tion to the products of synthetic chemistry we have a new field in the long-unused animal kingdom. Here constant examination is necessary. It is not easy for the busy man to see how the so-called lymph of an alleged goat should not be as potent as thyroid extract. Serum, too, is a word that suggests potentialities of many kinds, though so widely applied that Virchow's jocular definition—"Serum is any fluid that is not precisely urine"—seems peculiarly apt. One hopes that the end is near when discoverers are driven to such names as "hydrogogin" and "anusol," but the possibilities of the prefix "eu" temper the hope considerably.

No doubt the commercialism of the day is partly responsible for the present state of this branch of medicine, but the medical profession has a heavy load of guilt. I am credibly informed that in a large factory of preparations used only by the profession, thirty clerks are kept busy answering letters from doctors in regard to the treatment of particular cases in practice. These clerks make no pretense to a knowledge of medicine, or even of drugs. They have their trade catalogue, from which they readily secure the desired information. But will this tendency stop with therapeutic problems? Will not diagnostic and pathologic questions also be given the manufacturing pharmacist for solution, and will he be so blind to his own interest as to remain silent? We can gather some idea of this in some recent literature on the important subject of vaccination, a subject strangely neglected in medical schools and scientific laboratories. In this we learn of *vaccinia sine eruptione* as a satisfactory explanation of what would strike a critical observer as a complete failure of the virus. No wonder that "a boy living in the infected district," who performs the operation, is put forth as a witness concerning a matter of which Jenner himself might not be competent to judge.

Therapeutic false prophets will last long into the twentieth century, but the examined, criticised life then, as ever since the days of Hippocrates, will be but little influenced by them. To it, "they come like water and like wind they go."

IMPROVED METHODS AND DETAILS IN THE CARE OF PATIENTS DURING SURGICAL OPERATIONS.

BY FENTON B. TURCK, M.D.

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Surgery has reached so high a state of perfection in technique, in toilet and in the care of the patient before and during operation; that there would seem to be nothing left for improvement. Notwithstanding our apparently perfect precautions, however, the surgeon occasionally loses cases through septic infection, shock or other causes.

In the case of septic infection, the surgeon is bewildered in the attempt to determine the source of infection. "The operation is successful but the patient dies," sometimes as the result of infection, sometimes from shock, oftentimes from both. The object of this preliminary report is to present a few facts that may indicate some of the subtle causes of infection and shock occurring, though all the usual precautions have been taken. In operating on the abdomen, the skin is found to be a source of infection. Welch and others have clearly shown that bacteria are still found in the skin, even after all the usual preparations have been made. I have made a number of cultures from the skin

before and after operations by various surgeons, as well as in cases of my own. The method was to take cultures from the operative area after the usual aseptic preparations of the skin had been made. After the incision cultures were made from the wound and from the peritoneal cavity. The operation completed, cultures were made from the superficial area, the skin, the deeper connective-tissue layer, the peritoneal cavity and the laparotomy sheets and towels. The result of the bacteriologic investigation was positive in each case and confirmed the observations made by others. The detailed results of my bacteriologic work are reserved for a more complete report.

The laparotomy sheets and towels, as they become wet, are capable of transmitting infection from the field to the edge of the wound and peritoneal cavity. The indications are, therefore: 1, to prevent, as far as possible, infection from the skin and contact with the skin, with the hands, instruments, sponges, etc.; 2, to protect the skin from becoming contaminated by pus or visceral contents. To meet these indications I have devised an improved laparotomy sheet made from thin rubber dam which is fitted close to the body and is illustrated by the accompanying cut (Fig. 1).

FIGURE 1.

The advantages of this rubber protective are that it not only lessens the danger of infection from the skin, but prevents the latter from becoming contaminated. It also prevents the loss of heat by evaporation from the exposed area of the body, thus lessening danger of shock. The use of the protective does not prohibit the additional use of the linen laparotomy sheet. The former is so arranged as to fit closely and does not interfere with the field of operation.

Some surgeons consider it necessary to protect the edges of the wound by suturing the peritoneum to the skin. This requires considerable time, and as the stitches are usually placed at some distance from each other, the edges are not entirely protected. If the rubber sheet be folded and under the edges of the wound, it may be clamped and held in position after the removal of the hemostatic forceps; the clamps act at the same time as self-retaining retractors, which may be used at any moment. This is shown in Figs. 3 and 3a.

