

the degree of extension which may be attainable need not return the cartilage to its normal site, and therefore a depression is noted in lieu of the normal contour of the cartilage. If the coronary ligaments be ruptured, these cartilages will recede and advance perceptibly during flexion and extension of the leg, provided the articular surfaces and those of the adjacent cartilage are smooth and properly lubricated. If otherwise, they may be easily pinched and perhaps overridden during extension of the limb. One should judge of the nature and extent of the injury of a joint by carefully comparing its physical and functional characteristics with those of its uninjured fellow.

If the cartilage be displaced, its prompt reduction should be attempted. Various methods of procedure are advised for the accomplishment of this purpose. The chief element of a successful reduction is based on the fact that flexion of the leg relaxes the connecting structures of the joint in direct proportion to the degree of that act. Now, since relaxation loosens joint tension, it follows naturally that loosening of the tension favors the restoration of the displaced cartilage, either by its own inherent elasticity or by direct manipulation, in the best possible manner. For this reason various degrees of extent and rapidity of flexion, combined with supination and pronation of the leg, are advised for the purpose of reduction. The following, advised by Allingham, is sufficiently comprehensive to suggest, and probably even meets the demands incident to, displacement. "Flex the leg as much as possible on the thigh, drawing upon the tibia as if to separate the articular surfaces from the femur. Then rotate the tibia inward if the internal cartilage be displaced, and outward if the external cartilage be displaced. Both movements should be resorted to if the usual one does not succeed. Then extend the leg on the thigh quickly, but not with great violence, at the same time pressing with the thumb upon the projecting cartilage." After reduction, rest and immobility, until the danger of inflammation has subsided, will commonly suffice. It is noteworthy that not infrequently the severe pinching of the cartilage due to displacement is followed by such a degree of swelling and tenderness of the structure and deformity of limb as to give the impression after reduction that displacement is still present. If reduction fail of accomplishment, then either of two plans can be pursued:

1. The employment of massage and passive motion, after the symptoms incident to the injury have subsided. The use of elastic knee-caps, bandages, and perhaps even apparatus to limit movement may be needed. This course will in time restore the function of the joint, although at intervals derangements will ensue, the same as may happen even when the reduction is accomplished at first.

2. The exploration of the joint through a liberal perpendicular or oblique incision made into it at the site of the displaced structure, about three-fourths of an inch from the ligamentum patellæ. If the integrity of the cartilage will permit, it should be returned to its proper position, and be stitched there with fine aseptic silk or chromicized catgut. If this be not allowable, on account of the great extent to which its structure has been damaged, it should be removed entirely. In either instance, finally, the joint should be irrigated with an aseptic solution and closed by two rows of sutures—the first including only the synovial membrane and its closely adjacent connective tissues; the second, the remaining tissues of the wound. Either silk or catgut can be used, as best suits the wish of the operator. The employment of drainage will depend greatly on the extent of handling to which the structures of the joint cavity have been subjected. Ordinarily it need not be employed; still, the introduction into the joint of carbolized horsehair or silkworm gut, for drainage purposes, cannot in itself do harm, and should therefore be employed when indicated.

The alar cartilaginous structures of a joint may become so elongated or enlarged, as the result of disease, as to be pinched by the articular surfaces. Extravasations of blood within their folds may so change their relations

with the joint surfaces as to cause pinching at once, or bring it on at some later date, on account of the formation of fibrinous bodies within them, which remain attached to the borders of these structures, or are eventually disconnected and wander freely in the cavity.

The result of operation for this condition is fairly represented by the statements already made in regard to the outcome of operative interference in the case of movable bodies.

Joseph D. Bryant.

**JORDAN'S WHITE SULPHUR SPRINGS.**—Frederick County, Virginia.

POST-OFFICE.—Jordan's Springs. New hotel.  
ACCESS.—Via Harper's Ferry and Staunton Branch of the Baltimore and Ohio Railroad to Stephenson's Depot, thence by stage two miles to springs.

