tube contaminated by bacillus subtilis. From the wound in the inguinal region the staphylococcus albus was obtained.

All cultures from the different viscera remained sterile.

Histology.—Skin from the neck (Erythema). Desquamation of the stratum corneum down to the stratum lucidum; much hemorrhage into this portion of the epidermis and the gland crypts; much round and epithelioid cell invasion of the stratum malpighii; comparatively little leucocytic invasion; distension of vessels of the musculature with blood.

The spleen showed some congestion; no other changes.

The lungs showed extensive destruction of air cells, congestion of large and small blood vessels and deposition of coal pigment, especially about the larger vessels. The air cells in many places were filled with red and white blood corpuscles. Polymorphonuclear leucocytes were numerous. A small amount of fibrin was present in a few alveoli. No bacteria were shown by polychrome methylene blue staining.

The lumen of the appendix was filled with areolar tissue traversed by fibrous bands, showing numerous round lymphoid cells at one point.

In the liver there was considerable fatty infiltration and some round cell proliferation in the interlobular septa about the ducts, but no other changes.

The vessels of the capsule and of the kidney itself were much congested; otherwise no changes.

The heart muscle showed slight increase in connective tissue, and some pigmentation of the muscle fibers.

The pancreas was normal.

The prostate showed a glandular proliferation of the epithelium and the acini filled with a hemorrhagic exudate and granular debris.

The abscess wall showed the muscle fibers scattered and a marked increase in connective tissue, also an infiltration of round cells and many red and white blood corpuscles, the latter chiefly of the polymorphous variety.

An analysis of a sample of the boric acid used in the hospital, and from which that used in this case was taken, was made, and the chemist reported it to be chemically pure.

Unfortunately, the reactions of the blood and secretions were not taken.

The lack of other causes, and the fact that clinically this case so closely resembles those previously mentioned, leaves no doubt as to the identity, all the cardinal points of boric-acid intoxication being present: profuse vomiting, a papular rash over the face, neck and chest, and a weak irregular pulse increasing before death. It differs only in its more rapid onset and course, the onset being immediate and the fatal termination in four days. The delirium and the slight rise in temperature are possibly indications of a greater degree of intoxication.

The postmortem and histologic findings in Rose's case are identical with those found here, the former being entirely negative except for a congestion of the liver, spleen and gastro-intestinal tract and a cloudy swelling and granular degeneration of the liver and kidney cells. In the latter we have practically the same findings, with the addition of subpericardial hemorrhages and fatty changes in the liver and kidney, together with discoloration and maceration of the tissues about the cavity in which the boric acid was placed.

These findings then limit the cause of death to one of two things: a toxemia, resulting either from the abscess in the groin or from the medicinal agent employed, as other recognizable causes were not present. Its resemblance to those cases previously reported, together with the demonstrated overuse of this substance, is sufficient to make a positive diagnosis of fatal boric-acid intoxication. The clinical features and the lack of success in cultivating pathogenic bacteria from the blood, eliminate septicemia in this case, which is the condition most likely to simulate such an intoxication.

A METHOD OF DISPENSING WITH RUBBER GLOVES AND THE ADHESIVE RUBBER DAM.

SECOND COMMUNICATION.

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A short time ago¹ I gave a preliminary account of the use of an impermeable coating designed to prevent the escape of the epithelium and sebaceous gland secretions from the skin during operation, and the entrance of blood, pus, etc., into the crevices of the skin. It consists, briefly, in the application of a 4 to 8 per cent. solution of gutta-percha in benzine or acetone—the benzine solution for use on the hands, the acetone for surface applications at and around the field of operation. The 4 per cent. benzine solution has proven the best for wear. The benzine solution, however, dries more slowly than the acetone; it requires one and a half to two and a half minutes for it to thoroughly evaporate. If the rubber has not been destroyed by heat or sterilizing processes, the parts will have a decided adhesive tendency. If the solution is not good the adhesiveness will not be manifest. The acetone solution evaporates much more rapidly and, therefore, makes the best for the field of operation.

The following experiments show the comparative results between the rubber solution and the gloves, and while great differences in various operations appear, they are due to many extraneous conditions, which are not under control by any means so far suggested. However, they give a fair idea of the comparative advantages of the rubber gloves and solution over the naked hands.

METHOD OF TESTING VALUE OF PROCEDURE.

The method employed to test the efficacy of the rubber solution in protecting the patient from infection at the hands of the operator was as follows: The solution was used either by the operator or his assistant, while the other wore gloves or used bare hands. The hands of each were subjected to the same process of disinfection so far as possible. After the operation, each would wash his hands in 1 liter of controlled sterile water. Agar plates were then made with 1 c.c. of the water, and a comparative count of the colonies made in forty-eight to seventy-two hours.

In order to obtain a fair and unbiased result, the following requirements must be fulfilled:

1. All chances of contamination from the patient himself must be avoided. Hence all operations on infected cases, on the gastrointestinal tract or biliary passages and in the vicinity of the mucous outlets, were unavailable. As a result, only a limited number of clean operations were left for selection, such, for example, as those for hernia, for varicose veins, for specific disease of the tubes, certain abdominal and somatic tumors, etc.

2. The operator and his assistant should do as nearly an equal amount of work as is compatible with the operation, so that each would be subject to equal chances of contamination from the patient.

3. Extreme care must be taken not to allow puncture of the gloves to pass unnoticed, as this occurs much more frequently than is generally supposed.

4. The rubber solution, sterile water, etc., should be

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carefully controlled. (The difficulty of fulfilling the second condition can be readily seen. The others were met satisfactorily.)

The experiments carried out thus far show that the solution, while not so perfect a protection to the patient as intact gloves, is infinitely superior to the bare hands, and is equal to or superior to the glove, considering the chances of puncture.

