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ON THE ADVANTAGES OF
PLASTER-OF-PARIS DRESSINGS
AS A MEANS OF SPINAL SUPPORT.*

BY LEWIS A. SAYRE, M. D.

SINCE the days of Percival Pott, who first accurately described the correct pathology of caries of the spine in 1783, and who so strongly recommended the horizontal position to be constantly assumed during the entire existence of the disease—because by this position the diseased portion would be relieved from the pressure caused by the weight of the upper portion of the body on the diseased surfaces—I believe that there has been an entire consensus of opinion among the profession in all countries as to the correctness of this opinion of relieving the diseased parts from undue pressure as one of the most essential elements of successful treatment in this unfortunate malady.

We all know that undue *pressure* upon any part interferes with its normal circulation by cutting off a portion of its blood-supply, and thus diminishing its vitality and increasing its tendencies to disintegration—such as caries, sloughing, and other necrotic changes—the result of *mal-*

* Read before the Orthopaedic Section of the New York Academy of Medicine, May 18, 1888.



nutrition, simply from this obstruction to its proper nutritive supply.

As I have before stated, the entire profession recognized the advantage of the *horizontal* posture, as diminishing this amount of pressure by taking off the superincumbent weight of the head and shoulders, which would have to be borne by the parts when the body was in the erect position.



FIG. 1.

But there is another element of pressure, even when the body is in the horizontal position, and which tends to increase this absorption and disintegration, and which has been entirely overlooked by the profession. I mean the pressure caused by muscular contraction from reflex irritation, even when the body is in the horizontal posture, and it therefore requires *traction*, or extension and counter-extension, to overcome its ill effects, even when the patient has had the benefits of the horizontal position.

For this reason I have for some years past put all my smaller children, whose pelves were not sufficiently developed to apply the plaster jacket and jury-mast (to which I will refer hereafter), in the wire cuirass, with head extension, as in Fig. 1. In this cuirass, with the head extension, they can be stood up against the wall and look out of the window for hours, and thus amuse themselves, or be taken to the park to drive, or transported any distance in a railroad car, without the slightest inconvenience or discomfort, as seen in Fig. 2 and Fig. 3. In adults who are paralyzed

and are too large to carry in the cuirass, I make the traction from the head and heels by weight and pulley attachments.



FIG. 2.



FIG. 3.

This horizontal posture, while it was of the greatest advantage to the local parts involved in the disease, was still a great detriment to the general health of the patient by the *in-door* confinement of the adult, and by limiting the muscular movements of the child when confined in the cuirass. It was to obviate this difficulty, and allow the patients the advantage of out-door exercise, that various surgeons in different parts of the world have invented and used different

kinds of support to the spinal column, to prevent the deformity from increasing while the patients assumed the erect posture and had the advantage of free exercise in the open air.

To attempt a description of all these various braces would be a useless waste of time, as their number is legion, and, with the exception of Taylor's, Banning's, and Allen's, most of them are of no practical good, many of them, in fact, being absolutely injurious, not only increasing the disease and deformity, but at the same time giving the patient great physical agony, and sometimes even absolute torture.

The spinal support of Taylor, which is altogether the best of any of the iron braces, and that of Banning and of Allen, are based upon the principle of removing the *pressure* from the *anterior* portion of the bodies of the vertebræ (which are spongy in texture and easily absorbed) by bending the body directly backward, using the "bos" as a fulcrum, and thus transferring the weight to the transverse processes, which are of a different textural composition from the *bodies* of the vertebræ, and not so liable to undergo interstitial absorption under the influence of additional pressure. Taylor's and Allen's braces are of great service in the treatment of Pott's disease, inasmuch as they prevent an increase of the posterior angular projection by removing the pressure from the *anterior* portions of the bodies of the vertebræ; but they do not give the same amount of benefit as the plaster-of-Paris jacket (hereafter to be described), which removes the pressure from *all parts* of the vertebræ, *posteriorly* as well as *anteriorly*, when properly applied.

