Original Articles.**SUPPURATIVE PERICARDITIS AND ITS SURGICAL TREATMENT.¹**

BY CHARLES B. PORTER, M.D., BOSTON.

YOUR committee invited me to present the subject of suppurative pericarditis because they knew that in 1895 I had had a successful case of pericardotomy in a patient of Dr. F. C. Shattuck, who asked my surgical aid in its treatment. The case in full was reported to the American Surgical Association in 1897, together with a study of the literature of the subject up to 1895 and 1896. As all here may not be familiar with that report, I should like to read two short extracts from it, and then present the literature of the subsequent years with additional cases and some new ideas.

In my previous study of the subject I collected 24 published cases, beginning with the first case of recovery, the case of Rosenstein, operated upon in 1881. Of this number 8 recovered and 16 died, and in 1 the result was unknown.

In 1 case pericarditis developed one month after a wound. Many of the cases were complicated with left empyema, and twice the pericarditis was discovered at operation while draining the empyema. Of the fatal cases, 2 died at operation; 1 lived two days; 1 (Delorme's case) lived eight weeks after the operation.

The organisms found in the exudate were the staphylococcus aureus and streptococcus pyogenes, pneumococcus, and colon bacillus (in case of stab wound).

The amount of pus evacuated varied from 10 ounces to 2 quarts. In 1 (Dickinson's case) it was brownish and thin with arterial blood; in 2 (Korte's and Eiselberg's cases) foul and thick; in 2 (Newman's and Delorme's) thin. In the majority it was thick, creamy, without odor. In a number of cases large fibrinous masses were found, the pericardium being covered with thick layers of lymph. At autopsy in 1 fatal case (Pepper's), the whole sac was full of a thick mass of fibrin as large as the fist; the drainage had been good, and the heart probably failed from pressure of these fibrinous clots. The shortest case of healing of the sinus after drainage was nineteen days, the longest two months.

Preliminary aspiration was done in all these cases before opening the pericardium. In a number of cases paracentesis was done more than once, with and without injection of carbolic acid; and incision was finally resorted to owing to the rapidity of the reaccumulation. The immediate relief to pulse and respiration was almost always striking.

THE SURGICAL ANATOMY OF THE PERICARDIUM.

All authorities agree as to the great variations in the line of reflection of the pleura and pericardium.

Sick found that in the adult, out of 23 cases, the pleural reflection at the level of the fifth rib cartilage lay either at or within the left border of the sternum in 17; at the level of the sixth cartilage the pleural border had not gone beyond the sternal border in 10; at the level of the sternal articulation of the seventh cartilage it was in 9 cases at the sternal border, or

this cartilage was below its lower border. Twice it was less than 1 centimetre from the sternal border.

In 12 children Sick found at the level of the fifth rib cartilage the pleura was either within or just at the sternal border in 11. At the level of the sixth cartilage the pleural had not left the sternal border 8 times.

It will thus be seen that, according to Sick's careful observations, even at the fifth space the reflection of the pleura will often be behind the sternal border. Brooks (quoted by Quain) in 4 of 7 quite healthy cases found the left pleural reflection entirely behind the sternum, and in 1 at the sternal border.

According to Luschka (quoted by Quain), the pleura normally diverges from the median line at the upper border of the fifth costal cartilage, so that at the level of the fifth cartilage it is $\frac{1}{2}$ centimetre, at the sixth 2 centimetres, and at the seventh 3.5 centimetres, external to the left border of the sternum.

Delorme and Mignon found in 32 adults that in the fourth interspace the left pleural border was within the border of the sternum in 17. At the level of the fifth cartilage it lay 15 times internal to the sternal border, and 17 times outside. In 12 cases at the fifth interspace the pleural border was at, or inside, the sternal; and in the sixth space the pleural border was outside the sternum in 26 cases, and at or within it in 8.

Dr. Thomas Dwight, professor of anatomy at Harvard University, agrees in the main with Sick's observations, but states that there are many variations, and that frequently it is possible to reach the pericardium through the fifth intercostal space and frequently not. Owing to the fact that the sixth intercostal space is small and narrow, and that even here the pleural often reaches the sternal border, he concurs with the writer in advising resection of the fifth costal cartilage, and if necessary the excision of a piece of the sternum opposite this cartilage.

