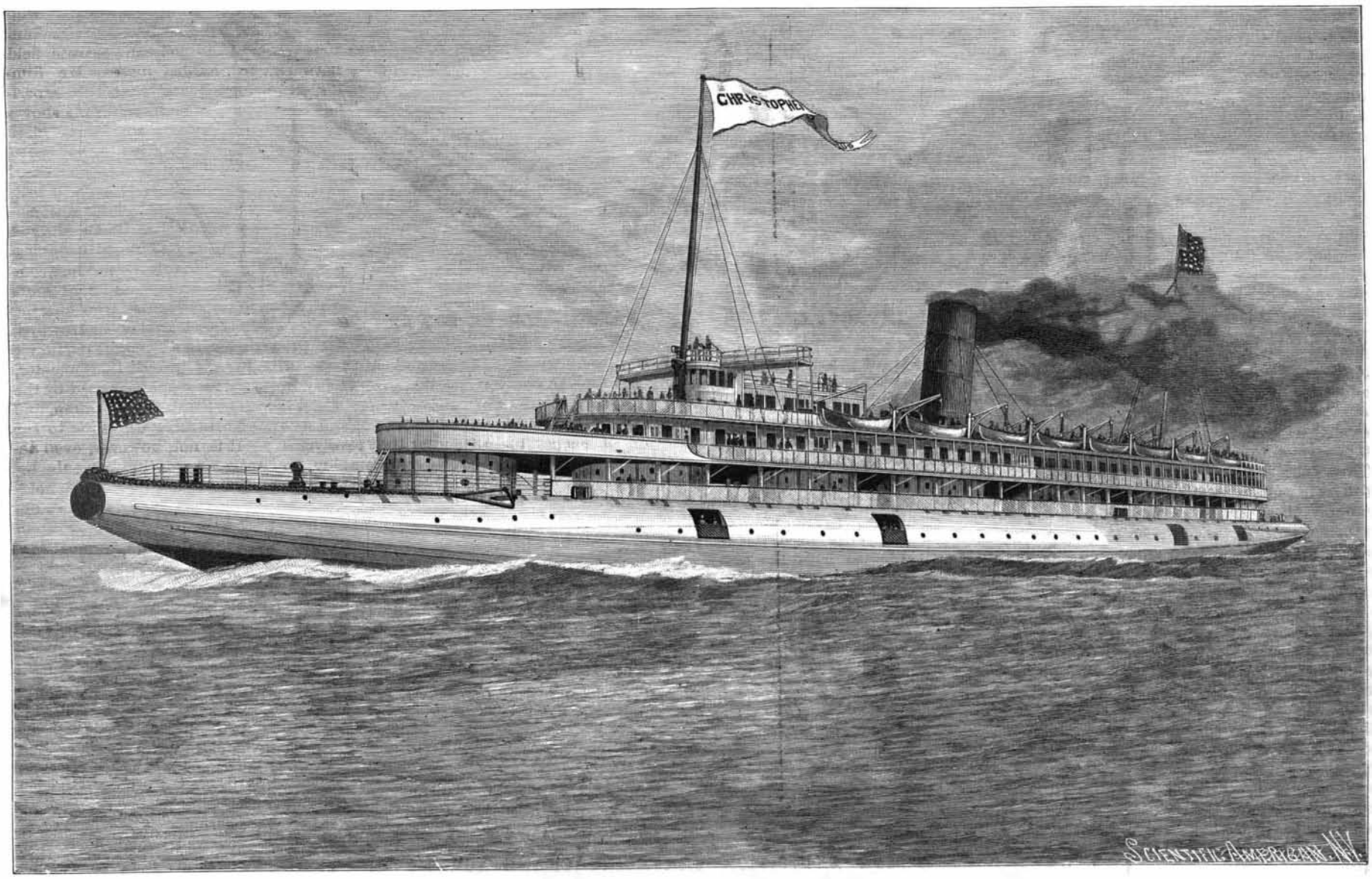
THE COLUMBIAN EXPOSITION STEAMER CHRISTOPHER COLUMBUS.

