pupils began to dilate, then to contract, and then to dilate enormously again. The respiration became stertorous, then "blowing", and subsequently diaphragmatic. The violence of his struggles surpassed anything I have ever seen even in cases of the most violent delirium; and his screams were very loud. At about 2 P.M. he began to become much worse, and it became obvious that his end was approaching. After each attempt to get off his bed he became weaker. At 3 P.M. he was seen again by me, Mr. Adams, Mr. Hamilton, Sir W. Wilde, and Mr. Porter. Shortly after this he became comatose; and at about 4 o'clock on the evening of that day he died.

July 17th. At about 1 P.M. I proceeded to make a *post mortem* examination. There were present Mr. Tufnell, Dr. Yeo, Dr. Kirkpatrick, Mr. Vesey, Mr. Walker, Mr. Woodhouse, Mr. Smith, Mr. Frazer, Mr. Johnson, Mr. Elliot, Mr. Goode, and two or three others. Mr. Vesey, who acted under my directions, began by removing the scalp and sawing off the calvaria. The brain was then removed and inspected. Its coverings at the posterior and lateral regions (especially at the left side) were found intensely congested. There was a great deal of subarachnoid effusion on the left side also; but there was no evidence of any purulent matter either on or beneath the meninges. On cutting into the substance of the brain, nothing abnormal was observed. An incision was next made down on the original wound, and a portion of the bullet was discovered firmly wedged in the suture between the temporal and occipital bones. Following the incision a little deeper, a collection of matter was discovered in the immediate vicinity of the atlas; and above the left transverse process of the atlas two pieces of lead were found. A third piece of lead was also found lying a little external to the left condyle of the occipital bone. On examining the occipito-atloid articulation, a quantity of purulent matter was found communicating with the spinal canal. The membranes of the cord, from the base of the brain down to the third cervical vertebra, were in a state of inflammation; and it is no exaggeration to say they were bathed in pus. The cord was greatly inflamed and abnormally soft. A fracture of the atlas was next discovered, whereby a small portion of the posterior part of the left superior articular facet was broken off. Several very minute fragments of bone were subsequently found in the adjacent tissues; so that the portion of bone broken from the atlas may be said to have been pulverised. A careful search was then made for the remaining portions of the bullet, but I did not succeed in finding them. Probably, had we continued the search much further, we should have succeeded; but the sole object I had in view in making the examination was, not to discover the whereabouts of some missing fragments of a very minute conical revolver-bullet, such as No. 7 Eley is, but to determine what was the immediate cause of Talbot's death; and, having determined that to my satisfaction and that of all who were assisting, I did not deem it necessary to continue the dissection further, especially as Talbot left distinct and specific directions that nothing but the head and the neck at the situation of the wound were to be examined. A part of the skull, comprising the portions of the temporal and occipital bones in which a portion of the bullet was wedged, was removed; also the atlas and axis. General decomposition of the body had progressed very rapidly.

From the results of the *post mortem* examination, my belief as to the immediate cause of Talbot's death is, that the fracture of the left superior articular process of the atlas necessitated the tearing of the posterior occipito-atloid ligament, and that thus a communication was established between the parts external to the spinal column, where the abscess probably originated, and the spinal canal, through the vertebral canal, or canal for the passage of the vertebral artery; that the fragments of the bullet and the minute particles of bone found in the soft tissues immediately adjoining the fracture, and the tearing of the ligamentous structures between the occiput and the atlas, gave rise to the formation of an abscess, which abscess penetrated the articulation between the atlas and the occiput; that the matter also penetrated into the spinal canal through the vertebral canal; that the existence of that suppuration gave rise to inflammation of the coverings of the spinal cord; that the inflammation extended to the cord itself; and that the inflammation of the coverings of the cord extended up to the base of the brain—these inflammations being the immediate cause of death.