The internal mammary artery, according to Quain, runs parallel to the sternum at a distance from it of 1 centimetre. Delorme and Mignon, in 30 cases, found it a distance from the sternum of from $\frac{1}{2}$ to 2 centimetres, the distance averaging about the same in the first six interspaces.

In looking over the arrangement of the left pleura by Dwight, Delorme, Sick, Quain and Testut, all agree that there is a varied arrangement. Below the fourth intercostal space in the majority there is a slight interspace close to the border of the sternum which is free from pleura. In 22 operations on the cadaver by myself it was found that the removal of the fifth intercostal cartilage, and the removal of $\frac{1}{2}$ inch of the sternum opposite the sternocostal joint, gave free access to the normal pericardium near its lowest level.

Three of the methods of operation which have been proposed and practised, namely, trephining the sternum (Riolan), approach through an intercostal space, and epigastric incision (Larrey), should all be discarded, as it will be evident from the above account of the anatomy that in all of them there is danger of wounding the pleura or diaphragm.

In this earlier work I decided that operation was indicated in all cases of purulent pericarditis and perhaps in serous pericarditis in cases where aspiration once or twice repeated is followed by reaccumulation of the fluid; and the following "ideal operation" was planned after careful consideration and experiment on

¹ Read before the Massachusetts Medical Society, June 12, 1900, and recommended for publication by the society. Abstract.

the cadaver in order so far as possible to meet the following indications: (1) To avoid opening the pleural cavity. This may be made more easy by adhesions as a result of tapping or inflammation; (2) to open the pericardium opposite the point where drainage will remain good after the sac has contracted; (3) to secure permanent and free drainage.

The steps of the operation are:

An incision from the middle of the sternum outward over the fifth costal cartilage to its junction with the rib.

The soft parts are cleaned from the cartilage with periosteum elevator, care being taken not to wound the pleura on the under surface. The cartilage is divided with bone forceps from the rib and the sternum. The internal mammary artery and vein are thus exposed, ligated in two places and divided between. The triangularis sterni is separated from the sternum and pushed to the left.

A little careful dissection with the director in case fat is encountered exposes the pericardium, which is normally much thicker than the pleura. An aspirating needle should now be introduced, if this has not been previously done, in order to corroborate the diagnosis. If confirmed, the knife should follow the needle. The incision in the pericardium is best made obliquely downward and outward, beginning close to the excised border of the sternum. The edges of the pericardium should be stitched to the soft parts.

Irrigation should always be employed, with the object of removing any masses of fibrin which may lie at the bottom of the cavity; and if there are many such masses, it should be continued until the fluid returns clear. The fluid may be weak sublimate or carbolic solution, or salt solution, according to the preference of the operator. The fluid must be warm and must have free exit. With this exception no harm has resulted from irrigation, which has been practised in more than half the cases.

Drainage is best provided by two rubber tubes, one long and reaching to the bottom of the sac for the inflow, and a short tube just entering the sac for the outflow. As the discharge diminishes one tube may be removed and finally gauze drainage inserted. Gauze drainage has proved adequate from the first, but where the fluid is thick or flocculent, tubes give the only adequate facilities for the subsequent daily irrigation.

The after treatment must, of course, be directed to two ends: (1) Systematic treatment, consisting of forced feeding and free stimulation, and (2) the care of the wound and the maintenance of drainage. The wound should be irrigated daily and the patient, if his strength is sufficient to allow it, turned on his stomach to facilitate drainage.

Roberts, of Philadelphia, also, before the meeting of the American Surgical Association in 1897, presented an elaborate and exhaustive review of this subject. In this report he advocates the method of turning up a flap consisting of portions of the fourth and fifth left costal cartilages with the attached soft parts, thus exposing the field of operation. This method he had never followed on the living subject. Roberts collected 35 cases from all literature up to June, 1897, including my own case.

The previous work of the writer and the careful paper by Roberts brought the collected knowledge of this subject up to the summer of 1897, and leaves us nothing further to do than search the work of the last

three years, and make our final conclusions and analyses.

