it is their germinating leaves which, according to the traveller Aitchison, chiefly impart the tinge of green to the landscape. Later, these huge leaves interlace so thickly as to become obstructive to travel, and huge flower stalks shoot up to the height of many feet. These, like their branches, terminate in great umbels of small greenish or yellowish-white flowers. Among these plants are numerous species of the genus *Ferula* L., several of which have been supposed to yield the substance under consideration. It is fairly well established that this is collected from the species named above, as well as from *F. asafœtida* L., assuming these to be distinct. It is probable also that it is collected from *F. narthex* Boiss., and perhaps also from *F. alliacea* Boiss. and *F. persica* Willd. The young leaves and shoots of these plants are used as pot herbs in their native home.

The history of asafœtida in Europe before the twelfth century is not clear, although it has been held to have been an article of commerce from near the beginning of the Christian era; but, from the twelfth century down, there is no doubt of its presence in European drug lists. On the other hand, of its use in Asia there is evidence in Arabian and Sanscrit writings of great antiquity.

The principal supply of this drug is collected in Afghanistan, and exported to India (Bombay), whence it comes to Europe or America. It is usually packed in large cases, but sometimes in bags or "mats."

Our knowledge of the collection of asafœtida rests principally upon the evidence of two travellers, who had the fortune to see it at an interval of nearly two hundred years from each other. The first of these was the celebrated Kaempfer, who observed it in the Persian province of Laristan. His description has been repeatedly quoted, and is, in the main, as follows: "About the middle of April, when the leaves have done growing, the fields are visited by the peasants, who dig away the ground around the older roots, tear off the leaves from the crown, and then carefully cover it up with earth and leaves, to protect it from the rays of the sun. After leaving the plants in this way for several weeks, they again uncover them, remove a portion of the top and cover them again, being careful that nothing touches the newly cut surface. In one or two days more the exuded juice is scraped off with a knife, a fresh surface is made by cutting off a thin slice, and the covering is repeated. This is continued until the root is exhausted, the product growing better as the season advances. The soft juice is mixed with earth to give it body."

The other authority is Staff Surgeon Bellew, who saw asafœtida collected during a visit to Afghanistan in 1857. The process was something like that observed by Kaempfer, but it was done at a season when the young leaves were sprouting, and instead of cutting off the top of the root they cut or gashed it in several places; the digging away of the earth and the covering of the roots to keep off the heat of the sun were the same in both cases. Mr. Bellew states that the juice is mixed with gypsum or flour, although some very fine juice, obtained from the bud, is usually sold pure. This latter, like the fine juice of Kaempfer's later cuttings, probably never reaches the European markets.

Good asafœtida, when the cases are first opened, is a moderately soft, yellowish-gray, rather tenacious mass, of a not very homogeneous texture; sometimes lighter, whitish or yellowish tears are common in the mass; oftener coarse impurities are the cause of its unevenness. Upon exposure, this light-colored asafœtida turns first pink, or reddish plum or violet pink, and then gradually becomes brown. Its odor is characteristic; strongly alliaceous, penetrating, and persistent. It is exhaled, like that of onions, in the breath of persons taking it. Taste bitter and acrid, nauseous. When in lumps, even if long kept, asafœtida is usually not quite brittle, but if finely broken and dried it can be ground to powder, in the cold.

The quality is considered fine according to the abundance of clear, whitish tears which it contains, and the absence of impurities and insoluble residue. Occasionally specimens are met with, consisting wholly of tears, but these are rare. The United States Pharmacopœia requires that it should dissolve at least to the extent of sixty per cent. in alcohol.

In spite of this requirement, such asafœtida cannot now be found in our markets. Very much of it will yield little more than twenty per cent., and importations yielding as low as twelve per cent. have not been unknown of late. This state of the asafœtida trade has been regarded as in the nature of a scandal in the United States Custom Department. Many authorities suggest lowering the standard to accommodate the adulteration, but it would appear a better policy to apply drastic methods of exclusion, which would doubtless cure the evil radically, even though slowly. When it is considered that the chief cost of the article is the result of its long transportation, much of it over very expensive stages, it will be recognized as exceedingly wasteful to import from eighty to ninety per cent. of sand and crushed stone. Polisek, in 1897, determined the composition of an almost pure sample of asafœtida to be as follows: "Ether-soluble resin (ferulic acid ester of asaresinol tannol, $C_{24}H_{32}O_4OH$), 61.4; ether-insoluble resin (free asaresinol tannol), 0.60; gum, 25.1; volatile oil, 6.7; vanillin, 0.06; free ferulic acid, 1.28; moisture, 2.36; foreign matter, 2.5." This composition is by no means constant, as the relative proportions of resin and gum, and to a less extent of the oil, are quite variable. The impurities and ash should not exceed ten or fifteen per cent. The gum is mostly insoluble in water. The resin yields resorcin when fused with potassa, and umbelliferon and oils when subjected to destructive distillation. The oil is light yellow and possesses very strongly the odor of the drug. It is related to the volatile oil of mustard, but is not, like it, a strong local irritant. It is of a very complex composition, which has not yet been perfectly worked out. It contains about twenty-five per cent. of sulphur.