Having presented methods for protecting the viscera from infection by the skin, the next important consider-

ation is the protection of the abdominal cavity and the edges of the wound from any possible danger of infection that may arise from opening the viscera, as in operations for gastroenterostomy, enteroanastomosis, cholecystotomy, etc. When a pus cavity exists in the abdomen it is often impossible to avoid peritoneal infection. As an

FIGURE 2.

illustration of the method for preventing this infection, the operation of gastroenterostomy may be taken.

A square sheet of rubber dam is made with two small openings which are reinforced by a rubber band forming a collar, as shown in Fig. 4. The openings are about

FIGURE 3.

three to six inches apart. The protector or shield is laid over the abdominal wound, and the portion of the stomach to be incised is drawn through one of these small openings, which stretches and hugs closely the protruding viscus. The loop of intestines selected for the anastomosis is drawn through the other opening. As

the shield or protector entirely overlaps the edges of the wound, the two portions, stomach and intestines, are entirely excluded from the peritoneal cavity. When the

FIG 3a.—The self-retaining retractor and clamp.

viscera are opened for the anastomosis, the contents can not possibly gain access to the cavity, or come in contact with the rest of the viscera. This is well shown in Fig. 5.

FIGURE 4.

The constriction band around the viscera not only prevents the gastric or intestinal contents from contaminating the wound, but also prevents any considerable

FIG 5.—A, stomach; B, loop of intestine.

escape of the contents. Acting like clamps, but without undue pressure, it at the same time prevents hemorrhage

—a very important point in operating on the stomach. The completion of the anastomosis is shown in Fig. 6.

The operation completed, the entire shield is slit open with scissors, the viscera set free, and replaced in the abdominal cavity. The principle involved in other operations, such as end-to-end anastomosis, is the same. In cholecystotomy, or any operation of like nature, a shield with one opening only is used. In all the various operations where this method is serviceable, gauze may be used in addition to the shield. When gauze is used

FIGURE 6.

alone in the cavity there is great risk of infecting the viscus, whereas by this method the rubber dam can be kept perfectly clean, at the same time absolutely "walling" off, and excluding the operative area from the rest of the field. Where this special field or protector is not available¹ one may be improvised by using a new rubber dam of medium thickness. A small round hole is punctured at the points desired, and the viscera drawn through as described above.

FIGURE 7.

The advantages claimed are: 1. Absolute shutting off of the abdominal cavity from the danger of infection; from the escape of visceral contents and pus; and from any outside influence. 2. Preventing the escape of the visceral contents. 3. Preventing or checking hemorrhage. 4. Protection of the viscera from trauma in handling. As the rubber-covered viscera are grasped and not the viscera directly there is less danger of injury. Furthermore, as the viscera are held in position by this simple method, much tugging and pulling in holding

them in the wound is avoided. This is a decided advantage in preventing shock. 5. As the viscera are covered in with rubber, there is no evaporation—no desiccation or loss of heat—which is another important factor in the prevention of shock.

Another valuable protective device, though not so serviceable as the foregoing, is that which I have named the rubber drainage coffer-dam. It consists of a thin rubber cylinder and is used as a protection against leakage. Around the drainage-tube at the point of insertion—as for example in cholecystotomy where drainage of the gall-bladder is desired—the thin flexible cylinder is stretched around the neck of the gall-bladder, and fits snugly to the outer wall, but not with sufficient pressure to shut off circulation. A few stitches hold it in place. The drainage-tube is then inserted within the rubber cylinder and stitched into the gall-bladder in the usual manner. Between the inner drainage-tube and the rubber coffer-dam, a few strands of the suture mate-

FIGURE 8.

rial are placed for drainage. The folds of the thin wall of the cylinder act also as capillary drainage-tubes. By means of the rubber coffer-dam, we are enabled to more completely shut out the peritoneal cavity. Gauze may now be packed around this coffer-dam in the usual way. This device with some of the various modifications and sizes of thin cylinders may be used in other operations and is shown in Fig. 7.

In abdominal operations, when we have used every precaution against infection, we still have another threatening factor—shock.