The principal objection, however, to both of these spinal supports is their mode of attachment. In order to be kept in position they have to be secured by a bandage around the body, called the apron, which has to be laced or

buckled sufficiently tight to retain the spinal supports in a positively *fixed* position, and if they are not thus securely retained, they excite friction and chafing by their motion, and if the body apron is buckled or laced sufficiently tight to retain this exact position, it necessarily girdles the body to such an extent as to very materially prevent the full expansion of the chest, thus diminishing full inspiration; and to this extent at least they are injurious, as preventing proper oxygenation of the blood.

Banning's brace is superior to either of the others in its mode of attachment by elastic springs and the absence of the body belt, thus allowing of free expansion of the chest; but it is so very elastic and insecure as to afford but very little if any support in a case of spondylitis or Pott's disease, whatever benefit it may render in a case of lateral curvature.

The Knight brace or crib, formerly used in the Forty-second Street Hospital for the Ruptured and Crippled, has all the objectionable features of the Taylor and Allen spinal supporters, without one single redeeming quality.

I have tested the respiratory capacity of a very large number of patients (certainly over one hundred) with the spirometer, who were wearing at the time some one or the other of the braces above referred to, and in no single instance could they expire as much with the Taylor, Allen, or Knight brace upon them as when it was removed. And in every single instance where a plaster-of-Paris jacket was applied to the same patient the expiration was increased without one single exception, in some cases this increase amounting to ten, twelve, fifteen, and even twenty cubic inches.

In the Banning brace this difference in respiration was nothing like so marked, although it held the spinal column less securely than the Taylor or the Allen brace.

In the autumn of 1874 a poor child was sent to me from Chatham Center, Putnam County, paralyzed in the lower extremities for some weeks before from Pott's disease of the lower dorsal and first lumbar vertebræ of three years' standing, the eleventh and twelfth dorsal spines being very prominent, with a very sharp angle at the eleventh spinous process. The child was carried by the father, being unable to stand even when held by the hands. He had the projecting sternum, the peculiar catching, grunting respiration, with the well-marked features in countenance and expression, of spondylitis or Pott's disease in its far-advanced stage. As the child could not stand erect while Mr. Reynders measured him for a Taylor brace (which was the instrument I used at that time in all my cases of Pott's disease), and as I always preferred the measurement by the flexible lead tape to be made to the spine when in the erect position, rather than in the horizontal posture, I requested my son to hold the boy up by the arms while Mr. Reynders made his measurements and applied his leaden tape to the exact curvatures of the spinous processes. As my son lifted the child from the floor I was struck with the marked change that took place in the curves of the spine, which became apparently much straighter and the body more elongated, and the child immediately moved his feet, which he could not do before. He was then placed on his feet again, but, not being able to stand, was seated on the sofa, and as soon as my son let go of his hands his body dropped forward and folded together as before, with an immediate return of the peculiar grunting, catching respiration which was so conspicuous in his case, and which entirely disappeared every time that he was suspended by the arms.

As they were compelled to leave in the next train, and I had no time to apply my usual "turtle-shell,"* which takes

* For some years before this, in cases of persons too poor to pay for a Taylor brace, I had been in the habit of applying as a spinal support what I called a "turtle-shell" of plaster of Paris. This was done by placing the child on the stomach and pulling the shirt down smooth, so as to have no wrinkles in it; a piece of flannel or any cloth of loose texture, like cheese-cloth, or an old towel, was cut so as to fit the back from the neck to the buttocks, and to extend two thirds around the

some hours to complete, and as Dr. Yale, my assistant, was just completing the application of a plaster-of-Paris bandage to a child's club-foot, I told him to apply the same to this child's body, as we could do it more quickly than we could apply a "turtle-shell," while, if there should be any danger from respiration, we could easily divide it down the front, my object being merely to give the child some kind of support until Mr. Reynders could make the brace, and at the same time to protect the child from the danger of jar in traveling.

