scribed the removal from the knee-joint of such a body by himself. One hundred and thirty-three years later Pechlin duplicated Paré's experience. In 1726 Monro, and ten years later Simpson, both removed from the knee a movable body, only that of the latter being from the joint of a living subject. During the last one hundred and sixty years extended consideration has been given to the topic by nearly all prominent surgical writers, notably Hunter, Nélaton, Velpeau, Brodie, Rokitansky, and others, not to omit König whose modern contention regarding his own belief of their nature has done much indeed to foster investigation and hasten etiological conclusions regarding them. It appears that all freely movable articulations are subject to this infliction, that the knee-joint suffers oftenest, the elbow next in frequency, and that the ankle, shoulder, temporo-maxillary, and carpal joints, all comparatively rarely exhibit this infirmity. The number and size of these bodies are variable. Magendie found 25 in a knee-joint, Haller 20 in a temporo-maxillary, Malgaigne 63 in a shoulder-joint. Dr. James Berry reports (1894) the case of a man twenty-two years of age, from the knee of whom 1,047 loose bodies were removed. They vary in size from that of a mustard seed to that of a patella and of the astragalus. The structure of these bodies differs and is variously described by different writers, suggesting a difference of origin and development and possibly also a difference in the degree of care exercised in observation. Some of the growths are characterized as fibrous, others as tough and striated, of ligamentous texture and hard like stone. In the majority of instances they are said to be fibro-cartilaginous, and, if ancient, possessing a central bony structure. Bolton (1896) reported 72 cases from various sources which he examined and classified according to structure with great care, as follows: Cartilage 20 cases, cartilage and bone 9, articular cartilage 6, fibrocartilage 5, fibrous bodies 5, bone 20. The remaining specified 9 instances comprised 4 of lipoma arborescens, 2 of which were associated with tuberculosis, 1 each of tuberculous tissue, hypertrophied fringe and sarcoma, and 2 of blood clot in fringe. In 16 the structure was not stated. Barth (1898) reports 55 cases, all containing cartilage, some partly composed of spongy bone. They are variously shaped, being oval, lenticular, round, in fact, of devious outlines apparently modified in part by their articular environment; as, for instance, in the knee-joint they are usually compressed and wedge-shaped, perhaps raised on one side and hollowed on the other; in some cases resembling in outline the patella, in others angular with facets. These bodies may be detached and freely movable or tethered and consequently of limited movement. Of Bolton's 72 cases 23 were pedunculated, 49 non-pedunculated.

The *etiology* of these bodies is as yet not fully settled. Whether or not they are the direct or indirect products of traumatism or are independent of it, their presence being disclosed by the special attention directed to the injured joints, are open matters of discussion. Hunter regarded their origin as dependent on coagulated blood in the joint cavity, therefore practically of traumatic inception. Velpeau concurred in this idea. The museum at St. Thomas Hospital contains several examples of movable bodies in joints, the character of which bodies sustains the preceding idea of their causation. Movable bodies are found in joints afflicted with rheumatoid arthritis. Then they are found both outside and inside of joints, and in the latter instance are thought to gain access thereto by means of external pressure pushing them against the synovial membrane, finally causing the membrane completely to surround the intruding body. Brodie believed that in the majority of such instances as the last stated, the body was primarily developed in the synovial structure and later gained access to the joints in the manner just stated. Laënnec, Béclard, and Cruveilhier concurred in their belief, and the latter illustrated cases demonstrating their presence in, and external to, the synovial membrane attended with free and attached loose bodies in a joint, each covered with synovial membrane, the attached bodies being tethered by slim pedicles composed of synovial membrane itself. König (1887) expressed the belief that these bodies seldom were the result of injury of a healthy joint, but rather were the result of disease of bone or cartilage supplemented occasionally perhaps by severe traumatism. This distinguished surgeon reported (1899) 70 cases happening during the preceding twenty years, 36 of which were due to osteochondritis. Barth, Vollbrecht, and others opposed König's views. Barth asserted that slight traumatisms could produce the conditions necessary to the presence of these bodies, and that they were either of traumatic or of arthritic origin. Vollbrecht (1898) determined, from careful examination, for a period of ten years, of clinical and army subjects, that quite sixty-five per cent. of the cases had histories of trauma. Weir called attention (1892) to an interesting condition causing joint derangement of the knee, which simulated in all essential respects the presence in this joint of a movable body. Exploration of the joint revealed the fact that a duplication of fibrous membrane extended from the under surface of the patella and the adjoining surface of the femur to such a length as to be caught between the articular surfaces during flexion, thus "locking" the joint, and also impeding extension. A grating sound beneath the patella attended the establishment of motion in the two cases of this disease which he had observed. Both were readily cured by removal of this obstructing agent. Others have noted a similar experience. In a recent unique case (1902) of the writer's, bearing on the structure of the obstructing body, Prof. Edward K. Dunham, after a most careful examination, expressed the following opinion: "The specimen is a piece of spongy bone covered with a thin layer of fibrous tissue. The outer shell of bone is thin and appears continuous except for a few foramina containing blood-vessels and a little adipose tissue. The fibrous covering is more highly cellular near the bone than at the free surface, and a layer of cells contiguous with the bone may be clearly seen in some places. This layer contains a few larger cells which are multinuclear and lie in small excavations in the bone. The interior of the specimen contains plates of bone which divide into branches that join to form spongy structure. The spaces between these bony plates contain fatty marrow supplied with blood-vessels in considerable numbers. The surfaces of the bone plates are covered with a layer of flattened cells. The bone is laminated, the strata being parallel to the surface, and it contains bone corpuscles regularly and typically arranged. Beneath the periosteal covering there are places where a few laminæ of bone appear to be younger than the rest, indicating bone production by the deeper layers of the periosteum. There are no indications of any recent or post-inflammatory process in any part of the specimen, and the sections are entirely free from cartilage." When it is considered that this specimen was nearly half an inch in diameter, and that if it originated in the injury which revealed its presence, it must have developed in less than three months, it is quite evident, in view of its complete bony structure and the absence of local inflammatory changes, that its inception antedated the injury, and that its presence was revealed by the scrutiny that followed the local effects of the traumatism. That synovial membrane and fringes which characterize the joint may become so elongated or otherwise changed as to be caught between the articular surfaces, is a matter not infrequently demonstrated by operative practice.

