

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.

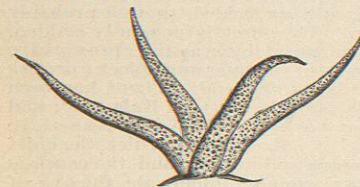
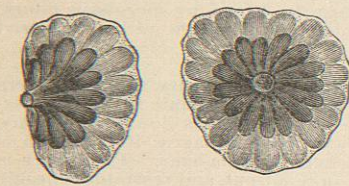


FIG. 3048.—Kamala. (Baillon.)

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-

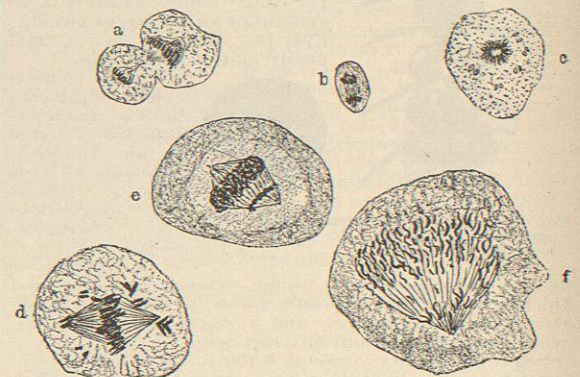


FIG. 3049.—Pathological Mitoses. a, Asymmetrical mitosis; b, hypochromic mitosis; c, d, mitoses with displaced and partly degenerating chromosomes; e, f, asymmetrical mitoses. (After Hansemann.)

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;

in larger quantities it produces general anaesthesia, and diminishes and ultimately abolishes reflex action by influencing the spinal cord, and probably also the spinal centres. The great muscular weakness observed is not due to any action on the higher cerebral centres, as they maintain their normal functional activity. Very large quantities depress the circulatory and respiratory systems, and, in poisonous doses, death is produced by failure of the respiration or by cardiac paralysis. Placed on the tongue, it at first causes a burning sensation, which is followed by numbness and anaesthesia, which continue for some time and are accompanied by a free flow of saliva. On the cornea and conjunctiva the same effect is produced. The local anaesthetic action is said to be equal to that of cocaine, but its use is restricted by the insolubility of the preparations in water.

Kava is the best simple diuretic that we possess. It quickly produces an abundant flow of pale urine without irritation, but, on the contrary, with soothing effect, and is hence very useful in removing dropsical effusions. At other times its action is favored by the use of an abundance of water. Such use of it is recommended in cystitis, gonorrhoea, and chronic inflammatory conditions of the mucous membrane of the urinary organs. The inflammatory action is rapidly moderated, and the purulent and catarrhal discharges diminish in amount.

The fluid extract is the most convenient preparation to use, and has been employed with decided success. It may be given in doses of ℥ xx.-lx. three times a day, and has been combined with sweet spirits of nitre and glycerin when these are indicated. The alpha resin is given in doses of gr. i.-iss., three times a day. A solid extract is prepared, the dose of which is gr. ij.-vi. The principle, kavahin, is not employed, as its therapeutic action and dose are uncertain.

Henry H. Rusby.

KEFIR GRAINS.—KEFIR SEEDS. Small pebble-like or seed-like masses, occurring in the Caucasus region, consisting of a fungus mass containing the ordinary yeast-plant, together with the bacterium *Diospora Caucasica* Kern., and there used for the fermentation of milk into a substance called kefir, the equivalent of koumyss. The vitality of the dry grains is excited by soaking in water for some hours before they are introduced into the milk.

Henry H. Rusby.

KELOID.—(Synonyms: Kelis; Kelos; Fr. *Cheloïde*; Ger. *Keloid*, *Knollenkrebs*.)

DEFINITION.—A circumscribed connective-tissue, benign, cutaneous neoplasm resembling an hypertrophic scar and consisting of accumulated embryonic connective-tissue elements.

To Alibert ("Précis théorique et pratique sur les maladies de la peau," 2 vols. 8vo, Paris, 1810, Art. "Cancroïdes," T. i., p. 417. Atlas, pl. 28; Vallerand de Lafosse, *Revue méd.*, October, 1829) belongs the credit of giving the first reliable description of keloid to the medical profession. The term is derived from the Greek word *κῆλις*, a scar, or *χρῆς*, a claw, and *εἶδος*, resemblance, from its fancied resemblance to a crab's claw. Alibert differentiated two forms of keloid, the true or spontaneous, *kelis genuina seu vera*, developing without any injury to the skin, and the false, *kelis spuria*, also called scar, cicatricial, or secondary keloid, the result of traumatism. This division, however, cannot be adhered to strictly, as the injury is often of such a slight character as to be readily overlooked. The term Addison's keloid refers to morphea or scleroderma circumscriptum, and is to be distinguished from the affection under consideration.

