ferred from there to me. My assistant, Dr. Heckmann, diagnosed a slight bulging of the right side of the neck and a corresponding osseous tumor which could be traced from the spinal column to the neighborhood of the sternoclavicular joint. Pulsation was marked. After Dr. Heckmann had confirmed his diagnosis of accessory cervical rib by means of the Roentgen plate (Fig. 1) he exposed the anterior portion of the rib by means of an incision running along the posterior border of the sternomastoid muscle. He found both the brachial plexus and the subclavian artery passing over it. After the resection of this portion the plexus as well as the artery dropped back into the newly formed cavity. As the cause of the pressure had been removed it was decided to let the posterior remnant of the rib take care of itself. The symptoms of complaint gradually disappeared, but returned with undiminished vehemence three months later.

Examination.—When I examined the patient I could find neither prominence nor pulsation. The pulse of the axillary, brachial and radial arteries, however, was diminished in tension. The reaction to electricity of muscles and nerves was also diminished. Sensation was normal. Patient was extremely anemic and complained of pains in the neck and right arm and of numbness of the fingers. On stretching the neck the pains were intensified. The power of compression of the right hand was diminished.

The Roentgen picture—extreme lateral position of head during exposure—(Fig. 2) shows on the right side the presence of a fair-sized costal stump running from the seventh cervical vertebra, while the left side shows a small rudiment. The sixth cervical vertebra shows a rudiment on both sides.

Operation.—In view of the vehemence of the symptoms, especially of the pains, I decided to reopen the field of operation for the purpose of removing the remainder of the rib. Advancing carefully, layer by layer, into the deeper tissues, I neither came in contact with the brachial plexus nor with the artery. It was rather difficult to separate the muscle from the edges of the rib. Most of the separating was done bluntly with the aid of the Cooper scissors, using them as a support. The extirpated fragment of the rib measured 4 cm. As the previous resection had been done subperiosteally a new formation of bone of more than one cm. in length had attached itself to the stump of the rib. Hence it becomes evident how necessary it is always to remove the periosteum with the rib. The rib, on the whole, was narrow, thickened at its vertebral attachment and presented a small groove on either side.

Recovery was uneventful. The symptoms disappeared entirely shortly after the operation. Two months later slight symptoms of pain made themselves felt in the neck on the right side, but these also disappeared after the use of the galvanic current.

BLOODLESS REPOSITION OF THE CONGENITALLY DISLOCATED HIP JOINT VERSUS ARTHROTOMY.

WITH STATISTICS OF 34 CASES OPERATED ON BY DR.
LORENZ DURING HIS VISIT TO THE UNITED
STATES IN 1902.

FREDERICK MUELLER, M.D.

Attending Orthopedic Surgeon to St. Luke's Hospital, Chicago;
Professor Orthopedic Surgery, Milwaukee Medical
College, Milwaukee.
CHICAGO.

A dispute which appears to be settled, at least so far as the competent authorities in Germany, France and Italy are concerned, seems to have been resurrected in America in recent days. The question is whether the open operation or the bloodless reposition of the congenital dislocation of the hip joint should dominate the future therapy of this deformity.

One of Sherman's later publications¹ is so much in favor of the open operation that it seems quite justifi-

able to compare these methods of treatment critically without any prejudice.

In this connection I quote the historical fact that the originator of the bloodless method, Prof. A. Lorenz of Vienna, had the largest record (about 200 cases) of open operations just at the very time when he began to develop the bloodless method, which he considers the only and the most suitable treatment. Prof. A. Hoffa of Berlin, whom we may call the most prominent pioneer in the development of the open method, recommends in all cases at first the attempt to reduce the congenitally dislocated hip, leaving for the open operations only those cases in which the bloodless method failed.

Among American surgeons it must be admitted that some uncertainty about the advisability of the new method has developed, because of the many accidents which have been observed; but to be just we must frankly state that for those accidents and mischief the method can not be held responsible. They occurred mostly in unsuitable cases and were due to rough maneuvers or to other mistakes in technic.

The great importance of the first mentioned point may readily be seen in the many cases scattered between Boston and San Francisco on which Lorenz operated. Not half of those cases were pronounced by Lorenz as favorable, either because of the advanced age of the patients or because they had been operated on before without success either by arthrotomy or by reposition. Knowing how small a chance for success he would have, and emphasizing this fact, he nevertheless was obliged to operate on these patients, as these cases were often the only ones which could be secured for his clinical work.

