

improvement one is justified in delaying more radical measures.

There is, practically speaking, no spontaneous outgrowth of knock-knee deformity, such as is not infrequently observed in the opposite distortion of bow-leg.

Treatment by Braces.—The most efficient brace in the treatment of genu valgum is the simple straight steel bar or splint extending from the trochanter to the heel of the shoe, without joint at the knee. The greater efficacy of the rigid bar as compared with the jointed brace is explained by the fact that the rectifying force acts constantly when the joint is fixed, preventing the attitude of flexion so characteristic of the deformity.

The simplest and cheapest brace is that of Thomas (Fig. 3092), which consists of a light steel bar provided with a pad at its upper end for pressure against the tro-



FIG. 3093.—The Modified Thomas Brace with Pelvic Band, showing Over-correction of Deformity.

chanter, while the lower rounded extremity is turned inward at a right angle, to pass through the heel of the shoe. The knee is fixed by a posterior bar attached to a thigh and calf band, as illustrated in the figure. When the brace is applied the knee is drawn backward and outward, and is attached firmly to the brace by a roller bandage.

In the more extreme cases, in which the knees and thighs are habitually flexed, the addition of a pelvic band attached to the uprights by a free joint at the hips, adds to the comfort and efficiency of the apparatus, as the attitude of the feet can be regulated by twisting the uprights slightly, or the pelvic band may be divided, the two halves being attached to one another by straps and buckles (Fig. 3093). The uprights may be bent somewhat inward at first, and as the legs become straighter they are straightened and finally bent outward to allow for the over-correction of the deformity. Twice a day the braces should be removed to allow massage, manipulation, and voluntary exercises of the legs. In most cases the braces are not employed at night, although the rectification of the deformity may be hastened by their constant use. It is of course evident that mechanical treatment would be

more effective if the child were not allowed to stand; as a rule, however, the brace must be employed as an ambulatory appliance.

If the deformity is unilateral so that a brace is required for one leg only, the other shoe should be raised by a cork sole about three-quarters of an inch in thickness to make walking easier. Children soon become accustomed to the braces and walk easily in spite of the absence of joints.

The duration of the brace treatment depends of course upon the degree of the deformity and the age of the child; from six months to a year is the ordinary period. Cure is assured by the gradual adaptation of the parts to the new static conditions, and by the transformation of the internal structure of the bone which accompanies the rectification of the deformity. When the braces are discarded attention should be paid to the attitudes, and exercises and massage should be continued with the aim of strengthening the muscles of the limb.

If the bones are very flexible, as in deformity due directly to rachitis in young children, it may be corrected rapidly by the repeated application of plaster bandages. This method is not often employed except in dispensary practice.

Operative Treatment.—Immediate correction of deformity, when it is at all marked, is as a rule indicated after the age of three or four years. For although it may be possible to correct the distortion by mechanical treatment in cases far beyond this limit of age, yet the time required and the incidental discomfort exclude it from consideration in all but very exceptional cases. Immediate correction of the deformity may be attained by osteotomy or by osteoclasis.

Osteotomy.—The so-called subcutaneous osteotomy is the operation of choice. The limb having been prepared in the usual manner is semiflexed and the inner surface of the knee is placed on a sand bag. With the fingers the femur is firmly grasped just above the condyles so that the size and position may be accurately determined, and a sharp osteotome about the size of a lead pencil is forced, with its cutting edge parallel with the axis of the leg, down to the bone, at a point about one and a half inches above the tuberosity of the external condyle. While it is held firmly in position against the bone, it is turned to the transverse direction and is then driven through the cortex. When it enters the medullary canal, as is made evident by the lessened resistance, it is partly withdrawn and moved slightly to one side and the other and driven through the cortical substance, until with gentle force the bone may be fractured. The osteotome is then withdrawn, the minute wound is covered with a pad of dry gauze, or, if the oozing be profuse, it may be closed with a catgut suture. The deformity is then over-corrected by bending the cortex on the inner side and opening a wedge-shaped gap in the bone, sufficient to make the patient somewhat bow-legged when the plaster bandage is applied. If the deformity is double, both limbs are operated upon, and, in order to assure better fixation, it is the rule to apply a spica bandage, double or single as the case may be, which includes the foot as well.