My son stood on the sofa and held the child up by the hands, Mr. Reynders had him by the feet, and I pulled his red flannel shirt down so tightly that it fitted almost like his skin, and Dr. L. M. Yale applied the plaster bandages very rapidly around his entire trunk, commencing at the waist, going down to the pelvis, and reversing, going up to the top of the sternum and back several times, until we thought it was sufficiently thick to sustain him.

At first I was much alarmed about his breathing, but as he hallooed quite loudly my fears were soon dispelled.

We then laid him on his stomach on the sofa to dry while we went to lunch; on our return to the office, you can imagine

body, nicking it at the waist and other places where it might be necessary to make the adjustment accurate. Several of these were cut after the same pattern, and then dipped in a mixture of plaster of Paris and saturated with the plaster.

Two assistants then gently extended the child by making traction by the arms and legs, and after the shirt had been pulled down smoothly, these plastered cloths were placed in position on the child's back and around his body, and a dry cloth or blanket of the same pattern was placed over them, and all these were secured in position by a nicely adjusted roller bandage around the whole body; the child was to be kept lying on the stomach until the plaster had hardened or become "set," after which the mother could roll the child on his back and accurately fit a piece of elastic webbing to the open space in front, which, being laced in the center, would accurately retain the plaster shell in its proper position on the back, and give the child a much more secure support and infinitely more comfort than any of the "Knight cribs" for which I had so frequently used it as a substitute.

our surprise to find him standing at the window looking out into the street, the mother stating that he had got off the sofa and walked there a few moments before without any assistance, a thing he had not done before for many months. The child seemed to be perfectly comfortable, but I was afraid to leave his entire thorax in this inelastic casing, and I therefore slipped a paper-knife beneath his shirt and cut both shirt and plaster casing from sternum to pubes. I then secured the pelvic portion by a few turns of a roller bandage and left the upper part gaping open, instructing the mother to secure it by tying three elastic straps on either side, which were cut from her rubber garters, and directed the parents to bring the child on the following week to apply the Taylor brace. The present arrangement was a mere temporary expedient, without the slightest intention of making it a permanent plan of treatment.

Mr. Reynders brought the Taylor brace the following week, as by agreement; but the child made no appearance, and, as I did not know the name or address of the people, I lost sight of them until March, 1875—nearly four months after their first visit. In the mean time, as I had given up all expectations of ever seeing the child again, I had given the brace to another child that it happened to fit.

In March, 1875, they came to my office just as I was leaving for my clinical lecture at Bellevue, and I took them in my carriage to the hospital and described the history of the case, as here narrated, to the class.

The mother stated that the reason she had not returned according to her promise was because the child had been so perfectly comfortable all winter, running around the house the same as the other children, and she only came now because he had been bleeding from his belly for the last few days, and some of her friends had told her he had a cancer coming on his belly, although he seemed to be perfectly well. The child had grown quite stout, and was looking the picture of perfect health, walking around the room quite firmly.

On removing his clothes, I found the front of his plaster

jacket all stained with blood. The bandage securing it around the pelvis was exactly as I had put it on four months before, except that it was exceedingly filthy. From about two inches below the umbilicus to the top of the jacket it gaped open, quite widely at the top, and was held together by the elastic ties the mother had sewed on.

At the umbilicus there was a mass of very red exuberant granulations, which bled quite profusely and which had been oozing blood for some days, and it was for this reason that she had returned.