In a great many cases his refusal to operate would have resulted in great disappointment to many physicians and students who wished to witness the single steps of the operation. In one large eastern city with a population of nearly a million, not a single half-way suitable case was among those that were prepared for him; he was not loath to cancel the clinic altogether, and only the consideration of the crowded amphitheater, as well as regard for his host, induced him to do his best in spite of the very unfavorable circumstances.

That under these conditions the method could not show its best results and could not be expected to give the claimed 50 per cent. of anatomic cures is an evident matter of fact.

The few cases which Lorenz pronounced favorable could not give the best results possible, as the very important after-treatment was administered by the various surgeons under whose care the patients were left in various ways and after different principles. This fact, although deplorable, was unavoidable, as with the exception of the few pages which Lorenz² devoted to this chapter in his book nothing existed dealing with these very important features of the treatment. Many new details have been added to this chapter, and simple comparison of the after-treatment as outlined by Lorenz in his book in 1900, and given by me in 1904 and 1905,³ shows this fact very clearly. Those details explain why the majority of the cases operated on by Lorenz can not be regarded as giving average results or as being

2. Lorenz: Ueber die Heilung der angeborenen Hüftgelenksverrenkung durch unblutige Einrenkung. Wien, 1900.

3. Mueller and Ashley: Treatment Following the Bloodless Reduction of Congenital Hip Dislocation. New York Medical Journal. A series of four articles, beginning May, 1904, ending January, 1905.

1. Sherman: Congenital Dislocation of the Hip. THE JOURNAL A. M. A., Jan. 7, 1905.

fitted for drawing figures for statistics. That among Lorenz' cases, however, a good many first-class results have been secured I am able to prove by the following statistics:

Total number of cases operated on by A. Lorenz and left under my care, 34.

Cases suitable for statistics, 32.

Anatomic repositions, 21 (Table A).

Subspinal positions, with excellent functional result, 11 (Tables A, B and C).

TABLE A—ANATOMIC RESULTS.

No.	Name.	Age in Years.	Side.	Date of Operation.	Gait. (1905)	Motion. (1905)	Notes.
1	L. Th.	3½	L.	Oct. 18, 1902.	Normal.	Full.	February 19, 1903, depression of the head, which stood in suprapubical position.
2-3	B. M.	4	L. & R.	Nov. 24, 1902.	Normal.	Full.	April 25, 1903, removal of the cast; after-treatment.
4-5	E. L.	4	L. & R.	Oct. 24, 1902.	Normal.	Full.	June 24, 1903, depression (as in Case No. 1). August 29, 1903, third cast; February 5, 1904, after-treatment.
6	M. W.	4½	L.	Oct. 18, 1902.	Good.	Full.	April 20, 1903, after-treatment; Feb. 15, 05, some outward rotation still exists.
F	B. E.	4½	L.	Oct. 15, 1902.	Stiff.	Limited.	March 15, 1904, forcible correction of the abducted position; parents discontinued treatment.
8	S. L.	4½	L.	Oct. 22, 1902.	Normal.	Full.	July 6, 1903, after-treatment.
9-10	K. B.	5	L. & R.	Oct. 16, 1902.	Good.	Limited on left side.	May 20, 1903, depression on the right side (as in Case No. 1).
11	L. R.	5	L.	Nov. 12, 1902.	Normal.	Full.	December 12, 1903, depression (as in Case No. 1).
12	D. A.	5½	L.	Oct. 22, 1902.	Normal.	Full.	Operated on without success by Dr. J. Ridlon, 3 years ago. April 23, 1903, after-treatment. August, '04, died from typhoid fever.
13	A. L.	6	R.	Oct. 10, 1902.	Somewhat stiff.	Somewhat limited.	Operated on without success by Dr. J. Ridlon, 2 years ago. April 19, 1903, second cast. July 2, 1903, after-treatment.
14	W. M.	6½	L.	Oct. 17, 1902.	Normal.	Full.	April 18, 1903, after-treatment.
15	N. H.	7	L.	Oct. 24, 1902.	Good.	Full.	Operated on without success by Dr. J. Ridlon, 2 years ago. April 19, 1903, after-treatment. Leg somewhat rotated outwards.
16	L. E.	7½	L.	Oct. 12, 1902.	Normal.	Full.	Operated on without success by Dr. J. Ridlon, 3 years ago. May 29, 1903, depression (as in Case No. 1). August, 1903, after-treatment.
17	B. Ph.	8	L.	Oct. 16, 1902.	Normal.	Nearly full.	April 27, 1903, after-treatment.
18	E. S.	8½	L.	Oct. 12, 1902.	Normal.	Full.	May 18, 1903, depression (as in Case No. 1). August 18, 1903, after-treatment.
19	H. R.	8½	L.	Oct. 22, 1902.	Normal.	Full.	May 19, 1903, after-treatment.
20	L. T.	8½	L.	Oct. 18, 1902.	Stiff.	Limited.	January 14, 1904, and February 9, 1905, correction of the abducted position in narcosis.
21	K. M.	9½	L.	Nov. 2, 1902.	Normal.	Full.	June 8, 1903, after-treatment.

