method as high up as possible, and the vessels having been secured, a vertical incision was made over the trochanter, and the head of the bone with a portion of the shaft was dissected from its socket. A small portion of the periosteum of the shaft was saved. The joint proved to be healthy, but a sequestrum occupied the region of the trochanters. The shock from the operation was comparatively slight; and before the patient left the amphitheatre he exclaimed, in answer to a question, that he felt "good." The wound healed partly by first intention and partly by granulation.

On December 10th the record states that the patient was about on crutches, and that the urine had cleared up and the liver dulness had greatly decreased.

On December 31st the patient was discharged with a small sinus about one-inch deep on the outer surface of the stump. He had gained greatly in weight and was in excellent condition.

CASE II. E. T. F., a tall and emaciated young man about nineteen years old, entered the hospital October 23, 1890, with hip-disease of the right limb, of fourteen years' duration. The femur was dislocated backwards and strongly adducted. The right leg was very much shorter, greatly atrophied and nearly useless, although formerly he had been able to touch the tips of the toes to the ground. There was an abundant discharge of pus from several sinuses on the thigh and hip, and a marked evening rise of temperature. His general condition was otherwise good, and the urine was normal. On November 15th an examination under ether showed that the head and greater portion of the trochanter had disappeared. The end of the bone was exposed and about three inches of the shaft was excised. A temporary improvement followed the operation, but the discharge of pus soon became as abundant as ever, and the "pus temperature" re-established itself. The limb was accordingly removed on December 20th, and an attempt made to lay open the sinuses about the acetabulum; but the shock of the operation rendered any prolonged dissection inadvisable. The patient rallied well from the operation, but the flow of pus continued.

On February 5th an examination was made under ether, and a large pus cavity in the buttock was laid open, and an attempt was made to drain the acetabulum.

Shortly after this I was able to pass a probe through the acetabulum into the pelvis, and it was then found that pressure on the right iliac fossa was followed by an abundant discharge of pus. By straining, the patient could force a jet of pus through this sinus.

On February 23d the whole stump was laid open by a long incision; and the acetabulum being freely exposed, a sinus was seen communicating with the interior of the pelvis. This was enlarged with the chisel so that two fingers would be passed easily through the opening, and the probe was felt presenting in the right iliac fossa. The cavity was thoroughly washed out with a weak solution of corrosive sublimate, and two large-sized drainage-tubes were inserted, a third being placed beside them to drain the external wound. From this time on the patient gained strength rapidly, and the discharge of pus diminished.

On March 19th he used crutches for the first time, and left the hospital March 25th.

May 6th. At an interview with the boy's father to-day, I learn that after leaving the hospital there

was a rise of temperature with increased discharge from the wound, but that the temperature is now nearly normal, and only about a tablespoonful of pus comes from the four tubes that are at present in the wound. He is able to walk on crutches and to make his way about the house. He has gained greatly in strength and flesh, and the prospects of complete recovery are now good.

Case I, I am able to show you this evening. You observe that the patient is in perfect health, and no sinus of any kind is to be found in the stump. My thumb and fore-finger extend only half way around his thigh. The disappearance of all symptoms of amyloid degeneration of the liver, kidneys and spleen, which seemed to be well marked before the operation, is, perhaps, the most interesting feature of this case.

PROGNOSIS IN POTT'S DISEASE OF THE SPINE.¹

BY SAMUEL KETCH, M.D., NEW YORK,
*Chairman Orthopedic Section of the New York Academy of Medicine;
Clinical Professor of Orthopedic Surgery, Woman's Medical College, New York, etc.*

IN making a prognosis regarding the result in a case of Pott's disease, the surgeon has many different factors to take into consideration. We will succinctly treat of these from the following standpoints: (1) location, (2) age of the patient, (3) etiology, (4) complications, (5) thoroughness of treatment.

Clinically the vertebra, the seat of an osteitis, regarded from the standpoint of prognosis, may be considered as follows: the superior region, from the first cervical to the third dorsal vertebra, inclusive; the middle, from the fourth dorsal to the tenth; and the inferior region, from the eleventh dorsal to the fifth lumbar vertebra, inclusive.