The plaster bandage is continued for from four to six weeks, and it is then usually supplemented by a brace. This may be worn with advantage for several months, because of the laxity of the ligaments of the knee-joint which is usually present in this type of marked deformity of rachitic origin. In less marked cases, particularly those in older subjects, the support is unnecessary. Massage and exercises during the stage of recovery should be employed if possible.

In the more extreme cases of general rachitic deformity of the lower extremity in which the tibia is implicated, in addition to the femoral osteotomy it may be necessary to remove a cuneiform section of bone from the inner side of the tibia just below the epiphysis. In such cases it is better to perform the second operation at a later time in order that the effect of the first procedure may be observed.

Osteoclasis.—Osteoclasis by means of the Grattan osteoclast is, from the standpoint of the result, an equally efficient treatment. With this instrument the bone may be broken above the condyles at the desired point.

The adolescent type of genu valgum is not often extreme, and as a rule the distortion of the bone is comparatively slight, the deformity being exaggerated by laxity of ligaments and by the habitual attitude. In the more chronic cases osteotomy above the condyles may be performed in the manner described, but in Berlin and Vienna where the deformity is more common than in New York, other procedures are often employed.

One method is that of Wolff, who by means of the "Etappen Verband," gradually corrects the deformity.

The patient is anesthetized, and the limb having been carefully protected with cotton, particularly about the malleoli, the patella and the inner condyle are enveloped in a firm plaster bandage reaching from the malleoli to the pubes. When the plaster begins to harden one assistant steadies the pelvis, another holds the inner condyle, while the operator draws the leg inward with moderate but persistent force against the fulcrum formed by the hand of the second assistant and holds it firmly in the partly corrected position until the bandage is hard. About three days later a wedge-shaped section of the bandage, about one inch in width, is removed from the part that covers the inner half of the knee, the other half of the bandage being simply divided. The leg is then forced inward until the two sections are again brought into contact. The position is retained by an additional plaster bandage about the weakened part. This procedure is repeated at intervals until the leg is completely straightened, a result that is often accomplished in a few weeks. No anæsthetic is required for the secondary treatment. When the deformity has been corrected the patient is allowed to walk about, and for convenience the plaster bandage is divided into a thigh and leg part, which are attached by lateral joints incorporated in the substance of the plaster, so that movement is allowed. This apparatus must be worn for several months, and is of course to be supplemented by massage and exercises.

Another means of correction of deformity without open operation is that employed by Lorenz, what he calls "Intraarticuläre modelierende Redressement." In this operation the deformity is reduced under anæsthesia in one sitting, by the gradual application of force by means of his osteoclast. The distortion is corrected partly by stretching the external ligaments and partly by straightening the bones. A plaster bandage is worn for six weeks when it is replaced by a jointed brace. As a rule, the patient is allowed to walk about in a few days after the operation.

Royal Whitman.

KOLA (or COLA) NUT.—(*Semen Kola* or *Cola*; *Guru* or *Goroo Nuts*; *Bichy* or *Bissy Nuts*; *Soudan Coffee*.) The fresh or dried cotyledons of *Cola vera* Schum. or of *C. acuminata* (Beauv.) Schott. (fam. *Sterculiaceæ*). These plants are medium-sized trees of western tropical Africa, cultivated there and elsewhere in tropical regions and extensively naturalized in the West Indies. The commercial product is obtained from both cultivated and wild trees and both from the West Indies and from Africa. The seeds grow from one to three in each of the four to eight cells of a large woody capsule, the cells of which split open at maturity. The seeds possess a thick, softish testa, which is allowed to soften by partial decay for some days, when it is removed. The cotyledons, two in the first-named species, three or four in the second, constitute the whole of the kernel. This kernel is very thoroughly washed in the purest of water. If to be exported in an undried condition, those which are still entire are then wrapped in the large leaves of a related species, and packed carefully in baskets. If kept carefully, they will remain fresh for many weeks and, thus imported, they constitute our "fresh kola." Otherwise, they are dried in the sun, when the cotyledons usually separate. There can be little doubt of the greater activity and superior properties of the undried kernels.

