

mally maintained at the tension of the cerebral veins, and that any attempt on its part to take up a higher tension is promptly checked by absorption taking place through these veins. This fact at once excludes the cerebro-spinal fluid from taking any part in the transmission of a pathological increase of cerebral tension. It is a fact, moreover, which holds good in all physiological conditions, not only for cerebro-spinal fluid but for all fluids of similar density, notably serum. The rapid escape of fluid injections from the cranial cavity has been noted by Adamkiewicz, Naunyn, Schreiber and Falkenheim; and Duret has recorded the escape of over nineteen ounces of water in two hours, the pathway of escape being through the cerebral sinuses.<sup>22</sup>

With these facts at command we are ready to consider the sequence of pathologic events in that class of cases in which vascular paralysis is permanent. This, as is perfectly self-evident, will be as follows, and in the following order: arterial stasis with enormous rise in intracranial (venous) pressure, thrombus formation, transudation. What becomes of the transudate? Under normal circumstances, we have seen that it is quickly taken up by the veins, but in the present instance this is rendered impossible by the enormous pressure already existing in the veins; it must therefore gravitate, and room must be made for it. The brain itself has been shown to be incompressible, but supplied with a compressible arterial system; hence capillaries contiguous to the transudate will be obliterated. In other words, a vicious cycle is established which may go on indefinitely, the result thereof being a gradual increase of brain anemia. Under these circumstances, if the vicious cycle is started in the brain proper, the circulation, following physiological laws, is naturally turned toward the channels of low resistance, namely, the vascular areas of the cerebellum and bulb, and life is prolonged until the waterlogged cerebrum has attained sufficient size to obliterate bulbar capillary circulation. That this may take a long time will be evident if we take into consideration the pressure discontinuity which exists between the cerebral and cerebellar chambers, and bear in mind the fact that the bulbar centres possess the power of functioning with a greatly diminished blood supply. On the other hand, it is easy to understand how this very pressure discontinuity may be active in bringing about a quickly fatal issue in the case where the vicious cycle is started in the cerebellar chamber.

If we turn now to our introductory considerations on pathology we find that the vicious cycle which we have just described as having its origin in a traumatic paralytic stasis of cerebral vessels is analogous in every essential detail to that complex of pathologic conditions designated general contusion, and we may assume their identity. On this assumption, the following conclusions seem legitimate at this stage of the argument:

(1) That traumatic cerebral edema can find no place as a pathological or clinical entity.

(2) That it is primarily the inevitable sequence *in time* of that complex of pathologic conditions which we designate contusion.

(3) That inasmuch as contusion of the brain and its meninges is most commonly met with as a concomitant lesion to the more macroscopic lesions designated hemorrhage and laceration, the primary seat and extent of its accompanying edema will be largely fortuitous.

<sup>22</sup> Quoted by Hill: *loc. cit.*: Note 13, p. 18.

(4) That in the rare instances in which the application of a traumatizing force is expended in the production of a local contusion of the brain cortex or its meninges the brain is of itself abundantly capable of getting rid of the edema through its venous channels.

(5) That in the remaining cases in which the contusion is primarily extensive in the cerebrum, or where it affects the cerebellum or bulb, the factors which enter into the mechanism of the production of the edema are such as to preclude the possibility of operative relief.

(6) That contusion *per se* can easily cause death.

(7) That death in such cases results from anemia of the bulb.

If we examine now the observations of Bullard, Walton and others, we think that it will at once be obvious that the clinical and pathological findings so variously described by them may, when reduced to their lowest terms, be easily interpreted on the basis of contusion. Bullard<sup>23</sup> has accurately described the clinical manifestation of the paralytic dilatation of cerebral vessels which we have shown to precede the production of edema, in the following words: "In many cases, moreover, on operation we have no evidence suggestive of any severe hemorrhage and yet the increased pressure is present. What seems to occur is this: The brain in some way acts as a sponge and swells and pushes so hard against the dura as to inhibit or diminish pulsation." Again,<sup>24</sup> he summarizes an article on the increase of intradural pressure in head injuries in these words: "(1) An abnormal increase in the intradural pressure often occurs as an accompaniment or result of severe head injuries, where no large clot exists. (2) This intradural pressure may be in part due to an excess in the amount of subdural fluid. This, however, is, as a rule, not the chief element in the intradural pressure, which is principally due to the bulging of the brain itself. (3) The cause of this intradural pressure is apparently a congestion or filling of the intracranial blood-vessels and the results thereof."

