10. Opposite standing, hacking of back.
11. Same as 1.

The movements, No. 3, 5 and 6, of this prescription, are active, with resistance, taken in restful position, the active work localized upon the muscles of the leg, the thigh, the upper arm, and the forearm, in the order mentioned; all the other movements are passive.

Prescription No. 4. Begun January 9th; discontinued January 31st.

1. Cross-sitting, circumduction of arms.
2. High-opposite-standing, flexion and extension of feet (with resistance).
3. Wing-prone-stride-sitting, raising of trunk (with resistance).
4. Opposite half-hook, standing, downward pressing of knee (with resistance).
5. Half-hook, half-lying, extension of leg (with resistance).
6. Half-lying, flexion and extension of elbow, wrist and fingers (with resistance).
7. Half-lying, massage of abdomen.
8. Half-lying, manipulation of precordium.
9. Half-lying, circumduction of thigh.
10. Wing-sitting, lifting of chest.
11. Opposite standing, hacking of back.
12. Same as 10.

The movements, Nos. 2, 3, 4, 5, 6, of this prescription are active, with resistance taken in restful position, the active work localized upon the extensor muscles of the hip-joint and erector muscles of the spine in No. 3, upon the iliopsoas and abdominal muscles in No. 4, and upon the extensor groups of the hip-joint acting together with quadriceps extensor cruris in No. 5, besides No. 2 and 6 giving the same localization as introduced in the next preceding prescription.

After the first two weeks of treatment all the subjective symptoms were relieved, expressed by the patient in these words: "I breathe easy, feel flexible, not heavy as before; my palpitation and pain in the chest have ceased to trouble me."

When, six weeks after the beginning of the treatment no subjective symptoms had returned, the mild active movements were introduced, which are indicated in Prescription No. 3. The effect being favorable, after three weeks more a greater amount of active work was introduced, as indicated by Prescription No. 4, the localization in this prescription, involving all the larger groups of skeletal muscles, except those attached to the thorax. In administering these active movements, I graded the resistance, rhythm and frequency of repetition so as not to allow the pulse-rate after the movement to reach 100; and during the latter half of the prescription I administered the mildest degree of resistance, or entirely passive movements, with the aim in view that at the end of every day's treatment the pulse-rate should be reduced to below 80, or as near that as possible.

TABLE SHOWING THE PULSE-RATE IN THE CASE REFERRED TO, BOTH BEFORE AND AFTER THE EXERCISES.

Before After.		Before After.		Before After.	
Nov. 1,	120 96	Nov. 27,	84 72	Dec. 19,	86 72
4,	124 88	29,	84 72	20,	90 84
5,	90 84	30,	84 78	30,	92 82
6,	101 90	Dec. 2,	96 84	31,	86 80
7,	108 90	3,	88 84	Jan. 6,	88 72
8,	100 84	4,	88 76	7,	92 72
10,	96 80	5,	84 84	8,	82 72
18,	88 74	6,	88 88	9,	78 72
19,	98 96	12,	88 76	10,	98 76
20,	88 88	13,	88 76	13,	82 78
21,	78 78	14,	88 80	14,	90 78
22,	88 74	16,	88 76	15,	80 80
23,	94 80	17,	80 72	16,	88 88
25,	84 76	18,	80 72	20,	88 80
26,	94 84				

My plan was to continue with a fifth prescription, containing localization upon the pectoral muscles and

serratus magnus, and thereafter somewhat more complicated movements, involving simultaneous localization upon a greater number of groups of muscles.

At the end of the three months there was no change in the objective signs, observed at the first examination.

The theory of the gymnastic therapy in heart diseases which I have presented is open to criticism, and does not claim to satisfy the classical rule "Totum et rotundum ab omnibus partibus." Whatever may be the strength or deficiency of the theory, all who have the most experience with the method advocate it as a rational method, supported by very satisfactory results—relief from symptoms, increased strength, usefulness and comfort.

