AN ADJUSTABLE KNEE SUPPORT — MARSHALL

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PATIENTS with chronic joint troubles not infrequently have contractures that for some reason cannot be corrected by surgical measures or forcible manipulations, or they have recurrent contractures after previous treatments; and such individuals need additional mechanical supports owing to their deformities.

Severe progressive cases of arthritis deformans, for example, are especially liable to show stages in which mechanical aids are beneficial; and the device figured here for knee joints seems to possess the following advantages in such instances.

It is comfortable because it is made upon a plaster model of the patient's leg and therefore fits exactly. It can be adjusted very readily and accurately by the patient from day to day in any degree of flexion or extension that is wished; and it can be employed simply as a splint to protect a sensitive knee joint when adjusted to the position of greatest ease. Or it can be used to increase gradually flexion or extension by adjustments that exert slight continuous pressures in the desired direction. For illustration, when a contracted knee is placed in as complete extension as possible, the patient being seated in a chair with the heel resting upon the floor, and pressure is exerted backward upon the patella with the hand until a slightly forced position is gained, this advantage can be permanently maintained if the nut which interlocks the two toothed discs of the support is simply tightened before relieving the hand pressure.

It can be used as a safe support when walking because the joint between the two discs is exceptionally strong when they interlock, and it can be worn inconspicuously under the clothing.

It may be of use after surgical or manipulative treatments as well as when employed independently. It does not bring increased irritation from unusual pressure upon the patella and underlying articular structures as some knee supports do.

Patients can adjust the brace frequently themselves, a feature that furnishes them with something to do to assist themselves.

Its limitations are that it does not remove the pressure from the articular surfaces, and cannot be used as an ambulatory device where all such mechanical irritation has to be avoided. Also it has the financial drawback of every carefully made support of being somewhat more expensive than rougher, less nicely fitted ones.

DESCRIPTION OF THE SUPPORT.

It consists essentially of two lateral steel rods. One is placed upon the inner aspect of the leg and the other upon the outer side, and both run

from beneath the heel to the upper part of the thigh. They are hinged at the knee, and are joined to each other across the posterior side of the thigh and lower leg, with steel straps. Two model, one around the thigh and one around the broad cuffs of leather moulded to fit the plaster calf, are fastened to the metal rods and grip the leg firmly, binding the support to it.

The lower end of the rods fit into metal sockets in the heel of the shoe.

The adjustable joint at the knee is made of steel-toothed discs that are shown in actual size in the accompanying diagrams. Each disc is provided with a ring of radially arranged teeth at its periphery; and each is riveted to a divided, overlapping end of one of the rods of the support, where the ends enter into the adjustable joint. There are four discs in the complete brace arranged in two pairs corresponding to the pair of divided rod ends on each side of the knee, and the discs are placed face to face so that their teeth interlock when they are approximated.

Each disc has a hole in its center, and holes in the brace rods to which the discs are riveted permit a bolt to pass through both discs and both rod ends. A bolt clamps all firmly together in any desired position when an adjustable nut (5) is tightened.

In order to gain the additional feature of having the discs pulled apart and held conveniently for readjustments when the nut is loosened, as well as having them bound together firmly when it is tightened, the following conditions are necessary:

The central hole of one disc (4) is made larger than the hole in the other (3), and the adjusting nut (5) which clamps them together is provided with a projecting collar that fits into the circular opening accurately and extends through it to the other side of the disc. A flange (6) is screwed to this projecting collar of the nut, preventing it from being separated from the disc, yet readily allowing turning in the central circular opening of the latter. The diagram (4, 5, 6) shows assembled upon the rod of the brace the disc, and the nut with its collar and flange.

The other disc (3) has a central aperture that is flattened purposely upon two sides, and into which the central bolt (2) fits so that it is held firmly without revolving, when the small nut (1) is permanently tightened upon the other side of the interposed disc and brace rod. The diagram (1, 2, 3) shows this bolt, disc and nut assembled in position.

The central axis or bolt (2), which is long enough to go through the entire joint of the brace, has a long, cylindrical section of large diameter at one end provided with a thread upon which the adjusting nut advances or recedes as the latter is tightened or loosened. Also the bolt has a narrow flattened middle portion which fits into the flattened aperture of the disc to prevent rotation as has been stated.