Voinitch-Sianojensky, of St. Petersburg, in 1897, a Russian writer,² contributed a long study on the anatomical questions in pericardotomy, but added nothing new to the conclusions of Delorme and Mignon, or to the anatomical studies of the writer given above. He refers to a case of incision in the second intercostal space for suppuration in the pericardium done by Bexman, of Russia, in 1891, with recovery. This case is not mentioned, so far as known, elsewhere. He refers to a number of different methods of incision and the advocates of each as known to him:

Through the third intercostal space, Sievens; through the cartilage of the fourth rib, Eiselberg; through the fourth space, Rosenstein, Orlov, Minine, Bronner, Parker, Klefberg; through fifth rib cartilage, Ollier, Gussenbauer and Körte; through fifth space, West and Davidson. Desault and Robinson, as well as himself, advise operation through the sixth rib and sixth space. Del Vecchio resects fourth and fifth ribs and cartilage, also Roberts. Delorme and Mignon the fifth and sixth; Riolan, Laennec, Skielderup and P. Malle propose to trephine the sternum in the median line. Velpeau, Pirogoff, Baizeau, Delorme and Mignon think it unnecessary to keep to left side of the sternum, while Desault, Romero, Karanaff, Trousseau and Tillaux advise it. Rotch, Wilson and Dickinson choose fifth space on right side for tapping.

He claims to have had the opportunity of studying post mortem 20 cases of pericardial effusion and to have done 100 pericardial operations on the dead, and on this experience he declares that incision through the sixth costal cartilage will *always* avoid the pleura (which is not an accurate statement), and his proposed method of operation is to go through the sixth cartilage, and, if necessary, cut away some of the seventh cartilage also.

He states that open incision in all cases of pericardial effusion (not only in purulent cases) should be much preferred to puncture, because of the danger of wounding the heart and pleura by any method of using a needle.

Eichel, in 1899³ gives a fairly complete résumé of the anatomy of the pericardium and pleura with several diagrams. This article is chiefly valuable as showing that the most modern anatomical work does not change the accepted views of 1897 as given by me. In his paper he makes reference to all the latest foreign anatomies.⁴

He recommends pericardotomy for all effusions as well as for all wounds. He gives several interesting cases of operation for wounds and resulting hemorrhage into the pericardium.

The use of tubes for drainage after hemo- or pyopericardium operations Eichel opposes, stating that he had a case in which he could not keep the ends of the tubes from impinging on the heart wall and causing stormy and irregular action. He says that Riedel had a case that taught him the same thing.⁵

A point which is of great importance and which

² *Annales de Chirurg., Russe*, 1897, xlii, ii, f. 3; also *Rev. de chir.*, 1898, vol. xviii, p. 993.

³ *Die Schussverletzungen des Herzbeutels*, Arch. f. klin. Chir., Bd. lxi, ii, 1, 1899; also *Annals of Surgery*, vol. xxx, p. 668, 1899.

⁴ *Lehrbuch der topographische Chir.* Anat. von Joessel and Waldeyer, Bonn, 1899; also Terrier et Raymond: *Surgery of Heart and Pericardium*, Paris, 1898.

⁵ *Ref. to Riedel, Verhandl. d. deutsch. Gesellsch. f. Chir.*, 26 Cong., 1897, S. 72; also *Centrbl. f. Chir.*, 1897, p. 56.

Brentano and Schaposchnikoff lay great stress upon, namely, the anterior situation of the heart in all effusions into the pericardium, is denied by Eichel. In his case, he says, there was plenty of fluid between the heart wall and the anterior wall of the pericardium.

Brentano⁶ reports 5 cases of operation for pericarditis, and discusses this question as to the situation of the heart when the pericardium is more or less full of fluid, whether it is nearer to the posterior than the anterior wall. From his clinical experience Brentano decides that in all pericardial effusions the heart is situated down and forward and most often lies right against the anterior wall of the sac even when no adhesions exist, and that in many cases there will be adhesions between the pericardium and the anterior wall of the heart. In all cases most of the pericardial fluid is behind. If this anterior situation of the heart is a fact, the danger of wounding the heart wall in all cases of paracentesis is great.