On removing the bandage around the pelvis, for the purpose of taking off the jacket, the source of trouble was readily discovered. In cutting through the shirt and plaster the day that I put it on I had left a *single thread undivided* just on the umbilicus, and, as the child grew and the upper part expanded, this thread irritated the umbilicus, causing a warty growth, which was very hæmorrhagic. I snipped it off with a pair of scissors and touched the base with nitrate of silver, and that was the end of it. I then scolded the woman for neglect, and told her to go to Mr. Reynders and be measured for a new brace, as I had given her other one away, and to return the next week without fail, as I wished to show the class how to apply a Taylor brace. I then reapplied his dirty jacket, and as soon as I had finished the bandaging the mother said, "Now, sir, he can stand again." I asked her if he could not stand when I had it off, and she said, "No, sir." I had not noticed that fact, and therefore immediately removed the bandage and took off the plaster-cast, and sure enough the woman was right; the child immediately staggered on his legs, put out his hands to seize something to keep from falling, and could not or would not lift either foot from the ground. My assistant held the child up by the arms and I readjusted the jacket, and immediately he walked as before. This was to me a revelation, and I then and there prophesied that this was probably destined to be the future plan of treatment of Pott's disease. Dr. George, who was then a medical student and most excellent short-hand reporter, published this lecture in the "Philadelphia Medical Times" for April 10, 1875. I told the woman not to go to Reynders for a

Taylor brace, but to wash the child clean, get it a closely fitting shirt, and bring it to my next lecture, and I would apply a proper plaster-of-Paris jacket to him.

This was done on the following Wednesday at my clinic, and was the first public exhibition of this plan of treatment. I next made a public demonstration of the treatment at the meeting of the American Medical Association in Louisville, Ky., in May, 1875. At the meeting of the American Medical Association in Philadelphia in 1876 I made a practical demonstration of the application of the plaster-of-Paris jacket in a case of Pott's disease. Dr. Alfred C. Post then remarked that "this method of treatment marked an era in the history of medicine," and moved a vote of thanks to me, which was carried without a dissenting voice.

In 1877 I made public demonstrations in Guy's Hospital, St. Thomas's, University College Hospital, and St. Bartholomew's, in London; Birmingham Infirmary, and twice before the British Medical Association at Manchester, the second lecture being in response to a unanimous request from the association, upon a motion made by Mr. Lund and seconded by Mr. Ernest Hart, secretary of the association, asking me to make the second demonstration. At this last lecture the room was insufficient to accommodate the audience, and they adjourned to the largest hall in the university, which was soon crowded to its utmost capacity, and for the ovation that followed the demonstrations I must refer you to the medical journals of that date both in England and in this country. In Liverpool, Cork, Dublin, and Belfast, at the different meetings of the British Medical Association, at the meeting of the International Medical Congress at Amsterdam (1881), and also at Copenhagen (1884), I made public demonstrations of the plan of treatment, and received a unanimous vote of thanks in each instance, and an indorsement of its superiority over any other plan yet devised.

This is not the time or place to describe my method of applying the plaster of Paris as a spinal support, as that has already been so fully done in my published works. But some substitutes have been offered to take its place, such as silicate of sodium, the porous felt, leather, etc. The objection to the first is its want of porosity and difficulty of removal. The felt splint is also impervious to the air, on account of the gum that is in it, and it has not sufficient firmness to retain its form unless sustained by iron supports, and can not be constructed in any part of the country by the ordinary physician independent of the instrument-maker, as the plaster-of-Paris jacket can.

The same objections apply to the rawhide of Darrach, the leather jacket of Bartow, and the wire corset of Roberts. They can not be made except by the skilled mechanic, and can not be compared to the plaster jacket for comfort and utility, even when made by the most accomplished instrument-maker.

Mr. Davy, of London, has also made some modifications in my mode of applying the plaster-of-Paris jacket by laying the patient in a hammock, instead of partially suspending him, as I always do. The objection to this mode is that the body is bent too much in a backward curve, and also that the thorax is more compressed when the child is lying on its stomach than when it is partially suspended, according to my plan, which necessarily expands the thorax to its fullest capacity, and this capacity of thoracic expansion I look upon as of most vital importance, and, in fact, the restriction of this thoracic expansion is one of the principal objections to some, if not most, of the other spinal supporters. It is true that Mr. Davy has now modified his plan somewhat by cutting a hole in the hammock to let the head fall through, and another for the feet, and then by having extension made by two assistants

while the plaster bandages are being applied. But, as the child is lying with its face toward the floor you can not see the effect of your traction on its countenance, and therefore may apply it too strongly or not strongly enough; and, as the child is often too young to talk, you can only be governed in your amount of traction by the effect produced in its countenance by the expression of either pain or pleasure.