In operating on the upper abdominal area, in liver, stomach, or intestinal operations, this factor of shock is a constant menace to the life of the patient, and a great source of anxiety to the surgeon, however perfect his technique may be. In the above described methods I have called attention to the manner of preventing in-

1. Made for me by Miller Rubber Mfg. Co., Akron, Ohio, and sold by dealers.

juries in handling the viscera and methods of preventing desiccation of exposed viscera and loss of heat. The application of heat to the viscera is for the purpose of stimulation and it is usual to apply hot sponges for this purpose. The heat in the wet sponge is soon dissipated and instead of supplying heat the sponge abstracts it from the viscera and surrounding tissues. The sponge can not be changed frequently enough to keep up the temperature. To avoid this, I have placed within a gauze pad a small, thin, rubber, hot-water bag.² These are made in different shapes and sizes, adapted for various uses, as shown in Figs. 8a and 8b.

In some cases the gauze is not needed for absorptive purposes, but simply for holding back the viscera. The hot-water bag alone may then be inserted into the abdominal cavity and a ring may be formed such as shown in Fig 8b, and surrounding this a plain gauze sponge may be placed. This acts as a coffer-dam for the operative field.

The rubber bags to be placed within the abdominal cavity may be rendered absolutely sterile, then partially filled with sterile water and heated in the receptacle or

and those placed within the abdominal cavity. The value of the heat obtained from hot water introduced into the abdominal cavity is well known, also that it is necessary to maintain heat. But there are many objections to water placed directly within the abdominal cavity. The danger of spreading infection is especially important, and it has been claimed that some of the evil results are due to "flooding" the endothelial layers of the peritoneum. With the hot-water rubber pads we possess all the advantages of heat stimulation to prevent shock and none of the above disadvantages. To keep these rubber abdominal pads or sponges at the desired temperature, a receptacle is used containing water and surrounded by a water-jacket. This also keeps count of the sponges used. (See Fig. 9.) Each time the lid is raised it is connected with a small apparatus which rings a bell and registers one, two, and so on. By this automatic registering of the number of sponges taken from the receptacle a perfect check is kept.

The advantages of the hot rubber sponge pads are:

FIG. 9.—A, rod connected with coverlid; B, register; C, thermometer; D, water gauge; E, burner; F, forceps.

bath to the desired temperature. The degree of temperature which I have found most useful is about 48 C.—118.4 F. A thermometer placed in the water-bath regulates the temperature of the sponge pads and bags. (See Fig. 9.)

There must be a distinction made between measures used in the prevention of shock, where this is imminent, and those used where profound shock is present. In all measures for preventing shock the application of heat is one of our most valuable agents.

In previous contributions on this subject³ I have shown that splanchnic congestion in shock is most readily reduced by the application of heat to the splanchnic area. The methods of application are already quite well recognized, such as the use of intragastric hot-water bags,

FIGURE 10.

1. The continuous application of heat at the required temperature. 2. These hot-water rubber abdominal pads or bags are soft and yielding like a water-bed. 3. They can be changed at will and can be removed through a small opening. 4. At the end of the operation, before closing the abdominal cavity, a hot-water rubber pad is placed in the cavity under the line of the closure. A small gauze pad is placed over this to catch any blood discharge. This bulges the walls upward sufficiently for the more accurate closing of the abdominal wound. In removal the pad is partially pulled out through the small opening at the end of the wound; the water enters the extracted portion, and the bag is easily withdrawn, far more easily than gauze can be dragged out.

Another method for the prevention of shock is the stimulation of the soles of the feet. The plantar reflexes are already well recognized; the vasomotor effects are not so well understood by the general profession. Stim-

2. Journal of American Medical Association, June 11, 1896; Turk: Surgical Shock, *ibid.*, June 19, 1897.
3. Proc. Am. Gastro-Ent. Ass'n., 1900. Turk: The Splanchnic Circulation and Its Relation to the Stomach and Intestines.

ulation of the terminal nerves results in more prompt and effectual action than when stimulation is applied to the nerve trunk. In experiments on dogs I have observed that heat stimulation applied to the soles of the hind feet produces a marked effect on the splanchnic circulation. When hot water is applied at the temperature of 50 C. it causes a marked contraction of the splanchnic vessels with a rise in blood-pressure. When moderate shock is produced in the dog it is possible to lessen it by the application of heat to the soles of the hind feet. When profound shock is established it requires more active measures, such as the introduction into the stomach of the hot-water bag at a temperature of 55 C.

In order to provide a practical and effectual means of applying heat at a constant temperature, to the soles of the feet during surgical operations, I have had made the hot-water-coil slippers shown in Fig. 10. These slippers have been of valuable service in the prevention of shock in my own experience. I now recommend them to surgeons in all abdominal operations. Even when shock is not imminent the use of heat applied to the soles of the feet is valuable. A good effect is produced on the circulation and better elimination is established.

