

This "early rising," however, possesses still further advantages: it stimulates the circulation, thereby aiding in the prevention of post-operative embolism and thrombosis; it promotes the coaptation and healing of the abdominal wound; it prevents or alleviates those difficulties in micturition so commonly experienced after extensive pelvic dissections; and, by giving the patient hope and confidence, the bodily functions are improved, so that she not only sleeps better but digests and assimilates her food better.

The effect on the abdominal wound is quite remarkable, for I have seen the edges so pressed together in an obese patient that the small pieces of rubber tubing were completely hidden from view. When the dorsal position is maintained for any length of time there is a tendency for the edges of the incision to be dragged asunder, often aided by a varying amount of intestinal distension, whereas the contraction of the recti muscles brought into play in assuming and maintaining the erect posture of the trunk serves to coapt the edges. Although no apparent change may be observed in the skin, yet the subjacent fascia, and more often the muscle, may have undergone separation. This is evident long after the operation, and may be demonstrated by placing the hand over the incision with the patient in the dorsal position, and then asking her to raise herself, when it will be found that the muscles are not united and there is not infrequently a bulging produced along the line of the incision. For all these reasons I have become a strong advocate of "early rising" whenever permissible. I do not, however, believe in permitting patients to leave the hospital or nursing home too soon, for it is to their interest to be kept under observation until they are able to walk with confidence. The practice of "early getting up" and "early getting out" is not to be recommended.

As the use of a catheter, especially if not skilful, causes both pain and discomfort, every effort should be made to favour the natural action of the bladder, whilst the danger of infection is an additional reason for avoiding a catheter. The removal of the Michel clips and the through-and-through sutures should be practically painless, if properly done. The early removal of the through-and-through sutures deprives the wound of the advantages of a splint, whereas if they are not removed and the patient gets up, firmer union is obtained. It only remains to be added that the dressing of antiseptic gauze fixed in position by collodion is removed after the collodion is dissolved by acetone, thus rendering the removal painless.

#### *Vaginal Operations.*

The routine employment of douches after vaginal operations is not to be recommended. Indeed, the less that is done in the way of local treatment or manipulation the better for the patient. The use of an antiseptic "wash" after defaecation or micturition is helpful in favouring local cleanliness, and the employment of a special dusting powder favours dryness and relieves pain.

To the patient the most dreaded event is the removal of the perineal stitches, but if these are tied over small pieces of fine india-rubber tubing the removal of the stitches is painless. Where stitches have become embedded through constriction and subsequent oedema their removal may not only be very difficult, but very painful.

Both in incomplete and especially in complete perineal tears I believe it is best to leave the bowels undisturbed for four or five days in order that healing may be uninterrupted.

The other details in the after-treatment of vaginal operations should always be carried out so as to avoid pain and discomfort to the patient. A longer period of rest must be enjoined after operations for genital prolapse, in order that the newly united tissues may become thoroughly consolidated before the erect position is assumed. It is wise to keep such patients in bed for at least three weeks.

Although I must plead guilty to having dealt with what may be regarded as trivialities, yet, after all, it is the little things that matter. Too often it is forgotten that an operation is to the surgeon but a part of his daily work—to the patient it is a great adventure.

#### REFERENCE.

<sup>1</sup> BRITISH MEDICAL JOURNAL, March 9th, 1918, p. 277.

## A STUDY OF THE EFFICIENCY OF STERILIZATION OF DRESSINGS.

BY

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### INTRODUCTORY NOTE

BY

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THE honorary surgical staff of the Jessop Hospital, Sheffield, watched the experiments described in the paper by Mr. R. J. B. Hall and Mr. A. W. Chapman with great interest. They were satisfied that the observations and deductions were correct. It is valuable to have obtained corroboration of the suspicion that the permeability by steam of surgical dressings, etc., is greatly influenced by the nature of the container and the compactness of the contents. Lightly packed hessian bags are evidently much more easily sterilized than tightly packed metal drums.

However, the chief interest lies in Mr. Chapman's clever device for detecting not only the highest temperature reached, but the duration of time for which that temperature has existed. Most surgeons must have desired such a control. Here it is to hand, and it can be easily and inexpensively employed, as the tubes only cost 40s. to 50s. a gross.