This well-known summer resort is located in the north-eastern part of the beautiful Shenandoah Valley, six and one-half miles from the city of Winchester. The elevation here is 1,200 feet above the sea-level. Charming scenery and delightful climatic conditions will be found. The hotel, just completed, is thoroughly modern and sanitary in all its appointments. A new bath-house affords all conveniences for bathing. The springs supply an abundance of water, having an unvarying temperature of 57° F., the year round. Like other sulphur waters, it is at first unpleasant to the taste, but a tolerance and even a liking for the water are quickly acquired. The following analysis was made in 1871 by Thomas Antesill, chemist of the United States Department of Agriculture:

ONE UNITED STATES GALLON CONTAINS:	
Solids.	Grains.
Calcium sulphate .....	5.13
Potassium sulphate .....	2.09
Sodium chloride .....	.76
Potassium carbonate .....	9.71
Magnesium carbonate .....	2.88
Iron carbonate .....	Trace.
Manganese carbonate .....	.01
Hydrosulphuric acid .....	.79
Silicic acid .....	.25
Alumina .....	.01
Total .....	21.63

This water has been in use for many years. Its most marked properties are diuretic, aperient, and tonic. It is also believed to possess an alterative as well as a diaphoretic influence. The chief application of the water has been in cases of chronic diseases resulting from derangement of the liver, kidneys, stomach, and blood, and glandular system. It is said to be very beneficial in obstinate cases of gout and rheumatism. The water is sold by the barrel, half-barrel, demijohn, or bottle.

James K. Crook.

**JUNIPER.**—*JUNIPERUS.* The fruit of *Juniperus communis* L. (fam. *Pinaceæ*). Juniper fruits are no longer official.

The common European juniper is of variable stature, sometimes attaining the dimensions of a small tree; more often it is a short, broad, pyramidal shrub, with spreading branches; sometimes it consists only of a large flat rosette, with its prostrate or slightly ascending branches lying on and rooting in the ground; by this habit, as well as by its slender, spreading, awl-shaped leaves in whorls of three, and by its larger and more juicy berries, it is easily distinguishable from the common juniper of this country (*J. virginiana* L.).

This shrub grows in nearly all parts of Europe, and is also widely distributed through Central and Northern Asia, as well as in the United States, either native or naturalized. The chief production of the fruit is in Hungary. The "berries" are in reality short fleshy cones, whose three upper scales have become soft and juicy, and coalesced over the three stony seeds; the rudiments of their scale tips may be seen near the top of the fruit. The lower scales are small, dry, and appressed to the axis or peduncle. The berries shrivel a good deal

in drying, and were described in the Pharmacopœia as follows:

"Nearly globular, about one-third of an inch (8 mm.) in diameter, dark purplish, with a bluish-gray bloom, a three-rayed furrow at the apex, internally pulpy, greenish-brown, containing three ovate, somewhat triangular, bony seeds, with several large oil glands on the surface; odor aromatic; taste sweet, terebinthinate, bitterish, and slightly acid."

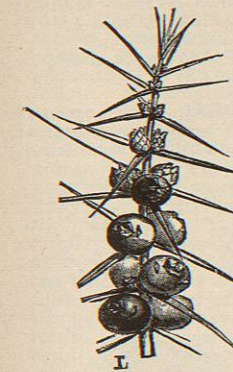


FIG. 3047.—L, Juniper branch, with fruit attached. (Baillon.) O, Juniper fruit, separate. (Baillon.)

COMPOSITION.—The most important substance is the essential oil, of which they contain from one-half to one and a half per cent. There is also a large amount of sugar (up to twenty-five per cent. or more), and nearly half as much resin.

