male sperm actually gets into the uterus and that sperm is not evaporated, as Harvey claimed, and incorporated into the body of the womb or into a more internal part and then redistilled into the womb again after a period of six weeks. He surmised that in the does or hinds in the womb of which Harvey found nothing before six weeks probably were barren. He emphasized that Harvey's idea in this matter was like that of Fabricius, who thought that "an irradiating influence fecundates the Hen and makes fruitful all the eggs that shall for a long time after be produced, without any admixture of seed at all." He says that Fabricius believed this because he found the mouth of the womb so small and because the cock had no intromittent organ.

Highmore insisted that only the womb was big enough to hold so large a quantity of sperm as is usually ejaculated, and continued:

"We shall find the material parts of the Male copied out to the life in the Fetus; even his marks, which never came under his sight or knowledge peradventure, to be branded on the young one; we must needs acknowledge something more than irradiation, or fecundating qualities, impressed on the womb by the Masculine seed; and more than phansie in the Females to produce such effects. A Hen trod by a Pheasant, though in a dark room that so she could never see his proportions or color, brings forth Chickens resembling both herself and the Pheasant. A Bitch lined with several kinds of Dogs, though in the dark, when her phansie could not operate to the assimilating of her births, brings forth her whelps fashioned and colored like to all those she coupled with. The Horse leaves some material impression of himself, on the Mule, which she begets on the Asse."

Highmore also controverted the idea of Fabricius that the cicatricula is a scar left by "breaking of the footstock, by which it was fastened to the Hen," and added, "Parisanus thought it the seed of the cock, but I think it to be the seminal Atomes derived from both" the cock and hen for it is already present "when the eggs are but small little grains contained in the Egg-bag or Vitellary."

Highmore's treatise contains a number of illustrations on the early development of the chick and of plants and also an essay on Sir Gilbert Talbot's powder of sympathy in the efficacy of which he fully believed. He stated his conceptions of generation of animals as follows:

"The first rank of Animals rises from corruption of other creatures (Eeles from Mud; Flies and Worms from Beasts; the Sarabeus from Oxen; Lice from the filth of most Creatures)."

This, to be sure, is a plain recognition of spontaneous generation such as is found in Harvey, and Highmore also holds that perfect animals do not arise in this way, but from ". . . Atomes by the testicles of both, thrown into the Matrix of the Female." He insisted that both sexes must share in procreation because one of them must supply the rôle of the earth in regard to the seed, thus recurring to a very ancient concept. According to Cole, Highmore's idea of generation lies between pangenesis and preformation, but preformation without emboitment and constituted by an orderly prearrangement of seminal atomes.

Shortly after the appearance of Harvey's book another contemporary of his, Joseph Needham, published a work also on the topic "De Formate Foetu," which contained illustrations of mammalian embryos, but a far more substantial advance in embryology was made by the more detailed and comprehensive observations of Marcello Malpighi. His studies were accompanied by many illustrations of great merit. It is interesting that Harvey's treatise on the circulation was published in Frankfurt in 1628, and that on generation in London and Amsterdam in 1651, while Malpighi's was published by the Royal Society of London in 1672. The first of Malpighi's contributions was entitled "De Formatione Pulli in Ovo," and the second, "De Ovo Incubato."

### HEART ILLUSTRATIONS IN MALPIGHI'S TREATISE

Malpighi's treatise contained twenty figures on the development of the heart alone. He recognized a difference in size of the cicatricula in the fertilized and unfertilized egg and, although they are very transient structures in the development of the vascular system, he saw and pictured the aortic arches. He further represented the neural groove, the head fold and the optic and cerebral vesicles, but contrary to the correct view of Harvey, Malpighi believed that some parts of the completed body preëxist in the ovum and that others form during the course of development. However, in spite of this, Malpighi's services to embryology were considerable, and it is significant that Sir Michael Foster generously regarded him rather than Harvey, as the founder of embryology. Cole also speaks of Malpighi's "masterly analysis of the organogeny of the chick."

Malpighi used a self-made microscope instead of a magnifying glass even in his young manhood, and had a great advantage over Harvey, who did his work with a poorer instrument, but, according to Cole, not in the later years of his life. Harvey's work on the circulation appeared the year Malpighi was born.

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(To Be Continued)

# CLINICAL NOTES AND CASE REPORTS

## UPPER ABDOMINAL WOUNDS—ON METHODS OF RETRACTION

*By* O. O. Witherbee, M. D.
*Los Angeles*

THE success of surgical procedures depends in large measure on the facilities with which the tissues are brought under control. The accompanying illustration will at once appeal to the surgeon as depicting a practical point in gall-bladder and colon work. Satisfactory exposure, without undue manipulation of the upper abdominal structures, is essential if we wish to accomplish our work with the least trauma and with minimum shock to our patient.