Asafœtida is a typical antispasmodic, as well as one of our best carminatives. It stimulates the appetite and the gastric secretions and movements, as well as the internal functions. As an antispasmodic it is particularly useful in hysteria, and is sometimes useful in spasmodic affections of the respiratory organs, as pertussis and asthma. It frequently permits sleep by allaying excitement, and especially by removing intestinal irritation. It is very largely used in veterinary practice. The dose is 0.3 to 1.5 gm. (gr. v. to xx.). Four preparations are official: The Pilulæ Asafœtidæ contain each 0.2 gm. (gr. iij.) asafœtida and three times as much soap; the Pilulæ Aloes et Asafœtidæ contain 0.09 gm. (gr. 1½) each of aloes, asafœtida, and soap; the Emulsum Asafœtidæ (formerly "Mistura") has a strength of 4 per cent. and the dose is 15 to 30 c.c. (fl. ʒss. to i.). This preparation is remarkably effective when used as an enema, in which case the dose may be doubled. The tincture has a strength of 20 per cent. and the dose is 2 to 4 c.c. (fl. ʒss. to i.). Asafœtida is frequently used externally in plasters, being a mild rubefacient.

It may be added that asafœtida renders bait attractive to certain fishes, notably bullheads. *H. H. Rusby.*

ASAPROL.—Abrastol-beta-naphthol-alpha-mono-sulphonate of calcium—$C_{10}H_6.OH(SO_3)_2Ca+3H_2O$. An aqueous solution of beta-naphthol-alpha-mono-sulphonic acid is saturated with calcium carbonate, and the salt crystallized out. It is a white or pale reddish crystalline powder without odor and soluble in one part and a half of water and three parts of alcohol. It is of neutral reaction, is not changed by heat, and is incompatible with the sulphates, and with quinine and antipyrine. It is antiseptic, antineuralgic, and antirheumatic, and is eliminated by the kidneys in the form of a naphthol sulphuric ether. It may be detected in the urine by the formation of a blue ring on the addition of ferric chloride.

Internally it may be employed as an antiseptic in intestinal indigestion, enteritis, and typhoid fever. As an antirheumatic it is claimed by Dujardin-Beaumetz, Buck, Stackler, and others that asaprol is equal in value to the salicylates, and at the same time does not cause headache, buzzing in the ears, and depression of the heart. It has been tried with moderate effect in influenza, malaria, and chorea, and with relief of the pain in neuralgia. Locally, as antiseptic, astringent, and styptic it may be applied in one to four per-cent. solution or ointment, and in whooping-cough a one-per-cent. solution may be sprayed into the throat.

The dose internally is gr. xv. to lx., or more, three times a day, given in gaultheria water or elixir of orange, or in capsules. For typhoid fever gr. iij. to v. should be given every two hours. *W. A. Bastedo.*

ASARABACCA. See *Snakeroot, Canada.*

ASBOLINE.—A product of the destructive distillation of pine roots, prepared by Braconnot. It is a yellowish or brownish oily-looking liquid consisting mainly of pyrocatechin, homopyrocatechin, and allied substances. It is used in medicine against the tubercle bacillus.
W. A. Bastedo.

ASCARIS LUMBRICOIDES. See *Nematoda.*

ASCITES.—(Synonyms: Hydrops Ascites, Hydroperitoneum, Dropsy of the Peritoneum.)

Definition.—Ascites is an accumulation of free fluid in the peritoneal cavity.