At the Jessop Hospital these controls have been constantly employed for over a year and the surgical staff derive great comfort from their use. They take this opportunity of thanking Mr. Chapman and Mr. Hall for the skill and trouble displayed by them in inventing the control and in elucidating the details of its correct use.

#### OBJECT OF INVESTIGATION.

If a package or drum of dressings is to be sterilized efficiently the steam must penetrate to the centre of the package and raise it to a temperature sufficiently high to destroy any micro-organisms present. In addition to the occasional use of maximum thermometers, many tests have been employed to indicate the temperature in the centre of the dressings. Usually they depend on the fusion or rapid colour change of an organic compound, or, more recently, on the fusion of small pieces of standard alloys.<sup>1</sup>

If complete security is to be attained, the materials to be sterilized must not only be raised to a sufficiently high temperature, but must be kept at that temperature for a certain length of time. All the tests previously employed suffer from the common disadvantage of recording only the maximum temperature in the dressings, without giving any indication of how long it has been maintained. A simple type of indicator has been devised, the reading of which depend both on temperature and time, and hence give a more trustworthy index of the efficiency of sterilization than one recording temperature alone.\*

#### *Indicator for Checking Sterilization.*

The indicator consists of a small, stout, sealed glass tube containing a few drops of a standard solution of glucose and sulphuric acid. When heated to a sufficiently high temperature the solution slowly darkens in colour and finally chars. The concentrations of acid and glucose are so adjusted that at 212° F. the change in colour is very slow, whilst at 239° F. the solution becomes straw-coloured after five minutes, bright yellow after ten minutes, deep brown after twenty minutes, and nearly black after thirty minutes.

A series of experiments was carried out to determine whether the colour developed in the test solution was a satisfactory index of sterility under the ordinary conditions employed for dressings. A number of sterilizing drums

\* The device is made and sold by Messrs. Albert Browne, Ltd., Chancery Street, J.

were packed with gamgee tissue and towels, some tightly, others loosely, and among the contents of each drum one or more of the control tubes were enclosed. Beside each control tube was placed a small glass tube containing a sporing broth culture of *Bacillus subtilis*. The drums were treated at various pressures for different times in a pressure steam sterilizer and then opened. The control tubes were matched against a colour scale prepared from tubes heated at 239° F. for known times, and the culture tubes were opened under aseptic conditions and subcultured to test for sterility. In all, 47 comparisons were carried out, the results of which are summarized in Table I.

TABLE I.

Group.	Number of Tests.	Subculture Results.	
		Sterile.	Growth of <i>B. subtilis</i> .
A. Colour of control tube indicates exposure to 239° F. of 20 minutes or more	24	23	1 (?)
B. Colour of control tube indicates exposure to 239° F. of between 10 and 20 minutes	9	7	2
C. Colour of control tube indicates exposure to 239° F. of less than 10 minutes	14	0	14

It was therefore concluded that when the colour of a control tube enclosed in a package of dressings corresponded with exposure to 239° F. for not less than twenty minutes, the material had been efficiently sterilized, whilst a lighter colour indicated at best doubtful efficiency.

#### Factors Influencing the Penetration of Steam into Dressings.

A few preliminary tests showed that under ordinary conditions steam frequently fails to penetrate to the centre of a drum of dressings even when these are not very tightly packed. This observation has recently been confirmed by Black.<sup>1</sup>

Experiments were accordingly carried out to determine the factors influencing the penetration of the steam through the dressings. It was found that the tightness of packing was one of the most important. How tightly a drum may be packed with safety depends on various considerations, such as size of the drum, the degree of evacuation attainable, the nature of the material to be sterilized, and the pressure of steam and duration of heating which can be employed without damaging the outer layers of dressings. Efficiency can only be attained by trial in each case, but the following experiment illustrates the bad effect of packing too tightly.

