When all the diluent is whey, the whey proteid is approximately .90%.
 When $\frac{2}{3}$ the diluent is whey, the whey proteid is approximately .75%.
 When $\frac{1}{3}$ the diluent is whey, the whey proteid is approximately .50%.
 When $\frac{1}{4}$ the diluent is whey, the whey proteid is approximately .25%.

Suppose we wish to make a 32-ounce mixture containing 2% fat, 6.50% sugar, .50% whey proteid and .40% casein. Proceeding as before, we find that 4 ounces of 16% cream are needed. To obtain a .40% proteid, 4 ounces of skimmed milk and cream are necessary. We already have 4 ounces of cream, so no skimmed milk is needed. As 4 ounces of cream provide the necessary fat and casein, the amount of diluent will be 28 ounces, and as we want .50% whey proteid, one half the diluent must be whey. The next step is to find the percentage of sugar we already have in the mixture. Under the heading "sugar" we find that 4 ounces of cream adds .56% sugar, and under the heading "whey" that 14 ounces of whey increases the sugar 2.18%, a total of 2.74%. As one level tablespoon of milk sugar in a 32-ounce mixture increases the total percentage of sugar 1.20%, 3 level tablespoons will give, approximately, the amount desired.

A column headed "number of calories" has been added under the main headings "fat," "proteid" and "whey," not, however, to provide a method of feeding on a caloric basis, but as a means of quickly determining the caloric value of a formula. In writing directions for making a home modification, as we write the number of ounces of the various ingredients, we also write down the number of calories as found in the next column to the right. To return to our first example of a 40-ounce mixture containing 3.60% fat, 7% sugar, 1.40% proteid.

	Calories.
9 ounces of cream,	402
17½ ounces of cream and skimmed milk,	166
5 level tablespoons of milk sugar (48 calories in 1 level tablespoon),	240
Total,	808

This is the caloric value of 40 ounces; the infant was to take but 36 ounces, or $\frac{9}{10}$ the whole amount; $\frac{9}{10}$ of 808 = 727 calories, the number of calories in the food taken.

The calories under the heading "fat" are computed only from the fat in the cream; the calories under the heading "proteid" are computed from the proteid and sugar in the skimmed milk and cream. In modifications in which cream is used but no skimmed milk, as in the whey mixtures given above, it must be remembered that the calories supplied by the sugar and proteid in the cream are found under the heading "proteid."

This, briefly, is the scope of the card. A knowledge of infant feeding is assumed, and no attempt is made to suggest formulæ which infants at various ages should digest. When a suitable formula is decided upon, the card offers a quick and easy means of determining how that formula may be prepared at home.

NOTE. — The card is published by F. H. Thomas Company, 691 Boylston Street, Boston, Mass.

OBSERVATIONS ON EUROPEAN AND AMERICAN ORTHOPEDIC APPARATUS.

BY WILLIAM H. KRAUS,

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(From the Orthopedic Clinic of the Massachusetts General Hospital.)

THE manufacture of apparatus for the correction of deformity has for many years been recognized as a special art. Most of the designs for such apparatus have emanated from the orthopedic specialists, and in European countries this work has engaged the closest attention of the leading members of the profession.

The actual making of these appliances has everywhere been left to the instrument maker, and in this country he is often called upon to be the designer of the apparatus as well. While this practice, except in rare instances, is perhaps to be condemned, yet the average physician in this country lacks either the time or the necessary stimulus to acquaint himself with the details of steel and leather work and often orders apparatus which the trained instrument maker recognizes at once as impractical and not likely to fulfill its purpose.

In order that he might acquire a working knowledge of the principles underlying the manufacture of the more standard forms of apparatus used for many years abroad, and in order that the details of this manufacture might be learned, the writer was assisted by the Massachusetts General Hospital and some of the Boston physicians to visit the principal European instrument shops. It was hoped that thereby much wasteful experimentation might be saved and the proverbially ingenious American mind might start at least from the vantage ground of the knowledge of solutions of many problems which had been worked out in the foreign clinics. Shops in England, France and Germany were visited. The apparatus in these countries differs as much from each other in detail as the products of our shops differ. Each instrument maker was seemingly contented with his work and sure his own type was the most desirable.

