

general conditions were exceedingly probable, and at the same time explained the reason why catgut was oftentimes so troublesome in its application, because of its pulpy swelling, and when knotted was so untrustworthy on account of the ease with which it loosened. About fifteen years ago I sought for material better as a substitute for the catgut ligature and suture. Knowing that from time immemorial the Indians had sewed their skins with animal thread, I applied to this source for information. In the tepees of the Sioux of the far North-West, the squaws instructed me as to the sources and preparation of their suture material, which was generally taken from the broad fascia of the shoulders of the Buffalo, but sometimes from the long tendons of the leg of the moose and caribou. This was carefully sun-dried immediately upon removal from the animal, and kept dry until required for use.

"In 1882, Dr. Simmens, of Charleston, S. C., sent me beautiful specimens of tendons with long, fine parallel fibres, taken from the tail of the fox squirrel, but these were too short and fine for general use. I at once instituted a careful investigation of the caudal appendages of various animals, in a considerable measure with ludicrous and disappointing results. Reasoning from analogy that the kangaroo should furnish a distribution of tendons not unlike those found in the squirrel, I interested an Australian friend to investigate the subject and send me specimens. These proved far more satisfactory than the tendons of any other animal, and, indeed, furnish the ideal material for ligatures and sutures. The different varieties of animals called by the general name kangaroo, the opossum of the Southern States, the squirrel and the common rat, so far as known are the only animals which have this remarkable distribution of parallel tendons running to the extremity of the tail. They are each attached to a separate fasciculus of muscle, and in anatomical construction are independent. Twenty-five or thirty parallel tendons are found in each animal, and they vary in size and length proportionate to the animal's development. Many are sufficiently fine for the most delicate surgical use, while others are quite too large for any purpose, but are generally capable of subdivision, although rarely as satisfactory as the undivided tendon, which is uniformly even and round. They vary in length from eighteen to thirty inches. For years I had very great difficulty in obtaining a supply of tendons sufficient for my own use, but a few publications in the popular press in Australia and through the mercantile houses engaged in the collection of kangaroo skins, I have established the collecting of the tendons in a regular way. At first they were very expensive, I having paid sixty dollars a hundred in Australia for the tendons as collected by the hunters. They are now, however, furnished

in a quantity ample for general use and can be supplied properly prepared at a cost of about the sum of ten dollars per hundred, not much in excess of the cost of catgut. The histological structure of the connective tissue sheath of the intestine from which catgut is made is interesting. The fibres are generally obliquely disposed, interlacing with each other so as to admit of easy extension and contraction in order to accommodate the bowel in its ever varying degree of contents. That this connective sheath may be separated from the other coats of the intestine it must be macerated for days, until it becomes a seething mass of putrefaction. This, in our own country, is saved by the butchers, and furnishes the sausage skin of trade. In Italy, where the best catgut for musical purposes is prepared, it is made from the intestine of the sheep. A cork armed with short knives is drawn through the sheath, subdividing it to produce the requisite size for musical purposes. The cement substance which binds together the connective tissue cells is by this method, necessarily softened, and it becomes everywhere invaded with bacterial infection which may escape destruction in the subsequent methods of preparation for surgical purposes. It is only with the greatest care in keeping catgut perfectly dry that it serves its purpose for musical uses. However, for surgical application it must ever be considered as a wet, softened material. When in this condition it is yielding, soft, and comparatively weak, and the comparison is not far-fetched between the spinning of silk into fine thread, weaving it into a delicate fabric, cutting it into diagonal strips, and twisting it in order to manufacture a cord, instead of keeping its fibres parallel. In the tendon, the strongest tissue in the animal economy, the fibres are constantly maintained parallel, and when properly preserved and prepared are aseptic and trustworthy. The knot is firm and unyielding as in silk, aseptically applied it is unirritating and is slowly absorbed to be replaced by new connective tissue cells. Silk, wormgut, is unchanged in the tissue and as wire remains as a foreign body, or must be removed. Silk is encapsuled and not absorbed, and even when aseptically applied frequently becomes an irritant, and when buried in the tissue is often eliminated months after as a foreign body. As the profession come to understand the advantages from the use, in the daily widening field, of buried sutures, the value of tendon for this purpose will be appreciated, and I hazard a little in predicting that the day is not far distant when the surgeon will feel the necessity of providing himself with a supply of trustworthy suture material.

Dr. Marcy exhibited to the section specimens in considerable variety of the tendons of the kangaroo.

Dr. Meek replied briefly. Dr. Dupuis also pressed the use of the kangaroo tendon.

Dr. J. F. W. Ross, of Toronto, read a paper