#### Experiment on Packing.

Three metal drums, each 11 by 9 by 9 inches, were packed evenly with gamgee tissue. The drum which was most tightly packed contained roughly twice as much as that most loosely packed. Control tubes were placed in each drum in the positions indicated in the table and in some cases were accompanied by small maximum thermometers. A control tube and thermometer were also placed unprotected inside the sterilizer to afford a check on the conditions outside the drums. All three drums were sterilized simultaneously. The sterilizer was first evacuated to a negative pressure of 10 inches of mercury, and steam was then admitted. The process was completed by drying in a current of hot air for one hour. The results obtained are shown in Table II, the control tube readings being expressed as number of minutes' exposure to 239° F.

It will be seen that whilst it was possible to obtain adequate penetration of the steam even into the most tightly packed drum, the length of time necessary to produce efficient sterilization in this case was so long that the outer layers of material would soon be damaged by repeated treatments. Similar experiments with linen towels and cotton abdominal sheets yielded completely analogous results.

#### Comparison of Drums and Bags.

Experiment showed that, within the limits found in the types of drum commonly used, variation in the area of the holes for the entrance of steam made little difference to the penetration. When, however, the dressings were enclosed in a hessian bag of similar size and shape to the drum,

TABLE II.

Drum and Weight of Contents.	Position of Control Tube and Thermometer.	Heating 1.		Heating 2.		Heating 3	
		20 mins. at 15 lb.		20 mins. at 20 lb.		1 hour at 20 lb.	
		Max. Temp.	Tube Reading (mins.).	Max. Temp.	Tube Reading (mins.).	Max. Temp.	Tube Reading (mins.).
A.—1 lb. 12 oz.	1. Middle of drum one-third way up	°F. 235	10	°F. 246	10	°F.	
	2. Middle of drum two-thirds way up	243	20	243	10		
	3. Edge of drum against holes at side	—	20	—	30+		
B.—2 lb. 10 oz.	4. Middle of drum one-third way up	178	2	199	6		
	5. Middle of drum two-thirds way up	204	4	205	8		
	6. Edge of drum against holes at side	—	30+	—	30+		
C.—4 lb.	7. Middle of drum one-third way up	176	2	181	4	266	30+
	8. Middle of drum two-thirds way up	176	4	187	4	261	30+
	9. Edge of drum against holes at side	—	30	—	30+	—	—
Control	Uncovered in sterilizer	246	30	257	30+	263	30+

the increased area available for the entrance of the steam resulted in greatly increased penetration. There can be no doubt that, whatever the disadvantage of bags for storage purposes, they are much more efficient than metal drums for the actual sterilizing process.

#### Conclusions.

To ensure efficient sterilization it is necessary that the articles be packed loosely in bags or in adequately perforated drums. The pressure of steam and time of sterilization must be adjusted according to the material being treated so as to ensure complete penetration without damage to the goods.

Satisfactory control of the process can best be assured by placing in the centre of the materials an indicator such as that described, the changes in which depend both on temperature attained and the duration of exposure to that temperature.

We desire to express our thanks to Miss C. D. Tingle, M.B., Ch.B., who kindly conducted all the bacteriological examinations.

#### REFERENCE.

<sup>1</sup> Black: A Weak Point in Sterilizing Methods, BRITISH MEDICAL JOURNAL, 1925, i, 210.

## A CLINICAL STUDY OF ENCEPHALITIS LETHARGICA,

BASED ON SIXTY-TWO CASES.\*

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THE present outbreak of encephalitis lethargica was admirably described by Von Economo<sup>1</sup> in May, 1917, in a classical description in which somnolence, ophthalmoplegia, and profound asthenia are given as diagnostic criteria. It must not, however, be forgotten that even in April, 1917, Cruchet, Montier, and Calmette recorded a series of 40 cases of "subacute encephalo-myelitis" before the Société Médicale des Hôpitaux de Paris<sup>2</sup>; these cases had occurred in the winters of 1915-16 and 1916-17. Thus the disease was recorded in France and Austria almost at the same moment.

Dr. Crookshank<sup>3</sup> traces the disease back to the time of Hippocrates, and shows that during the last 450 years there have been a number of epidemics in various countries of Europe. It is worthy of note that during the twenty or

\* A paper recently read before the Liverpool Medical Institution.