When applied as I suggest, the gradual traction can be continued until you reach the point of greatest comfort, which is easily recognized by the child's expression, and can then be securely retained until the plaster is accurately adjusted, when the retention in this position of perfect comfort will be permanent.

The various substitutes that have been suggested to take the place of plaster of Paris—such as silicate of sodium, shellac, porous felt, gutta-percha, etc.—are all objectionable on account of their want of porosity, and therefore being impermeable to the air, whereas the plaster jacket is perfectly permeable to the air, as is seen in this experiment: by blowing the smoke into this tight plaster-of-Paris box, you see it emerging from *all* its parts, thus proving its porosity, which is of such vital importance in retaining the skin in a healthy condition and not interfering with the insensible perspiration, which is a point of vast importance. In cases of rotary lateral curvature, where the deformity has been allowed to progress to the point of requiring artificial support, there is no substitute that can be applied that will so well retain the body in the improved position which partial self-suspension gives it, and which can be worn with so much comfort to the patient as the plaster-of-Paris corset.

Conclusions.—That the plaster-of-Paris jacket and jury-mast in cases of spondylitis or Pott's disease, and that the plaster-of-Paris corset in cases of rotary lateral curvature, are

altogether superior to any other instruments yet devised for the relief of these infirmities, and for the following reasons :

1. They can be applied in any place and by any competent physician with perfect success, without the intervention or aid of any instrument-maker. This to the country practitioner is a point of most vital importance.

2. They can be worn with perfect ease and comfort to the patient in all cases where they can be properly applied.

3. The plaster-of-Paris jacket and jury-mast retains the spinal column in a more quiescent condition, and relieves the inflamed parts from the pressure of the superincumbent head and shoulders in cases of spondylitis better than any other device heretofore employed.

4. That, being applied while the shoulders are elevated and the body partially suspended, the thoracic cavity is expanded to its utmost capacity, thereby increasing the ability for full inspiration better than can be done by any instrument which is retained in position by girdling the thorax, either by fixed bands or by elastic straps.

5. That, being porous and permeable to the air, it does not interfere with the insensible perspiration, and is therefore infinitely more healthy than the shellac, gutta-percha, felt, leather, rawhide, silicate of sodium, or any of the other substitutes that have been suggested to take its place.

6. That it does not "breed vermin" or other filth, as has been charged against it, but is, on the contrary, more cleanly and more healthy on account of its porosity.

7. That, in cases of rotary lateral curvature, when the deformity can not be overcome by any amount of lateral pressure until the column has been elongated—as was most conclusively proved by Dr. A. B. Judson in his beautiful experiments before this Academy some years since—the plaster-of-Paris bandage can be more *accurately* applied than any other material, and, being thus accurately adjusted

to all of the irregularities of the body, and closely fitting it in every place, will retain the body in the improved position which partial self-suspension gives it better than any other device, and be infinitely more comfortable to the patient.

From all these facts we feel justified in quoting the language of Mr. William Adams, of London, at the International Medical Congress held in Copenhagen in 1884, when he said: "The modifications in the plaster-of-Paris jacket which Dr. Sayre has recently introduced and exhibited to this meeting seem to have *perfected* the jacket as a mechanical support."

Discussion.