(To be continued.)

## THE LOCAL TREATMENT OF PNEUMONIA IN CHILDREN.<sup>1</sup>

BY R. F. CHASE, M.D., BOSTON,

Assistant in Clinical Medicine, Tufts College Medical School; District Physician to Boston Dispensary.

From the fact that there exists at the present time much difference of opinion regarding the local treatment of pneumonia, not only among physicians of different localities but of the same place, and as this diversity has, perhaps, recently been increased by the introduction of the "cold treatment," it occurred to me the present might be an opportune time for the discussion of the subject. Therefore, with this as the principal object in view, this paper is presented.

As the result of an experience in the treatment of some forty-five cases of pneumonia in the past thirteen months, I shall herein take the privilege of expressing a few convictions.

There was a time, as you all know, when the ab-

<sup>1</sup> Read at a Meeting of the Clinical Section of the Suffolk District Medical Society, January 18, 1899.

<sup>23</sup> *Loc. cit.*: Note 6, first ref.

<sup>24</sup> *Loc. cit.*, second ref.

straction of blood in this affection, as in many others, constituted almost the sole treatment. To-day this procedure is resorted to only in certain plethoric individuals, in which cases leeches are generally used.

Blisters, which at one time were thought to accelerate resolution, have been discarded on account of the irritation and sloughing so liable to result.

I can best give you an idea of the local treatment of pneumonia in children from the early eighties to the present time by quoting from some of our well-known authorities:

Starr in 1844 lecturing on lobar pneumonia, said: "The local treatment consists in covering the affected side with a flaxseed poultice, and if the case is seen in the stage of congestion more decided counter-irritation should be employed. Mustard plasters or dry cups should be used, followed by a poultice—this to be changed twice in twenty-four hours, and not to be used after the crisis. If this treatment will not be carried out put on a cotton jacket."

Holt in 1885 recommended the use of the cotton-wadding and oiled-silk jacket.

In Meigs' and Pepper's edition, 1886, they say: "Poultices are useful whenever there is great oppression, and when resorted to in the evening dispose the child to sleep."

Smith, of New York, in his 1890 edition says: "Local treatment is required in all cases of pneumonia; counter-irritation should be produced over the chest with mustard, and, after, the chest should be covered by an emollient poultice."

In 1896 certain representatives of the children's hospitals of New York, Philadelphia, Washington and Boston contributed short communications to *Archives of Pediatrics* on the hospital treatment of pneumonia. The following are extracts:

Adams, of Washington: "In lobar pneumonia the cotton jacket, with or without oiled silk, is worn throughout the attack. If there is acute pain and surface congestion dry cups are applied over the inflamed area, followed by hot poultices and a jacket. For the fever cold water or water and alcohol sponging is used. The cold pack and ice poultice have not been used by us as yet." In broncho-pneumonia he used the cotton jacket and counter-irritation, and said, "Hot flaxseed poultices are indicated whenever pulmonary congestion is intense or general."

Northrup, of New York, used thin, light, flaxseed and mustard poultices to cover whole front, back or side as needed, and when removed to be replaced by a warm flannel cloth. For the fever sponging with warm water and alcohol, also immersions in water at 90°, for seven to fifteen minutes, with constant rubbing.

Griffith, of Philadelphia, said he no longer used the cotton jacket, that he saw no good in it. Jacket poultices were only occasionally used. He used hot light poultices and turpentine stupes for pain, and recommended rubbing with turpentine for the bronchitis in broncho-pneumonia. For a temperature of 104° he gave sponge baths with water at 70°–80°; also the warm or cool tub-bath. For heart failure and dyspnea he used plunges in water at a temperature of 103°–105°.

Dr. Buckingham said: "I do not remember that I ever saw a poultice used in the Children's Hospital for this affection, nor is the cotton and wool jacket at all common." He recommended warm but light clothing.

Certainly from no better source could we derive an

idea of the hospital treatment in 1896. One year earlier Dr. Rotch in his edition says: "There is no necessity for making any external applications to the chest. The use of poultices is to be deprecated, and in my experience is usually without benefit except in certain instances for the relief of pain."

One year later Jacobi says: "Warm poultices will greatly stimulate the bronchi. Their place is during hepatization, for the purpose of aiding absorption, not in the first stage of pneumonia."

