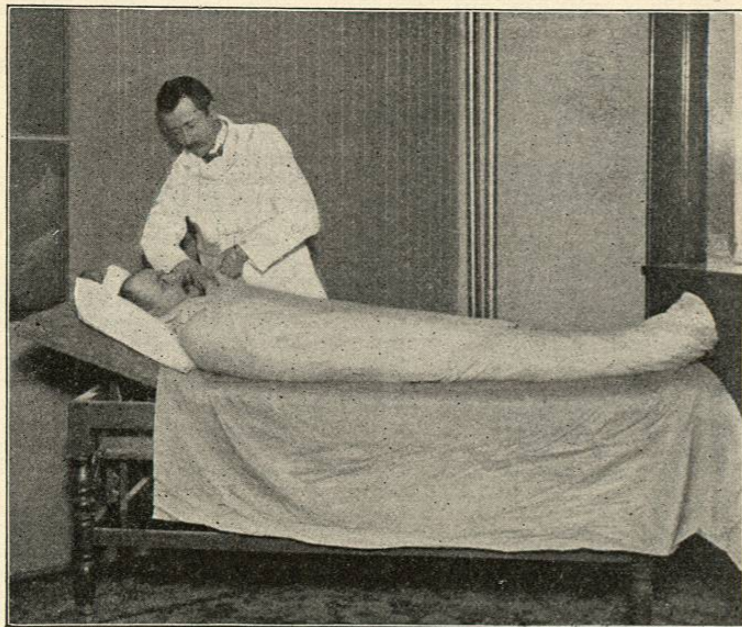


FIG. 2757.—Wet Pack, Showing Method of Tightening Blanket Around Neck.

gentleness and least fuss he is lowered into the water. He gasps and shudders a moment, or perhaps cries out. But gentle reassurance by word and deed, a calm demeanor, devoid of haste, and the absence of all actual force or argument will quiet him. Friends or relatives must be kept out of the room. An air-cushion suspended at the head of the tub will make a head rest, and a large water cushion ring makes a comfortable support for his nates. Two nurses must constantly practise good friction or chafing over successive parts of the body. These frictions are of supreme importance in preventing chilling, collapse, cyanosis, and heart failure. The effect of the continuous gentle chafing is a suffused redness, which demonstrates that the calibre of the cutaneous vessels is considerably enlarged. As this is being done in successive parts of the body, we really manage to maintain a constant contraction and dilatation of the peripheral vessels, the former being accomplished by the contact with the cold water in motion, the latter by the friction and its attendant reaction. Complaints of chilliness must not be regarded as an indication for removal of the patient from the bath, unless they be accompanied by decided chattering of the teeth, or the face becomes cyanotic. Several times during the bath, which usually lasts fifteen minutes, a basin of water at 50° F. is gently poured over the patient's head and shoulders. If the patient is somnolent or delirious, several basins of cold water are poured over head and shoulders. The bath being finished, the patient is gently lifted out, the napkin covering the sexual organs rapidly dropped, and he is placed upon the previously prepared linen sheet, so that the upper edge extends above his shoulders to the nucha. He is now carefully wrapped in the sheet, a fold being pressed in between the arms and the body and between the lower extremities. The blanket is now wrapped around the patient. If the body temperature has been high, above 103° F., in the rectum, the patient is allowed to lie in the sheet for five or ten minutes; if the temperature is lower he should be at once dried with the sheet and afterward with soft towels. In either case hot bottles are to be placed against the feet. Usually the patient will fall asleep.

When a bath having a temperature of from 70° to 65° F. is given every three hours in the case of a patient who has a rectal temperature of 103° F., this may be looked upon as the ideal bath designed by Ernest Brand, of Stettin, for the treatment of typhoid fever.

In the case of the graduated bath, devised by von Ziemssen, the preparation for bathing and drying the patient is the same as in the Brand bath. The tub is filled with water at 90° F. Colder water is added for half an hour until the water temperature reaches 68° F. Chafing is here also an all-important element of the bath. The patient is wrapped in a prepared sheet and blanket without being dried, for a quarter of an hour, and then he is dried and his clothing replaced.

The rationale of the cold baths, which have been chiefly applied in typhoid and other infectious fevers, is so exact and scientific that it must lend firmness born of conviction to the attendant who applies them with a clear understanding of their aims and capabilities. The nervous system is overwhelmed by toxæmia. An indefinite malaise is followed by ataxia, general lassitude, somnolence, and other adynamic manifestations, which culminate in severe cases in stupor, delirium and coma, subsultus, tremor, etc. The heart, being called upon to do extra duty, threatens to fail, and often does fail, not owing to the elevated temperature only, but to a paretic condition of the capillary circulation, induced by the infective process, which embarrasses the propulsive action of the cutaneous arterioles.