I have, in conclusion, to acknowledge with gratitude the recent publication in the *Times* of the memorandum signed by Sir James Paget and the other justly celebrated English surgeons, who, unsolicited and with characteristic generosity, came forward and stated their opinion not only as to the inevitably fatal nature of the gun-shot injury which Talbot received, but also as regards the treatment that was adopted in his case in the Richmond Hospital.

EXTRACT FROM A LECTURE ON DISLOCATION OF THE HIP-JOINT: DR. BIGELOW'S VIEWS.

By JONATHAN HUTCHINSON, F.R.C.S.,
Senior Surgeon to the London Hospital, and Lecturer on Surgery, etc.

NEXT, gentlemen, let me say that I regard the researches of Dr. Bigelow in respect to our subject as amongst the most valuable of recent additions to the science of surgery. His essay on the *Mechanism of Dislocation and Fracture of the Hip* I recommend to you most strongly, as an excellent example of experimental investigation applied to a subject concerning which but too many had been contented merely to guess and speculate. I will endeavour to state to you briefly some of the chief results of the Boston professor's work—for details, of course, I must refer you to his book.

The main fact to which I must ask your close attention is, that the ilio-femoral ligament is the strongest part of the envelopes of the joint; that it is very rarely torn through; and that it is to it that the peculiar positions of the bone in the several displacements are chiefly due. This ligament must be described as arising from the anterior inferior spine of the ilium, passing downwards and outwards, and being inserted into the whole length of the anterior intertrochanteric line. Thus at its origin it is not more than half an inch broad, and at its insertion more than two inches. It is supplementary to the capsular ligament, over which it passes, and with which it is inseparably connected. You will find in most anatomical works that the term ilio-femoral or "accessory intertrochanteric ligament" is restricted to the lower part of the structure described; but as the whole arises from one part, there can, I think, be no question that it is well to regard it in its entirety. Dr. Bigelow purposes for it the name of the Y-ligament, because its lower fan-shaped expansion has a space between its upper and lower portions like that between the arms of an inverted Y. The accompanying diagram, copied from his work, well illustrates the arrangement referred to (Fig. 1). For

Fig. 1.—The Y-ligament, shewing its inner and outer bands: the former known as the ilio-femoral. (Copied from Bigelow's work, page 18.)

myself, I doubt much whether anything is gained by rechristening it. However, whatever name we give it, the truth remains the same, that it is this ligament—as strong as the ligamentum patellæ or the tendo Achillis—which in dislocations restrains the movements of the great trochanter, and thus regulates the position of the limb. It is this ligament which, when we reduce by manipulation, guides the movements of the bone. We have long known that the ligamentum teres has nothing to do with these matters, being indeed powerless to keep the

bone in the socket; and we may now, I think, discard, to a large extent, the supposed influence of muscles.

The diagram which I now show will illustrate the action of the Y-ligament in the common form of dorsal or posterior dislocations (Fig 2).

Fig. 2.—Dislocation upon the dorsum, shewing the influence of the Y-ligament in causing inversion. (Copied from Bigelow's work, page 40.)

It there holds the great trochanter to the pelvis, and thus inverts the limb. It also, assisted by other lower fibres of the capsular, hinders the passage of the head of the bone upwards, and thus keeps the shortening within limits. Upon it, as upon a pivot, the neck of the bone will move, if you commence manipulations and use the shaft as a lever. It will be by its aid, and not, as erroneously supposed, by that of the adductor muscles, that the head will be directed into the socket if you flex and then abduct (or, still better, circumduct outwards), as in our usual method of reduction.

Amongst the special services which Dr. Bigelow has done, is that of explaining the peculiarity of "the dislocations into the ischiatic notch," and of teaching us how to reduce them. His assertion is, that they differ very little from the majority of so-called dorsal dislocations, for in both the head of the bone lies not so much on the dorsum ilii as just behind, or behind and above, the acetabulum; and in neither does it really pass so far back as the sciatic notch. The real difference between the two consists in the relation of the head and neck of the bone to the tendon of the internal obturator muscle and to the portion of capsular ligament beneath it, these being below the neck in a true dorsal, and above it in the so-called ischiatic dislocation. This fully explains the increased difficulty in reducing the latter dislocations by the old method, and also the ease with which the flexion plan succeeds.