Coming to the present time, or November, 1898, I quote extracts from the discussion held by the Section on Pediatrics of the New York Academy of Medicine, on The Treatment of Pneumonia in Children in Hospital and General Practice.

Dr. Crandall: "Mustard paste is of great service."

Dr. Carr, on broncho-pneumonia; "Counter-irritation to the chest, by means of a mustard paste or a mustard bath, at a temperature of 95°–100°, will loose the labored breathing, lessen the congestion and calm the nervous system. Poultices are not to be applied, as their weight and the need for constant renewal are reasons why they are harmful. Jackets of flannel and of flannel and oiled silk are much better than poultices, as the skin under them can be cleansed."

For high temperature he recommends baths at 95° gradually reduced to 85°; also the pack at 65°–70°.

Dr. Holt: "Moderate counter-irritation, especially early in the disease, is usually maintained by the use of a mustard paste every three to six hours, and an oiled-silk jacket is worn throughout the attack. He prefers these to the use of poultices. "Hyperpyrexia is best controlled by the cold pack"; has never seen any bad results when properly used.

Dr. Northrup: "Little treatment is necessary in most cases of lobar pneumonia, but, whatever you do, do not put a child with a temperature of 104°–105° and respiration at 60 in a hot poultice tightly wrapped about the chest."

Dr. Berg: "Children recover from croupous pneumonia under any treatment, even under the old-fashioned poultice treatment, which is the most barbarous I know of. Neither the oiled-silk jacket nor poultices should be used in pneumonia."

Dr. Koplik: "Poultices or cataplasms do not work any good, nor can their use be justified on any scientific grounds in any form of pneumonia."

In summing up, we find that there are still in use the various counter-irritants, the cotton jacket and the cold applications. Of the counter-irritants and the cotton jacket there are, as you have seen, divers opinions, while of the cold applications there seems to be, in the main, but one mind.

Certain details of the "cold treatment" I quote from Baruch's paper on Hydrotherapy in the Pneumonia of Children, presented at this same discussion:

"In children under three years the tub-bath, with continuous friction, is most useful. If the body temperature is between 101° and 103° the child's face is bathed in water at 75°, its trunk is gently submerged in water at 95°, and held by pressing the finger upon one shoulder (not upon the chest). Ice-water is then added to 85°; friction over the entire body is maintained for five minutes. This bath may be repeated every four to six hours with advantage so long as the temperature does not fall below 101°. The duration should be prolonged to eight minutes."

In most children over three years the chest compress

is the most useful. The compress should be wrung out in water at 65°–70°. It is repeated every hour, and discontinued when the temperature drops to 100°.

Of the 45 cases of pneumonia referred to in the beginning all but 5 occurred in my district work for the Boston Dispensary, consequently among the poorer class of patients. In the treatment of these cases I was ably assisted by a competent trained nurse, herein having an advantage over some of our private cases. On the other hand, through the prejudices of ignorant parents, I was not given the freedom usually exercised in hospital treatment; 39 of these cases were of the lobar form, 6 of the lobular, or broncho-pneumonia.

Of the 39 with the lobar form, but 2 were under one year of age, 16 between one and three, 14 between three and eight, and 7 between eight and forty-five years. Of these but one terminated fatally; this, an eleven months' child, with a double pneumonia, developed diphtheria in its third week, dying several days later.

Of the 6 cases of broncho-pneumonia, aged sixteen months to seven years, one died on the day of my second visit; an unfavorable prognosis was given at the first visit. Another, on account of family difficulties, was sent to the hospital in the third week, recovery being doubtful. The four remaining recovered.

I give these few statistics that you may become familiar with the class of cases with which I have had to deal—mostly children one to eight years of age, and none of the very youngest or the very oldest cases frequently met with.

In treating these cases I have used many flaxseed-meal poultices (some experimentally), some mustard pastes, the cotton jacket occasionally, the ice cap, cold water, and water and alcohol sponging, and have allowed to be used, at times, camphorated oil, lard, etc.

The use of the poultice in this affection was not taught in the Harvard Medical School in my time, and I am sure has not been since. Its use here in Boston is, I believe, generally looked upon with disfavor, also by some of our best men in other cities. On the other hand, we see its use still tolerated, and even advocated, by good men, one or two of whom I might mention as authority. It is, perhaps, a late day to discuss the use of poultices, but as I have used them I cannot refrain from expressing my convictions regarding their beneficial effects.

