

Steel Wires.—Steel wires are used to unite large fractured bones, when silver wires have proven too weak; they are sterilized in the same manner as silver wires.

Kangaroo Tendons.—Kangaroo tendons are used as catgut, and are far more reliable, stronger and more easily rendered sterile. The tendons are cut into suitable lengths, placed in sterile glass tubes filled with 99.8 per cent. alcohol, plugged securely with sterile absorbent cotton, placed in a water bath and sterilized for three successive days. When used, the tendon is divided into narrow strips.

Fine Rubber Tubing.—Fine rubber tubing is used only as a ligature in fixation of the uterus or fibroid tumours in abdominal hysterectomy; it is sterilized in the same manner as the whip cords.

Silk, catgut, silver wire, and silkworm-gut should always be at hand at an operation; the other ligatures and sutures can be added as directed by the surgeon.

(To be continued.)

Critical Suggestions on Cleansing the Surgeon's Hands.

At the present time, says the *Annals of Surgery*, there is a wave of hopelessness passing over the surgical world as to the possibility of effective cleansing of the human hand. Many surgeons have devised methods of hand sterilization which seemed successful, but the laboratory worker has always found some defect negating the scientific accuracy of the process. The basis of every method is, of course, the removal of the natural skin grease, and with it the dirt, by means of scrubbing and solvents. (Hot water, soft alkaline soap, alcohol, etc.) This is followed by the application of chemical disinfectants. Examination of scrapings from the skin and from under the nails of freshly cleaned hands failed to give cultures; sterile silk threads pulled through between the firmly closed finger and thumb remained sterile. Clean hands seemed to have been attained. The laboratory worker, however, found that, in spite of lavage in plain sterile water, sufficient antiseptic material was left in the skin to inhibit bacterial growth; when the antiseptic was neutralised by some sterile chemical agent cultures could be obtained from scrapings. If a surgeon, cleaned by any of the standard methods, worked for a few minutes under aseptic conditions and then pulled a sterile thread through between his finger and thumb (as is often done in tying a ligature), the thread became contaminated. It was found that if the so-called clean hand was put inside a

sterile rubber bag and allowed to sweat, the exuded sweat was infected. Examination of the structure of the skin with its sweat-glands, hair-follicles, etc., shows that absolute scientific sterilization is an impossibility with the means at our disposal. Hence the wave of hopelessness.

Recently current surgical literature has been loaded with articles descriptive of the advantages to be obtained by using various devices for overcoming hand dirt. Firstly, surgeons, who use the dry method of operating, began to wear gloves of cotton or silk thread. A succession of such gloves would be worn during one operation. Undoubtedly, as long as the hands and gloves are dry, protection is afforded. This is proven by experiment. Even in the dry method of operating, the gloves and hands became moist from blood and sweat and the protection is lost. (Dr. Barow Kuster, *Archiv für klin. Chir.*, lxiii., 339.) Very thin pliable rubber gloves have been highly praised by many eminent men. The gloves are easily sterilized and are impenetrable to moisture and filth. Before donning the gloves, the surgeon cleans himself as if he was to wear no protectors.

Given no great inconvenience from the gloves interfering with the sense of touch, by their interposition, and by their constant pressure on the fingers, given no accident, then the use of gloves is admirable. The hands encased in waterproof material are practically being poulticed; they sweat freely; their epithelial covering becomes sodden; the bacteria always present in the deeper layers of the skin are set free, and the gloves now contain a collection of sweat, epithelium, and bacteria. Accidents are liable to happen. The gloves may be punctured by a needle or spicula of bone, or they may split and much of the collected filth escape into the wound. As long as the gloves remain intact, they protect the patient perfectly from hand contamination, as soon as they are punctured, they are sources of great danger.

To take the place of rubber gloves various elastic varnishes have been applied to the hands. Several receipts for such varnishes are to be found in recent numbers of the *Centralblatt für Chirurgie*. The advantage to be gained by using an impermeable varnish instead of rubber gloves is problematical. The same disadvantages belong to both.

Is it necessary to have recourse to gloves? Is it necessary to attain scientific sterilization of the hands? The writer believes that no effort to cleanse the hands should be relaxed, but he also believes that scientifically clean hands are impossibilities and are unnecessary.

If the hands are cleaned conscientiously by any

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