SYMPTOMS.—Keloid usually begins as an elevated nodule or tubercle, or several nodules may coalesce, varying in size from a pea or a bean to that of the hand. Its favorite seat is on the trunk, particularly over the sternum, although it may occur on the mammae, neck, ears, and arms. The tumor consists of a hard, fibrous growth, is irregular in contour, the surface is smooth or covered with lanugo hairs, the epidermic covering is thin and of a

white or pinkish color, due to the presence of dilated capillaries; it is firm and elastic to the touch, adherent to the cutis, and elevated and sharply defined. Keloid presents not only variations in size but also in form, at times appearing as a tumor of oval shape, from which prolongations extend into the surrounding neighborhood, resembling the appearance of crab's claws, at times it is simply ovoid or nodular without projection. Again it is met with as an elongated, cylindrical growth, or occurs as elevations, resembling cords or in the form of bands or ridges. Occasionally a slight depression of the centre with elevated margin exists. Keloid slowly increases and may remain stationary for years, and usually it persists throughout life. Even when the tumor has existed for years, ulceration never takes place, and spontaneous involution has been observed to occur in very exceptional cases. Although usually single, keloids may be quite numerous, and at times are distributed along the course of cutaneous nerves. Schwimmer in one case reported one hundred and five, and De Amicis in another individual three hundred keloids. Usually the growth is painful, especially when it is subjected to pressure, and occasionally the pain may be spontaneous. In some cases pain is entirely lacking. At times a pricking or burning sensation and occasionally itching are experienced; when the growth is situated on the flexor surfaces of articulations, it may interfere to some extent with motion.

ETIOLOGY.—The etiology of so-called spontaneous keloid is obscure, and it is regarded as of exceedingly rare occurrence; it is highly probable, as already stated, that it is due to injury of the cutis so minute in character as

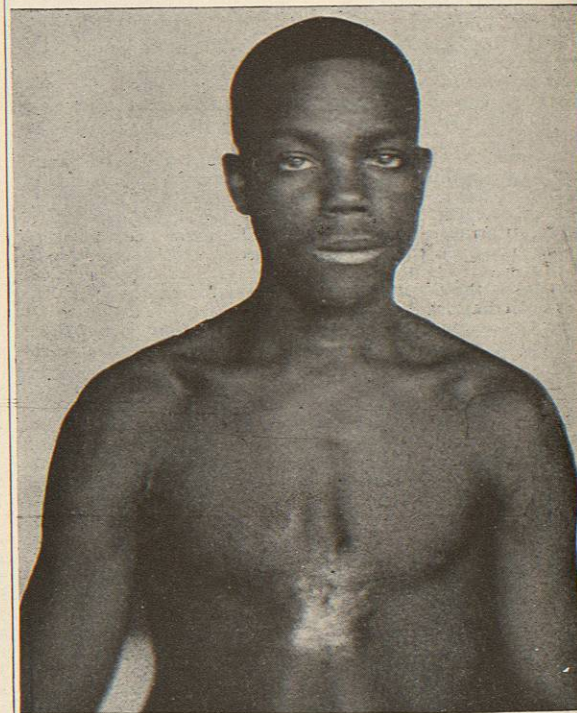


FIG. 3050.—Keloid of Sternum Developed after a Burn.

to be readily overlooked. Sex does not appear to influence its occurrence, although some observers are inclined to regard it as being of greater frequency in females than in males. It has been observed at all ages, although it is of rare occurrence in the very young and very old, and

usually appears during middle life. It is met with most frequently in tropical countries, and it appears that certain families and the negro race are predisposed to keloid. Cicatricial or scar keloid, on the other hand, is often met



FIG. 3051.—Keloid of Inferior Maxillary Bone following an Operation. Figs. 3050 and 3051 illustrate the occurrence of keloid in two negro brothers.