NEURASTHENIA AND THE REST CURE.

BY FREDERICK A. MCGREW, M.D.

DAVIS, ILL.

The use of the rest cure as a method of treatment is rapidly increasing. "Retreats," "rest-homes," etc., are springing up in the neighborhood of cities in numbers almost rivaling the hospitals. In growing numbers patients with nervous complaints present themselves with a history of having "already taken the rest cure." Some of these have done so under professional advisement; others at their own discretion, or at the solicitation of friends. Some have been benefited, for without doubt it is a valuable resource in certain neurasthenic states. Some have escaped with no unpleasant effect other than an irksome sequestration; while others have returned with either a waning confidence in the judgment of their physicians, or a firmly fixed belief that their ailments are beyond the comprehension and reach of ordinary medical skill.

Considering the ill-defined scope of the term "neurasthenia," and the inexactness with which text-book and journal writers prescribe the rest cure for its treatment, it is not surprising that there should be many "cut-and-dried" rest-cure methods. Unless we desire this useful measure to come into disrepute, there must be a more definite knowledge of its proper use and limitations. And this means, first of all, the substitution of a working scientific basis in place of the prevailing haphazard fashion of disposing of troublesome neurasthenia patients.

From my observation of these cases in private practice, and during a service on the resident staff of the Alma Sanitarium, where the study of neurasthenia and its treatment is simplified by the number of cases for comparison, I have come to classify them under three heads, viz.: 1. Developmental neurasthenia. 2. Overstimulation neurasthenia. 3. Developmental plus overstimulation neurasthenia.

A long discussion of the symptomatology of each of these classes is foreign to the object of this paper. It will suffice for our present purpose to indicate the distinguishing features of the two primary classes, as the

third class partakes, in varying degrees, of the qualities of the other two.

Neurasthenia, whether due to abnormal development or over-stimulation, exhibits itself symptomatically in fatigue, especially that of brain and muscle. We rely on the history and the symptoms associated with fatigue in determining the class to which a given case belongs, and, as will appear, the course to be pursued in the treatment.

DEVELOPMENTAL NEURASTHENIA.

There are some individuals in whose lives a nerve asthenia is an evident and prevailing factor from the cradle to the grave. Most of them are the offspring of degenerate parents and the neurasthenia is inherited. Occasionally individuals are born with a constitutional nerve weakness which can be traced to no taint in the immediate or remote ancestry, and then it is due to some adverse influence during fetal life; some disorder of nutrition during the developmental period; some accident of labor; or perhaps, unhealthy environment and habits during the formative years of childhood. Neurasthenia due to abnormal development usually manifests itself at an early age, but is either disregarded by the guardians of the child, or they trust to time for a cure. Instability and imperfect balance characterize the activity of the brain and cord in these nervous children, who commonly combine an inability to sustain prolonged exertion with an unusual cleverness of thought and action.

The developmental neurasthenic who eventually comes under professional care is usually a woman of remarkably healthy appearance, who complains most of a chronic fatigue. Her other symptoms are various, indefinite, and legion. Many of them are not incompatible with health, many more are exaggerations of normal physiologic functions, but she readily discloses the fact that they are nearly, if not quite, all associated with exertion, and consequently with the fatigue which follows it. She appears well nourished, but her flabby muscles, weak heart, insufficient respiration, and languid air tell us more plainly than words, that under the superficial accumulation of unoxidized fat there are nerves and muscles, a heart, stomach, and other organs which years of indolence have made inactive.

It is quite evident that what such a patient needs is not rest, but *exercise*—such exercise as shall tend to harmoniously develop and strengthen every part of the physical organization. Much care needs to be used in inaugurating such a course of physical training, because self-confidence is at low tide, habits of mind and body are slow to yield, and a failure of persistent effort is not only easy but woefully discouraging. It is seldom possible to bring such patients sufficiently under the directing and moral influence of physician and nurse in their own homes, but oftentimes intelligent treatment in the routine course of an institution will bring about a comfortable degree of resistance to fatigue, and such an amelioration of the symptoms as amounts almost to a cure. The change of diet and surroundings, and the carefully graduated physical culture must be combined with stimulating and eliminative hydrotherapeutic measures and massage. And it may not be out of place to remark, that these patients should have the judicious sympathy of their attendants, and a ready attention to their petty complaints, that their coöperation and confidence may be secured, for without these latter it is needless to attempt a cure.