The oil consists chiefly of pinene, but its characteristic odor is due to an unknown substance. It is official, and is thus described in the Pharmacopœia:

"A colorless or faintly greenish-yellow liquid, becoming darker and thicker by age and exposure to air, having the characteristic odor of juniper, and a warm, aromatic, somewhat terebinthinate and bitterish taste.

"Specific gravity: 0.850 to 0.890 at 15° C. (59° F.). Soluble in about four times its volume of alcohol, forming a somewhat turbid liquid, which is neutral or slightly acid to litmus paper. Also soluble in an equal volume of carbon disulphide."

ACTION AND USE.—Juniper berries and oil have the properties of the terebinthinate substances in general. In small doses aromatic, stimulant to the stomach and intestines, hæmstatic; in large ones capable of producing gastritis, nephritis, strangury, etc., as well as nervous disturbances. The chief use is as a stimulating diuretic. A violet-like odor in the urine, and a copaliba-like erythema, are occasionally observed after its administration. Juniper berries are, or ought to be, used in making the liqueur called gin, which is alcohol distilled off from them and containing their oil. They are not much given by themselves in this country, but might be used as a stimulating diuretic; an infusion or the oil being used.

ADMINISTRATION.—From 4 to 8 gm. (3 i. to ij.) may be given at a dose. An infusion of the bruised berries extracts much of the oil, the sugar, etc., and is an acceptable form. The oil may also be given, but is much adulterated with harsher oils from the tops and leaves, and even with oil of turpentine. Dose, gtt. v.-x. There is also a simple five-per-cent. spirit of juniper, the dose of which is fl. ʒ ss. to i., but it is not much used; and a compound spirit, or artificial gin, offered as a more reliable aromatic than that liquor. Its composition is as follows: Oil of juniper, 8 parts; oil of caraway, 1 part; oil of fennel, 1 part; alcohol, 1,400 parts; water, to make 2,000 parts. Dose, fl. ʒ i.-iv.

ALLIED DRUGS.—Other important products of the genus *Juniperus* are *savin* and *cade oil*, elsewhere described, besides which there are a number of minor products, mostly oils distilled from the fresh twigs of various species of cedar. Since the properties of these differ in no important respects from those of oil of savin, they need not be further considered.

W. P. Bolles.

KAIRINE.—The name *kairine* is in present use to designate, generically, certain artificially prepared derivatives of chinoline, where either a *methyl* or an *ethyl* substitution has been effected in the chinoline molecule. Of the

two kairines, the *methylated*, although the one first made and experimented with, has been superseded by the *ethylated* example, for the double reason that the latter is both easier and cheaper to make, while at the same time it is better as a medicine. The ethylated compound *kairine A.*, as it is technically called, is what is now commonly dispensed under the simple name *kairine*. The kairine in medicinal use appears as a whitish crystalline powder, without smell, but of a bitter and pungent, slightly aromatic taste. It is fairly soluble in cold water, freely in hot, moderately only in alcohol and in glycerin, and but sparingly in ether.

Physiologically, the essential action of kairine is that of a powerful but evanescent antipyretic. Experiments upon animals show reduction of body temperature, along with slowing of rate of pulse and respiration, and, when the drug has been given by hypodermatic injection, anesthesia and paralysis in the limb receiving the injection. Elimination is by the kidneys, and the urine presents a dark green color, observable, it may be, within half an hour after administration of the drug. Toxic effects have followed when the dosage has risen to between one and two grains per pound weight of the animal. In the human subject, kairine produces certain and speedy lowering of fever temperatures, with less proportionate derangement in the way of roaring in the ears, headache, giddiness, and gastric distress, than the cinchona alkaloids produce. The action, however, is apt to be attended by profuse sweating during the fall of the temperature, and a decided chill when the after-rise begins. Overdosage has produced profound reduction of temperature, with a condition of general collapse, but, so far as the writer knows, no case of death from direct kairine poisoning has been reported.