The depreciated condition of the nerve centres, which in typhoid and similar fevers is the leading point of attack, must be the leading point of defence. From it originates a condition of the circulation which, by its effect upon the peripheral vessels, not only disturbs heat radiation, and thus develops temperature elevation, tympanites, etc., but later gives rise to other most perilous conditions, such as failure of the heart, local hypostases,

bed-sores, etc. The stimulating, refreshing effect of cold water and friction upon the terminal fibrille of the sensory cutaneous nerves is conveyed to the central nervous system; the gasp emitted by the patient is evidence of a reflex effect. The cutaneous arterioles are stimulated and dilated in reaction, filling with cooled blood, and thus the heart, laboring ineffectively to overcome these paretic conditions, is afforded some relief. Elastic resistance at the periphery being thus increased, the ventricular contraction becomes more complete, and the blood courses with increased vigor through the entire organism. Excretion is enhanced, and the vitality of the patient rises. The patient's condition is the best evidence that these effects are salutary. He who has witnessed the dull eye of a typhoid patient glisten after a cold friction bath, who has felt the dicrotic pulse rebound, who has seen the apathetic countenance brighten, the urine increase, and slumber ensue, must be convinced of the value of cold procedures in infectious fevers. Reaction must always be induced by friction during the bath.

In Typhoid Fever, the Brand bath, above described, is of the greatest value, as clearly shown by the only absolutely reliable medical statistics extant. Dr. Vogl, medical director of the Bavarian army, has published the records of a period of forty years, covering all types of epidemics of typhoid fever and all kinds of treatment; and according to these statistics, based upon 8,500 cases of the disease occurring in soldiers, the mortality has been reduced, by the Brand bath, from twenty-two per cent. down to three per cent. The subjects being all of the same sex, occupation, age, and environment, and the inquiry covering large numbers and a long period, these statistics are unique and absolutely reliable.

The writer's method of procedure is as follows: When he suspects that he is dealing with a case of typhoid fever he proceeds at once to use ablutions every two or three hours, applies an abdominal compress between the ablutions, and then orders a sheet bath of from 80° to 70° F. On the fourth day he orders a friction bath at 90° for fifteen minutes, as above described, to be succeeded in four hours by others at 85°, 80°, 75°, and 70° F. These may be taken in the bath-room. When the diagnosis becomes positive the baths must be administered in a six-foot tin tub, placed alongside of the bed, eighteen inches from the floor. The temperature of the bath should never be less than 65° F., but cold enough to produce good reaction—70° to 75° F. being the average. Active friction must be continued for fifteen minutes, and affusions given as above described. This is the Brand bath given every four hours as long as the rectal temperature registers 103° F. Abdominal compresses at 60° F. are always applied between the baths. When this bath cannot for any reason be obtained, the sheet bath is an excellent substitute, because it furnishes the thermic excitation and the reaction is furthered by friction over the sheet. A towel bath is also useful when the sheet bath is positively inapplicable. This consists of a towel smoothed, dripping, over the back and successively over the glutei and the front of the body, and friction with a block of ice held in gauze, until each part is cooled. The patient is dried and left to rest. This may be repeated every two or three hours. All cold baths must be given with friction, and chattering of the teeth and cyanosis must be avoided.

In Scarlet Fever and Measles the tub bath of 90° F. gradually reduced to 85° F. without friction, continued for from eight to twelve minutes, and repeated every four hours, is soothing and antithermic.

Pneumonia.—Happily, the day of fighting pneumonia as a disease is passing away. The enlightened practitioner prepares the pneumonia patient by providing him with a comfortable bed, pure air, easily assimilated food and drink, and good nursing. He no longer relies upon aconite, veratrum, quinine, repeated antipyretics, morphine, stimulants, and stuffing, because he recognizes these to be impedimenta, when the patient should be stripped for the fight. They embarrass the eliminating function, impair the appetite, and cripple his resources. The application of cold water, on the contrary, meets all

the indications for which these powerful remedies were formerly applied—and it accomplishes it without their depreciating effects. What affords more comfort to a child suffering from pneumonia than a tub bath with good friction in water of 95°, reduced during five to eight minutes to 85° or 80° F.? A few baths of this kind repeated every four to six hours, without fuss or confusion, at the bedside (not in a bath-room), calm the respiration, reduce temperature, promote sleep, slow and strengthen the pulse, and refresh the oppressed nervous system. In the interval between the baths I am in the habit, if the temperature and pulse are high, of wrapping around the upper half of the trunk a compress made of three folds of old linen and wrung out of water at 65° F. and always covered by a wider bandage of one layer of thin flannel (without oiled silk), snugly secured over the compress.

