

eight hours cat-gut steeped in such a solution is sufficiently prepared. It is then taken out of the solution and dried, and, when dry, is placed in 1 to 5 carbolic oil. It is then fit for use."* It improves by age, and is better not to be used until after it has been several months in carbolic oil. The preliminary disinfection of the gut is of the first importance, since the carbolic acid may not penetrate the hardened structure and destroy the bacteria within the strands. I have elsewhere published** in detail the micrococcal infection, developing only along the line of the buried sutures, of four consecutive surgical cases, giving evidence upon which I deduce the conclusion that it could have been owing only to this inherent defect of the cat-gut, which had been selected from freshly opened preparations, preserved in carbolic oil, and sent to me from London.

Owing to these inherent defects in cat-gut, I was led to inquire if there were not animal tissues better suited for surgical uses. The tendinous structures of the body demonstrate the connective-tissue cells parallel and firmly united to each other. Although generally thus disposed, there is considerable variety in the arrangement of the cells, making a parallel separation much more uniform in some tendons than in others. As far as possible, I entered into a detailed investigation of all animal tendons of sufficient size for surgical purposes with varying results. The tendons of the hind leg of the moose or caribou, soaked in a sublimate solution until soft, were the first tested. A considerable portion of the tendon can be subdivided sufficiently fine for sutures, in length from fifteen to eighteen inches. Such sutures were exhibited in London at the International Medical Congress in 1881, this for the purpose of the cure of hernia by the reconstruction of the inguinal canal to its normal obliquity.

The late Dr. John H. Gilman, of Lowell, called my attention to tendons from the whale, stating that he had "used them with great satisfaction in the ligation of vessels." Specimens were sent me from Provincetown, four feet in length and of sufficient strength to draw a cart, but the ultimate fibrils were interlacing;

* In several instances I have known sutures to be ruined by a misunderstanding of the above directions of Mr. Lister, much too large a quantity of chromic acid having been used. It may simplify to remember that the quantity is about four grains of chromic acid to a quart of a saturated solution of carbolic acid.

** "The Surgical Advantages of the Buried Animal Suture," *Journal of the American Medical Association*, July 21st, 1888.