with and may appear in any locality. As an example of the disease occurring in the negro race and as an argument in favor of family predisposition (see Hebra's case in which three sisters and the mother were affected, "Hebra," vol. iii., p. 278; Wilson and Bryant have also recorded

the following cases: In the one individual, eighteen years of age, there existed a tumor on the sternum, about midway between the manubrium and ensiform cartilage. It dated from the third year of life and developed as a result of a burn. The tumor was about three inches in width by five inches in length, was elevated about one-sixteenth to a quarter of an inch over the surrounding skin, was sharply defined and felt firm and elastic to the touch. It was irregular in contour, and characteristic claw-like processes extended on either side, both laterally and above and below. The surface of the growth was smooth and totally devoid of hair, and the color was whiter than that of the neighboring parts; dilated blood-vessels on the surface were not visible. In the second case, a brother of the foregoing individual, aged twenty years, there developed in the scar, two weeks after removal of a tumor (presumably sebaceous), a keloid. This was situated on the ramus of the inferior maxillary bone, and extended from a point just below the articulation to one situated a little in front of the angle of the jaw. The growth projected about one-quarter of an inch above the surrounding surface, was of rather oval shape and of a lighter color than the adjoining skin, and measured about three inches in length by about two in width. On either side of the growth there existed three small keloids marking the site of the introduction of the sutures for closing the wound after operation.

Scar keloid often follows burns, operations, and other slight cutaneous injuries. Thus it has been observed to occur after blisters, in the lobe of the ear after piercing for earrings, in the scars of leech bites, also after the

scars of eruptions of smallpox, acne indurata, syphilis, herpes zoster, and non-parasitic sycosis, and in vaccination scars. The writer recently had occasion to observe, on the right cheek of a young lady, a keloid that had developed after an attack of dermatitis venenata. It has also been known to follow after psoriasis and is not infrequently seen (in male individuals of the African race) in the form of small, indurated, whitish, elevated lesions due to shaving.

PATHOLOGY AND PATHOLOGICAL ANATOMY.—Keloid is a growth consisting of dense, fibrous connective tissue, situated in the corium. According to Warren, the disease originates in the vessel walls of the corium, which are involved to quite a distance beyond the growth, which would explain the recurrence of the neoplasm after extirpation. The same observer states that it is impossible to differentiate between true and false keloid with the aid of the microscope. According to Kaposi, in true keloid the sections present a whitish, dense fibrous mass, the fibres running parallel to the long axis of the tumor and the surface of the skin; here and there they run in a vertical direction. The new growth is inserted in the corium in such a manner that normal layers of the latter, particularly the papillae and rete pegs, remain intact, while they are wholly absent in the hypertrophic scar. There are a few nuclei and nucleated spindle cells within the keloid body and around the vessels, which are compressed, as if by a sheath, by the dense bundles of fibres. The cells are abundant in the younger parts of the keloid, around the arteries; indeed, it appears as if the fibres of the keloid were derived from spindle-shaped cells sheathing the vessels. Neumann states that in keloid a new growth of parallel connective-tissue fibres takes place, and that these fibres are situated, in the shape of a wedge, in the substance of the corium and ultimately displace it entirely. Spindle-shaped cells accumulate along the adventitia of the vessels, especially of the arteries; a few oblique bundles may occur here and there. The sebaceous and sudariparous glands at first remain unchanged, later they disappear and the glandular substance in the centre of the keloid is lost. The tumor

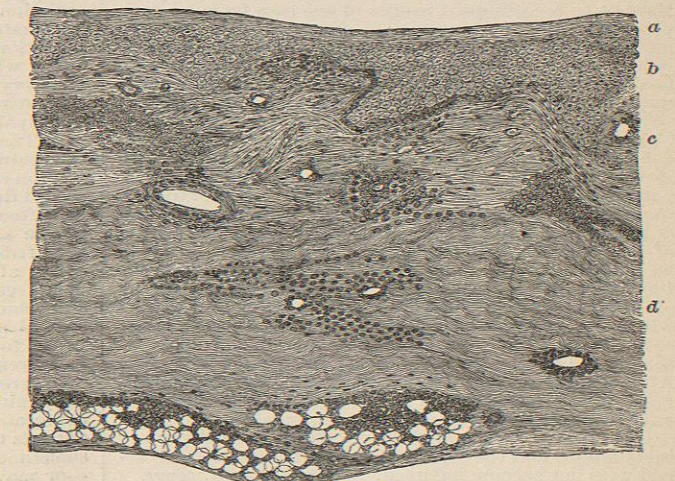


FIG. 3052.—Cicatricial Keloid from the Gluteal Region, following a Burn. a, Epidermis; b, Malpighian layer; c, remains of papillary layer near the border of the tumor; d, keloid tissue. The cellular infiltration around the blood-vessels is also indicated at several points. (From an original drawing by Dr. James M. French.)

develops in the following manner: Spindle-shaped cells appear along the vessels, especially the arteries, and they extend even into the neighboring normal tissue. This change in the adventitia is especially noticeable along the