Brentano advises open incision in any effusion, with resection of the fifth costal cartilage. In fact, this seems to be the growing thought in the last few years, that incision through resection of the fifth left costal cartilage is a far safer operation than paracentesis.

Schaposchnikoff, in 1898,⁷ agrees entirely with Brentano on this question. He states that he has studied the point for twenty-seven years clinically, post mortem and experimentally, and has proved that the heart is in all cases forward against the sac wall.

Brentano recommends almost the identical procedures of my own technique, namely, stitching of the sac to the skin, and irrigation; for drainage, however, he always used iodoform gauze, not tubes.

He decides that opening the pericardium through a resection of fifth rib cartilage is very simple, and advises against puncture in any case. Local anesthesia with cocaine is all that is needed in most cases. In regard to this question Körte—speaking at the Freie Vereinigung der Chirurgen, at Berlin, December 13, 1897⁸—favored the use of cocaine in many cases, but stated that in certain cases of thick chest walls ether or chloroform must be used. Brentano mentions as one of his chief arguments against puncture in cases of serous effusion that it is impossible to remove all of the fluid by aspiration alone. Of 80 cases of paracentesis tabulated by West, in 23 the puncture had to be repeated.

Brentano reports 5 cases which are as follows: All 5 were done by resecting the fifth rib cartilage. Two were for purulent pericarditis, both of these cases following acute osteomyelitis in children seven years old. Operation was followed by temporary and marked improvement, but death occurred in twelve days from pyemia, as shown by autopsy. In both cases there were found multiple abscesses in the heart muscle itself, and in one the direct cause of death was from rupture of one of these abscesses into the left ventricle.

Two cases were for subacute serofibrinous pericarditis after rheumatic attacks and rheumatic endocarditis. Both died in three days.

The fifth case was a brilliant case of open incision for simple serous pericarditis, without preliminary puncture.

Delorme, in 1897,⁹ the same surgeon who collaborated with Mignon in 1895 in an article on the technique of pericardotomy,¹⁰ recommends resection of the fifth rib cartilage to relieve mediastinal and pericardial adhesions whether or not due to tuberculosis, and also as the route to the pericardium in all cases.

11. Allingham¹¹ brings forward an entirely new method of operation for draining the pericardium in suppurative cases, and also, with Ogle, of London, reports a case of purulent pericarditis operated on, though not by his suggested method. The case was one of purulent pericarditis originating from a chronic abscess in the pleural cavity near the pericardium. Incision after resecting the fifth cartilage was followed by death in fourteen hours.

Allingham's suggested method which he tried on 12 cadavers, but never on the living, is as follows. It is designed to give best access to the sac and best dependent drainage by opening the sac from below through the diaphragm:

(1) An incision about 3 inches long with its upper end at the costoxiphoid angle is made along the lower edge of the seventh costal cartilage; the latter is then exposed by separating the abdominal muscles from it; the cartilage can then be pulled up and back, exposing the fibres of the diaphragm together with the cellular interval between its attachments to the cartilage and to the xiphoid appendix.

(2) This cellular space is enlarged by cutting or tearing through the muscle of the diaphragm as far as necessary, when a mass of fat is usually seen just above the diaphragm in the space between the diaphragm below, the sternum in front, the pericardium above and behind. This fat, together with the diaphragm, is then pulled down when the pericardium presents, and can be opened up at its lowest point.

During the operation the peritoneum may be exposed to a slight extent as it sweeps downward from the under surface of the diaphragm. It is, of course, not injured, being pushed away as in a suprapubic cystotomy.

The advantages claimed for this method are as follows:

(1) The pleural cavity cannot be injured, as it is far away in the normal arrangement of the organs and further off in pericardial distention. It is claimed that this is the only sure method of avoiding the pleura.

(2) Drainage is through the most dependent part of the sac, through a large opening not limited by bone or cartilage.

(3) Great ease of exploration and cleaning of the sac is afforded.

In certain fat subjects it may be necessary to cut away some of the seventh cartilage to get room in the xiphoid space. (It is to be noted that Roberts has recommended this area as the point of election for puncture, though not for incision.)

Ljunggren¹² reports a case of suppurative pericarditis successfully treated by incision and drainage.