Therapeutically, kairine has been used as an antipyretic in febrile diseases, and was the first synthetic substitute for the cinchona alkaloids for such purpose. It has, however, been superseded by newer products of the laboratory, such as antipyrin, which are not so severe in operation. A dose of 1 gm. (gr. xv.) of kairine begins to affect a febrile temperature in about an hour, effects its maximum influence within another hour, holds its effect for yet one hour more, and then rapidly fails in potency, so that when a fourth hour has passed since the time of taking the medicine the temperature has commonly reattained its original elevation. By continuous medication, however, a practically continuous depression can be maintained. In ordinary cases, four successive hourly doses of 0.50 gm. each (about gr. viij.) will bring down the temperature to 101° F., at which point it may be held by succeeding doses of half the previous dimensions. When necessary, however, kairine has been given hourly in gram doses (gr. xv.) for four successive hours. Kairine may be administered in capsule, pill, aromatized solution, or elixir.

Edward Curtis.

KALA-AZAR.—During the last twenty-five years there has been observed in Assam an epidemic fever of a particularly virulent type, which spreads slowly from place to place and depopulates whole villages; it is known as Assam fever, black fever, or Kala-azar. This fever is generally intermittent or remittent, and resembles chronic malaria; its etiology is still undecided, though probably it is of malarial origin. The onset is generally sudden, and the fever is accompanied by wasting, progressive anemia, and enlargement of the liver and spleen; drowsy is apt to supervene toward the end. There has been considerable discussion as to the cause of Kala-azar; and the Indian government has received no less than three reports on this subject. 1. According to Giles, the chief characteristics are anemia and drowsy, and the cause is asserted to be the *Ankylostomum duodenale*, the ova of which Giles found in great quantities in the intestines of those who had died of the disease; the victims had, however, been considerably enfeebled by malaria. He describes it as "a mixed anemia brought about by ankylostomiasis acting on a population worn down by chronic malarial poisoning" (*Brit. Med. Journ.*, March 26th, 1898).

2. Rogers believes that Kala-azar is essentially a malarial disease, but one which has somehow acquired infectious properties. 3. Ross, whose views have met with the widest acceptance, is inclined to agree with Rogers but thinks that Kala-azar is communicated in the same way as malaria. There can be no doubt that malaria is a most important factor in the production and dissemination of Kala-azar; for all the cases so far reported have been from districts notoriously malarial, and in individuals considerably enfeebled by that disease. It must be remarked, however, that Kala-azar is communicable and epidemic, and is not influenced by quinine. Ross gives three stages of the disease: (1) Stage of parasitic invasion, in which there are recurrent attacks of high fever and rapid enlargement of liver and spleen, particularly the former; (2) stage of secondary effects, in which there are low fever and general tumefaction of the organs; and (3) stage of cachexia, when the fever gradually disappears, the organs decrease in size, attacks of pneumonia and dysentery supervene, the malarial parasite which was formerly present is now no longer found, and there follow cachexia, coma, and death. The disease is particularly fatal, Rogers reporting ninety-six per cent. of deaths; but recoveries do occur. Manson reports cases of two Englishmen who had become invalided in Assam: "both had formerly suffered from malarial fever; in both there was splenic and hepatic enlargement, recurring spells of quotidian fever, unaccompanied by parasites in the blood and uninfluenced by quinine, and attended with profuse diaphoresis, profound anemia, darkening of the skin, and emaciation. One died of cerebral thrombosis, the other of exhaustion" ("Tropical Diseases," page 221).

Treatment consists in prompt removal from the country to a more healthy locality.

Kala-jwar, or Kala-dukh of the neighboring territory is practically the same as Kala-azar of Assam.

For a discussion on the etiology of Kala-azar, and other facts in reference to the disease, the reader is referred to an article by Ross, in *The Indian Medical Gazette*, vol. xxxiv., pp. 233-241.