The peculiar advantages of the McDougall whaleback attracted attention to it as a means of steamship travel from Chicago to Jackson Park during the World's Columbian Exposition, and the World's Fair Transportation Company of Chicago had built for this service the large steel passenger whaleback Christopher Columbus, which was constructed under the supervision of the inventor in the yards of the American Steel Barge Company. This is the first effort made to adapt the whaleback for passenger traffic, and the large size of the vessel makes the innovation in this field especially interesting. The Christopher Columbus was launched at West Superior, Wis., on December 3, in the sight of fifteen thousand people. This great vessel does not differ in any essential from the regulation whaleback. It is designed to carry five thousand passengers. The new vessel has seven turrets. These rise seven and a half feet above the deck, and are elliptical in form. They extend the full length of the vessel, and are occupied by the windlass, stairways to the saloon deck above and between decks below, air fans, stacks, ash hoists, engine room and machinery. The refreshment rooms are spacious and located amidships. Four gangways on either side are provided for entering and leaving the vessel.

The Christopher Columbus is 362 feet in length, has a beam of 42 feet and a depth of 24 feet. It has one screw, 14 feet in diameter, and a speed of 20 miles an hour is promised. Practically the entire deck supported by the turrets is devoted to the saloon proper. It is 225 feet long and 30 feet wide. The vessel has electrical equipment for lighting, and steam heating apparatus. A promenade deck, 4 feet wide, runs around the saloon, with more than 30 feet of space at the bow and stern. The promenade deck proper is above the saloon and is 257 feet long, with a skylight 15 by 138 feet in the center. An elaborate fountain in the center of the grand cabin will be one of the principal features of the boat. It is said that the run from the Lake Front at Chicago to the World's Fair grounds, a distance of seven miles, will be made in half an hour.



THE COLUMBIAN EXPOSITION STEAMER CHRISTOPHER COLUMBUS.

Magnetic Screens.

Mr. Smith, in *Nature*, describes a magnetic screen which he had constructed to protect delicate laboratory instruments from the magnetic action of a large dynamo which was within 60 feet of the test room. The three sides of the dynamo room nearest the laboratory were inclosed in a double brick wall, the space between the two walls being filled with scrap iron. The iron wall is about 8 inches thick. Delicate tests showed that this was an effective barrier to the magnetic influence.

Electricity at the Columbian Exposition.

The latest developments in the practical uses of electricity are fully shown at the World's Columbian Exposition. There are no experiments or other demonstrations of the possibilities of this energy except what few are made by exhibitors. So far as the Exposition itself is concerned, the general scheme is to show as completely as possible the latest practices in the use of this energy, but not to enter the speculative field.

Electricity played an important part in the preliminary work of constructing the Exposition buildings and laying out the grounds. One of the very first buildings erected was a power plant, in which was installed considerable electrical apparatus. The grounds were lighted from this plant, and most of the lumber sawing was done by saw mills operated by electric motors. When a building was to be constructed, a portable sawing plant, of which an electric motor formed a part of the outfit, was placed in the most convenient position, connection made with the circuits which transmitted electricity throughout the grounds, and an abundance of power was at hand. In no instance up to date has electricity been used to such practical advantage in this country as was done in this work at the Exposition. Now that the Exposition is completed and in the hands of the public, it is interesting to note the marvelous extent of the practical uses of electricity.

Electric lighting in all its phases is very completely shown. The incandescent plant for lighting the Exposition has a maximum capacity of 180,000 sixteen-candle power lamps. This plant uses the alternating current system. Exhibitors in the Electricity building show all the advantages of the direct current system of incandescent lighting, and thus the capabilities of both systems are fully demonstrated. Besides this use of incandescent lamps, there is also shown a great variety of arc lamps designed for use on low-tension circuits. In the arc lighting plant most of the lamps are operated by the high-tension direct current, although there are a few alternating current arc lamps. Practically, every maker of arc lighting apparatus in the country is represented in this plant. French and German manufacturers also make an extensive and quite elaborate display of their lighting systems for ordinary lighting, and especially for special artistic effects, in which these nations have attained such perfection. The use of arc lamps of great power in the form of search lights is also fully shown, and they are used every evening that the Exposition grounds are open to the public, to heighten the illuminating effects.