Different views are held regarding the range of applicability of the method. Some physicians in Sweden begin to administer mild, passive movements of the extremities, gentle massage of the extremities and mild respiratory movements when the patient is bed-ridden by severe symptoms of broken compensation. Others give gymnastic treatment as after-treatment, when rest in bed, digitalis and other agencies have done their work. The ultimate end of the treatment is to establish the compensatory hypertrophy, to train the patient to such degree of activity as is consistent with the safety of the heart and to keep him informed of the limits of exertion which he must not go beyond.

My own experience at present is limited to some cases of mitral incompetency with symptoms in milder degree. I succeeded invariably by the gymnastic movements to reduce the heart-rate, if it was high before the beginning of the movements, the pulse exhibiting at the end of the movements appreciable increase in strength. The highest reduction of the pulse-rate, which I have obtained, within an hour, has been by 38 beats, in an instance where the rate was 120 at the beginning and 82 at the end of the day's exercises. On an average the reduction has been by 10 to 15 beats after an hour's gymnastics, more if the pulse-rate was high, less, the nearer it was to the individual pulse norm. It is my hope, that larger casuistic material in the near future will enable me to give some contribution to the demonstration of the value and scope of gymnastics in heart-diseases.

METEOROLOGICAL CONDITIONS AND PUBLIC HEALTH.

BY DR. LORNE W. ROBINSON, M.D.,

Secretary of the South Dakota State Board of Health, Member of the National Public Health Association, etc.

In no other portion of the world are so many and so rapid changes of temperature as occur in the part of the world in which we live, and in no other portion are these variations so marked and frequent as in the Northwest States. During the colder seasons of the year these phenomena of high and low temperature and warm and cold areas occur on an average once in from seven to ten days, and traverse along one or more extensive storm-paths on which they are constantly recurring.

These extreme variations from a high to a low temperature meteorologically are known as "cold waves."

So far as known they originate in the far north, and extend in three general directions over large areas of

the United States: first, over a long sweep of plains east of the Rockies from Manitoba to the Gulf; second, a west to east translation from the North Rockies across the Great Lakes to the Atlantic; third, from the Red River region south through the valley of the Mississippi and over the Middle States.

Evidence so far gathered, chiefly through meteorological observation, have led investigators to believe that these cold waves are the result of radiation from barren and snow-covered surfaces, principally in the Arctic north.

The warmer or higher temperature areas which so often bring soft and pleasant winter weather to the more humid portions of the Northwest States, and to the dryer regions of these States the balm of May in January, pass eastward or southward, and in their wake, and often under-running them, comes a rush of cold, dry air, made colder by the pulsations and interminglings of the upper and colder air currents.

When the atmospheric pressure is great and the earth's surface unbroken by mountains and hills, these inrushes of cold air are violent, the friction of the wind is great, and the temperature variation rapid and extreme. "Cold waves" of great variation have from time to time passed rapidly over large areas of the United States, the temperature often within several hours showing a fall of thirty degrees Fahrenheit.

That extreme and rapid variations of temperature, notably from a high to a low degree, have a marked and important effect on the public health; that they are important factors in the cause and severity of disease, if, indeed, they are not a potent power in the production of disease, is not now generally doubted; that there are certain influences, the character of which is not definitely known, associated with and accompanying variations from a high to a low temperature and the disturbances of the air currents, which directly increase general sickness and contribute to the death-rate from all causes is apparent.

It is an established fact that diphtheria, scarlet fever, pneumonia, bronchitis and other severe and fatal diseases have a maximum prevalence during the season of the year when cold-temperature changes occur, and their severity and the fatality attending them varies with the degree and rapidity of these changes.

It is fully recognized also that in the high, dry, cold and uncrowded localities, where epidemic diseases are comparatively rare, that in the cases of all sufferers, whether from acute or chronic disease or from traumatism, a rapid change from a high to a lower temperature, and the atmospheric changes preceding and accompanying them, greatly derange the vital functions; that when from any cause the vital powers are low and resistance thereby impaired, cold weather changes are attended by greatly increased mortality.

In many Northern States, excepting those of high altitude and dry climate, where tuberculosis and other diseases of the air-passages are not extensively prevalent, the mortality varies from 15 to 20 per cent., higher during the months of extreme variations from a high to a low degree of temperature.