The work in Germany proved most interesting and instructive and there, in my opinion, are to be found the most practical and efficient types of apparatus in Europe. Germany has a standard type of her own, originated by Hessing and Hoffa, and so satisfactory does it seem to them that little effort is made to experiment or improve. Owing to the similarity of their types, manufacturers of the principal materials used, such as steel and leather, make a specialty of supplying to this particular trade that which after careful tests has proved most suitable. The steel made especially for apparatus can be obtained in most convenient sizes and of such malleability that it permits working cold to a greater extent than our own common cast steel. The leather used for jackets is especially manufactured and is said to be of secret tannage. It comes in whole hides, which can be cut to better advantage than our ordinary side leather, and is unstretched, permit-

ting molding over a plaster torso by stretching alone,—a better method than stretching and shrinking, as the shrunken parts often alter during wear. A description of the basic principles of the corsets and leg apparatus will convey an idea of the settled conditions regarding apparatus in Germany, for those two comprise the larger part of their work and with necessary variations are used for almost all cases of spine and lower limb disease. For leather corsets, steels are first fitted accurately and tacked to the plaster torso. These consist of a pelvic band, two back uprights and two steels curving over the crests of the ilia. Over these steels, leather is stretched, a better method than fastening the steels over the leather. The crest steels (Fig. 1) are perhaps the most

FIG. 1. Apparatus for severe infantile paralysis, after Hessing.

- a, a, etc. Fine adjustments.
- s, s, etc. Steels over which leather is molded.
- b, b. Self-locking joints at hip and knee.
- r, r. Releases of locked hip and knee joints.
- e. Elastic to insure locking of knee-joint in extension.
- c, c. "Crest" steel.

important, as these support the weight, thus relieving the spine. It is surprising how much weight can be supported over the spines, but great care must be taken when preparing the cast to add just enough plaster on the bony prominences to prevent chafing. Upon these crest steels are fastened adjustable axilla crutches, not intended to lift the shoulders so much as to hold them back, thus permitting almost complete removal of the front of jacket, which is substituted by cloth laced with elastic cord. It is at once evident that

changes in such apparatus are much more difficult to make than where the steels are put on the outside of the leather, but we believe, after careful observation, their efficiency is enhanced thereby.

It seems to us advisable that, in all possible cases, the man who is to superintend the actual making of the appliance should either take the model and measurements himself or be present while this is being done in order that he may allow for the bony prominences and make such other notes and markings as may be necessary.

The leg appliances (Fig. 1) are strong, comfortable and very durable. At first sight in many cases we should probably consider the patient overburdened with apparatus, but the remarkably good results in our opinion offset this seeming disadvantage. The basic principle of lower limb appliances is the same for diseases of the hip, paralysis, Charcot joint, etc. It consists of a firm reinforced leather cuff above and below the knee and a leather boot connected with adjustable steel uprights. The comfort that this appliance affords is due to the broad cuffs which, reinforced with light steels, make an excellent support for the steel uprights, a better method than the numerous steel bands and straps which cannot always be adjusted for comfort.

The standard type of German apparatus will not permit of a cheap grade, that is, by reducing cost by cheap material or inferior workmanship, for it is due to the excellent material and skill required in the making that good results can be obtained. Both these things increase materially the first cost, but we are convinced in the end they will be found more economical and more satisfactory to patient and physician.

Elastic webbing plays an important rôle in German apparatus, especially in some walking appliances, where they are so adjusted to assist disabled tendons, thus permitting an active appliance in many cases, without which the retentive would be necessary. Elastic webbing is also used extensively on leather corsets to assist in correcting the deformity of scoliosis. From inside the corset, either side of the "hump," the elastic leads outside through slots and fastens on opposite side, where the proper tension is adjusted. For milder cases of spinal disease the drill or cloth corset is a very desirable appliance and much appreciated by one who has graduated from the leather one. They are rather expensive, owing to the skill and time required in making, and much fitting must be done on the patient.