It is either (1) a part of a general dropsy involving pleuræ, pericardium, and the subcutaneous tissues of the body, or (2) a strictly localized dropsy caused by disease in the peritoneal cavity. Class (2), if of long standing, may secondarily cause œdema of the legs, as a result of the anæmia which usually develops, or as a result of pressure upon the iliac veins. Class (1) includes diseases of the heart, kidneys, lungs, and blood. Class (2) includes atrophic and hypertrophic cirrhosis of the liver, cancer and syphilis of the liver, amyloid liver, atrophy of the liver due to external pressure or growth, abscess or echinococcus of the liver causing pressure upon the portal vein. Tumors of the stomach and pancreas, peritoneal adhesions and enlarged lymphatic glands may cause ascites by pressing upon the portal vein. Thrombosis of the portal vein or of the inferior vena cava likewise may cause ascites. Chronic peritonitis, either simple, tuberculous, or cancerous, and perihepatitis chronica (*Zuckerguss-leber*) are causes of ascites. Leukæmia and splenic anæmia are occasionally associated with this condition; and so also are intrathoracic growths and mediastino-pericarditis. A small ascites may occur in apoplexy; it has also been noted in intestinal obstruction. Occasionally on the post-mortem table there have been found, in the different cavities of the body, collections of fluid which had not been demonstrated by physical signs during life. Immediately preceding death there is an intense congestion of the viscera which frequently results in an outpour of serum. This condition, when involving the peritoneal cavity, is termed preagonal ascites.

Pathology.—From an etiological standpoint all varieties of ascites (chylous ascites is discussed under the corresponding heading in Vol. II.) may be classed under three heads:

1. Ascites due to stagnation of blood in blood-vessels.
2. Ascites due to interference with the escape of lymph.
3. Ascites due to disturbance of capillary secretion, *i.e.*, alteration in the walls of capillaries.

In certain diseases we have combinations of the above causes; for example, a chronic heart disease with incompensation may secondarily produce changes in the capillary walls, as a result of lack of nourishment resulting from the imperfect renewal of blood.

The third class is distinctly a conception of modern pathologists and will require more detailed discussion. The former belief that the process which resulted in dropsy was merely a filtration of fluid through an animal membrane has been discarded. It is now held that the capillary walls are to be regarded as living organs with a capacity for secretion. The prompt passage of the crystalloids from the blood and the lymph is accomplished with the aid of a force inherent in the capillary walls. The fact that the proportion of salts or of sugar in the lymph is often greater than that in the blood suggests a capillary secretion. The fact that the proportion of albumin in pure transudates in different parts of the body varies considerably, points to a differing constitution of the vessel wall in these several regions. According to Reuss' table, transudates in different parts of the body give the following percentages of albumin:

Pleura	22.5	pro mille.
Pericardium	18.3	"
Peritoneum	11.1	"
Subcutaneous cellular tissue	5.8	"
Cerebral and spinal fluid	1.4	"

Heidenhain believes that the specific function of the capillary walls plays a controlling part in the formation of lymph. Whenever the removal of lymph fails to keep pace with its formation, dropsy results. This investigator has demonstrated that the formation of this material can be influenced by various substances present in the blood. Subcutaneous injections of an infusion of crabs or leeches so increased the transudation of water from the blood-vessels into the lymph that the quantity of lymph flowing from the ductus thoracicus was increased even to fifteenfold. This exciting substance must stimulate the specific functions of those capillary cells in the capillary walls which secrete the lymph. Class 3 includes the varieties of ascites usually termed inflammatory and cachectic. In the majority of cases, the changes in the vessel walls are the result of protracted ischæmia, of imperfect oxygenation, or of chemical changes in the blood, or are due to the effect of high or low temperature or to active traumatism. It is also probable that either irritation or paralysis of the vasomotor nerves may lead to an increased vascular secretion. The exact changes in the vessel walls are not known, but there are probably alterations of the endothelial cells and of the cementing substance between them. It is quite possible that Class 3 may include Class 1 and that our so-called pure transudates of obstructed circulation are capillary secretions rather than filtrations, the capillary cells being stimulated to secretion by irritating substances circulating in the blood.

In cases of hydræmia with œdema, Ziegler looks upon the increase in the amount of water in the blood as only one factor which is favorable to the occurrence of œdema. In cachectic and nephritic subjects œdema occurs often when no hydræmic plethora is present, and conversely œdema may be absent when hydræmic plethora is present. So it is held that the œdema of cachectics and nephritics is due to alteration in the vessel walls caused either by the hydrated condition of the blood or by a poison circulating in the blood.