Dr. SHAFFER thought that surgeons were all perfectly agreed as to one point regarding the mechanical treatment of Pott's disease of the spine, and that was the desirability of removing, so far as possible, traumatism from the part affected with chronic spondylitis. The various means of accomplishing this had been subjected to more or less experience by all. He had personally used the plaster jacket in quite a large number of cases and had been somewhat disappointed in its use. He felt that if the position gained by recumbency was maintained, we were apt to do our patient more good than if we subjected him to the increased traumatism secured by suspension. In the application of the plaster jacket in bad cases of Pott's disease we inflicted a certain amount of traumatism every time suspension was applied. If the position gained by suspension was maintained for any length of time, he felt that it would be to keep this traumatism up. If a patient was taken under the arm and lifted up, he was relieved during the time he was suspended; the very moment the force was relaxed an indescribable expression of pain passed over his countenance. Some time since he had made several experiments with the plaster jacket to determine how thick the anterior wall should be in order to support the patient, so as to prevent him from relapsing into the position of the former spinal curves. He had accordingly had the patient suspended,

and as soon as the jacket hardened had cut it off and taken its outline. He had then measured the antero-posterior diameter of the jacket and had found that it had increased nearly an inch. He had then applied another jacket and had found that the antero-posterior diameter had increased an inch and a half. In other words, unless the jacket was applied very frequently, it did not maintain the position required by suspension, and the patient, so to speak, sooner or later telescoped down into the jacket.

In another respect the jacket had proved a fallacy; the deformity increased a good deal during the month or six weeks that the patient had it on, as he had found from actual measurement. He would simply say that above the eighth dorsal vertebra the Taylor support far excelled the plaster-of-Paris jacket in his experience, and that was especially true if the apparatus was surmounted by the proper head support. His conclusion, after considerable experience with the plaster jacket, was that he would prefer to place himself under a competent surgeon who applied Taylor's antero-posterior support rather than the plaster jacket.

The CHAIRMAN said, in regard to the traumatism in applying the plaster jacket to which Dr. Shaffer had referred, that it was absolutely impossible for traumatism to occur, provided the surgeon applied the jacket properly and in strict accordance with the instructions he had so carefully given; that the plaster jacket, on the contrary, when properly applied, afforded a perfect relief to every one who had ever worn it, and there was no possibility of restricting the breathing, which was a feature to be objected to in the Taylor brace. A practical demonstration was worth all the theorizing in the world. "Here," said the chairman, "is a gentleman from Hutchison, Kansas, who came to me yesterday to be treated for a chronic inflammation of his knee joint. On examining him, I discovered that he had also suffered from Pott's disease some years before, and had been cured by a plaster-of-Paris jacket which had been applied by a country doctor, and I therefore asked him to come here this evening to illustrate the fact that the treatment could be successfully applied in the most remote

sections of the country, and without the aid of any particular specialist. This man is twenty-six years old. He was injured in his back by attempting to lift a heavy weight when he was sixteen years old. In a few months he began to suffer pain in his abdomen, which increased rapidly and was accompanied with severe spasms in his legs and numbness of the same, terminating in eighteen months in complete paralysis of both lower extremities. He remained in this condition, confined on his back in bed, for more than twelve months, suffering intense pain and constant muscular spasms in his legs and the lower part of his abdomen. Blisters, liniments, and various internal remedies were employed by the different medical men who saw him, but without any benefit. After all hope of his recovery had been abandoned, a young physician came to the place, who had seen me apply the plaster-of-Paris jacket at Bellevue. He was called to see the patient, and, after properly suspending him, applied a plaster-of-Paris jacket. From the instant that the patient was properly suspended, the pain in his abdomen and the spasms in his legs ceased and have never returned. In a few days he could sit up, he recovered the use of his legs in about three weeks, and from that time he continued to improve rapidly, so that in a few months he was able to attend to considerable business on his farm. He wore the same jacket for eight months and became perfectly consolidated as you now see him, and, as he says, never suffered the slightest pain or inconvenience from the day the jacket was applied. You observe quite a prominence of the seventh and eighth dorsal vertebra, but the father says that the 'hump' is not so large as it was before the jacket was put on. How this is, of course, I can not say from personal knowledge; but I do know that, if it had been properly applied before the deformity had appeared, he might have been cured, as I have seen many others, without any hump at all. I simply show the patient to illustrate the fact that a country doctor can cure these cases as well as any specialist."