As a matter of clinical experience it is commonly asserted that of these regions, more cures are effected in the superior and inferior regions and in a shorter space of time, than in the middle portion of the spine.

In order to have some definite statistics concerning regional prognosis, I have taken 75 cured cases, through the kindness of Dr. Newton M. Shaffer, from the case-books of the New York Orthopedic Dispensary and Hospital, and divided them equally amongst the different regions. These cases, I would state, were not selected ones, but taken as they presented in the regular order of admission. I have analyzed them from the following standpoints: (1) sex; (2) age at which they presented for treatment; (3) etiology; (4) duration from time of beginning of treatment, until the patient was discharged cured; (5) complications arising in the different regions during treatment.

We shall first consider the superior region.

Of the 25 cases, 10 occurred in males, 15 in females; a proportion on which no argument can be based to show that either sex is peculiarly liable to disease in this region.

As to the age at which the patients presented with disease in this area, I found that the youngest was one and a half years, the oldest seventeen years of age; five were from one to five years of age; thirteen were from five to ten years, and seven over ten years old.

Regarding as we do that spondylitis is essentially a

¹ Read before the American Orthopedic Association at Washington, September 24, 1891.

disease of childhood, although not absolutely so, this would show that during this period, that is, from one to ten years, 18 cases presented, or about 72 per cent. of the total number. From clinical observation I should be of the opinion that disease in the superior region occurs at an earlier age than in the middle or inferior areas. It is worthy of note also, that with these cases we are not always in the position to discover how long the disease existed before presenting for treatment, questions as to this point eliciting the most vague and oftentimes unreasonable replies. Thus, I have seen large kyphoses, which the parents stated had only existed for a short time. Again, in attempting to arrive at some conclusions regarding the etiology of spondylitis in the superior area, the answer given to the question as to causation, "as stated by patients or parents," was almost invariably, "I do not know." This was also true of the other areas, where no leading questions were asked concerning falls or injuries; the peculiarity in the latter respect being that most all the patients could furnish a history of a fall at one period or another.

In attempting to give the relation of etiology to prognosis, I shall consider the total number of cases; and of the 75 cases included in this paper, no definite cause was assigned in 68. Seven cases, three in the superior region, two in the middle, and two in the inferior region, give unmistakable histories of traumatism. In all of these seven cases, the time occupied in the treatment was much less than in the others, bearing out the fact, that simple traumatic cases are, as a rule, more favorable from the standpoint of prognosis. I found that in 45 of the 68 cases, or about 60 per cent., some evidence of hereditary tubercular predisposition could be found, either on the side of the father or mother, phthisis being the most frequent disease. This bears out researches of Jaffé, Gibney and Taylor, regarding the tubercular origin of the majority of cases of Pott's disease. The influence of etiology on prognosis, is therefore most important in estimating the outcome in any given case.

The duration of time from the beginning of treatment until the patient was discharged cured, showed that in the superior or cervical area 26½ months as the average time occupied in gaining this result. The shortest time taken in any given case was three months, the longest eight years. This also included the time of observation after the apparatus was removed, and while the patient was still regarded as liable to relapse. It must also be remembered that these cases were treated in a public institution, that they did not receive the best home care, and that in many the treatment could not be carried out as regularly and as faithfully as in private practice; all factors which would materially influence the prognosis. Of the complications most liable to happen in the course of Pott's disease, namely, abscesses and paraplegia, of the total number analyzed, this region gave but one case with abscess and one with paraplegia.

In the middle region fifteen cases occurred in males and ten in females. The time at which the patients presented for treatment, showed the youngest recorded age as twelve months, the oldest thirty-two years. Ten were from one to five years of age; nine from five to ten; and six from ten to thirty-two years. The average time occupied in obtaining a cure in this area, shows an average of 64½ months. The shortest time in any case being one year, the longest eighteen

years. Eight cases in this region were complicated with abscesses and but two with paraplegia.