In typhoid fever, a disease most prevalent in summer and fall seasons of the year, it is observed that the percentage of mortality is much increased as the winter months approach; and reaches a maximum death percentage when storm periods are most frequent. In the recent endemic of typhoid fever at Grand Forks, N. Dak., the death-rate has been enor-

mous, and the mortality increased as the seasons of cold approached.

The zymotic diseases — whose prevalence increases with the winter's approach — reach their maximum death-rate during the time of severest storm periods of low temperature, the percentage of deaths to the number of cases reported bearing a direct relation to storms of this character.

Temperature depressions are not so marked as to affect the death-rate or contribute to the general ailments in New England and farther south than the 35th parallel, nor west of the valley of the Missouri. The greatest perturbations occur over high elevations in the more northern latitudes, and in localities otherwise unsurpassed for climatic conditions conducive to health, notably the Dakotas and the high elevations of Minnesota and Nebraska. In the former or humid localities, the percentage of death is largely augmented by diseases of an epidemic type and those that arise during the heated season. In the latter or high, dry sections, epidemic and hot-weather diseases rarely exist extensively, or become at any time seriously disastrous; but the increased amount of general ailments and the greatest mortality from various causes takes place near and at the height of storm periods when the air is unusually dry, wind velocity great and temperature low.

The physician whose field of labor has been in the region of the greatest variation and depression on the great sweep of plains east of the Rockies will bear testimony with me to the fact that a strong relationship between weather changes and health and disease exist, and that his pain-tossed, sleepless, over-stimulated and eventually depressed patient keeps constantly reminding him that nature has placed a manacle on skill and effort that he is often unable to remove. The writer has more than once, despite his most earnest efforts, seen patients whose recovery seemed assured under the influence of favorable weather conditions, pass into hopeless depression and eventually death under the strain of atmospheric disturbances. It is a time when death more often overtakes the aged and feeble, the organic sufferers and weaklings.

Here the inquiry naturally arises, What are the peculiar characteristics that contribute most toward deranging the vital functions and disturbing the normal, healthful equilibrium in the well and vigorous? And more especially what element or elements in these atmospheric variations so add sensitiveness to the already sensitive organism when under the influence of disease? What influence in this direction has increase and diminution of barometric pressure? Do marked and rapid changes of temperature alone have the controlling effect? How much may be attributed to cold, rapidly moving air currents? What, if any, effect has atmospheric electricity?

It is an established fact that barometric variations have a decided effect on the vascular system and thereby on blood-pressure, and that a diminution of the pressure, even very slightly below the usual range, causes alarming and serious results on the robust. It would therefore seem reasonable that rapid barometric variations, especially a diminution, would strongly influence the healthy and still more the ailing. The correspondence noted between the storm periods and the barometric variations, together with a low, variable temperature existing at these periods, have been assigned as the chief cause for the lack of equilibrium

between the external air and the gases of the body, and hence morbidity in the healthy and the aggravation of symptoms in the diseased. It is evident to the writer, after considerable observation in a region where extreme changes of temperature are frequent, that a falling or rising barometer does not sufficiently correspond with marked deviations from health to be assigned as the principal cause.

What effect has low temperature in itself? It is believed by high authority that the cold-weather diseases depend upon the presence of non-volatile salts upon the mucous surfaces; that they accumulate by reason of the drying effect of a cold and constantly dry air; and that these diseases prevail more extensively and are relatively more severe "in proportion to the coldness and dryness of the atmosphere."¹ The observations that led to this belief were made in a damp climate; and if the conclusions were correct, it would follow that the salts would increase as moisture decreased, and consequently their influence in the causation of disease would be alarmingly augmented in the regions of dry, cold winters. With due regard for so high authority on this subject, it may be said that the above conclusions as to the increased prevalence of cold-weather diseases—"in proportion to the coldness and dryness of the atmosphere"—do not apply to the dry, cold regions elsewhere referred to in this article. Although in these cold, dry sections a low temperature is much more marked and the atmosphere much less humid than in other regions in the same latitude, yet observation tends to show that the relative number of sufferers from cold-weather diseases diminishes instead of increases in the high, cold localities.