Electric power, its transmission and utilization, are demonstrated on a far greater scale than has ever before been attempted. Five thousand or more horse power is transmitted electrically and used in various parts of the grounds. There is no very long distance transmission, however. Most of the electric energy generated for power purposes is the direct current, and it is used in the Palace of Mechanic Arts, the Electricity building, the Mining building, the Transportation building, the Agricultural building and the Manfactures and Liberal Arts building to a greater or less extent. Motors are operated for such service as running the traveling cranes, elevators, and for any purpose for which power is used, from a small fraction of horse power to units of 25 or 50 horse power. The most extensive use of electrical energy in one plant is in operating the Intramural Railway, which requires 5,000 or so horse power. In these various uses of electricity the adaptability of this energy for anything where power is needed, regardless of the size of the units, is fully shown. There is also an exhibit of the alternating current for power purposes. This is shown in the Electricity building by an exhibitor.

The storage of electric energy does not receive as much attention at the Exposition as its importance from an electrical standpoint deserves. This is because of the complicated condition of storage battery patents on account of legal complications and because of the fact that electrical storage has not yet proved a great success in this country in practical use. Nevertheless, there is one extensive demonstration of stored electricity in the electric launches which ply in the lagoon, canals and basin. There are fifty or more of these launches; all of them are operated by storage batteries. Exhibitors in the Electricity building also make quite an extensive show of the latest results that have been obtained in storing electric energy.

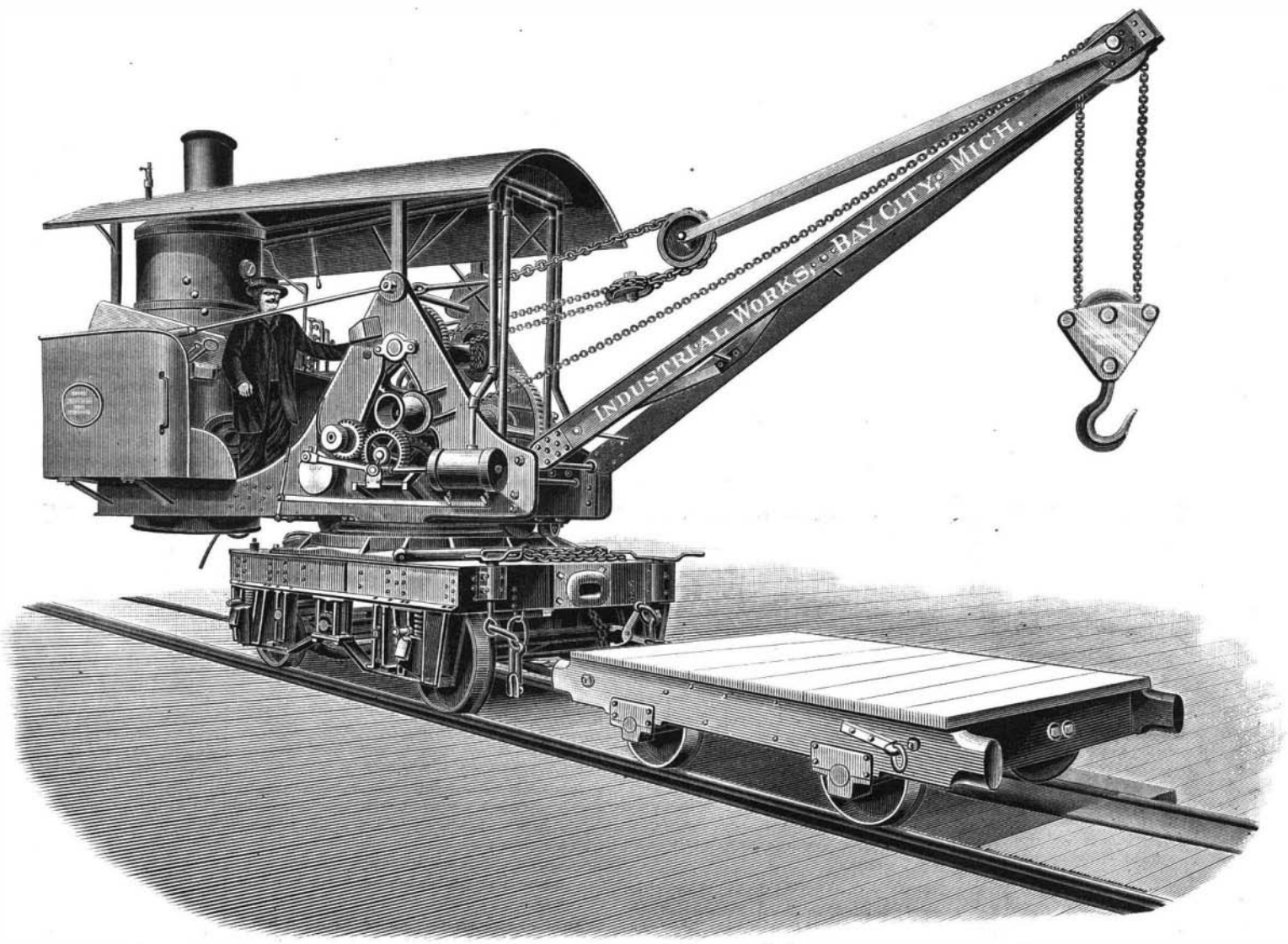
Stoppage of Chemical Action at Low Temperature.