As the cases contained in Table C must be excluded, the proportion of the anatomic repositions to the subspinal positions stands 21 to 11. Although more than two years have elapsed since the time of the operations, the treatment of all cases can not be considered as finished. This is shown by Cases 7, 13 and 20 of Table A, where some stiffness and limitation of the motion of the hip joint is still present. Under suitable treatment all these cases are improving, so that for

each one a perfect motion (continued care provided) may be predicted. Even in case we subtract for the present time Cases 7, 13 and 20 from the perfect anatomic cures, the proportion stands 18 to 14. That means about 50 per cent. of anatomic cures with absolutely normal gait.

Among the 21 anatomic results, depression of the head, which stood in a suprapubical position, was necessary in six cases. All cases thus treated gave beautiful results.

That many of the patients operated on unsuccessfully before are among these cases, and that many of them

TABLE B—SUBSPINAL POSITIONS.
ANTERIOR SUPERIOR REDISLOCATIONS.

No.	Name.	Age in Years.	Side.	Date of Operation.	Gait. (1905)	Motion. (1905)	Notes.
1	B. L.	3	R.	Oct. 16, 1902.	Good.	Full.	April 27, 1903, after-treatment.
2	T. H.	3	R.	Oct. 31, 1902.	Nearly normal.	Full.	June 5, 1903, after-treatment.
3	M. M.	3	L.	Oct. 17, 1902.	Good.	Full.	April 18, 1903, after-treatment.
4	B. T.	3½	L.	Oct. 12, 1902.	Good.	Full.	May 15, 1903, after-treatment.
5	V. T.	4	L.	Oct. 21, 1902.	Good.	Full.	April 25, 1903, after-treatment.
6	L. M.	4	L.	Oct. 15, 1902.	Nearly normal.	Full.	April 18, 1903, after-treatment.
7-8	S. M.	6½	L. & R.	Nov. 22, 1902.	Good.	Full.	September 10, 1903, second cast; August 14, 1903, third cast; March 15, 1904, after-treatment.
9	L. G.	7	L.	Oct. 18, 1902.	Somewhat stiff.	Full.	April 29, 1903, after-treatment.
10	E. N.	5	L.	Oct. 29, 1902.			Although both children walked well the parents were determined to have the attempt made of changing the subspinal position into an anatomic position. In both cases the secondary operation was successful. Further particulars about this new improvement will be published later.
11	A. G.	5	L.	Oct. 18, 1902.			

TABLE C—MISCELLANEOUS CASES.

No.	Name.	Age in Years.	Side.	Date of Operation.	Gait. (1905)	Motion. (1905)	Notes.
1	G. E.	10	L.	Oct. 14, 1902.			During March 1903, a correction of the abducted position was made and a cast was applied by a Chicago surgeon; this manipulation probably led to a relapse. June 17, 1903, this cast was removed and a relapse was apparent.
2	E. McL.	4½	L.	Oct. 20, 1902.			

were near or beyond the age limits can be seen from the statistics, but so much the more must we be satisfied with the fact that over 50 per cent. of anatomic results and no relapses have been obtained. The reported relapse in Case 1, Table C, is certainly due to the unsuitable maneuvers while the second cast was put on.