It may be said also that, although the cold-weather diseases are less prevalent in the high, dry regions of low temperature, yet when they do occur they are much more severe and are attended with a greater death-rate, the severity and the fatality attending them corresponding to weather perturbations which do not exist in the damper localities.

What effect has atmospheric electricity? Doubtless much more than has generally been supposed, although not as yet demonstrated. The knowledge gained by recent investigation in electrical science and chemistry leads to the conclusion that meteorological conditions, such as exist in the high, dry regions, subject to changes to a low temperature, are such as favor high fluctuating electrical potentials. It has been, I believe, positively demonstrated that as the temperature of any medium or body falls the electrical and magnetic potentials become proportionately increased; that oxygen and other gases and many metals become more highly electrified as the temperature lowers; that friction of cold, rapidly moving air currents over long sweeps of country tend to still exalt the electrical potentials; it is thus not unreasonable to conclude that atmospheric electricity has more to do than any other cause with the deviation from health in the healthy and a dangerous depression in those already reduced by disease. For, could it be expected that a sensitively developed organism, such as a human being, would be omitted where the air and the surrounding objects were charged with electricity, whose potentials at these periods are probably constantly fluctuating.

¹ Dr. Henry M. Baker, Secretary of the Michigan Board of Health: *Observation of Cold-Weather Diseases.*

In the application of electricity for the cure of disease the operator is often reminded of its potency by unexpected results, and of the importance of the use of a proper dosage at a time when the vital forces are more delicately balanced, and the body probably made a more sensitive conductor by chemical changes unusual in health.

May it not be that nature at times and certain places varies the electrical potentials regardless of public health, by conditions such as low temperature, dry air, and the intruding of upper and colder electrified currents? The writer has often observed at times of rapid changes of temperature, notably from a high to a low degree, when the velocity of the wind currents was rapid and fluctuating, that friction, such as rubbing the feet on carpets, would enable one to light a gas jet by proximity of a finger point, and that metallic objects would send forth a shock when touched; and that the electrical conductivity of a moist room, when the outside conditions were favorable to high electrical potentials, would so charge the atmosphere as to make the presence of electricity felt on entering the room. The writer does not pretend that these suppositions would stand the test of more exact and scientific knowledge; but, whether right or wrong, it is clearly evident to him that a different problem confronts the health officers in different regions. In the dry, north latitudes, the study of meteorological conditions and their relation to the public health—whether conclusions are positive or negative as to their importance in this connection—should doubtless claim a large share of attention. Sanitary science has achieved marvellous results in diminishing sickness and death. Since the seventeen century the average life of man has been raised from about thirty to fifty-four years. It is probable that in the not far distant future there will exist such security that untimely death from large classes of diseases will be rare indeed; when men will live in reasonable security of attaining old age; when an immense burden of sickness and sorrow for the lost ones will be lifted from the living. In its constant evolution the relation of meteorological conditions to public health will, no doubt, come in for a share of notice and investigation. The United States Meteorological Bureau has given long and valuable service to investigations for the benefit of commerce and agriculture; and it is to be hoped that the near future will find it working in conjunction with the boards of public health for a better understanding of this important subject.

A PLEA FOR MODERATION IN OUR STATEMENT REGARDING THE CONTAGIOUSNESS OF PULMONARY CONSUMPTION.¹

BY VINCENT V. BOWDITCH, M.D.,
Assistant in Clinical Medicine at the Harvard Medical School, Assistant Visiting Physician at the Boston City Hospital.

GENTLEMEN OF THE AMERICAN CLIMATOLOGICAL ASSOCIATION:—Recent events in Boston have impelled me to say a few words to you at our annual meeting with the hope that by discussion of the subject we may have some influence directly or indirectly upon the community, especially the laity, in checking what has of late frequently seemed unnecessary alarm

¹ Prepared for the Annual Meeting of the American Climatological Association at Lakewood, N. J., May 13, 1896.