He objects to puncture as a dangerous procedure in any case, recommending incision and drainage as the rational thing in all cases. He added 6 cases to Roberts's 35, making 41 in all, but 4 cases are inaccessible

⁶ Deutsch. med. Woch., 1898, xxxii, S. 506.

⁷ Russisch. Arch. f. Path., klin. Med. und Bact. von Padw., July, 1896; also Deutsch. med. Woch., 1898, No. 38, S. 611.

⁸ Deutsch. med. Woch., 1898, S. 170.

⁹ Gaz. des hôp., 1898, p. 1,150.

¹⁰ Rev. de chir., September and October, 1895.

¹¹ Lancet, March 10, 1900.

¹² Nord. Med. Ark., new series, 1899, vol. ix, No. 23, extracted briefly in Annals of Surgery, 1899, vol. xxx, p. 659.

to us and doubtful. Of these, 16 recovered and 25 died. Of the 16 recoveries, 8 were complicated by other diseases; in 7 of the fatal cases death was due either to faulty methods or slowness in operating.

His eight rules for the technique of the operation do not differ from my published method. He uses rubber drainage tubes, double.

The pleura should be bluntly loosened and sutured laterally to prevent infection of the pleural cavity. He mentions the occasional necessity of cutting away some of the sixth cartilage after resecting the fifth, in order to get more room, but does not mention removing any of the sternum. General anesthesia is not necessary and in weak cases is contraindicated.

Lilienthal, of New York, in 1889,¹⁸ reports a case of recovery from operation in a boy convalescing from lobar pneumonia; operation under eucaïne, local anesthesia, 40 ounces pus evacuated, giving cultures of pneumococci; this organism and streptococci were also in the sputum.

C. Mansell-Moulin, in 1897,¹⁴ reports an operation for "hemopericardium" as he calls it. The case was successfully operated on about one month after a blow on the chest at foot ball, and six pints of thin, dark, bloody fluid removed, from which no cultures were made. It seems reasonable to class this with purulent cases like certain other cases of suppurative effusion after injury (note the case of Riedel, also case of West). The case is not very dissimilar from Eiselberg's at the first aspiration.

Sevestre, in 1898,¹⁶ reports a case of purulent pericarditis in the course of acute pneumonia. Cultures, pure pneumococcus. Operated on under cocaine anesthesia. Double empyema afterward with resection of ribs on each side. Death.

In Sevestre's case two aspirations were attempted before the incision was finally resorted to. At the second aspiration only bright blood was obtained (the query arises as to whether the heart itself was wounded); the operation through the fourth space seems to have been careless, and the empyema following may have been caused by the pericardial operation.

H. Bethan Robinson, who reported his first case,¹⁰ has reported a second case, in 1898.¹⁷ A case following bronchopneumonia in a child four years old. Death in three days.

Several recent elaborate papers given in my bibliography deal with the surgery of the heart itself or with the surgery of wounds of pericardium.

Loison, on wounds of the heart and pericardium, in an exhaustive paper¹⁸ gives in his table 4 cases of pericardotomy for wounds of pericardium, namely, cases of Cappelen, Eiselberg, Garber and Reidel. Two of these, Eiselberg's and Garber's cases, are cases of operation for suppuration following wounds.

A new method of opening the chest in surgery of the heart and pericardium is advanced by Wehr.¹⁹ He recommends it especially where large exposure is necessary in wounds of the heart itself. It consists of making an elliptical flap of skin, bone and cartilage, cutting across sternum at the base of fourth cartilage

and again at the xiphoid joint, and by a curving sweep taking in fourth, fifth, sixth and seventh costal cartilage, turning this flap back with the right edge of the sternum as a hinge. He does not say he has done this on the living. His method can best be shown by reproducing his cuts, two in number.

Manges, of New York, in 1900, reported on cases of pericarditis following pneumonia at the Mt. Sinai Hospital.²⁰ Of 500 cases of pneumonia, pericarditis developed in only 11, and of the 11 5 died. He thinks all cases of pericarditis as a complication of pneumonia are due to the pneumococcus, and further states that infection with this organism is probable in many cases of so-called idiopathic pericarditis. This same organism finds its way from the pulmonary passages. In the pericardium, as in the meninges, the pneumococcus is always a pus-producing organism. It is probable, he says, that many cases of pericarditis in pneumonia are overlooked because the conditions around the heart when the left lung is affected are such as to obscure the most important sign, namely, increase of heart dulness; the to-and-fro murmur of the pericardial friction may last but a few hours.