R. J. E. Scott.

**KAMALA.**—"The glands and hairs from the capsules of *Mallotus philippinensis* (Lam.) Muell. Arg. (fam. *Euphorbiaceae*)," U. S. P. This plant is a small tree, growing very extensively through southeastern Asia and Polynesia. The fruit is a small tricoccus capsule, covered with a dense, crimson, velvety surface, consisting of the above-mentioned glands and hairs. Kamala is collected by gathering the fruits and shaking or rubbing them about in baskets, and sifting out the dust-like glands.

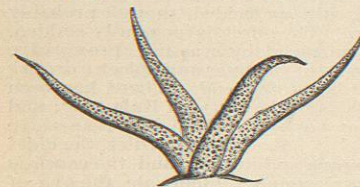
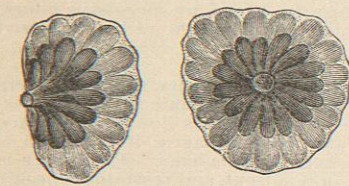


FIG. 3048.—Kamala. (Baillon.)

An inferior variety is obtained by taking the glands and hairs from other parts of the plant. The collection of more or less adhering dirt is inevitable, and advantage is often taken of this fact to adulterate it heavily with earthy matters. Hence the fixing of the limit of ash at eight per cent., which is a very liberal allowance.

It has long been used in India, both as a dye and as a medicine, but its employment as a cure for tapeworm appears to date only from the middle of the present century.

The glands consist of an external capsule containing a yellow fluid, and enclosing from forty to sixty club-

shaped cells filled with a homogeneous, transparent, red resin, amounting to about four-fifths of the whole weight of the glands.

**ACTION AND USE.**—The only purpose for which this drug is employed in medicine is as a tenicide, for which purpose it has considerable value; but the discovery of koso and pelletierine has displaced it from medical favor, and it is now becoming obsolete. From 4 to 10 gm. (3 i.—3 fss.) may be given at a dose.

Henry H. Rusby.

**KARYOKINESIS.** See *Cell*.

**KARYOKINESIS. (PATHOLOGICAL.)**—Atypical forms of karyokinesis are found in certain pathological conditions. In place of normal bipolar division multipo-

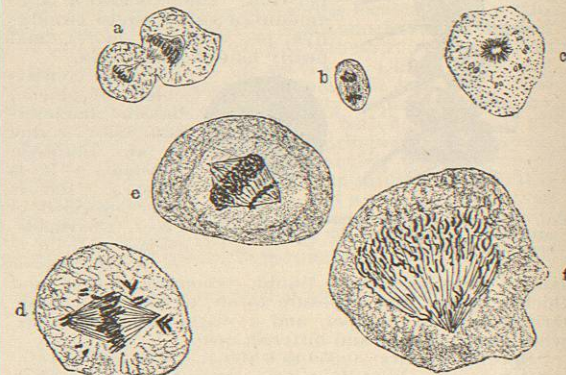


FIG. 3049.—Pathological Mitoses. a, Asymmetrical mitosis; b, hypochromic mitosis; c, d, mitoses with displaced and partly degenerating chromosomes; e, f, asymmetrical mitoses. (After Hansemann.)

lar division may take place, two, four, six, eight, or more nuclear spindles with a correspondingly increased number of equatorial plates being formed. The number of chromosomes may be greater or less than normal. Asymmetrical splitting of the nuclear chromatin, or the destruction of some of the chromosomes may lead to the formation of daughter stars having an unequal number of chromosomes. In the place of a single mother star a complicated chromatin figure may be formed from which a number of daughter stars may be developed. The separate chromosomes may vary greatly in size, or they may be altered in form through irregularities in the course of the fibres of the spindle, spherical, spindle- or biscuit-shaped chromosomes being in this way produced. The division of the cell protoplasm may be delayed or entirely fail of occurrence. Multinuclear giant cells are formed in this manner. Deviations from the normal division axis may also occur. Degeneration of the chromosomes is sometimes shown by their displacement, granular disintegration, or loss of staining power.