Two factors are present as causes of ascites in inflammatory changes in the peritoneum, viz.: alterations in the walls of the blood-vessels, and the destruction of a large number of lymphatic vessels through which the fluid, secreted in excessive amount, should be carried. The ascites almost invariably associated with perihepatitis chronica is to be explained by the coexistence of a chronic peritonitis. In a few cases of perihepatitis in which there was no ascites, general peritonitis was absent. *Ascitic fluid* is either a transudate or an exudate. Transudates are found in non-inflammatory conditions and are usually light yellow in color, while exudates are found in inflammatory conditions and are darker in color. There are essential differences in their composition, a fact which may be of aid in diagnosis. Peritoneal transudates have a specific gravity varying between 1.005 and 1.015, while that of exudates frequently reaches 1.030. The difference in the specific gravity is due to the difference in the amount of albumin; exudates contain from four to six per cent., while transudates con-

tain from one to two and a half per cent. Transudates do not coagulate spontaneously; in exudates a coagulum is frequently observed after standing for twenty-four hours.

Microscopically the transudate shows only a few isolated leucocytes and endothelial cells derived from serous surfaces and undergoing fatty degeneration. Exudates contain many more formed elements and may be serous, sero-fibrinous, sero-purulent, purulent, putrid, hemorrhagic, chylous, or chyloid.

Following the administration of potassium iodide it is possible to obtain the iodine reaction in ascitic fluids.

Etiology.—Atrophic cirrhosis of the liver is the most common cause of ascites. It is less commonly found in the hypertrophic form. The frequency of ascites in diseases of the heart and kidneys is illustrated by the statistics of 300 cases of general dropsy, as revealed after death, taken consecutively from the post-mortem books of St. George's Hospital, London, from 1888 to 1897. One hundred and sixty-three of these were due to affections of the heart or aorta. As regards ascites, 1 in 2.5 of the cardiac cases and 1 in 2.2 of the renal (not lardaceous) cases presented this condition. Any of the organic heart lesions when incompensated may be followed by ascites. It is most frequently associated with mitral stenosis. The pleuræ and peritoneum are especially liable to dropsical invasion with the large white kidney of nephritis and the advanced granular kidney in which secondary cardiac changes have been added to the renal. Diseases of the lungs, such as emphysema and fibroid changes, may cause ascites by obliterating pulmonary vessels. This results in an increase of pressure in the right heart, and secondarily in the veins and capillaries, with transudation.

Diagnosis.—*Inspection.*—In ascites of moderate degree with the patient lying down, the abdomen is full at the sides and flat on top; in the upright position it projects below the navel. If the ascites is enormous there is a uniform distention and no change of shape with change of position. The superficial abdominal veins become enlarged in cases of long standing. In cirrhosis of the liver the veins surrounding the umbilicus may become very prominent and form the caput medusæ. When the amount of fluid is excessive there is a marked hernial protrusion of the navel.

Palpation.—Fluctuation is obtained by placing one hand flat upon one side of the abdomen, and tapping gently on the opposite side with the other, as in direct percussion. A similar sensation may be felt, however, if the abdomen be very fat or tympanitic. In order to exclude this pseudo-fluctuation, an assistant presses the edge of his hand along the linea alba; this manœuvre does not interfere with the transmission of the wave in ascites, but effectually interrupts it in the other conditions mentioned.

Percussion.—In the horizontal position there is dulness at the sides, and tympany over the upper and middle portions of the abdomen. The fluid seeks the dependent parts and the intestines float to the top so far as the mesentery will permit. The area of dulness changes with the position of the patient. On assuming the side position, dulness is obtained over the lower side and tympany over the upper. If the ascites is enormous, the intestines and stomach do not reach the surface, consequently there is dulness over the entire abdomen. The amount of fluid necessary for demonstration varies with the size and sex of the patient.

Toma's sign has been employed to distinguish between an exudate and a transudate, or inflammatory and non-inflammatory conditions. In inflammatory conditions of the peritoneum the mesentery contracts, drawing the intestines over to the right side. As a result, the patient assuming a horizontal position, tympany is elicited over the right side and dulness over the left.

Exploratory puncture is the crucial test, and should always be employed before operation.