By renewing this compress every hour the good effects of the bath are maintained and their frequent repetition is rendered unnecessary.

In the adult patient the tub bath is not so useful, because it involves more trouble to, and disturbance of, the patient, especially if pleurisy be present. Here the wet compress around the chest, not too firmly wrung out of water at 60° F., usually fills all therapeutic indications. It becomes hot, and when removed the re-application causes a deep inspiration, a betterment of pulse quality, and an increase of urine. The latter is also enhanced by draughts of from four to six ounces of water at 45° F., administered regularly every two hours.

No claim is made that cold water cures the disease. The object of these mild cold procedures is to fortify the patient's resisting powers and thus to aid him in maintaining a successful defence against the disease until its natural limitations are reached. The frequency of application, the temperature of the water, the extent of the saturation of the compress, the duration of the bath, the selection of the procedure, are matters for judgment in each individual case. That we can utilize all these, and thus adapt them to conditions as they arise in each individual case, gives this remedial agent a positive advantage over all others and entitles it to more extensive trial and study than it has received. Large clinical observation is the basis of these views.

The *Douche* is a procedure by which water is driven upon the patient's body from the nozzle of a hose the internal diameter of which varies from one-eighth to one-half inch. The ordinary shower bath and the needle bath are multiform douches. The water is usually supplied from a reservoir placed at a height of from thirty to seventy feet, and giving a pressure, at the nozzle, of from fifteen to thirty-five pounds to the square inch. A douche table has been devised by the author (1894) by which the temperature, duration, and pressure are regulated before the patient receives the water. This apparatus is useful only in institutions. It has been adopted in the United States (St. Elizabeth Hospital in Washington and in many other lunatic asylums. It is adapted only to hospitals treating chronic cases in large numbers.\*

CHRONIC DISEASES.—Chronic diseases furnish such a favorite field for hydrotherapy that no internal disease should be yielded up as hopeless until this mode of treatment has been systematically tried, in connection with all those hygienic agencies which are usually of more avail than medicinal agents, viz., exercise or rest, diet, drink, clothing, climate, etc.

The general abluion, drip sheet, wet pack, and douche are useful if they are employed in a properly graded manner. Beginning with the general abluion and gradually lowering the temperature, and doing the same with the drip sheet, always producing reaction, and then, if need be, going on to the wet pack, we have a variety of modes and measures which afford great latitude in energizing the system, enhancing its vital capacity so as to throw off the materies morbi or re-establish the equilibrium of the circulation and nerve centres. (See above for technique.)

\* See author's treatise mentioned on p. 788.

A case of anæmia, for instance, which has resisted iron, strychnine, malt, digestives, etc., often assumes a different aspect when the neuro-vascular discipline produced by this treatment is secured. The effect of increased oxygenation may be greatly aided by following daily treatment with exercise in the open air. The pallid lips assume a ruddier hue, the languid eye brightens, the step becomes lighter. Appetite and assimilation are improved because of the enhanced hæmatosis and improved circulatory conditions in the gastro-intestinal mucous lining. (For rationale see above.)

*Neurasthenia*.—A type of cases which I see quite often is that trying class of neurasthenics who wander from one doctor's office to another, and sooner or later become the prey of charlatans. These patients present every phase of depreciated vascular and nerve condition; some are the prey of morbid fears and become the despair of family, friends, and physician. If such a case be subjected to a methodical course of hydrotherapy the result will often prove a revelation, provided there be no organic basis for the malady. If mild procedures do not meet the indications, douches adapted with regard to temperature, duration, and pressure to each individual case, play the most important rôle here. These are capable of arousing the dormant neurons, enhancing vascular activity, and improving general and local nutrition. The cortical centres, which are the chief points of failure in these depressed neurasthenics, feel the impulse of a better circulation and nutrition. The morbid ideas and illusions vanish. The hypochondriacal introspection ceases, and the patient slowly but surely regains his neuro-vascular equilibrium. The results of hydrotherapy in such cases are, in my experience, far more enduring than those following other methods of treatment.