The occurrence of but three cases of paraplegia in the superior and middle regions, is, I hardly think, a fair estimate of the liability of the superior and middle areas of the spine to the occurrence of this complication, as clinically the proportion is much larger than appears from these cases, and these regions may be truly called the "paraplegic regions of the spine." Two of the cases in the middle area were also complicated by a coexisting hip-joint disease.

In the inferior region twelve cases occurred in males, and thirteen in females. The youngest case recorded as presenting for treatment was one year old, the oldest twenty-six years. Thirteen were from one to five years of age; nine from five to ten; and three above ten years. The average time occupied in obtaining a cure in this region was 47½ months. The shortest time in any individual case was six months, the longest nine years and four months. Ten cases had abscesses and but one paraplegia in this region. Other complications recorded were two cases of morbus coxarius, one of these cases being a double hip-joint disease.

It would hardly be commensurate with a paper on the prognosis of such a chronic, painful and deforming disease as the one under discussion, to dismiss the subject without a brief allusion to the questions of deformity and mortality.

It is an unfortunate fact that the majority of cases brought to the orthopedic surgeon have already advanced to the stage of deformity; and one of the first questions asked, is, as to the disappearance of the hump. Regarding its absolute disappearance, I am convinced that very few cases have this fortunate conclusion. We are certainly in the position to prognosticate a smaller amount of deformity in the cervical and lumbar regions, but our art is hardly yet advanced to that point where we can promise a complete recession.

That this does occur at times there can be no doubt, and in rare instances we all witness it, but as stated before this Association, in a paper read at the last annual meeting, "Some of the marvellous cases of supposed organic kyphoses the result of caries, were, in reality, puzzling cases of posterior rachitic curvature." I am convinced, however, that the prognosis of deformity will be much better in proportion to the time at which we are enabled to begin treatment, and that in this, as in other deforming diseases, much is still to be done in the way of prophylaxis, by rendering the diagnosis so clear that patients with incipient disease will be placed under treatment at the earliest opportunity.

In regard to mortality it is my belief, that, with improved methods of treatment and better facilities for carrying these out, both in public and private practice, the percentage of deaths from Pott's disease *per se* has been materially decreased. Indeed, it is rather with the complications or sequela of the disease that mortality occurs.

The influence of thorough mechanical treatment on the prevention of abscess and paraplegia, will be brought before the Association by another member. I am convinced, however, that the carrying out of mechanical treatment in every detail exercises a very decided influence in preventing these serious complications of Pott's disease, not only reducing the mortal-

ity but rendering the eventual prognosis more favorable.

As to the statistics regarding mortality, we are already in possession of sufficient bearing on this point: Jaffé, 22 deaths in 82 cases; Mohr, seven deaths in 72 cases; and Billroth and Menzel, 23 deaths in 61 cases.

A point of some importance in prognosis is the known fact of the tendency of some cases to spontaneous recovery. If this were to apply to any particular class of cases, it would pertain to those of traumatic origin, in cases without hereditary tubercular taint. We are, however, in possession of no other means of differentiating these at the beginning from cases which pursue the ordinary chronic course.

Another fact largely influencing ultimate prognosis, is the opportunity to be able to carry out treatment over a long period. The statistics here compiled show that in no portion of the spine can we produce uniformly rapid cures, and I should urgently protest against the strong tendency towards the early removal of apparatus, as the relapsed cases only frequently show the folly of this step.

A *résumé* of the more important points evolved by this analysis would show that in 75 cases 37 were males, 38 females; that 28 cases presented from one to five years of age, 3 cases from five to ten years, 16 above ten years old; that the average time of treatment in obtaining a cure was $26\frac{1}{2}$ months in the superior region, $64\frac{1}{2}$ months in the middle region, $47\frac{1}{2}$ in the inferior region; that, as a complication, abscess was most frequent in the middle and inferior areas, nearly fifty per cent., developing there in the course of the disease; that paraplegia may be looked for more frequently in the superior and middle areas, rarely in the inferior.