For native consumption, they are used entirely in the fresh condition, and are mostly caused first to enter the incipient stage of germination. Opinion differs as to whether this operation changes them only by a sweetening process, due to the conversion of some starch into sugar, or whether, as claimed by the natives, their nerve action is thus increased.

DESCRIPTION.—The fresh kernels are irregularly oblong, or ovoid, somewhat inclined to be bluntly angled, slightly compressed one way, usually with a slight fissure indicating the division of the cotyledon; about one to one and one-half inches long, not quite so broad and about two-thirds as thick. The surface is smoothish, somewhat granular, the color purple to brown, the texture tough-fleshy, the odor somewhat aromatic, the taste aromatic, bitterish, and astringent. In the dried condition, the above bodies are mostly separated into halves, reduced about a third in size by drying, each somewhat bent, thus becoming irregularly plano-convex, or the flat side even a little concave. The edge is thin and quite sharp, the color dark-brown, the outer surface granular, the inner smooth, the consistency hard and quite tough. They have almost no odor and the bitterness and aroma are nearly lost, the astringency being mostly retained.

CONSTITUENTS.—Much effort has been bestowed upon attempts to determine the presence of constituents which can explain the remarkable statements which have been made concerning the effects of the native use of kola, but, as usual in such drugs, these constituents, if they exist, are elusive. Besides about one-tenth per cent. of volatile oil, forty per cent. of starch, and from two to four per cent. of tannin, the important constituents are alkaloidal, to the extent of about two to four per cent. A very slight amount of this alkaloid is theobromine, the remainder caffeine. About half of this caffeine exists free, the remainder combined with the tannin (*kola-tannin*) as *kolanin*. Although the latter compound is said not to be a glucoside, yet it is decomposed by a special enzyme, after the manner of glucosides in seeds. A peculiar coloring matter, *kola red*, is also yielded.

ACTION AND USES.—Kola is to the native of Africa what coca and maté are to the South American, and marvellous tales are told of the amount of work and fatigue that the African is enabled to endure when supported by the stimulating properties of this seed. It has been held in the greatest esteem from time immemorial, and is now looked upon almost as a necessity.

In addition to its ordinary use, it has acquired a reputation as a specific in counteracting the depressing and debilitating effects of alcoholic intoxication. Experiments have been made with it in the French army which prove that it has decided stimulating properties, but is in no sense a food.

The kola nut and its physiological action were treated in a thorough manner by Dr. Monnet in 1884, under the direction of Dr. Dujardin-Beaumez, and an abstract of his thesis was published in the *Therapeutic Gazette* in the following year. The physiological and therapeutic actions are summed up by him in the following conclusions:

1. Kola, by virtue of the caffeine and theobromine which it contains, is a tonic of the heart, whose pulsations it accelerates, while it increases its power and regulates its contractions.
2. A second phase of its action, similar to that of digitalin, proves it to be a regulator of the pulse, which revives under its influence, the pulsations becoming fuller, and less numerous.
3. In consequence of its action upon arterial tension, diuresis is increased, and, consequently, kola can be employed to good advantage in cases of dropsy with cardiac lesion.
4. It might be deduced from observation that kola, which acts energetically upon cardiac contractions, and upon the contractility of muscles of organic life, would, on the other hand, have a paralyzing influence upon the striated muscles, when it is used in toxic doses.
5. It retards tissue metamorphosis and diminishes the

excretion of urea resulting from decomposition of azotic substances, very likely by exerting a special action upon the nervous system.

6. It is a powerful tonic, through the principles which it contains, and its employment is indicated in cases of anæmia, in chronic affections associated with debility, and in convalescence from acute disorders.

7. It favors digestion, either by augmenting the secretion of the gastric juice (eupeptic), or by acting on the fibres of the stomach, which it would render less atonic in cases of dyspepsia. Under its influence, rebellious anorexia disappears and the digestive functions become more regular.

8. Finally, it is an excellent anti-diarrhoea remedy, and has rendered great service in chronic diarrhoea or sporadic cholera, although its action could not be explained physiologically.