The rubber coating is slightly permeated by the perspiration, but perspiration is limited by the coating just as it is by the rubber adhesive plaster.

However, Harrington of Boston has shown that the secretion from the sweat glands is not septic, while epithelium and the secretion from the hair follicles are. The hair is glazed over and matted to the skin by the rubber solution, and its epithelium does not escape after applying the solution as does the perspiration.

The experiments were carried out by my assistant, Dr. Arthur D. Dunn. (The figures show the colonies obtained in the agar plates from the washings.)

SERIES 1.

No.	Rubber Solution.	Bare Hand.	Gloves.	Control.	Remarks.
1	224	*	...	0	Exploratory laparotomy; time of operation, 45 minutes.
2	56	*	...	50	Varicose veins; time, 1 1/4 hrs.
3	17	...	11	0	Hernia; time, 30 min. Equal amount of work by each man.
4	11	*	16	1	Varicose veins; time, 1 hr. Man with solution did rather less work than other two.
5	187	*	...	0	Rubber solution defective.
6	253	...	17	0	Rubber solution defective. Hernia; solution used by interne who was very careless.
7	24	...	169	2	Laparotomy (Dr. Schroeder).
8	36	123	24	...	Man with gloves did comparatively little work.
9	2	...	0	0	Exploratory incision, thigh. Man with solution did most work.
10	30	*	...	0	Varicose veins.
11	18	...	300	0	Laparotomy.
12	76	...	54	0	Hernia.
13	5	...	2	0	Laparotomy.

*Countless.

SERIES 2.

No.	Disinfected hand.	Nails.	Rubber to back of hands.	Rubber to nails.
1.	17	2	5	3
2.	25	20	0	0
3.	5	2	1	0

SERIES 3.

No.	Non-disinfected hand.	+Rubber.	Non-disinfected nails.	+Rubber.
1.	*	0	*	2
2.	*	2	*	5
3.	*	0	*	0
4.	*	5	*	12

* Countless.

In this series the rubber solution was poured on and allowed to dry on the hands without friction. The method of using friction while applying the solution at operations is open to the criticism that microbes on or near the surface are worked up through the solution.

METHOD OF PREPARATION.

The method of preparing the rubber solution, as kindly furnished by E. von Hermann, chemist, Chicago, is as follows:

1. Care must be taken to cut the gutta-percha chips in small pieces.

2. Wash in formalin, full strength, and dry.

3. Macerate the chips in benzine or acetone for three days, then filter through cotton which has been in formalin vapor for 48 hours. Repeat the filtering twice and then the solutions are ready for use. The benzine is sterilized by boiling it in a water-bath in a strong, securely corked bottle. Repeated culture tests of the solution prepared in this manner all proved sterile; 1 per cent. carbolic acid may be added without producing irritation of the skin, but is unnecessary. Formalin will not mix with the solution, and therefore can not be used. The

solution will not stand boiling as it destroys the adhesiveness. The chloroform and carbon solutions are not advisable as they are too severe on the operator's hands, and are expensive.

At my suggestion the chemist macerated gutta-percha chips in benzine, acetone, chloroform and carbon tetrachlorid, and found the first two the best and cheapest. the best, as they form a thoroughly tough cover for the hands and have the most lasting qualities. They are not detrimental to the hands even after several weeks' usage. Not only that, but the skin is as soft and smooth after a full day's operating as it was on beginning. They are the cheapest, as the solution can be made (work not included) for 25 and 50 cents, respectively, per pound. A 4 per cent. solution is best; a higher percentage of gutta-percha may be used, but it rolls and scales off in an unpleasant way.

He also experimented with pure celluloid and acetone, and Schering's celloidin with ether and alcohol. These form a good covering, but are too expensive (about \$1.35 per pound) for general use.

For practical purposes, it seems to me the best way to put this on the market is to place the sterilized chips in small envelopes the same as dry catgut, having a sufficient quantity in each to make a 4, 8, 12 or 16 ounce solution. The operator can then have sterilized benzine in his operating room and add the gutta-percha, thus making fresh solutions. These, like soft rubber goods, deteriorate with time, and if kept long in a hot room. This is all avoided by keeping a supply of rubber chips, as above mentioned.

METHOD OF USE.

The best method of applying is by dipping the hands into a small basin containing the solution. It should be worked in around the nails and tips of the fingers, and should be applied as high as the elbows. Between operations the hands may be washed with soap and water, spirits of soap, alcohol, bichlorid, carbolic acid or formalin solution, without interfering with the rubber coating. Brushes, however, should not be used. After cleansing the hands and before proceeding with another operation, the fingers are redipped, as the coating wears off, but one application on the hands and forearms is sufficient for the entire day. The skin of the operator does not become "water logged" or shriveled with the solution, as it does with the rubber gloves. The coating is best removed by washing the hands in benzine and drying rapidly with a towel.

I quote as follows from a letter from Dr. Van Buren Knott of Sioux City as an example of many received:

I have used the gutta-percha solution for three weeks and am very much pleased with it. I think it a very valuable protection during operative procedures. I have used the solution with and without gloves, and in either manner have been well pleased. I find it a most excellent means of protecting the hands in the application of plaster-of-paris, as it prevents the plaster from sticking to the skin and avoids the harsh, rough feeling which follows the application of a plaster cast.

Since my previous report, I have used the solution on my hands and on the operative field in all operations, septic and non-septic, and am convinced that it is a simple and practical means of protection for the operator and patient.

Overcrowding of the Profession in Belgium.—The *Gaz. Méd. Belge* remarks that it might be a good plan to shut up the medical colleges for ten years instead of hatching out a new crop of physicians every year. There is no room for even those already on hand it asserts.