*Insomnia* is markedly affected by hydiatric measures. *Rheumatism, Sciatica, Gout, Neuritis*.—Another set of cases which are greatly benefited by hydrotherapy are those unsatisfactory rheumatic, gouty, and lithæmic conditions which are the bane of the doctor's life and which we are often so glad to rid ourselves of by sending them to the hot springs. These may be very satisfactorily treated at home.

My personal experience with hydrotherapy in chronic diseases extends over a period of ten years and embraces a very large number of cases of the most varied pathological conditions. The application of this method of treatment to such varied diseased conditions is rendered possible by its flexible nature, which enables the physician to adapt it, by modifications of temperature, pressure and duration, and numerous technical details, to the most varied pathological manifestations, provided he has mastered the rationale of its mode of action, and provided the carrying out of the details is not left entirely to the judgment of bath-nurses. It would be much better to consult some work on hydrotherapy than trust the latter.

When douches are needed, only institutions under the supervision and direction of a trained physician should be resorted to, for in no other way shall we be likely to avoid the dangers of the empirical application of the procedure, which has so often brought disaster to both and discredit to this remedial agent. *Simon Baruch.*

HYDROXYLAMINE.—This compound base is very unstable and exists only in solution. It is ammonia in which one atom is replaced by the hydroxyl group. The formula is NH<sub>2</sub>OH. *Hydroxylamine hydrochloride* forms in colorless crystals resembling ammonium hydrochloride; it is hygroscopic and very soluble in water, alcohol, and glycerin. It possesses active reducing properties, in consequence of which it has been proposed as a substitute for chrysarobin and other reducing agents in the treatment of skin diseases, such as psoriasis, parasitic affections, and in lupus. The disadvantage attending its use is the toxic symptoms that may arise from absorption. These ill effects are due to its reducing action on the hæmoglobin of the blood. It may also prove very irritating to the skin. For ordinary use, a strength of one part in a thousand should be commenced with and

increased to one in a hundred, if no local irritation is produced. The application may be made twice or three times a day. *Beaumont Small.*

HYÈRES AND COSTEBELLE.—Hyères, situated in the department of the Var, is the most southern of all the winter stations along the French Riviera. It is fifty-five miles southeast of Marseilles and seventy-two and a half miles west of Cannes. Unlike the other Mediterranean resorts, it is three miles from the sea, lying at the foot of a steep hill having an elevation of about seven hundred feet. It is sheltered by the mountains from the north and northeast winds, but exposed to the northwest and west winds; hence it suffers, like the other resorts on the coast, from the disagreeable "Mistral," which is especially frequent in February and March. It is less affected by the sea breezes, not only on account of its distance from the sea, but also on account of the protection afforded by the islands lying off the coast—the Isles d'Hyères.

Costebelle, a suburb of Hyères, consisting of a few houses and several hotels surrounded by pine woods, is almost on the coast, so that patients can easily have the change from the more sedative air of Hyères to the more bracing and stimulating atmosphere of the seaside.

The town of Hyères itself contains 17,700 inhabitants, and consists of the old and the new town, the latter being the resort of invalids and visitors,—a place where there are villas, hotels, fine avenues, and public gardens.

The winter climate is mild, dry, and sunny, but, as has been said, there exists the one great disadvantage of the cold northwest wind (mistral). "Favorable as I believe this station to be," says Cazalis, quoted by Burney Yeo, "up to the time that the mistral begins to blow, equally dangerous do I believe it to be from that moment." "It is a most searching wind," says Cormack ("The French Riviera—Hyères as a Health Resort," *The Climatologist*, January 15th, 1892), "and very trying to invalids and those of a nervous temperament. Patients, as a general rule, are much better at home than out of doors while it lasts."

CLIMATIC DATA OF HYÈRES. (From Biden and Cormack.)

	November.	December.	January.	February.	March.	April.	Mean of six months.
Temperature—							
Average or normal ..	53.6°	48.0°	47.5°	48.5°	51.0°	55.0°	50.7°
Average range .....	15.6	15.0	16.5	15.9	17.5	16.1	
Mean of warmest .....	61.4	55.5	55.8	56.5	59.8	63.3	58.7
Mean of coldest .....	45.8	40.5	39.3	40.6	42.3	47.2	42.6
Highest or max.* .....	83.7	57.5	57.5	57.5	60.0	66.7	
Lowest or min.* .....	45.0	40.5	41.2	41.5	44.2	52.2	
Humidity—							
Average or relative..	76%	73%	76%	75%	71%	71%	73.5%
Precipitation—							
Average in inches ...	3.52	2.86	3.08	2.21	2.26	3.11	17.04
Wind (number of days)							
Light to fresh .....	10	11	9	11	15	16	74
Strong to a gale .....	2	5	3	3	3	4	22
Weather—							
Days of sunshine per month .....	21	21	23	20	25	23	135
Days on which rain fell .....	7	6	6	6	5	7	39
Days calm .....	16	15	18	13	12	9	84

\* At midday and 8 A.M.