It can not be repeated often enough that in order to show the full efficiency of the bloodless method it is necessary to keep strictly within the age limits. It can not be expected that a method for which such limits exist will give the best results in cases which have passed this limit, although the operation itself, that is,

the reposition of the head of the femur into the socket, might be accomplished in a great many cases that are beyond that limit. The age limit—about 7 years for unilateral cases, and 4 or 5 years for bilateral cases—are too well known to need further discussion. Within these limits it must be considered a great rarity when the bloodless manipulations do not give the wished-for reposition; but such exceptions occur. Sherman's case of the 10-month-old baby in which he found the entrance to the cavity of the socket exceedingly narrow, may belong to this group; I had a similar experience four months ago in a case of a double dislocation—a girl of 3 years—in which I secured an anatomic result on the left side and two attempts to reduce the right side failed, although each attempt lasted more than one and one-half hours. Other orthopedic surgeons undoubtedly will have similar experiences.

The obstacle in such cases is the narrowed part of the capsule, which in some publications is called the "hourglass-shaped constriction of the capsule" (*Sanduhrförmige Einschnürung der Kapsel*), and in others, "the entrance to the pocket-shaped recessus of the socket" (*Eingang zur Pfannentasche*).

It always has been evident for every one who ever performed or witnessed an arthrotomy, or an open reposition, that a disproportion exists between the head of the dislocated femur and this narrowed part of the capsule, through which the head has to be introduced into the socket. All authors are familiar with this fact. This narrowed space, however, within the age limits of the bloodless operation with the exception of a very few cases, is always large enough to allow the passing of the head of the dislocated femur. That this passage is not always easily accomplished can be readily understood; usually some difficulties are met with in executing the reduction; the narrowed capsule must be widened according to the diameter of the femur head.

If we open a joint we can not tell from the appearance of the narrowed part of the capsule whether a reposition by mere maneuvers would be impossible. Sherman¹ in his paper, however, avails himself of this kind of argument and in discussing his 28 cases comes to the conclusion that among 28 impossibilities there was only one possibility for getting a real reposition by the bloodless method. Of course, no one is able to prove such a statement, not even Sherman himself.

The same objection to the bloodless method was made in Europe at the time the first communications about it were brought forth. All these voices were silenced after it was proved that the impossibilities were lost sight of in the overwhelming number of possibilities. When Sherman's paper was discussed at the meeting of the American Orthopedic Association, Atlantic City, June, 1904, as far as I remember Sherman's standpoint was not supported in the general sense. An eminent guest of the association, Professor Hoffa of Berlin, who, like Lorenz, performed several hundreds of open and bloodless operations and who is a pronounced partisan of the open method, did not consent to Sherman's accounts, and preferred not to answer when Sherman asked him whether he really believed the possibility of driving the camel (the head of the femur) through the needle's eye (the narrowed part of the capsule). Each surgeon who has performed a bloodless reposition may answer this question for himself.

The possibility of the immediate success of the operation, which means the fact of the introduction of the head into the socket is the same, whatever method may

be resorted to; but for the criticism of a method not only the immediate success of the anatomic result but also the permanency and the quality of the functional result comes into consideration and it must be emphasized that anatomic and functional results do not always correspond.

My connection with Prof. A. Lorenz in Vienna enabled me to form an opinion regarding the results of the two routine treatments, as in 1897, when I began to work with Lorenz, the open operation was still very often practiced by him in older cases, whereas, on the other hand, all those patients who have been operated on by Lorenz by the open operation previous to that time used to come regularly either for after-treatment or for an examination.

I was able to trace more than 200 cases of open operations in their results for a long time—some for several years. This gave me the opportunity to compare their results by interposition with the results obtained by the bloodless method.

The exact requirements of a perfect anatomic result are not always obtainable by performing the open operation. There are many cases in which the head does not stand centrally opposite the V-shaped cartilage, a sort of new socket being devolved above or in the back of this place. The functional result, however, is not altered by this fact, provided that it finds a stable position in its new place.