The *symptoms* attendant on the presence in a joint of one or more of these bodies are chiefly dependent on the structure and the use and mechanism of the joint; likewise on the fact whether or not the body be disconnected and freely movable or be connected to contiguous tissue by a long or short pedicle; and also upon its size and shape. The joint, whose structural mechanism permits of the widest articular separation, and those of the most varied movements and whose functional demands exact the support of burdens under varying degrees of movement, are the articulations that especially suffer from this form of infliction. The knee-joint, because of various causal requirements, is practically the most frequently and variously involved in this respect of the joints of the human economy. The symptoms of movable bodies in joints, especially the knee joint, are readily recognized by those familiar with the language of this misfortune. An unusually abrupt, unexpected, and often excruciating pain at a definite aspect of the knee-joint, with sudden arrest of movement and fixation of the limb at the angle of attack (causing the patient—often suffering from nausea and faintness—to stand still or to lean against a convenient support until the acuteness of the pain lessens or is entirely relieved by a studied or fortuitous movement of the limb, thus releasing the offending body from the confinement causing the distress), is a familiar picture of this infliction. Usually at the time of attack the leg is being extended from the flexed position characteristic of walking upon a plane surface or ascending stairs. Rotation at the knee-joint before the foot is firmly planted sometimes causes an attack. This symptomatic picture is varied, as regards the characteristic features, in different cases and in repeated attacks, each being usually severer than the preceding, and followed by correspondingly increasing traumatic reaction, until finally the joint becomes permanently incapacitated. It is not always easy to determine the presence of a movable body in a joint especially when one is unable to feel the object with the fingers. And when its presence is determined by palpation the elusiveness of a freely movable body often defeats immediate efforts at removal. In such a case a patient should watch for a reappearance of the body, hold it in place when detected, and keep the joint quiet until competent assistance can be gained to effect removal. The piercing of the object with a needle the better to hold it in place can be commended when aseptically practised. If the object is free in a joint and not within the grasp, its detection and removal are matters requiring wise surgical discretion under these circumstances. It is not easy and sometimes is impossible to detect in the knee-joint a freely movable body, unless the large size—large enough, in fact, to prevent its hiding in one of no less than four marked synovial elongations of the joint, to say nothing of intercondyloid and interarticular fibro-cartilage infoldings of the membrane—favors the effort. The free opening of the joint for the purpose of detecting and removing a supposed movable body should not be heedlessly undertaken, since the contingencies incident to the act may be of far greater import to all concerned than operative inactivity. Operative exploration ought not to be made until one is assured of the presence of an offending body by manipulative examination or until it becomes plain that the repeated attacks are exposing the patient to dangers which are quite as serious as those of the explorative operation itself.

The operation consists in making a free and usually vertical incision down upon the foreign body, under the strictest aseptic measures, supplemented with rubber coverings for the fingers. Then, after the body has been removed, the wound should be flushed with saline solution, the opening in the synovial membrane should be closed with interrupted sutures of fine chromicized catgut and the external wound with interrupted sutures of silkworm gut. Finally, the parts should be enveloped with aseptic dressings, and the joint kept immobilized for several days. Then, when the dressings are removed, complete union will usually be found to have taken place, and ultimately a perfect cure may be looked for. All needless exploration of the parts should be avoided.