Dr. RIDLON asked whether or not in the application of the plaster jacket fixation of the spine in the point diseased was aimed at. If that was so, he did not understand why one could

not obtain more fixation from the Taylor support. If motion at the diseased area was desired, would it not be better to let the patient go without any dressing at all? If fixation was desired, why was it desired in a tubercular disease of the vertebrae and not of the hip joint?

Dr. KERCH remarked that, admitting the superior advantages of the plaster-of-Paris jacket in certain localities, he did not believe that its application was such an absolute matter of ease as had been stated this evening. He believed that the plaster-of-Paris jacket and many other braces owed their effectiveness to the person who applied them. Possibly the chairman could get a great deal more benefit out of plaster of Paris than others who applied the same material. He was quite sure that those who were in the habit of applying Taylor's apparatus could get better results from it than those who were not, but who trusted the application and care of the instrument to the instrument-maker. From his own experience, he was sure that the plaster jacket afforded an excellent and ready means of treatment for disease located in the lumbar region. He doubted very much if the plaster-of-Paris jacket, or any other brace, would stop deformity in that most formidable portion of the spine—the mid-dorsal region.

Dr. TAYLOR said that he had been very glad to hear from the principal advocate of the treatment of spinal deformity by the plaster-of-Paris jacket, and he supposed the furor excited by its published announcement had seldom been equaled by any medical discovery. It had emphatically drawn the attention of the public and profession to the fact that Pott's disease and lateral curvature could be treated, and if the chairman had accomplished nothing but this, he thought that we should be very much indebted to him for it. We had had patients with lateral curvature and Pott's disease settling down to the full extent of their deformity, with abscesses, paraplegia, and the various complications of the disease, with scarcely a finger raised to help them out of their condition, and there were, he believed, at the present time surgeons in out-of-the-way places who did not know that the treatment of Pott's disease was one of the most successful things in surgical practice when properly carried out.

The speaker's experience with the plaster jacket had led him to think that the chairman obtained better results from it than from the Taylor brace, and that he himself would get better results from the Taylor brace. Men must use the apparatus they were most accustomed to. We must be a little cautious in accepting the indorsement of the chairman to-night in regard to the plaster jacket as compared with the verdict of other men. In von Ziemssen's "Hand-book of General Therapeutics," vol. v, Professor Bush, speaking of the plaster jacket, had said that it was of doubtful utility and should not be employed where more perfect means could be obtained. In England Dr. Reeves also had said that the plaster jacket had proved a disappointment in the hands of English surgeons, both in the treatment of lateral curvature and in that of Pott's disease. The speaker had had no experience in putting on the jacket, but a great deal in taking it off, and from the patients who had come to him he was convinced that many patients went under treatment with very little deformity and came out with a great deal. This must make us think that it was not, as Dr. Ketch had remarked, so easy to apply it as the chairman would have us believe. The treatment of Pott's disease needed the most careful knowledge that could be given to it, and it could be acquired only by long practice. He did not believe that a country practitioner could carry a patient successfully through Pott's disease with a plaster jacket. Looking at it from a mechanical point of view, if experts in mechanics, not physicians, were consulted, they would tell us that the antero-posterior support was a more perfect mechanical device than the plaster jacket.

Dr. R. H. SAYRE remarked that Dr. Shaffer had said that he had found by measurement that the jacket when applied had increased in its antero-posterior diameter from an inch to an inch and a half in two weeks. If the jackets did so they undoubtedly did not give the spine proper support, and had not been applied as they should have been. The jacket should retain its shape, and it ought to be so applied as to do so. Dr. Shaffer was mistaken in saying that suspension caused traumatism. All patients with acute Pott's disease were very apt to make self-suspension by putting their hands on a chair, and so

making extension of the spine. By the suspension apparatus this was done for them, and if the jacket was properly applied, instead of sinking into the original position and receiving a traumatism, as Dr. Shaffer had said, they would be retained in the improved position, which was a source of comfort to them. If they did not have enough of traction on the head to prevent the reflex spasm, it was evident that the most favorable condition for a cure had not been secured.

