and fungi can spread farther and faster through the flesh of tenderized than of untreated meats.¹ The commercial process of tenderizing referred to is by means of an ante-mortem injection of a papain enzyme solution into the jugular vein of the animal to be slaughtered. Even at cold temperatures some softening of tissue results, which appears to facilitate bacterial growth and spoilage.

The condition of any particular piece of meat is governed by methods of farming, marketing, slaughtering, cooling, hanging, transport, and retailing. Defects of hygiene can arise along this chain, and Hobbs² has shown that it is not uncommon for clostridia and salmonellae to be found on raw butchers' meat, British and foreign. Their multiplication in tenderized meat might increase the hazard.

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Marfan's Syndrome

Q.—How and in what way does Marfan's syndrome affect the life expectancy and proneness to morbidity of those who suffer from it ?

A.—As with many conditions due to dominant mutant genes, the clinical manifestations of Marfan's syndrome show great variation in their severity. Death may occur in infancy, but some patients have little disability and have a normal life-span.

The main causes of death are dissecting aneurysm of the aorta and heart failure from aortic valve insufficiency.¹ As regards mor-

bidity, apart from the symptoms of the cardiovascular lesions, the skeletal anomalies may lead to backache and joint pain, and the ectopia lentis to myopia, glaucoma, retinal detachment, and cataract. Deafness is present in about 6% of patients.

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Potassium Chloride with Diuretics

Q.—In view of the risk of ulceration of the small intestine associated with the administration of enteric-coated potassium chloride tablets should they no longer be used in association with thiazide diuretics or for any other purpose? What alternative drug is there ?

A.—There is no indication at present for prescribing enteric-coated potassium chloride tablets. In many instances they do not disintegrate but pass unchanged with the faeces. In rare cases when associated with thiazide diuretics they are associated with ulceration of the small intestine.¹⁻⁶

The most effective potassium supplement is potassium chloride taken orally in gelatin capsules or as a flavoured mixture. If used with diuretic therapy the dose should be at least 3 and preferably 12 g. a day. Unfortunately, this is likely to produce gastric irritation and reluctance to take the drug. Effervescent potassium tablets (B.P.C.) are composed of: potassium carbonate 0.5 g.; potassium acid tartrate 0.3 g.; and saccharin sodium 0.005 g. Each tablet contains 6.5 mEq potassium. They supply the potassium ion and are palatable. Unfortunately,

the chloride ion is not provided. There is strong evidence that this is necessary to correct the metabolic alkalosis and hypokalaemia associated with diuretic therapy.⁷

Attempts have been made to repair the deficiency with an effervescent potassium tablet containing chloride such as that devised by Hadgraft⁸ at the Royal Free Hospital, which is composed of: potassium chloride 0.3 g.; potassium bicarbonate 0.5 g.; tartaric acid 0.25 g.; citric acid 0.15 g.; and saccharin sodium 0.005 g. Unfortunately the amount of chloride contained is small. It is therefore necessary to give, in addition to the effervescent potassium tablet of the national formulary, an acidic amino-acid such as lysine-monohydrochloride (25 mEq four times daily).⁹ Such measures are not required in every patient receiving diuretics, but should certainly be considered in patients with added fluid retention—as in cirrhosis of the liver and ascites or in severe congestive cardiac failure. In these patients there is real danger of diuretic therapy being followed by hypokalaemic metabolic alkalosis, and this can be repaired not only by replacement of potassium but also by replacement of chloride.

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NEW APPLIANCES

Use of Fibreglass to Reinforce Plasters

Mr. NEIL A. BROMBERGER, Registrar, Orthopaedic Department, Royal Children's Hospital, Melbourne, writes: Despite the general satisfaction with plaster-of-Paris splintage, there is need, with young children especially, for a protective agent to prevent damage not only by water but also by abrasion and excessive stress. The use of a polyester resin bonded between fibreglass cloth is discussed.

The principle of the reaction, which is exothermic, is that a peroxide catalyst (activator) is added to the resin, and, depending on the concentration, the mixture rapidly sets to a mass which possesses "rock-like" properties. The rate of reaction is dependent on the amount of accelerating substance already present in the mixture, the amount of catalyst (activator) added, and the temperature.

In order to simplify the process we have used a specially pre-accelerated white resin. We have called it M.P.S. (medical plaster surfer), and to it are added 20 drops of

activator per ounce (31 g.) of resin. This has produced a mixture which has a working-time of five to seven minutes, and a setting-time of approximately 45 minutes. These times have been achieved after prolonged trial and error. The shorter the setting-time the hotter the resin becomes, and when the resin is applied in a thick layer it sets faster and becomes hotter. The rate of reaction, and hence the heat developed, also rises steeply as the outside temperature rises, but provided the room temperature does not exceed 80° F. (26.7° C.) these concentrations are very satisfactory. In higher temperatures a little less activator should be added.

The precise formula of the accelerated white resin is as follows. It is advised that only a qualified and experienced fibreglass manufacturer prepare the mixture.

1. A stock gellcoat is first prepared as follows: 1 part flexible polyester resin, 2 parts rigid polyester resin, 5% Aerosil. This is milled in a three-roller mill until

homogeneous. Up to 0.75% of 6% cobalt naphthenate may be added at this stage.