The results of operation both before and subsequent to antiseptic technique are practically shown by the tabulated statement of Dr. J. P. Tuttle:

	Cases.	Cured. Per cent.	Failures. Per cent.	Mortality. Per cent.
Baumdorf	216	66.2	18.99	14.81
Lowy (1860)	167	68.86	19.26	11.38
Browne (1884)	88	82.95	5.68	14.38
Tuttle (1896)	107	97.19	2.81	....

II. Defective Cartilages.—"Displaced cartilage," "slipped cartilage," "subluxation," and "internal derangement" are expressions of practically synonymous application and self-evidently refer to some form of modification of function and arrangement of the semilunar cartilages of the knee-joint. The injuries and diseases characteristic of these joint structures constitute important items of affliction incident to the life history of joints thus provided. The cartilages may be displaced, bruised, crushed, or torn, and the ligaments maintaining them in proper relationship with the articular surfaces and properly attuning their functional movements, may be stretched, bruised, or ruptured. The inner side of the semilunar cartilage of the knee-joint and its attachments suffers more frequently than does the outer side of similar structures. Bennett (1900) reports 155 instances of inner-side attacks against 45 outer-side. Of this number 182 were males and 18 females, and the ages of the patients varied from thirteen years to sixty-two years. The exact reasons for the greater frequency of inner-side involvement are somewhat problematical. It may be accounted for by the fact of the greater degree of functional activity that is present during motion at this portion of the joint; for the internal semilunar cartilage moves over a greater area of articular surface than the outer, in order to meet its functional requirement. Also greater weight is received on the inner condyle than on the outer, and, too, it is more exposed to external violence than is the former. Functional derangement of these cartilages, resulting in their becoming pinched between the moving articular surfaces, is predisposed by any roughening that hinders the harmony of action necessary for the proper performance of the advancing and retiring movements imposed on them during activity of the articular surfaces between which they are placed. And should this condition be present together with relaxed ligamentous attachments of the cartilages, then will the danger of pinching be increased, and even actual displacement be threatened. Especially is this true of the inner cartilage during actual extension with supination of the leg. In their normal state these cartilages cannot be broken, although they may be bruised, torn, and twisted. If, however, they have become hardened by morbid processes, it is not impossible that they may be displaced or broken by severe circumscribed violence directed from without. They may be broken, or their coronary attachments may be ruptured under these circumstances by violence, while the weight of the body is borne on the extended limb, but they cannot then be displaced. Violence directed against the outer border during the act of flexion of the leg and thigh may cause it to be torn from its attachments and even ruptured, and then if extension follow quickly and forcibly, it may be overridden by the opposing articular surfaces, and thus held or be forced posteriorly upon the articular surface. If the joint be already impaired by ligamentous relaxation and other structural changes, then surely derangement and displacement of these so-called cartilaginous structures will much more readily take place. The common symptoms of this form of knee-joint infliction differ in no especially practical measure from those of movable bodies with which it is often confounded.

The special indications of semilunar involvement relate more especially to modifications of the normal contour of the joint surface at the site of the cartilages, as determined by palpation. In health, with the leg extended, the external rounded borders of these cartilages can be easily felt in the normal state, and it will be noticed that they will recede gradually from the touch as the limb is being flexed, causing instead a marked depression corresponding to their former site. If the cartilage be displaced outward, then undue prominence is noted at that point, which may or may not disappear with flexion of the limb. The semilunar cartilages may become displaced outward at other aspects of the joint, but in these instances their mobility is less influenced by the normal movements of the joint than in the first instance. If the displacement be inward toward the centre of the joint,

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.—Viâ 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 northeastern 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."

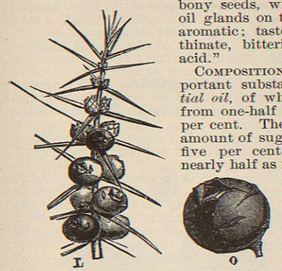

Fig. 3047.—*I.* Juniper Branch, with Fruit attached. (Baillon.) *O.* Juniper fruit, separate. (Baillon.)

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, hæmostatic; 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 copaiba-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. (℥ 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. ℥ 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. ℥ 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 derivates 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 karaine 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, anæsthesia 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 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 anæmia, and enlargement of the liver and spleen; dropsy 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 anæmia and dropsy, 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 anæmia brought about by ankylostomiasis acting on a population worn down by chronic malarial poisoning" (*Brit. Med. Journ.*, March 26th, 1898).