The small nut (1), screwed upon a short threaded section at the other end of the axis binds the toothed disc firmly against the large cylindrical part, where it forms a shoulder next to its middle flattened section. This shoulder of the bolt helps to push the two discs apart when the large adjusting nut with its flange pulls upon the other half of the joint.

It is apparent that when the two halves are brought together and the adjusting nut is screwed upon the thread of the bolt, that the two discs become firmly locked, and that they are pushed and pulled apart and held separated in a positive way when the nut is unscrewed.

The finished knee support as it appears in a photograph is shown in the last figure.

Book Reviews.

The Mechanistic Conception of Life. Biological Essays by JACQUES LOEB, M.D., PH.D., Sc.D. Chicago: The University of Chicago Press. 1912.

This volume, consisting of ten addresses and papers written for various occasions, represents a popular presentation of the results of the author's investigations in physiology, biogenesis, parthenogenesis and biochemistry, and constitutes "an attempt to analyze life from a purely physico-chemical viewpoint." Denying teleology, he aims by experimental observation to establish the thesis that the processes of animal and of vegetable life are essentially the same and that their phenomena are in reality all due to chemical reactions, chiefly in the nature of oxidation. On this basis he seeks to explain not only the process of fertilization, the signification of plant and animal tropisms, the pattern adaptation of fishes and the mechanism of vision, but also the psychologic processes of the central nerve system, which he considers due to the activity of the associative memory, or, as he terms it elsewhere, associative hysteresis.

As an exponent of the modern experimental method in science, Dr. Loeb is skillful and convincing. Every one of the facts which he demonstrates with such nice exactitude is indisputably true. The error lies in the interpretation. In his enthusiasm over the seemingly miraculous revelations of science he forgets that there are some doors to which it finds no key. Chemical process undoubtedly accounts for intellectual phenomena, but it does not explain the content of thought.

Dr. Loeb justly disparages most metaphysical speculations. It should be remembered, however, that the physician may fall into an error conversely analogous with that of the metaphysician. There is being poured out today a mass of so-called scientific research which after a few centuries will be recognized to be as profitless as the philosophic disputations of medieval

scholastics. This is not saying that all such research does not serve a purpose. It is the nature of the human mind to win truth chiefly by winning it from an intolerable deal of chaff. The difficulty lies in the discrimination between that which is important, if true, and that which, though true, is unimportant.

Dr. Loeb's concept of life is entirely justifiable from its own point of view, but that point of view is limited. It is not to be criticized because it leads to scientific determinism, since determinism is the conclusion reached by many other philosophies. Moreover, it affords an entirely adequate ethics; indeed the ethics of science seems in many respects superior to other forms, because it is rational. The failure of scientific, physico-chemical determinism is its inability to account for the significance of the life-processes whose phenomena it explains. The mechanistic conception of life, though correct, is inevitably incomplete.

A Manual of Clinical Chemistry, Microscopy and Bacteriology. By Dr. M. KLOPSTOCK AND Dr. A. KOWARSKY, of Berlin. Only authorized translation from the last German edition. Thoroughly revised and enlarged. Illustrated with 43 textual figures and 16 colored plates. New York: Rebman Company. 1912.

The German original of this book was intended primarily as a laboratory manual for practitioners, and was therefore written from the point of view of its practical clinical application. For the purposes of this English version the sections on typhoid fever and on the meningococci have been entirely rewritten, and new sections have been added on the spirocheta pallida and on the Wassermann reaction. The style of the translation is in the main idiomatic and flexible, within the limits afforded by so technical a subject-matter. The colored illustrations are particularly good. The routine methods of examining the various body fluids, excretions and secretions are clearly described, and the processes of laboratory diagnosis explained. The book should have a considerable usefulness as a convenient manual for the aid of general practitioners.

Landmarks and Surface Markings of the Human Body. By L. BATHE RAWLING, M.B., B.C. (Cant.), F.R.C.S. (Eng.). With 31 illustrations. Fifth edition. New York: Paul B. Hoeber. 1912.

The fourth edition of this admirable work was reviewed in the issue of the JOURNAL for June 1, 1911 (Vol. clxiv, p. 794). No important alterations have been made in the text of this fifth edition, but the 24 full-page plate illustrations have been improved. There is a very convenient terminal table of the ossification and epiphyses of the bones of the upper and lower extremities.