A much more important point is whether or not an ankylosis or restriction of motion in the joint operated on follows. Very often the success of the nicest anatomic reposition is annihilated or at least greatly interfered with by the presence of a total or partial ankylosis. This always threatens to develop when the children operated on are over 4 years of age. A sure exclusion of this disagreeable accident can never be warranted, however, not even in cases in which the children are operated on at a very tender age, say 2 or 3 years old, although the chance for a prospective ankylosis is greatly diminished.

Patients who suffer from a single dislocation only in cases of ankylosis may sometimes obtain, but not always, a half way good functional result so far as walking is concerned. Only after a long and tedious after-treatment of massage and gymnastics is it possible to teach them how to execute the motions of the thigh. In these favorable cases, too, a constant care and supervision and a continued after-treatment for years is necessary in order to overcome the tendency of contracture, which, if overlooked, flexes and adducts the thigh, thus causing in neglected cases formidable secondary shortenings.

For children operated on on both sides, the establishment of an ankylosis always proved disastrous. I know of 6 or 7 cases among the 240 open operations of Lorenz in which neither mobilizations under anesthesia nor secondary surgical interferences like resection of the head, nor gymnastic and passive motions, even when continued for years, were able to give any relief. Such patients are by far worse off with their double ankylosis after the operation than before, although the x-ray picture in some of the cases belonging to this group showed perfect anatomic replacement on both sides.

I wish to state these facts before going into a detailed discussion of the advisability of both methods. I think they explain clearly why the two orthopedic surgeons, Hoffa and Lorenz, who have the greatest ex-

perience with the various open operations, are righteously prepossessed in favor of the bloodless method.

The main objections which are made to the bloodless method by the partisans of the open operation are principally the impossibility of reducing the dislocated hip in all cases by bloodless manipulations; the dangers involved, such as hematomas, fracture of the bones, injuries of the capsule and of the nerves; the poor results as shown by statistics.

The first point, the frequently quoted impossibility of obtaining a reduction by the bloodless method, has been discussed enough and needs no further explanation. Sherman, in his paper, constructs on this infinitesimally small chance of not being able to accomplish a reposition within the proper age limits, a peremptory postulation to treat all cases by the open operation, without making an effort to reduce the dislocation by maneuvers, saying: ". . . if we are to save these cases, irreducible by manipulations, from the risks of forcible manipulation, we must save all, for no one can tell *a priori* which case is to prove reducible and which is not; and that will mean that all congenitally dislocated hips shall be reduced by arthrotomy."

The so-called dangers of the bloodless method, which have been discussed so often in various places, collapse if the operator, and this especially holds good for the unskilled operator, keeps himself within the age limits. All accidents, such as fractures and so on, are due to the fact that the operator either tries to increase the age limits or that he resorts to too much force without the exact knowledge of how much the tissues are able to stand. Both mistakes were made and are made frequently by the unskilled operator; if an accident then happens, of course "the method is responsible for the mischief done."

Lorenz himself made the same mistakes in the beginning and in this sense he reports them in his book. Similar cases are always reported if a method is comparatively new and its indications still unsettled.

Fractures of the bone and ruptures of the capsule can be promptly excluded by care or by resorting to a kind of preparatory treatment consisting in tenotomies and extension if greater difficulties should be foreseen.

The same is not true of the subcutaneous lacerations of some muscles (like the adductors) and the extravasate which is observed in many cases. No complication, however, ever results from their presence. No one should believe that accidental lacerations are absolutely excluded by using the open method. Sherman's case, in which the perineum was torn, is a classical example of this. Everyone knows that the resistance of the shortened muscles of the hip joint must be overcome by traction alone in performing the open operation. Therefore, it can be safely said that paralysis is more apt to happen in the course of an open operation than after a bloodless operation. This especially holds good for the paralysis of the sciatic and principally of the peroneal nerves. Sherman also reports a case of paralysis among his twenty-eight cases.

As the peroneus nerve is fixed where it enters the capsule of the peroneal muscles, it is easily understood that the fibers have to be stretched to overcome the shortening caused by the dislocation. As the knee joint is held rectangularly after the bloodless operation, the strain on the peroneal fibers is relieved, whereas the straightened knee joint held in a straight position by the cast after the execution of the open operation does not afford any relief. In consideration of this

fact, which can be proved by experience, one of the strongest claims of the open operation falls to the ground. Another kind of paralysis which sometimes develops after the bloodless reposition does not deserve any consideration at all; it is the so-called paralysis of the quadriceps; this disappears spontaneously within two or three months, not leaving the slightest sign of its presence.