In looking over the climatic table of Hyères arranged from data of Drs. Biden and Cormack, it will be observed that the mean average temperature for the months from November to April inclusive, does not vary very much from month to month. Neither do the extremes appear to be very great. The average daily range is large, owing to the rapid fall of the thermometer after sunset, which frequently amounts to as much as seven or eight degrees.

Between the hours of 8 A.M. and 4 P.M., however, says Cormack, the winter temperature may be said to vary between 50° and 59° F. in the shade, and from 75° to 85° F. in the sun. Occasionally the freezing point is

reached. The air is moderately dry, as indicated by the relative humidity, and there are no mists. The rainfall is small, and for the six months rain falls on an average only on 39 days.

There is a very large amount of sunshine, an average of 135 days out of a possible 181 days, or three-fourths. There is an average of 22 days of light winds and 22 of strong ones. If the winds, especially the mistral, could only be eliminated, this resort, as indeed the others of the Riviera, which in like manner suffer, would be most delightful; but the health resort is yet to be discovered in which every climatic factor is favorable. As has been referred to in the article upon *Cannes*, the climate of the Riviera, in the writer's opinion, is far inferior to that of southern California, with which it is comparable, especially in temperature, dryness, the amount of sunshine, and, more than all, in regard to the winds. Southern California is free from high, cold winds like the mistral. In Southern California we have, moreover, that degree of equability which is nowhere found on the Riviera.

In like manner comparing the Riviera with southern Florida, we find that the climate of the latter possesses that measure of warmth and equability which is not found in the former, and is free from cold winds, though on the other hand, Florida is considerably moister than the Riviera. Speaking in general of the winter climatic characteristics of Hyères, we may say that they are mildness, purity of air, abundant sunshine, and moderate dryness. On the other hand, the chief feature of an unfavorable nature is the "fearful" mistral. "It rakes the valley from end to end, with no obstacle to stop it or turn it; it blows sometimes for six or seven days together, and nights too!" (Cazalis, quoted by Burney Yeo.) Although cold, this mistral is a very dry wind, and a wind which generally brings fine, clear weather. The air loses its humidity and becomes dry, cold, penetrating, and irritating. As has been before noted, it is not frequent until February or March.

The invalid's day, as given by Cormack (*op. cit.*), is comprised between the hours of 10 A.M. and 3 P.M. for the warmest months, and between 11 A.M. and 3 P.M. when the days are colder. At sunset there is a rapid fall of temperature which renders it dangerous for delicate persons to go out after that time. There is also a marked difference between the sun and shade temperatures, so that it is always wise to be provided with a wrap. The vegetation is luxuriant and varied. "The mountains and hills are covered with trees as green in the winter as in the summer." The orange, olive, and palm trees are seen on every hand. Roses, violets, anemones, hyacinths, etc., are sent in great quantities during the winter to the European markets, and early fruit and vegetables are cultivated for the Paris market. There are many charming and picturesque promenades, and in this respect, says Burney Yeo, Hyères is much better off than most other resorts on the Riviera. The outdoor diversions are many and varied; botanizing, butterfly catching, antiquarian research, boating, fishing, golf, tennis, etc., are some of them. The valley in which Costebelle is situated is better sheltered from the mistral, and is "embosomed in pine woods, broken here and there by vineyards and olive orchards. . . . Near the shore there are large groves of olive trees, which are finer than at Hyères itself, and indicate a warmer climate" (Sparks, "The Riviera"). The water supply of Hyères is said to be good and the sanitary condition satisfactory, except in the old portions of the town. The accommodations are good and abundant.

As to the class of invalids for which the climate of Hyères is beneficial, the testimony is conflicting. Cormack says it is "admirably suited for cases of phthisis," while Drs. Sparks, Weber, and Yeo, says Richards, are rather non-committal. In the writer's opinion, the value of this climate for phthisis is very slight, and while there are so many other resorts of approved value for this disease, he would never think of sending a phthisis patient there, for the reason that the cure cannot be a continuous one on account of the heat in summer, and, secondly, on account of the winds, especially the mistral.