From the results, recently published, of some investigations carried out by Pictet on the effect of low temperatures on chemical action, it would seem that there is a limiting temperature below which chemical affinity is not operative. Just as, at the other end of the scale, chemical compounds are broken up, their union being dissolved through the operation of dissociation, so, when the temperature falls below a certain point, substances which ordinarily evince a powerful affinity for each other become entirely inactive. From theoretical considerations, he had deduced the conclusion that chemical action should be impossible under these conditions, and his experiments show this to be the case. For example, slightly diluted sulphuric acid, solidifying at —56°, was intimately mixed at —125° with finely powdered caustic soda, and the mixture strongly compressed, but there was no sign of chemical action. On allowing the temperature to rise to —80°, action suddenly commenced, and became so violent that the containing vessel was broken. Similar results were obtained with sulphuric acid and potash. Concentrated am-

monia solution and sulphuric acid are without action on one another at —80°, but complete action suddenly sets in at from —60° to —65°. Common salt and sulphuric acid do not react at —50°, nor is there much action until the temperature reaches —25°. Moderately dilute sulphuric acid does not attack carbonates at —80°. Bubbles of gas begin to appear between —60° and —50°, but brisk effervescence does not set in until the temperature has reached —30° or upward. Similar results were obtained with nitric in place of sulphuric acid, but the temperature at which action commenced was rather lower in each case. Even the very sensitive vegetable colors are not affected at very low temperatures. Thus the litmus is not reddened by sulphuric or hydrochloric acid at —120°, and alcoholic potash does not give a coloration with phenolphthalein at —135°. From these and similar experiments, Pictet concludes that chemical reaction cannot occur between —125° and —150°.

AN EFFICIENT TRAVELING CRANE.

The work of installation of exhibits in the different buildings on the Fair grounds, during April and the early days of May, was greatly facilitated by the use of the very efficient and easily operated traveling crane shown in the illustration. Tracks were laid to every portion of the floor space of the various structures from all the railways, and it was a simple matter, with this machine, to transfer a heavy piece of machinery, a show case, or any bulky article, to the small platform car, and then employ the same power which had effected the lifting to draw the machine and car to the exact point where the exhibit was to be placed, and deposit it where required. The crane platform may be readily swung around and its arm conveniently adjusted to a greater or less angle, as desired, and the work of only one man is required for the operation of the machine.



THE WORLD'S COLUMBIAN EXHIBITION—TRAVELING CRANE FOR MOVING EXHIBITS.

Cardine—a New Heart Tonic.

Following the remarkable discovery of Brown-Sequard, of testicular elixirs and their sub-cutaneous injection for physical stimulation, comes Dr. William A. Hammond with a new preparation made from the hearts of animals, which he terms cardine. According to his accounts, as given in a recent paper in the New York *Medical Journal*, the new medicine is destined to play an important part in the treatment of all complaints pertaining to heart weakness and some other organs of the body. We make the following abstracts:

"Cardine, as used by me, is prepared as follows: One thousand grammes of the finely minced fresh heart of the ox, previously well washed in a saturated solution of boric acid, are submitted to the action of a menstruum consisting of twelve hundred grammes of glycerine, one thousand grammes of a saturated solution at 60° F. of boric acid, and eight hundred grammes of alcohol.