It must not be forgotten that there are dangers which are connected with every open operation and which neither the best technic nor the most skillful operator can exclude with absolute certainty.

Sherman asks why the orthopedic surgeon should be afraid to open the hip joint. I think it is safe to say that not one of them is "afraid" to open it; but that a good many of them decline righteously the responsibility of representing this procedure "as absolutely harmless" so far as the life of the little patient is concerned. It is a matter of fact that every operator who resorted to the open operation on a large scale had deaths among his cases, although the percentage may be small, perhaps 2 or even 1 per cent. This should make it apparent that among 28 cases no death must necessarily occur.

If, however, such an accident happens and sepsis claims a victim, then we can not compare such a death with an exitus after an appendectomy or laparotomy.

We never performed nor ever will perform any operation for a dislocation of the hip joint under a coercion similar to that which lets the surgeon choose between death and the operation, because all orthopedic operations have only a conditional indication.

One of the main questions of the parents is, and always will be, whether there is positively no danger connected with any of the proposed operations. With regard to the open operation, I leave the answer to the honesty of the surgeon whom it may concern; with regard to the bloodless operation, however, an affirmative answer to this question can be given quite frankly.

At all events, no death which should occur after an open operation performed for reduction of a congenitally dislocated hip joint can be excused, for nowadays the bloodless method has been developed and such accidents are excluded.

A total failure meets the recommendation of the open method if statistics of the bloodless method are referred to. Sherman, however, in quoting statistics comes to the opposite result; fortunately, however, he quotes two sets of statistics, which can not be considered as giving valid figures.

The first is the statistic of Wolff, a fanatic believer in the Lorenz method who died in 1900. He began experimenting with this method in 1896. No one can expect that his first cases could show the best figures possible. Nevertheless, his statistics in question showed 25 per cent. of anatomic cures. Since then the method has been developed to a much higher degree of efficiency, so that Wolff's statistics can not be quoted seriously to-day.

The other statistics quoted by Sherman are Ridlon's,⁴ which, although published in 1904, are not at all fitted to prove anything. The many objections which can be made to his statistics I⁵ described in a previous paper. I do not wish to fall back on them in this place, but wish only to mention that Ridlon's statistics deal mostly with cases operated on by Lorenz during his visit in

4. Ridlon: THE JOURNAL A. M. A., April 16 and 23, 1904.

5. Mueller: The Lorenz Operation as Seen in the American Statistics. Ill. State Med. Jour. October, 1904.

this country, and showed about 10 per cent. anatomic results. The fact that many of these cases were unsuitable for the operation because of the advanced age or because they had been operated on before, or that other cases such as the suprapubic positions (anterior transpositions, Riddon's) did not get the right kind of after-treatment (depression of the head) has been alluded to in the beginning of this paper.

Fortunately there are other reliable statistics³ existing, among which I wish to point to those published quite recently and quoted by me in my above mentioned paper, as well as at the Atlantic City meeting of the American Orthopedic Society, 1904.

These statistics are compiled by E. Mueller, Stuttgart; Joachimsthal, Berlin, and Drehmann, Breslau, and were published in 1903. The numbers of the anatomic results are 28 among 40, 17 among 23, 43 among 56, respectively.

Altogether, they show more than two-thirds of anatomic cures. From this it is to be seen that Lorenz is very conservative in pronouncing a possibility of 50 per cent. anatomic cures. Seventy-five per cent. would not be too much, and, with some improvements of the method, a still greater percentage might be obtainable.

Another statistic recently published by Braun⁶ shows 57 ideal anatomic results among 117 joints; excellent functional cures were obtained in 72 of these 117 cases.

We must not lay too great a stress on the anatomic results alone, however. We have also to consider the remaining 33 or 25 per cent. of cases which do not give a central reposition, but only a subspinal position (anterior superior redislocation). In these cases we always find such a great improvement that—suitable after-treatment provided—the overwhelming majority give such excellent functional results that they can truly be called a cure. The fact that no subspinal position is ever combined with partial ankylosis or stiffness of the hip should be highly appreciated.