Connor and Stimson, of New York, in 1900²¹ report a case of purulent pericarditis after a severe pneumonia. Operation under local anesthesia by Dr. Stimson. The right pleura was cut accidentally; death in a few days from purulent pneumonia.

Ljunggren in his paper,²² after reporting his case, the history of which has been translated and put in my list of cases, goes on to say that he has found some new cases which are not in previous lists. Three of these cases are inaccessible, however, and are given thus by him with no details; he merely gives the references: Hirschsprung, cited by Heyde; Heyde in a Dissertation, Kiel, 1896; Perls in a Dissertation, Strassburg, 1896. The other cases are those of Brentano, which I have given.

It has been possible for the writer to add 14 cases to the former collections of my own and Roberts, without counting the 3 cases cited above by Ljunggren, the details of which are not to be had. These make a total of 51 cases. (Of this series of cases the annexed tabular view has been made.)

An analysis of the 51 cases gives the following facts: 46 were for purulent pericarditis, septic; 2 were for serofibrinous pericarditis, rheumatic; 1 was for hemorrhagic pericarditis, traumatic; 2 were for serous pericarditis.

The etiology is as follows: Pneumonia, with and without empyema, 14; bronchopneumonia (in a child), 1; osteomyelitis, 5; wounds, gunshot or stab, 4; blow on chest, 1; periostitis, 1; necrosis of nasal bones, 1; septic throat, 1; septic arthritis of knee, 1; abscess of buttock, 1; empyema without pneumonia, 5; pleurisy of doubtful origin, 2; pleurisy with typhoid fever, 1; pleurisy with bronchitis, 1; influenza, 1; tuberculosis (?), 2; unknown origin, 7; rheumatic fever and endocarditis more or less acute, 3.

Of the total 51 cases of incision for pericarditis, 20 recovered and 31 died, a mortality for all cases of 60.5%.

Of the 2 operations for simple serous pericarditis both recovered.

Of the 14 cases in which acute pneumonia, either

²⁰ Medical News, January 20, 1900.

²¹ Loc. cit.

²² Nord. Med. Ark., new series, 1899, vol. ix, No. 28, extracted briefly in Annals of Surgery, 1899, vol. xxx, p. 659.

¹⁸ Journal American Medical Association, 1889, vol. xxxiii, p. 1,422, also Medical News, Nov. 25, 1899.

¹⁴ Transactions Clinical Society, 1897, vol. xxx, p. 217.

¹⁶ Lancet, April 23, 1898.

¹⁷ Transactions Clinical Society, vol. xxx.

¹⁹ British Medical Journal, November 26, 1898, vol. ii, p. 1,805.

²⁰ Rev. de chir., 1899, vol. xix.

²¹ Arch. f. klin. Chir., Bd. lxx, S. 949.

lobar, bronchial or septic, was the cause of the purulent pericarditis, only 4 recovered (cases of Bohm, Lilienthal, Porter and Bjorkmann); in 2 of these the pneumococcus was grown from the pus. The other 2 do not report bacteriological studies.

Twenty cases were not tapped previous to operation. Local anesthesia with cocaine or eucaine was used in 6 cases.

CONCLUSIONS.

(1) Pericardotomy is indicated in all cases of suppurative pericarditis.

(2) Because of the uncertain and varying relations of the pleura and because of the anterior position of the heart, whenever the pericardial sac is distended by fluid, aspiration of the pericardium is a more dangerous procedure than open incision, when done by skilled hands.

(3) Incisions of the pericardium can be done quickly and safely by resection of the fifth costal cartilage and in many cases under local anesthesia.

(4) In many cases of serous effusion open incision without puncture will offer less risk and speedier cure than aspiration.

(5) The method and detailed technique of the writer proposed in 1897 have been followed out by the majority of recent operators.