Differential Diagnosis.—The ascites of heart disease is associated with a dusky skin, while that of Bright's disease is associated with a pale skin. Diseases of the heart, lungs, kidneys, and blood should be excluded by careful examination. A satisfactory examination of the abdomen by palpation can be made only after the withdrawal of the fluid. Palpation is then very easy on account of the relaxed abdominal muscles. An enlarged liver or spleen, growths on the liver or in the neighborhood of the portal vein can then be easily felt. At times the nodules of tuberculous or carcinomatous peritonitis can be made out. If primary cancer or tuberculosis is found in other parts, the problem is simplified. The great value of microscopical examination of the fluid, as a material aid in differential diagnosis, should be strongly emphasized. The fluid should be centrifugated, the sediment spread on cover slips, dried in the air, fixed in absolute alcohol and ether, then stained with hæmatoxylin. Quincke, Rieder, Dock, and Warthin have found in exudates cells which seem peculiar to cancer and sarcoma of serous membranes. Rieder found cells undergoing division, their nuclei presenting numerous karyokinetic figures, especially asymmetrical division forms, which are found to a slight degree or not at all in endothelial cells. Dock found in cancerous effusions more cells showing mitoses than in simple or tuberculous inflammations. Warthin concludes from his investigations that the presence of numerous cell-division forms in the cells of the sediment of serous exudates may be taken as strong, perhaps conclusive, evidence that the effusion is due to the presence of a new growth, inasmuch as mitoses are but rarely found in cells of purely inflammatory exudates. Quincke claims that carcinoma probably exists if a marked glycogen reaction can be obtained in the endothelial cells. Endothelial cells are sometimes mistaken for the so-called cancer cells. Quincke states that the diagnosis should be made only when large epithelial cells of variable form, measuring at times 120 μ in diameter, are found in large numbers, especially when arranged in groups, unless indeed cancerous nodules presenting the characteristic alveolar structure are found. Hemorrhagic exudates are as a rule tuberculous or cancerous. The fluid should be centrifugated, spreads made and stained for tubercle bacilli; though these are rarely found even in undoubted cases of tuberculosis of the peritoneum. A guinea-pig should be inoculated with the sediment, since even when the bacilli are not found the pig often develops tuberculosis. The diazo reaction is occasionally present in the urine of tuberculous and cancerous peritonitis, but does not help in differentiating one from the other, as it has been found in both.

The quantity of fluid varies greatly with the disease, but is usually largest in atrophic cirrhosis of the liver and in perihepatitis chronica. W. Hale White reports the case of a patient with perihepatitis who was tapped thirty-five times; the total amount of fluid withdrawn was seven hundred and ninety pints; the largest quantity taken out at one time was thirty-one and a half pints. Pütz's case of atrophic cirrhosis of the liver was tapped forty-seven times, with the removal of twelve hundred litres of fluid, during a sickness of four years' duration.

Prognosis.—The majority of the patients die within two years. Some cases associated with incompensated heart lesions recover under cardiac treatment and live for many years. Occasionally a case of cirrhosis of the liver recovers, if a sufficient collateral circulation is established. Numerous recoveries have been reported in cases of tuberculous peritonitis with ascites, treated by laparotomy. Many theories have been advanced to explain the cause of recovery in these cases. There are tuberculous diseases of the peritoneum which heal spontaneously. Hildebrandt believes that laparotomy only increases the natural healing factors. This author believes that the venous hyperæmia which ensues is the important factor in the healing of tuberculous peritonitis. Following operation he has observed an involution of the tuberculous process, and in isolated cases a complete healing with disappearance of the tubercles which he had seen in the first laparotomy (*Münchener med. Wochenschrift*, 1898, Nos. 51 and 52).

Treatment.—The ascites, if troublesome, should be relieved immediately, and treatment directed to the causative disease instituted if advisable. The first is most successfully accomplished by the simple surgical procedure of tapping. This operation is strikingly free from the danger of infecting the peritoneum. Flint refers to a patient who frequently tapped himself with a jack-knife and used a clay pipe stem for a cannula.

Aspiration, or the introduction of Southey's tubes, may be resorted to.

If the diagnosis of tuberculous peritonitis seems probable, then laparotomy should be performed. The fluid may collect so rapidly that it is necessary to tap every fortnight or oftener, but frequent tappings do no harm. In ascites due to heart disease and anæmia, treatment appropriate to these diseases should be given. The use of diuretics and hydragogue cathartics is usually unsatisfactory. The value of the dehydrating effect of dry diet should be emphasized. Care should be taken in selecting appropriate cases, since it is well borne in cardiac dropsy and poorly borne in renal dropsy.

James R. Arneill.