Multipolar mitoses were first described by Eberth, but his statements were at first discredited, particularly by Flemming and Strassburger. The existence of such forms was, however, confirmed later by Arnold who observed numerous multiple mitotic figures in carcinoma cells. As a result of the great amount of interest excited in the subject by Arnold's observations numerous investigations were made, among the most important of which may be mentioned the studies of Hansemann, Ströbe, and Galeotti. According to Ströbe, atypical mitoses are found in a great variety of pathological conditions—cancer, sarcoma, different forms of benign tumors, tissue regenerations, etc. He regards them as a constant phenomenon in all tissues showing strong proliferative tendencies with active mitosis. Galeotti claimed to have found atypical mitoses in tissues irritated by antipyrin, quinine, chloral, peptone, etc., as well as in tissue exposed to high temperature.

Hansemann divides the pathological forms of mitosis into three classes—the hypochromic, hyperchromic, and irregular variations. Hypochromic mitoses are those which contain fewer chromosomes than normal. The number of chromosomes may be reduced to six or eight. Hypochromic cells arise in two ways, either through asymmetrical division or through the destruction of some of the chromosomes. According to Hansemann, the hypochromic mitoses occur only in malignant tumors, much more frequently in carcinoma than in sarcoma. They are to be regarded as evidences of cell degeneration; in the majority of cases cell division does not follow. He regards them as being only of biological interest, their significance with relation to tumor malignancy not being at the present understood. The hyperchromic forms contain more chromosomes than the normal cells. They are very abundant in malignant growths, much more so in carcinoma than in sarcoma. They may be divided into two classes, the bipolar and the multipolar. The bipolar forms are very large, containing over a hundred large chromosomes at times. On division they form similar hyperchromic cells having the same number of chromosomes. In the multipolar forms a reduction of the number of chromosomes occurs through division, so that their number may ultimately return to the normal. The multipolar mitoses usually result in the formation of multinuclear giant cells, the latter being most numerous in tumors containing the greatest number of multipolar mitoses. As irregular forms of atypical mitosis Hansemann includes changes in size and form of the chromosomes and centrosomes, irregular spindle forms, delayed division of the cell, etc. Hansemann was unable to confirm the work of Ströbe and Galeotti, and is therefore inclined to regard atypical mitoses as being characteristic of malignant tumors. The presence of numerous atypical mitoses in the cells of a new growth may be taken as positive evidence of its malignancy, but the absence of such pathological forms in a tumor is not to be taken as conclusive proof of its benign character.

A practical application of the above principle has been made by a number of writers in the case of the diagnosis of bits of tissue obtained by the stomach tube, aspirator, etc., or of cells found in pleural and peritoneal exudates, urine, uterine discharges, etc. The existence of carcinoma has been diagnosed by Rieder, Dock, etc., from the presence of numerous atypical mitoses in the cells of the centrifugated peritoneal fluid. Sarcoma of the pleura has been diagnosed in like manner. In other cases, however, the examination of the pleural and peritoneal fluids yielded negative results, though malignant growths were found to be present. Only in the case of very soft, cellular, quickly growing tumors are positive findings likely to occur. In suspected cases the fluid obtained by aspiration should be quickly centrifugated, cover-glass smears made of the sediment; and these, after drying in the air, should be fixed in equal parts of absolute alcohol and ether, and stained in hematoxylin and eosin. The presence of numerous mitoses in the cells of such exudates, either typical or atypical, may be regarded as strong evidence of the presence of a malignant tumor. Negative findings are without significance.

Aldred Scott Warthin.

**KARYOLYSIS.**—The change observed in the nucleus of a necrotic cell whereby its chromatin either entirely disappears or loses its staining power. Such change may be due to a solution of the nucleus, to chemical changes in the chromatin, or to its complete destruction. It is the most important microscopical evidence of necrosis, and is to be regarded as the essential feature of this process. The term is used synonymously with chromatolysis, but is gradually replacing the latter word.