This fact renders the second-class result after the bloodless reposition by far superior to the second-class result of the open operation, where we obtain ankylosis; as far as the functional result alone is concerned, the subspinal position exceeds even many so-called first-class results of the open operation. Therefore, Lorenz, who had his experience with the postoperative ankyloses after the open operation, knew why he called the subspinal positions "good" results, and every orthopedic surgeon who has had the misfortune to get a double ankylosis after an open operation, thus crippling the patient more than before, must agree with him.

We have all been taught that the first principle of medicine should be: *Primum non nocere*.

If we keep this in mind and if we are desirous to avoid even a mere chance of offending against it, we can have no doubt which method, whether the open or the bloodless, will be the method of the future days.

6. Braun: Zur unblutigen Therapie der Luxatio coxae congenita. Langenbeck's Arch., 1904. vol. lxxiv, No. 3.

A Bandage for Varicose Veins.—A zinc-glue bandage may be made of gelatin, glycerin, zinc oxid and water, heated in a water-bath and applied to the bare skin with a painter's brush. Then a gauze or cheese-cloth bandage is applied, very evenly and not too tight. This is painted with a zinc-glue, and a new bandage applied outside it. Such a bandage may be worn from five to eight weeks without change. Dr. H. Keogh states, in the *Northwestern Lancet*, that dozens of his patients who have been almost in despair at the annoyance of their varicose legs, have been made comfortable by this bandage.

INTESTINAL PERISTALSIS.

ACTION OF DIFFERENT AGENTS ON IT.

ISAAC OTT, A.M., M.D.,

Professor of Physiology in the Medico-Chirurgical College.

AND

JOSEPH F. ULMAN, M.D.,

Assistant Demonstrator of Physiology in the Medico-Chirurgical College.

PHILADELPHIA.

The recent method of Professor Magnus¹ of Heidelberg in the study by registration of the intestinal movements has simplified the investigation of the action of agents on the intestine. Magnus names two kinds of periodic movements of the intestine: 1, the pendulum movements, which follow each other rapidly in a contraction and relaxation of the intestine; and, 2, a tonus variation, much slower, but making periodic changes in the intestine. Drs. Kubliabko² and Alexandrowitsch, using the method of Magnus, have published a preliminary note on the action of several agents on the movements of the intestine.

Our experiments were made by taking a piece of the small intestine, about 10 centimeters in length, of a rabbit or cat. This was placed vertically in a glass containing 225 c.c. of the modified Ringer solution as advised by Magnus. One end of the intestine was fastened by a hook to an L-shaped glass tube and the other by a thread to Porter's heart lever, slightly weighted. The intestine was wholly immersed in the solution through which oxygen was constantly streaming. The temperature of the Ringer solution was about 37 C. The heart lever registered the contraction of the longitudinal muscles of the intestine on the smoked drum.

Before adding the agent to be experimented with to the Ringer solution several contractions were recorded before the substance was dropped into the solution containing the intestine. The changes then induced in the intestinal contractions indicated the action of the agent on the longitudinal muscles. The number of experiments was 115.

ADRENALIN.

Ott³ was the first (1897) to call attention to the fact that adrenal extract caused a relaxation of the intestinal wall. This was afterward confirmed by Boruttau (1899), Langley (1901) and subsequently by Pal (1901) and Kubliabko (1904). In these experiments we used the adrenalin of Parke, Davis & Co.

As is well known, adrenalin excites the smooth circular muscles of the arterioles to contract, but in the intestine it causes the longitudinal muscles to relax and to stop the pendular movement.

It seems to exert its action on the unstriated muscular fiber. Langley has shown that the effect of adrenalin on unstriated muscle was the same as exciting the sympathetic nerve supplying that particular tissue. Elliot⁴ has shown that, after section of the nerves going to the plain muscle of the dilator pupillæ and after their degeneration for three days or ten months, the plain muscle will respond to adrenalin with greater rapidity and longer persistence than does the iris, whose nervous relations are intact. Hence the conclusion that adrenalin acts on the muscular fiber of the intestine. When

1. Pfüger's Archiv, 1904.

2. Zentralblatt für Physiologie, 1904, July.

3. The Peristaltic Action of the Intestine, Medical Bulletin, 1897.

4. Proceedings of Physiological Society, Jour. of Physiology, 1904.