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ASCLEPIADACEÆ.—(*Milkweed Family.*) This immense family, of more than two hundred genera and fifteen hundred species, is an exceedingly difficult one for botanists. There is probably no other family the relations of whose members are so poorly known, so that any present system of classification must be regarded as very arbitrary. Nevertheless, the composition and properties of its members are singularly uniform. Its plants, with few exceptions, abound in a milky juice which possesses acrid, narcotic, and nauseating properties, so that a great many of them have been used as nauseating expectorants, alteratives, and mild counterirritants. The glucoside *asclepiadin* occurs frequently in this juice, as do many other glucosides. The only plants which have been much used in professional medicine are several species of *Asclepias* (see *Pleurisy Root*) and *Condurango*. Many are, however, used in native and domestic practice. In India especially, a large number of species have been used, the principal of which are described by Dymock and Hooper in the "Pharmacographia Indica" as follows: *Cryptostegia grandiflora* Br., which is poisonous and yields a rubber. *Calotropis gigantea* R. Br. and *C. procera* R. Br., which are irritant purgatives; *Tylophora asthmatica* W., and A. which is a nauseating expectorant; *Demia extensa* Br.; *Dregea volubilis* Benth.; *Hemidesmus Indicus* Br., the root of which is a much-used and powerful diuretic; *Cosmostigma racemosum* Wight.; *Gymnema sylvestre* Br. and many others less well known.

H. H. Rusby.

ASEPSIS, SURGICAL.—That wound infection and suppuration are the result of the presence of vegetable micro-organisms is no longer a theory but a fact proven by experimental research and clinical experience. While no one will deny that wounds may, under certain conditions, heal kindly without the use of any precautions to prevent the entrance of minute living organisms, such result obtains with great rarity, and not in consequence of a lack of these precautions but despite such negligence. The almost complete disappearance of hospital gangrene, the greatly diminished frequency of other forms of wound infection, the very low mortality rate, the safety with which the abdominal and cranial cavities are invaded at the present time, render unassailable evidence of the value of surgical asepsis. The term asepsis now indicates an absence of germs in a wound. Unfortunately, we are as yet unable to obtain a condition of absolute asepsis. There is perhaps in every wound some form of organism present, but by proper application of the means now at hand, aided by the resistance in the tissues, we are enabled, in a large percentage of wounds, to obtain healing without inflammation or suppuration. In the development of our present methods of asepsis, Lister stands out as the pioneer, and although his idea that air infection was very dangerous has been proven fallacious and the spray has fallen into disuse, the present technique is the direct outcome of his teaching. Other investigators have added to our knowledge during the time that has elapsed since his writings, and the present technique is the result. The object in wound treatment is to prevent anything coming into contact with the wound surface which can convey infection, and to limit the number and the virulence of bacteria whose entrance cannot be prevented. To accomplish this end requires unremitting care and attention to detail as well as a thorough appreciation of the dangers resulting from the slightest oversight. The more cleanly a surgeon is in his daily life, the more easily can he form habits of surgical cleanliness. Many surgeons obtain poor results because of an imperfect technique and fail to perceive such imperfection. Only by a careful investigation of poor results can the evil be remedied. The young surgeon educated to-day under the influence of the present teaching more readily learns and practises aseptic surgery than one who was taught and practised under the old régime. The infectious agents are bacteria of different forms which exist in the air, the soil, and the clothing, upon the skin and mucous membranes of the healthy body, in the beard and hair, and especially under the nails. The number of bacteria in the air is inconsiderable compared to the number found in the other places mentioned. The infection occurs as a rule by contact with a broken surface. If the chances of contact infection are excluded, air infection becomes of little moment. This can be almost entirely eliminated by care to prevent dust being raised in a room. No sweeping, brushing, taking down of curtains, opening windows or doors on opposite sides of a room should be allowed just before an operation. A moist cloth can remove dust and dirt with the least possible disturbance. Bacteria can scarcely leave a moist surface and pass into the air.

There is some tendency at the present time again to attribute greater importance to air infection, as certain investigators have obtained virulent cultures of the pyogenic bacteria from the air of hospitals. The methods of handling dressings and wound discharges will determine, to a large extent, the number of bacteria which reach the air. It is important, therefore, to destroy all wound dressings and not allow them to lie about in a dry condition. That flies and other insects can be the medium of transportation is well established, and while perhaps not a frequent means of infection yet it is well to exclude them from hospitals, for this reason as well as for the comfort of the patients, by the use of screens. The most frequent source of wound infection is the hands of the surgeon and his assistants. This can be readily appreciated when we consider the great fre-