It is to be noted that the above results were doubtless reached by the use of the dried kernels, in which the kolanin compound is in decreased amount. The question of the relative action of free caffeine, and of the same amount taken into the system in a combined state like kolanin, is an important one. It appears reasonable to suppose that there would be an important advantage in degree, if not in kind, if the latter method were employed; and reports must be judged differently, according to which of the two forms was employed.

Surgeon R. H. Firth publishes (*Practitioner*, July, 1889) some very practical observations made upon British troops and natives under his control, and concludes that kola is in no sense a food, and that its physiological action is explained by the contained alkaloids; when pure and not too old, it has a peculiar stimulant action upon the nervous system, temporarily strengthening the heart beat, and increases the arterial tension; taken continuously during times of exertion and fasting, it possesses some power of warding off the sense of mental and physical exhaustion. This power, however, is not so marked as some observers have reported; in the convalescence from long sickness, its value is not apparent, and its alleged antagonistic action to alcoholic sequelæ is not capable of proof.

The use of kola among pedestrians and athletes has gained some popularity and repute.

As a therapeutic remedy, it is of benefit in strengthening the weak heart, augmenting the general flow of blood and vascular tension, and promoting diuresis. Its tonic effect has also proved of benefit in disturbances of the nervous system and debility of the cerebro-spinal centres, and in the prostration accompanying and following severe fevers and protracted illness. As a remedy for diarrhoea, particularly of an atonic character, it has proved of decided value. The combination of the tannic acid and its tonic principles makes it of great service in this disorder. The preparations advised are the alcoholic tincture, the elixir, and the wine. The tincture is made by exhausting fresh kola with five parts of alcohol, and the wine by macerating the same proportions of kola in wine for a fortnight. The dose is from one to two or three teaspoonfuls three times a day. The elixir is prepared by diluting the alcoholic preparations with equal proportions of syrup.

Henry H. Rusby.

KOOSSO.—CUSO. BRAYERA. "The dried female inflorescence of *Hagenia abyssinica* (Bruce) Gmelin. (fam. Rosaceæ)." U. S. P.

This is a large and handsome, very leafy tree, with downy twigs and very silky buds and young leaves.

DESCRIPTION.—Mass red-brown, hairy and minutely glandular, consisting of panicles varying from 25 to 40 cm. (10 to 16 in.) long, a sheathing bract at the base of each branch, and two rounded bracts near the base of each flower; calyx having a cup-shaped, hairy tube and bearing on its back a circle, resembling an outer calyx, of five thickish and rigid, spreading, obovate, purple-veined bracts, which are larger than the five thinish, usually shrivelled and incurved, oval calyx lobes; petals five, delicate, whitish, oblong, much shorter than the

sepals, caducous, hence often wanting in the drug; stamens aborted; pistils two, the one-ovuled, ovoid ovaries concealed in the calyx tube, shorter than the styles, which are exerted; stigmas broad, hairy; odor slight, agreeable; taste bitter, acrid, and nauseous.

Cusso in the form of loose flowers, usually largely staminate, should be rejected.

This tree is a native of Abyssinia, where it grows abundantly wild, and is also cultivated about villages and roadsides for ornament. Its medical use was also

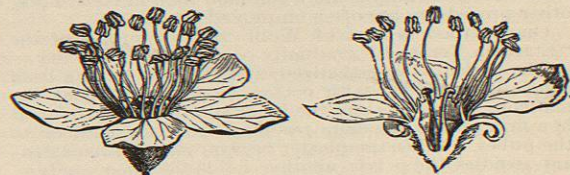


FIG. 3094.—Koosso; Staminate Flowers Enlarged. (Ballou.)

introduced about 1850 from that country, where every third person is said to have tapeworm, and where it has been used for a century or more. The detailed description of the flowers and panicles given above covers its description as a drug. The whole inflorescence is taken at about the time of flowering and simply dried and packed. Sometimes it comes in bales or large cakes, but more generally it is tied in rolls somewhat smaller and shorter than the arm. The pistillate panicles are easily distinguished by their large epicalices and their reddish-brown color, and are known as "red koosso." The odor is slight, fragrant, and tea-like; taste bitter and disagreeable.