TORSION; WITH DESCRIPTION OF AN AUTOMATIC FORCEPS FOR RAPID TORSION.¹

BY F. M. BRIGGS, M.D.,
Surgeon to the Boston Dispensary.

ALTHOUGH torsion has several distinct advantages over any other method of treating hæmorrhage, and although with certain limitations it is both safe and practicable, it has never found general favor as a hæmostatic measure and is rarely made use of.

The method is a very ancient one, having been recognized and practiced in the first and second centuries. In the early part of the present century it came into use in France, but after having been tried for a while, was finally abandoned, as being unsafe when applied to large arteries.

Warren² states that torsion was brought to the notice of and was used by Velpeau in 1826; that it was also practiced by Amussat, who, in 1829, presented a paper on the subject to the Academy of France.

Ashhurst³ says that in this year (1829) it was successfully used in Germany; but was followed by several failures in France, and it was referred to Duvuytren for thorough investigation. His report was unfavorable to torsion except in the case of small arteries. After this the method went out of use, but was revived and practiced by Syme.

Bryant⁴ speaks of it very highly. In an experience of nine years, upon vessels of all sizes, he has never had a mishap, and he believes it to be the most perfect physiological method at command for the treatment of hæmorrhage.

Warren,⁵ speaking of its physiological value, refers to the experiments of Kocher, who concludes that: "Torsion enjoys with acutorsion and acupressure the great advantage of favoring a rapid coagulation, and also has its own special advantage of producing a much more intimate union between the thrombus and the vessel wall . . . these advantages are especially true of illimited torsion; when properly done, it is the ideal for small arteries."

Holmes,⁶ although believing it safe, prefers the carbolized ligature, and thinks, that "even the most experienced operator will find that it takes a long time to close all the vessels in a large stump by torsion . . . and that much more handling of the parts is required."

Gross⁷ is doubtful as to its safety upon large arteries, and Ashhurst⁸ is strongly opposed to it, being of the opinion that "the only truly efficacious means of arresting the hæmorrhage from large arteries are compression and ligation."

No method of treatment is justifiable which does not offer the greatest possible security against the occurrence of secondary hæmorrhage. Such an accident is too serious to admit of taking any chances, and, with opinion thus divided, it would certainly seem better to use the ligature upon such vessels as the femoral, carotid and axillary, and to confine the use of torsion to the smaller vessels, where the question of safety can be disregarded. But, with this limitation, there is still a very wide field for its use; for, where the femoral is tied once, numbers of ligatures are being put upon vessels small enough to come strictly within the limits of safe torsion.

Twisting is done in one of two ways. In limited torsion the artery is seized with one pair of forceps, drawn out of its bed, grasped at its deepest point by a second pair, and the portion between the two forceps is then twisted four to six times.

In illimited torsion the artery is seized and twisted with one pair of forceps, without the aid of the second pair—the fixed point against which the twisting is done being found in the tissues in which the vessel is embedded.

After having tried illimited torsion upon small vessels, some time ago, it seemed to me, that probably one reason why it is not in more common use, is because, with our present forceps and method of performing it, torsion is a slow and clumsy proceeding; and it occurred to me, that if an instrument could be made which would twist quickly and effectively, and which, at the same time could be easily handled, that such an instrument might be found useful as a general hæmostatic for the smaller vessels.

My first models had a box of gearing wheels connected with a rod, to which the forceps were attached; by turning a small handle the wheels were set in motion, and the forceps made to revolve rapidly. I abandoned this model for its use required both hands, and it needed too much manipulation. These difficul-

¹ Read at the meeting of the Surgical Section of the Suffolk District Medical Society, May 6, 1891.

² The Healing of Arteries after Ligature in Man and Animals.

³ International Encyclopedia of Surgery.

⁴ Practice of Surgery.

⁵ The Healing of Arteries after Ligature in Man and Animals.

⁶ System of Surgery.

⁷ System of Surgery.

⁸ International Encyclopedia of Surgery.