I do not refer to the jacket poultice, which has, and I doubt not, for very good reasons, been discarded, but to the modern poultices properly made and properly applied. Such poultices are to be freshly made between pieces of gauze or cheese-cloth, the average area for children being about eight by ten inches, and its weight with the oiled-silk or paraffine-paper covering not exceeding six ounces. The poultice should be applied over the affected area, with the child lying in its bed, as hot as can be well borne by the attendant's face, and pinned with safety-pins to the undergarment. Each poultice should be removed at the end of thirty to forty minutes, or while still warm, and immediately replaced by a fresh poultice if desired, or by a warm flannel cloth if it is to be discontinued. The number required in twenty-four hours depends on the indications of the case; rarely, if ever, have I exceeded six or eight. They are, of course, to be discontinued when the patient is relieved or has fallen asleep.

My first and general impression regarding the use

of the poultice was that it seemed beneficial, especially in the younger children. Later on, when I became more fully aware of the opposition to its use, I noted its effect more carefully, instructing the nurse to do the same and report to me. As the result of my observations in this limited experience I came to the following conclusions:

That poultices diminish pain when present, and that in doubtful cases the child often seems relieved.

That in bronchitis accompanying either form of pneumonia the râles are often diminished and the dyspnea relieved. In two cases which I remember particularly well, an extensive bronchitis cleared up entirely within twenty hours after the use of poultices.

That they have a soothing effect, not infrequently disposing a fretful, restless child to sleep.

That children rarely oppose their use.

That the object of their use should be to relieve the various discomforts of this affection, thereby helping to preserve the strength of the child.

The beneficial effects of poultices are due, I believe, to their warmth and moisture, their mild counter-irritation. The chief objections made to their use are that their weight impedes respiration, that their renewal fatigues the patient, that they retain the bodily heat, and that they are nasty. As to the validity of these objections I must allow you to decide.

That there are many cases of pneumonia which do not require the use of a poultice or any other application I am fully aware. That there is still a place for the use of the poultice I fully believe.

The mustard paste so much advocated certainly seems of benefit. Some believe it is capable of limiting the affected area when used in the earliest stage. Being one of the stronger counter-irritants, it must be used with some caution. Koplik's statement, that "the use of cataplasms cannot be justified on any scientific grounds," may be true. But is not our clinical experience a sufficient guaranty for their use?

No great claims are made for the cotton jacket, but it is so much better than a half-dozen thicknesses of superfluous clothing about the chest that I have occasionally resorted to its use.

For hyperpyrexia I have relied entirely on water and alcohol sponging.

The ice cap has proven very beneficial in delirium, and congestive headaches; it also lowers the fever. Cold applications are undoubtedly coming into favor in the treatment of pneumonia, but, from the nature of this affection, they will never be used to the extent they are in typhoid.

For the last dozen or more of the cases treated, I have constantly been on the watch for one in which I considered the symptoms called for the use of one of the cold applications, but have failed to find one. In explanation, I will say the cases have been mild; in no instance has there been a temperature of 104° lasting for six hours; the other symptoms have been proportionately mild.

In conclusion, let me call attention to what are by no means the lesser details in the treatment of pneumonia:

A quiet room, with plenty of fresh air and sunshine, removed from the noise of other children.

Proper food, properly given.

An attendant who will let the child alone when it desires to be quiet, as is so often the case, and one who knows when to turn the child when choked by

the secretions, or from long lying needs a change in position.

As to the medicinal treatment, this subject in itself is sufficient for an extended discussion.

Some one has well said, "In the absence of a specific treat the child, not the disease"; to this I would add, let us not overdo.

### TREATMENT OF PHTHISIS.

BY A. B. FAIRHAM, M.D., MILWAUKEE, WIS.

THE first point insisted upon is air, plenty of air, more than plenty of air, day and night and in all kinds of weather, almost without exception, and sunlight when obtainable. The exceptions and cautions are general and individual: the general, to avoid facing a very high wind when the cold is marked or the air dust-laden. Sitting in the open air with one's back to a high wind is to be encouraged. Exposure under almost any circumstances is preferable to a stuffy room. The point is to have the patients warmly clad — summer about their bodies. This attended to, winds and storms even are of minor importance. The individual cautions and directions from their very nature hardly admit enumeration. The chief one is to avoid talking when walking on a cold day, so as to avoid gulps, spasmodic mouth inhalations, and always to breathe through the nose. It is well to visit the patient's dwelling and pick out the best room possible, and give such other directions as a knowledge of the actual environment may suggest.