COMPOSITION.—By distillation with water, koosso yields a small amount of essential oil, to which its fragrance is owing. It also contains nearly one-fourth its weight of tannic acid and considerable wax, resin, and other common vegetable products. Its peculiar active principle, however, is a yellow crystalline substance, *kosin* (of Merck). It is tasteless, insoluble in water, nearly so in alcohol, readily soluble in chloroform and ether, as well as in alkalies, from which latter it may be precipitated by acids. *Kosin* is permanent in the air, and is unquestionably the principal tannicidal agent of koosso.

USE.—Koosso has long been a popular anthelmintic in its native land, and since its introduction here has ranked among the best with us. Its action appears to be directly toxic to the worm, and, until the introduction of the pelletierine from pomegranate bark, was not only one of the most sure to bring the bulk of it away dead, but the



FIG. 3095.—Koosso; Pistillate Flower and Section Slightly Enlarged. (Ballou.)

most certain also to disengage and remove the "head." In order to obtain the best result from this, as well as from any other anthelmintic, the intestinal canal should be well emptied of its contents by a moderate laxative—say twenty-four hours before administering the koosso;—then, for at least twelve hours previously, no food whatever, excepting a glass or two of milk, should be taken. The koosso may then be given, when the patient should be kept quiet for one or two hours after, in order to overcome the nausea or vomiting that may result. Two or three hours after the tannicide has been taken, milk or beef-tea may be allowed, and five or six hours later a solid meal. If the drug be given in substance or infusion

it usually acts as its own cathartic, in spite of the large amount of tannin, but if it fails to do so in six or eight hours a saline should be given. Koosso is especially to be recommended for the different varieties of tapeworm; for the round and seat worms there are better medicines. The dejections should be carefully examined for the body of the parasite; from two to five, or more, metres of its larger joints are always found; they mean nothing as to cure, since any brisk cathartic might bring them away, and unless its attachment or "head" is killed, it will certainly grow again. If this is found, the cure is effected, excepting in those cases, exceedingly rare in this country, where two contemporaries exist in the same bowel. As a general rule, if 10 or 20 cm. of the long, thread-like "neck" not more than a millimetre in diameter and without distinct joints, are seen, the "head" is destroyed and has probably escaped observation; such cases are generally cured. But it is not safe, unless the "head" has been actually seen, to make a positive assurance to that effect until eight or ten weeks have elapsed without any segments appearing in the feces.

ADMINISTRATION.—A common and efficient method is to give a six-per-cent. infusion made without straining from the powdered drug, the patient being expected to stir up and swallow the dregs with the tea. A tumberful of this may be taken and repeated in an hour. The fluid extract (*Extractum Koosso Fluidum*) is another and less disagreeable preparation, but more infrequently used; dose from 15 to 30 c.c. (15 to 30 c.c. = ̄ss. ad ̄i.). *Kosin* may be given in doses of from 1 to 2 gm. with the same preparatory treatment. In England it is preferred to give ̄ss.-i. of the powdered drug suspended in mucilage.

W. P. Bolles.

KRESAMINE.—See *Ethylene-Diamine* and *Trikesol*.

KRYOFINE—methoxy-acet-para-phenetidin, methyl glycolic phenetidin (C₆H₄.OC₂H₅.NH.CO.CH₂.OCH₃)—is obtained by heating phenetidin with methoxyacetic acid to 120°–130° C. It occurs in white crystals, soluble in 600 parts of cold water, in 52 parts of boiling water, and in alcohol, ether, chloroform, and oils. It is odorless and ordinarily tasteless, though its concentrated solutions are bitter.

This drug, which is a modification of phenacetin (acet-para-phenetidin), has been recommended by Eichhorst, Hass, G. F. Butler, Fasano, and others as a very efficient analgesic and antipyretic in neuralgia, rheumatism, influenza, etc. Claims are made that its action is less rapid than that of many drugs of the class, and that it has less tendency to produce depression and profuse sweating. However, excessive diaphoresis and even cyanosis have been observed, and there is no evidence that kryofine is any better or safer than acetanilid or phenacetin. It has been found by Ebstein in the urine in fifteen or twenty minutes after ingestion, disappearing in from six to eight hours. The dose is 0.15–1.0 gm. (gr. iiss.-xv.). Sixty grains have been given in twenty-four hours without bad results.