Aldred Scott Warthin.

**KARYORRHESIS.**—The term applied by Klebs to that form of nuclear fragmentation in which the chromatin becomes broken up into small particles. It is distin-

guished from karyolysis in that in the latter process there is a complete disappearance of the chromatin, while in the former the nucleus is broken into particles which are often hyperchromic. Karyorrhesis is one of the earliest signs of necrosis, and is in the majority of cases a forerunner of karyolysis. The latter may occur, however, without a preceding karyorrhesis, the nucleus losing its staining power without undergoing fragmentation. According to Schmaus and Albrecht, the disintegration of the nucleus in karyorrhesis is not due to a rupture of the nuclear membrane, but is caused by definite and fairly typical movements on the part of the chromatin elements in response to certain influences acting from without the nucleus. The transposition of the chromatin elements is usually preceded by a condition of hyperchromatosis leading ultimately to a separation of the chromatin into single particles which gradually lose their staining power. The phenomena of karyorrhesis may be observed in all forms of beginning necrosis due to any cause, but can be studied to best advantage in the necrosing areas of malignant tumors, particularly in carcinoma.

Aldred Scott Warthin.

**KATHELECTROTONUS.** See *Electrotonus*.

**KAVA.**—**METHYSTICUM; KAVA-KAVA; AVA.** The root of *Methysticum Methysticum* (Forst.) Lyons, and of *M. excelsum* (Forst.) Lyons (fam. *Piperaceae*). The first-named (generally known as *Piper Methysticum* Forst.) yields the bulk of the drug. It is a good-sized softly woody shrub, native and widely cultivated through the South Pacific Islands. The root has acquired a local reputation as a remedy for dropsy and painful affections of the bladder and the urinary tract, but it is chiefly prized as the source of a native beverage. The plant is reduced to a pulpy mass by mastication and allowed to ferment until an intoxicating liquor is produced. The primary effect is as a stimulant, but ultimately it causes a peculiar form of intoxication in which the limbs and body are uncontrollable and helpless, while the mental faculties are clear or slightly dazed.

Authorities differ as to the resemblance of its effects to those of alcohol. It is not unlikely that by keeping, or by different methods of preparation, alcohol is yielded by the large amount of starch which is contained. Excessive use of it produces a chronic, troublesome scaly disease of the skin.

The root is soft and juicy when fresh, but becomes very light upon drying. It is light-gray in color externally, and pale yellowish-white when cut. It comes in large, thick, clumpy pieces, often 8 or 10 cm. across at the base of the stems, and divides quickly into several crooked, irregular branches. The texture is woody, but soft and light; the sawed surface is dusty or mealy. The odor is slight, the taste rather spicy and bitter, leaving the tongue slightly benumbed for a little while. A transverse section shows a thin bark, and a radiated, woody ring, in which the narrow wood edges are separated by broad, starch-bearing, medullary rays.

Half its weight consists of starch. It contains also an essential oil; two resins, alpha- and beta-resin kava; and a neutral crystalline principle called *kavachin*, or *methysticin*, which is closely allied to *pipirine*. The crystalline body exists to the extent of one per cent., but has been found inactive. The alpha resin, which is obtained by means of alcohol, and is insoluble in water, contains the medicinal properties of the plant, and is thought by Lewin to be the active ingredient. It has, however, been shown that the watery infusion also is useful, and this would indicate that the virtues of the plant are not limited to the resin itself. At present the resin and the fluid extract, not miscible with water, are the preparations employed for medicinal purposes.

Kava-kava has formed the subject of an exhaustive study by Dr. Cerna (*Therapeutic Gazette*, January, 1891) who arrives at the following conclusions regarding its physiological action: Moderate doses produce a stimulating effect, particularly on the central nervous ganglia;