Next to air comes the stomach; it is pivotal. The first direction almost always is never to force eating. A natural appetite will come speedily when other matters are attended to. A local, persistent, frequent and full cleansing of the upper air passages, notably mouth, teeth and tonsils, is of sufficient importance to be noticed. Such a cleansing as I give with a coarse spray relieves the cough that is depending upon any catarrh there, removes the slight amount of sputum due to faulty expectoration, and improves the appetite. Find out what is the patient's natural home diet and modify and supplement it in such ways as each one seems to require appears to sum up what calls for much continuous and painstaking effort.

As to bathing, patients are directed to go over their bodies twice a week rapidly, selecting a section each day. If massage can be added the better. In the majority of cases a member of the household can be speedily instructed to attend to both bathing and massage in a fairly efficient fashion.

As to clothing, usual directions — wool next the skin, moderate weight the year round, looking to the outside garments for additional protection required by the season or exposures.

Directions as to care and disposal of sputum are the usual approved ones. It might be mentioned that I impress upon them that when the cheese-cloth handkerchief be used it be promptly burned before the secretions have time to dry.

Lung gymnastics are of such importance as to call for detailed attention. This is done in part in the office but mainly outside. For their outside work I give them printed directions and try to see that they live up to them. The inside work is to dilate by means of compressed air, with attention to details according to case. The great point aimed at is to keep

in commission what good lung we have, to prevent further invasion and bring into operation increased area by distending the alveoli and clearing the smaller tubes. A local catarrh is a good soil for near-by germs to thrive in. This treatment is the very reverse of nitrogen compression, which at best ends in compressing two purulent sides together with attendant local pus cavities. What has become in such a treatment of our old drainage, cleansing and healing from the bottom practice? I would suggest to those who are using nitrogen compression, that they induce a pronounced phthisis in an animal, then inject the nitrogen, allow the animal to live a week or two, then kill, afterward freeze and examine the frozen sections; or experiment on a suitable cadaver along the same lines. Perhaps after this the vendors of nitrogen injectors may have more difficulty in selling their surplus stock.

In routine office treatment I use ozone freely after inhalations of vapors, generally one of a mixture of pine-needle oil, creosote and eucalyptus. I have used the ozone for three years and a half now, and think it useful.

Immediately the plan of the Tesla-Thompson high tension, high frequency battery was published in the *New York Medical Journal* I had such such a battery put up in my office. Have used it now for two years and a half with great apparent benefit in some cases.

Of direct medication I use strychnia sulph. identically as Doctor Mays recommends. Have had two patients on one-sixth of grain without showing any symptom. With patients who show such tolerance after intermitting I try the higher doses without running up. Proto-nuclein I use from the start and continuously.

All recognize the efficiency of creosote in some form. At present I am using the plain creosote, also the enteric coated pills of Dr. Flint, and the valerianate of guaiacol. Had a patient last fall who could take the medicine only in the form of valerianate of guaiacol; no trouble whatever with this preparation.

For fever I rely upon the general treatment and absolute rest. Fever is the test of the efficacy of the handling and rarely calls for special treatment; sweating likewise; cough the same. If I use anything for the cough yerba-santa is my favorite remedy. All are grateful for the suggestion that in the morning before rising they should use gravity to aid them in clearing the lungs, depressing the head over the side of the couch, lying prone on stomach.

Injections of serum I employed in one case — not thoroughly, as patient was alarmed at eruption and refused to go on. I want to see reports of the injection of antistreptococcus serum in cases of persistent fever, and may try it myself.

*Climate.* — Generally speaking, do not believe in change. Anyhow it is utterly impracticable for the many, and cruel to a large number. Stand by the guns at home and fight the fight out manfully there.

*Hospitals.* — The subject is too great to be more than touched on. I have lived in them and very briefly say that their usefulness depends upon the head in charge as much as an army depends upon the great captain. Anyhow for the many they are out of the question at present.

Some improve on any or no treatment, or in spite of treatment. The great object is to combine all that the best experience of our best physicians has approved. I tell my patients that I want them to stay with me at least three months; the various lessons for