While we believe that well-made ambulatory appliances are most desirable whenever they can be recommended, it does not necessarily follow that good results cannot be obtained from some of the simple and cheap retentive types. Owing to limited space, it will be impossible to give a detailed description of a certain type of this kind which deserves recognition,—that used by Mr. Robert Jones, F.R.C.S., of Liverpool. Some of it was devised by Mr. Hugh Owen Thomas, F.R.C.S., and has been used extensively in our own clinics. These appliances are ideal in several respects: cheapness, simplicity of construction

and adaptability. These frames, as they are called in England, are made of common band iron covered with leather or cloth and applied to the patient with adhesive plaster or swathe bandage. They are so simple in construction that with a few necessary rules to follow, the physician can easily instruct a blacksmith to make them. Their cheapness is of great advantage to patients when expense is to be considered, and in large clinics stock patterns of various sizes may be kept on hand for immediate use. (See Figs. II and III.)

FIG. 2. Foot splint, after Jones, for varus or valgus. To be padded and held in place by bandage.

C. Calf piece of thin untempered sheet iron.
A. Foot piece of same material, with flange at F.
I. Malleable iron connecting bar, which may be bent to obtain more or less dorsal flexion and twisted to obtain more or less varus or valgus.

Like England and Germany, France, too, has types of her own, which rather resemble ours in principle of construction. In Paris little work is done under hospital supervision, it being left almost entirely in the hands of private concerns and, owing to the exclusiveness of these shops, it was not the privilege of the writer to observe the actual making of apparatus. The appliances are strikingly beautiful in appearance and workmanship, a consideration regarded as important as their efficiency and due probably to the keen competition among shops in Paris. It seems to us possible that at times mechanical efficiency may be sacrificed to this very beauty of workmanship.

While it is not in the province of the writer to express any opinion as to the success of the various appliances in accomplishing cures, and while he realizes that the indication for any type of apparatus depends solely upon the opinion of the physician, he wishes to offer for your consideration certain suggestions which he believes would be of advantage to the patient and physician if they could be adopted:

1. The standardization of certain common types. It is of course true that improvements in existing types are to be looked for and welcomed. It is also true that each case is a separate problem, else we should have efficient ready-made apparatus. We believe, however, that there must be something approaching a consensus of opinion

in regard to the efficiency of the common forms of apparatus and that special needs can be met by comparatively minor adaptations of certain standard types.

2. We believe that the efficiency of any apparatus, providing, of course, that its mechanical principle is correct, depends largely upon the accuracy of its fit. We would urge, therefore, that, whenever it is practical, at least in the more complicated forms, the instrument maker be consulted in the presence of the patient and be allowed to take any measurements he desires. It is recognized that an ill-fitting apparatus may do harm, and rarely serves its purpose as a support. The brace should be so carefully worked out in detail that it may, as far as possible, adapt itself to give adequate support in whatever position or under what anatomical peculiarities it is called upon to serve. To attain this nicety of fit it is very important that the maker of the instrument should be allowed to take his own measurements of the patient. However, this should never be left entirely to the mechanic. There is at present no uniformity of type or style so that a hip brace, for example, can be fitted as the tailor fits an overcoat. The measuring, the fitting and the working of the brace should all be carefully followed and observed by the physician in charge, who alone can fully appreciate the requirements. But it is equally true (especially in the more complicated appliances) that the physician cannot expect a good result if he simply orders a brace from certain measurements without allowing the maker to note

FIG. 3. Thomas hip splint.

A. Thoracic band.
B. Pelvic band.
C. Thigh band.
D. Ankle band.

Notice the important and simple curves between B and C for the buttock, and the absence of other curves.

for himself the peculiarities of the case and to fully comprehend the principles that he is to carry out. The highest grade of efficiency in orthopedic apparatus can only be obtained by this intelligent co-operation of physician and mechanic.

Clinical Department.

SARCOMA OF THE TONSIL.*

BY GORDON BERRY, M.D., WORCESTER, MASS.

THE case of sarcoma of the tonsil to which I would first call your attention is of particular interest on account of the advanced age of the patient: eighty-five years eleven months. She gave a negative history

* Read at a meeting of the New England Otological and Laryngological Society, Nov. 14, 1911.