W. A. Bastedo.

KUMYSS. See *Milk*.

KYPHOSIS.—The term "kyphosis" is derived from the Greek *κνῆσις* meaning humpbacked, bent forward, and signifies of course, only a symptom, but one which is present in a number of conditions both of disease and of injury. It always refers to the spine, and, inasmuch as tuberculosis of the spine is the disease which almost invariably presents this symptom as its most conspicuous clinical feature, the term kyphosis is perhaps most generally supposed to refer to this disease. It always signifies an antero-posterior curvature.

We will consider the spinal column a moment from an anatomical point of view before taking up the pathological changes causing kyphosis. The column above the sacrum is composed of vertebrae which diminish in size as one approaches the atlas; these are separated by fibro-cartilaginous discs which equal one-fifth of the whole bony column in height and are more or less elastic and

compressible. The vertebrae are kept in place by ligaments outside the vertebral canal as well as within the canal itself. These have some elasticity and allow motion of the vertebrae on their articular facets. In addition to the support afforded by the ligaments the column is maintained erect by the powerful spinal muscles, and in the lumbar region by a fibrous aponeurosis as well. When these anatomical features are present in a normal condition, under normal relations one to the other, then the column in the erect position presents certain normal physiologico-anatomical curves dependent chiefly upon where the centre of gravity passes through the column. In a normal individual this is as follows: A perpendicular line should pass through the odontoid process, and then through the body of the second dorsal vertebra; thence it should intersect the column at the tenth and eleventh dorsal vertebrae and then pass on down through the sacrum. It is important to remember this because a lack of familiarity with the normal curves of the spine and the variations which may take place in it within normal limits is the source of much confusion and oftentimes of positive wrong, particularly in medico-legal work. Certain vertebrae at the junction of the cervical and dorsal portions of the spine are invariably more prominent than elsewhere. Again, in the lower dorsal and upper lumbar regions there are also two or three spinous processes which are more conspicuous than their fellows, particularly in flexion of the column. Posture, occupation, etc., readily aggravate such conditions, when once they are present, as does also the lack of subcutaneous fat. There are also congenital defects in the spine which give rise to a bending forward of the column, or at least an apparent bending of it. The defects are most commonly in the cervical region and in the lower dorsal or the lumbar region. In the latter region occur the spinæ bifidae; in the former, the meningo-encephalocèles.

1. To distinguish normal curves from pathological ones is not commonly difficult. The meningo-encephalocèles are the result of a failure of the posterior neural arches to unite, and a protrusion of the coverings of the cord ensues, either complete or partial. Many of these cases do not live longer than through the period of infancy, but occasionally, when the bony arch has not failed completely to unite, the patients survive and have a very short neck with high standing shoulders and considerable deformity. The spinæ bifidae, which commonly occur in the lower dorsal or the lumbar region, are readily recognized by the soft and fluctuant character of the swelling, which is in the median line, and is accompanied usually by more or less paralysis of the lower extremities, both sensory and motor. The kyphosis is not due to alterations in the bone.

2. Trauma may cause kyphosis, and frequently does. Under this head come the fractures of the spine which are commonly accompanied by considerable deformity and by more or less paralysis below the deformity, both motor and sensory, involving the sphincters also. The bend is sharp, and involves as a rule only two or three vertebrae at the most. Dislocations of the spine cause kyphosis frequently. They are more common in the cervical region. They are not apt to cause as complete paralysis as do the fractures, and they are amenable to treatment. Another sort are the so-called "torsions," or ruptures of spinal ligaments in which there is more or less motor and sensory disturbance below the seat of injury; a kyphosis is present on flexing the trunk, with an aggravation of the above-mentioned symptoms, which disappear, as does also the kyphosis, when the trunk is hyperextended. This kyphosis manifests itself in the form of a sharp bend involving two or three vertebrae.

3. In young children with acute rickets a kyphosis is very common. This curve is a long sweeping one, involving pretty much the entire dorsal portion of the column, but is not accompanied by muscular spasm; the curve disappears entirely on hyperextension of the trunk, and the child commonly presents the other evidences of acute rickets; viz., pain on handling; enlarged epiphyses; rosary; prominent abdomen, etc.