Dr. LACKEN, of Canada, said that he was a country practitioner, and he thought that there was nothing that had been such a boon to patients with Pott's disease as the plaster jacket. He knew of several cases of Pott's disease that had been cured by means of the plaster jacket. He had several plaster jackets in his office, and they retained the same shape they always had.

Dr. R. H. SAYRE asked Dr. Shaffer what time elapsed after the jacket was applied until the patient went home?

Dr. SHAFFER: About four hours.

Dr. SAYRE: Did he have a jury-mast?

Dr. SHAFFER: No.

Dr. SAYRE said that if he were to apply a plaster jacket on a patient with much deformity he would put on a jury-mast, and if he did not have one he would make the jacket strong enough to prevent the patient's sagging forward an inch and a half. It seemed to him that the patient was allowed to bear his entire weight upon the plaster jacket before it was sufficiently hard to sustain it.

Dr. SHAFFER: It was hard and of good quality.

Dr. L. H. SAYRE remarked that he thought that he could give a solution to Dr. Shaffer's troubles with the plaster jacket. There was a peculiarity of plaster of Paris that in fifteen minutes it would become absolutely hard, then some time afterward it became a good deal softer. The patient had been put on his feet too soon, and the weight of the body went on to the plaster before it was hard enough to sustain it, and thus produced an antero-posterior increase of an inch and a half. A jacket would not become thoroughly hard in less than twenty-four hours. His rule was, after applying a plaster jacket, to keep the patient an hour or two in the recumbent position until the plaster set,

then let him go home and keep the horizontal position, with the jacket exposed to the air until it had become thoroughly hard.

Dr. KETCH asked the chairman what had induced him to add the jury-mast in disease of the lumbar vertebræ. At the time the work on spinal diseases had been published in London (1877) nothing had been said about the application of a jury-mast below a certain dorsal vertebra, which one he would not now attempt to say.

The CHAIRMAN said that he was indebted for the suggestion to Dr. S. W. Gross, of Philadelphia. He had stated that fact in all his writings for the past five or six years. In regard to the question of Dr. Ridlon, the speaker would say that the fibrous tissue of the capsule of the hip joint, if kept quiescent, became fibro-cartilaginous and ankylosis occurred. Sir Benjamin Brodie had cited a case where complete ankylosis had occurred in a patient who lay in bed without any disease of the hip joint at all. In the back ankylosis was not a very undesirable thing to get. He had seen some patients with Pott's disease who had recovered with motion in the joint. As for the difficulty of applying the jacket, he knew of two instances where a woman in Charles Street, in this city, whose child he had treated for Pott's disease, went to Nova Scotia and treated two children with a similar ailment from the simple knowledge she had obtained by seeing it done in his office. She had sent to him for the plaster, and last summer Mr. Ward, the artist, had pictured these children as perfectly cured, and with the disease, too, in the mid-dorsal region. It was now four years since this had occurred. This position was also borne out by the remarks of Dr. Lacken (present at the meeting) that any country doctor could apply it properly, while in England McNaughton Jones, Golding-Bird, Durham, Berkely Hill, Keetley, Owens, Oxley, McLeod, Hobart, and others had strongly recommended it, and even St.-Germain of Paris, while censuring it in the first part of his book, said, later on, that he had found it invaluable *after he had learned how to apply it*.* The chairman's impression was that Dr. Shaffer and the different gentlemen mentioned by Dr. Taylor would agree with Dr. St.-Germain as soon as they became conversant with the proper way of applying it.

* "Chirurgie orthopédique," pp. 349-374.