Dr. Bigelow believes that the greater or less laceration of the capsular ligament is a matter of very little consequence to the patient's chance of good recovery; and he instructs us how, in cases when the smallness of the hole in this structure is supposed to be the impediment to reduction, we can easily and safely tear it as much as we wish.

It is not my intention to bring before you in detail at the present time the important statements made by the author I am quoting respecting the other special forms of dislocation. These may be better reserved until we have an opportunity for demonstrating the dislocations on the dead body. It will be sufficient at present to say that they seem to me to simplify greatly a very difficult subject, and that I have no doubt that they will speedily bear good fruit at the bedside. What I chiefly wish you to recollect is, that it is the strong ilio-femoral ligament which, in the backward or dorsal dislocations, holds the great trochanter forwards and inverts the limb, which in the dislocations downwards, still holding the trochanter, flexes the limb, and in dislocations of the head of the bone inwards (thyroid), still restraining the movements of the great trochanter, everts the limb. All these results can be easily witnessed by experiment in the dead body. Lastly, in some rare cases in which the displacement follows no rule, the explanation is to be sought in the fact that this ligament has been wholly or partially torn through. It is, however, very strong, and its rupture is very infrequent.

I need scarcely add that Dr. Bigelow is of course a warm advocate

of the manipulation, or flexion, method of reduction. He urges that almost anything may be done if you only recollect the manner in which the ilio-femoral ligament will be stretched in the different positions of the bone. Extension horizontally, whether in a straight line or obliquely, he for the most part opposes strongly, as only likely to be successful after forcibly tearing the important structure referred to. Extension with the thigh bent at right angles to the pelvis he as warmly advocates, for in this position the ligament is relaxed. For the accomplishment of this he has devised a special apparatus, which looks likely to

Fig. 3.—Tripod for angular extension. The pelvis is buckled to the floor. The flexed leg is suspended by pulleys from the apex of the tripod. A bar fixed to the splints, and, crossing the knee transversely, serves to rotate the limb.

be very useful (Fig. 3). As a practical suggestion likely to be available under the frequent conditions when this triangle may not be at hand, he advises that the surgeon should place his foot (unbooted) on the patient's pelvis, and then lift from the knee.

TEMPERATURE IN A CASE OF FRACTURE OF THE SIXTH CERVICAL VERTEBRA.

I ENCLOSE a short report of a case of fracture of the sixth cervical vertebra. It was caused by direct violence, which detached the spinous process and laminae, and, as was found on *post mortem* examination, crushed the pedicles and transverse processes into small pieces. There was complete paralysis of all parts below his arms; these latter were unsteady, and had cramps and abnormal sensations. Respiration was purely diaphragmatic. There were retention of urine and loss of control over the sphincter ani. The patient lived five days, and suffered most from thirst. The temperature was taken twice daily, at 10.30 A.M. and 8 P.M., in the mouth and on the thigh. The chief interest of the case lies in the concomitant variations till near death. The fall in the temperature of the mouth in the last observation might be due to the patient's sucking ice freely during the last few hours of life.

	Temperature of		Pulse.	Respiration.
	Mouth.	Thigh.		
First evening	97	...	60	23
Second morning	96	99.4	88	17
Second evening	96.8	100	85	17
Third morning	99	102.4	81	25
Third evening	99	103	91	16
Fourth morning	99.6	102.4	92	20
Fourth evening	98.2	101.8	92	16
Fifth morning	100.6	104.8	116	21
Fifth evening	99.8	106.2	122	29

I am not aware of any report similar to the above having been published.

GEO. H. SAVAGE, M.D. Lond.