2. The actual M.P.S. is prepared from the gellcoat as follows: 5 lb. (2,270 g.) accelerated gellcoat, 5 ml. 6% cobalt naphthenate. 5 oz. (155 g.) white pigment paste for polyesters. ½ oz. (15 g.) surfacing agent. Stir mechanically until uniform. To cure the mixture add 1-2% methyl ethyl ketone peroxide in the proportion of 20 drops per ounce (31 g.) of M.P.S.

A large variety of fibreglass cloths are suitable; the woven varieties fray less and are probably best. Nylon cloths, such as Dynel, have been used and are excellent.

We have not used the fibreglass in a circumferential manner because this makes removal more difficult; it would prevent the plaster from "breathing," and there have been no instances where local reinforcement has not been adequate.

Precautions.—The mixture is never volatile or explosive. When wet it will burn in

a manner similar to kerosene. It is more difficult to ignite once dry, and smoulders like wood if deliberate attempts to burn it are made. The resin, which smells like fresh paint, has been examined by the Victorian Department of Health, and has been considered not to constitute any health hazard. The activator, being peroxide, should not be allowed to splash into the eyes.

Method of Application.—The resin must be applied when the plaster is dry, because water interferes with the reaction. We allow 24 hours to elapse between the application of the cast and the time of reinforcement. Leg plasters are treated on the posterior surface, sole, and heel. Batchelor plasters are reinforced on the anterior surface and along the cross-bar. Spicas are reinforced on the anterior or posterior halves, depending on personal preference. With children we have used the posterior half because it prevents soiling.

Technique.—The steps taken in applying the fibreglass are as follows:

1. The area to be reinforced is mapped out and the child positioned accordingly. The working area is surrounded with tissue paper to collect any splashes (Fig. 1).

2. The surface to be treated should be roughened with a knife to improve the adherence of the M.P.S.

3. Strips of fibreglass cloth are now cut to cover the working area. Young children require three layers; spicas at least four layers; walking plasters five layers.

4. The resin (M.P.S.) is poured into a disposable paper cup, weighed, and then activated with 20 drops of activator per ounce (31 g.) of resin (Fig. 2).

5. The mixture is stirred for 20 seconds.

6. With the use of a cheap disposable 1-in. (2.5-cm.) paintbrush the M.P.S. is painted on to the working area in the same way as a household paint. A layer of cloth is pressed on to the area and a second layer of M.P.S. is applied over it (Fig. 3). Layers are built up until all the cloth is used. The final coat of M.P.S. produces a smooth surface.

7. The plaster is kept still for one hour.

8. After 30 to 45 minutes the mixture becomes rubbery and can be trimmed

with a knife so that all stray ends are removed.

9. The child can be removed when the mixture is solid, and between one and two hours after application the surface can be rasped or sanded to a most attractive finish.

10. Accidental splash marks can be removed with acetone or a detergent solution. The brushes, cups, and stirring-stick are all discarded at the end of the operation.

A small child requires about 5 oz. (155 g.) of M.P.S. to reinforce a below-knee plaster. Batchelor plasters require 7½ oz. (230 g.),

Working-time.—It takes not more than 10 minutes to reinforce even the larger areas. The mixture begins to set within five minutes, and so everything must be ready before the M.P.S. is activated. Trimming and rasping does not take longer than a few minutes.

Results.—In only one out of more than 50 cases reviewed was the cast destroyed before the allotted life-span. In this case, though the heel was bare, the rest of the plaster was still solid. This is in contrast to normal casts, which go soft and become functionless as well. A few plasters, when reviewed, were functional despite the fact that the plaster base had almost completely

FIG. 2.—Simple equipment required. Fibreglass cloth strips cut. Eye-dropper for activator. Paintbrush. Paper drinking-cup and wooden stirring-stick.

spicas from 10 to 20 oz. (310 to 620 g.). The paper cups hold 5 oz. (155 g.) very comfortably.

When the weather is cold the M.P.S. will be thick, almost like putty, and will not flow easily. This is overcome either by warming the mixture to about 80° F. (26.7° C.) by standing the tin in a bowl of warm water or by adding to the mixture a small amount of styrene monomer. About ¼ oz. (14 ml.) of the latter is all that is necessary for a 5-oz. (155 g.) batch. The styrene monomer does not alter the rate of reaction in any way.

worn away. The outer fibreglass casing had prevented the cast from disintegrating.

My thanks are due to Mr. R. F. Fowler, of R.F. Services, who has helped me develop the formula for the fibreglass; to Mr. Szczepanski for the photographs; to Mr. G. Keys Smith, Medical Superintendent, Royal Children's Hospital Orthopaedic Section, for his encouragement; and to Mr. P. F. Williams, Director, Orthopaedic Department, for allowing me to use all the clinical material in his department. The M.P.S. now in use is supplied by James Beadel & Co. Ltd., of Liverpool. The fibreglass cloth is chopped strand mat FGE 2000.

FIG. 1

FIG. 3

FIG. 1.—Hip spica. Working area mapped out. FIG. 3.—Application continued. Pressing on cloth strips. Note that sister is wearing disposable polyethylene gloves to obviate the need to remove splashes from her hands.