HYDROTHERAPY IN PNEUMONIA.¹

BY SIMON BARUCH, M.D., NEW YORK.

A RETROSPECTIVE glance at the treatment of acute diseases during the past half century reveals the fact that a revolution has taken place which has culminated in the practical abolition of the treatment of these diseases. In our own country the revolution was initiated by Jacob Bigelow, a former member of this society, by his work on the "Self Limitation of Diseases," published in 1835, and by his later book on "Nature in Disease." Reinforced by the good sense and captivating eloquence of your Oliver Wendell Holmes, American medical men have slowly, too slowly, alas, changed from destructive to constructive therapy.

We realize today that, with few exceptions, the manifestations of disease are but the expression of pathological conditions which no remedial agent is capable of removing. This proposition will not be construed by any fair mind as an abandonment of the patient to his fate, but simply to emphasize the fact that we no longer attack the disease by violent medication, as was formerly done by blood letting and mercury and blisters, later by veratrum viride, and more recently by antipyretics. If the symptoms of disease were really the essence of disease, our complete control of the pulse by veratrum, of temperature by antipyrin, of sleep by chloral, of pain by morphia, of feebleness by the modern foods and stimulants, would today ensure our triumph over disease. The fact that despite the response of the most significant symptoms to these powerful agents, patients continued to succumb, has awakened the medical conscience to a realization of the truth of the doctrines taught by Bigelow, Holmes and Hooker, sixty or more years

ago — that the patient rather than the disease must be treated.

In a malady like pneumonia, blood letting and other spoliative agents relieved pain, softened the pulse, and lulled the doctor into a false security, from which he was too often rudely awakened when heart failure presaged the approach of the end. So it is now with antipyretics, the chief value of which consists in enabling the patient to die with a more nearly normal temperature.

The old spoliative practice was abandoned when practical men discovered that it robbed them of the chief ally in the campaign against disease — the *vis medicatrix naturæ*.

If you reflect that for two thousand years the medical profession labored under the fatal error of fighting disease while the patient, being the battleground, suffered from friend and foe alike, you will bear with me in paying a tribute of gratitude to the man who courageously blazed a pathway through the confusing mazes of spoliative medication to "nature in disease." I esteem it a high privilege to announce here, amid the very scenes of his professional activity, that like Jacob Bigelow I trust to nature in pneumonia, as in every other acute disease. Not blind as that of the Christian Scientist in prayer and faith is my reliance on nature, but ready in armed expectancy to intercede in her behalf when peculiarities of the patient or of the disease or conditions of environment point to a deviation from normal processes of restitution.

Isolation, rest, cleanliness, ventilation, food, drink, and if need be medication, should be so directed as to enhance the resisting powers of the patient — to so fortify him that his inherent powers have free play in eliminating the noxious products which threaten to overwhelm him.

Among these agencies I esteem hydrotherapy as one of the most valuable. Water is not a curative agent for pneumonia, but its judicious use has afforded me much comfort and has doubtless contributed greatly to the diminution of mortality.

A somewhat active professional life of nearly forty years, spent in country, village, city, army, family and hospital practice, has brought me to the conviction that pneumonia is an infectious disease, which tends to destroy life by enfeebling the nervous and circulatory system, and that the indications for overcoming this lethal tendency are: (1) To fortify the nervous system; (2) to sustain the heart, whose integrity is of vital import in overcoming the local lesion and in removing inflammatory products by a vigorous circulation; (3) to strive for elimination of noxious products arising from the life and death of the diplococcus; (4) to render the patient comfortable by reducing high temperature, deepening inspiration and producing sleep.

Flexibility is a notable quality of hydrotherapy. By various procedures, changing of temperature and duration, we may adapt the application of water to the most opposite conditions for the fulfillment of these indications.

In no disease is this better exemplified than in pneumonia. Although its general manifestations resemble in many respects typhoid fever, its local manifestations differ from the latter as the Eberth bacillus differs from the diplococcus of Fraenkel. While in typhoid fever the cold bath, preferably as suggested by Brand, has proved of surpassing value, such a bath is not adapted

¹ Read before the Massachusetts Medical Society, June 12, 1900, and recommended for publication by the society.