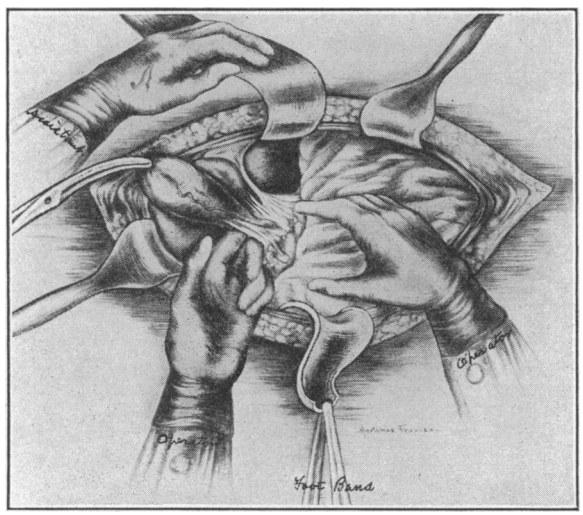


Fig. 1.—Showing manner in which foot retraction is used. (The retractor which is managed by the foot is shown in the center of the cut, being the retractor with the band of gauze.)

Surgeons whose work dates back through the years will remember with what difficulty the deeper structures in the epigastrium were formerly exposed. It seemed quite essential that the liver be forcibly lifted from its bed and held in the hands of a cumbersome assistant while the operator sought to expose the bile ducts and head of the pancreas. Often a pronounced suction sound became audible to all present as the liver was dragged outward from its bed, thus exposing the diaphragm and adding insult to injury, which too often proved an important factor in promoting pleural complications. It is true that the experienced surgeon of today, by making larger incisions, has ceased to disturb the liver in this way, but the ever present assistant, with bulky proportions, is still at his elbow trying as best he can to suitably retract the wound and not obscure the vision.

Several years ago the writer, being short one assistant, found it necessary to play a double part and do his own retracting. To accomplish this the center blade of a Balfour retractor was pressed into service and by means of a rope hurriedly improvised through the use of strips of sterile gauze the left foot was brought into most effective service. Much to my surprise the liver seemed to fairly lift into the wound. This was due to no disturbance of the organ but to the fact that I, with no conscious exertion, both retracted and very materially lowered the outer margin of the incision, quite the opposite to what can be accomplished by an assistant.

This also proved much superior to what can be accomplished by the spreading of the Balfour blades which exert equal pressure in both directions and with much greater trauma to the muscles and peritoneum. No pronounced retraction is necessary on the mesial edge of wound and if none is exerted, then the outer edge can be carried much farther and much lower than would otherwise be possible.

The accompanying illustration does not sufficiently stress the point, and the assistant's hands do not correctly portray the positions they should occupy. A single assistant standing opposite with one or two Deaver retractors will easily accomplish all that may be desired in such capacity.

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## NONUNION OF TIBIA: AN UNUSUAL CASE*

### REPORT OF CASE

*By* Alfred E. Gallant, M. D.
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THE problem which I wish to present has many interesting angles, namely: (1) the persistence of nonunion after several surgical attempts at bone repair during the course of seven years; (2) speculation as to the cause of the persistence of this nonunion; (3) the final decision as to the method of treatment; (4) the end result with union.

### REPORT OF CASE

The patient was first seen at one of the clinics of the Los Angeles County Health Department, where she appeared with a complaint of having had a fractured leg, while living in an eastern city, in June, 1923. The original injuries were fractures of the tibia and fibula, and there was a pseudarthrosis, with an outward and backward bowing of the tibia in the lower third, as shown by our radiographs. She was transferred to my service at the Los Angeles General Hospital for treatment.

The following facts were taken from her history: "Case No. 97705, Nellie T., a white female, age forty. Complaint: Old fracture of right leg. Patient had a compound fracture, right leg, seven years ago; both tibia and fibula were fractured. Tibia healed well; fibula was plated one month later, and patient did not have function of the leg." (I am inclined to think that the words "tibia" and "fibula" in the history were transposed, and the record should have read "tibia was plated, etc." The radiographs taken at the time of her admission to the Los Angeles General Hospital, and at the County Health Center, contra-

* Read before the General Surgery Section of the California Medical Association at the sixtieth annual session at San Francisco, April 27-30, 1931.

Fig. 1.—Preoperative, showing relative lenghths of abnormal tibia as compared with the normal. Lateral view gives a very good idea of the amount of pseudo-arthrosis present.