"The solution of cardine is a clear, transparent liquid, of a pale straw color, with the specific gravity of 1·070. Under the microscope, it exhibits no morphological constituents. It does not change, so far as I am aware, under any ordinary circumstances, and no bacteria possess sufficient vitality to exist in it.

"I have arranged the dose after many experiments upon healthy men and women of average size, and have accordingly fixed upon five minims as the proper dose of cardine after a maceration of from eight to ten months.

"The physiological effects of cardine, in their order of occurrence, as nearly as I can arrange them, are as follows:

"1. Within ten minutes the pulse becomes fuller, stronger, and sometimes more frequent. The sphygmograph shows this very clearly. The influence in increasing the force and frequency of the pulsations is remarkable, and it is still more remarkable that a tracing, taken eight hours subsequent to the injection, shows that the effect upon the heart was still present in a scarcely diminished degree.

"2. These tracings show what is also evident from a digital examination of the pulse—that the arterial tension is augmented.

"3. Increasing, as cardine does, the heart pressure, the effect upon the kidneys follows as a logical consequence. Many observations, made as far as possible under exactly similar conditions, establish the fact that the amount of urine daily excreted is increased by from ten to eighteen ounces.

"4. The number of red corpuscles in the blood is increased by the use of cardine.

"It is clearly a heart tonic of great power, a diuretic of notable value, and an agent capable of exercising a marked effect over the composition of the blood.

"In cases of cardiac weakness, from whatever cause it may arise, cardine is of inestimable value. It appears to me, from the few cases in which I have employed it in this connection, to be useful in fatty degeneration of the heart, improving the nutrition of the organ, not only by its action on the blood, to which I have made reference, but by its effects on the nervous organization of the cardiac tissue.

"But I have employed cardine more frequently in those cases of nervous prostration attended with anæmia and sometimes chlorosis. In such patients its action is so prompt and effectual as to excite surprise in all who have witnessed the change. In all these cases I have verified the great improvement in the appearance and apparent condition of the patients by the use of the hæmocytometer and hæmometer. In mild cases, a week or ten days' treatment has been sufficient, but never more than four or five weeks.

"As to the essential characteristics of cardine, while I am not able to give it a place in the nomenclature of organic chemistry, I am sure, from a consideration of the process by which it is obtained, that it is a substance derived from the heart. There is no escape from this conclusion. As to how it acts, I can at present only call attention to the theory that I proposed in my first paper on the subject, and that is briefly:

"That all the organs of the body possess the power, when in a state of health, of secreting from the blood the peculiar substance that they require for their nutrition, and that they take this substance and no other, never making a mistake in the matter. The brain separates brain substance; the heart, heart substance, and so on. If through disease or from derangement of function they lose this power, or if the peculiar pabulum they require be not in the blood in sufficient quantity, their functions cease to be normal. General debility, producing a diminution of nerve force, may cause the loss of this power, or it may result from local disturbance either of structure or function or some profound shock to the organism may so interfere with hæmatosis that the blood no longer contains the material which the organ needs. In either case, if we supply to the blood the peculiar principle which a diseased or disordered organ requires, we do that which nature, unassisted, cannot or does not do.

"Cardine, therefore, if this theory of its action be correct, nourishes the heart. It is the substance which an ill-conditioned heart must have for its well being. It is already in a fit form for assimilation, and it acts with a promptitude, a certainty, and a degree of permanence of which no other heart tonic within my knowledge is capable.

"It follows, also, that in all weak conditions of the system, and especially in those in which the blood is below the normal standard, cardine must prove to be of inestimable value. And in other and more serious affections, such as those in which depurative organs of the body, especially the kidneys, fall below the healthy standard of functionation, cardine, increasing as it does the heart pressure, may augment the bodily comfort and materially prolong life.

"Cardine is not an annihilator of the influence of old age, but my experience convinces me that it lessens the effects of this factor of deterioration so far, at least, as the heart is concerned. This organ, as is well known, is one of the first to fail in physiological power, and this is shown not only by the examination of the pulse and of the heart itself, but by the accumulation of fluid, especially in the lower extremities, owing to a diminution of the heart pressure. Cardine, taken in conjunction with cerebrine, assuredly counteracts this influence, for, owing to the increase of the cardiac pressure, the passive anasarcous condition disappears, and the other indications of heart weakness are either greatly mitigated or altogether abolished."