quently find either an old caseous focus with cicatricial tissue around it, or a focus of slaty induration with radiate cicatrices extending into the tissue; or, rarely, in cases of death from intercurrent disease we may find an earlier condition. I once found in the apex of the right lung of a young man a single focus of tuberculous pneumonia 0.5 cm. in diameter, which differed in no respect from the foci which are so common in advanced tuberculosis, and which must be referred to bronchial infection. Microscopic examination in most cases enables us to determine the character of the old lesions, and one certainly gets the impression that they are pneumonic in character.

It is rare that we find lesions that can be regarded as definitely healed. Around the old caseous foci single tubercles will be found outside of the cicatricial tissue showing a slow infection, probably by means of the lymphatics. In the cicatricial tissue we shall generally find fibrous tubercles which still show some remains of specific structure, or their situation may be shown by calcareous or hyaline foci. Probably in most cases the primary infection is followed by a period of quiescence, in which the process is slow or arrested. The bacilli increase in number, and infection of the surrounding tissue through the lymphatics and bronchi takes place, leading to new foci, which become united into a single caseous mass by the advance of the caseation in the primary focus. There is usually no marked advance of the process until the softening of the caseous tissue gives opportunity for an extensive general infection by the bronchi. There is still much uncertainty as to the immediate cause of the softening. It may be the result of the formation, in the caseous tissue, of a ferment which liquefies it in the same way that the liquefaction of the exudation in lobar pneumonia is brought about. Or it may be due to the action of other bacteria. The softening takes place either in the middle of the focus, or in one or several places, or at the edge, a line of softening separating the caseous mass. I have seen such softening take place both in the lymph nodes and in the lung. In one case there was complete sequestration of a caseous mass as large as a lemon, which lay in a cavity filled with thin purulent material. All around the edge of both the sequestrum and the lung there were great numbers of both tubercle bacilli and streptococci. With the expulsion of the softened mass there remains a cavity in the tissue. The cavity is usually surrounded by a zone of granulation and cicatricial tissue, in which numerous tubercles are found. The extent of cicatricial-tissue formation indicates the rapidity or slowness of the local extension. The interior of the wall may be covered by a layer of caseous tissue of varying extent, or it may have the soft velvety character of the wall of a chronic abscess. Tubercle bacilli are often found growing in masses in the wall with the same form of growth as in a pure culture in a test tube.

The further infection of the lung by means of tubercle bacilli or their products, carried into other parts of the lung by way of the bronchi, gives rise to several forms of the disease.

Tuberculous Bronchopneumonia.—This is due to the action of the bacilli. The foci of the disease are very similar in their situation and extent to the foci of bronchopneumonia met with in the infectious diseases of children, and due chiefly to streptococci. As in the case of the latter disease tuberculous bronchopneumonia has a relation to Miller's lobule of the lung. The infection begins at the bronchial termination in the atrium, and from this extends into the air sacs and air cells. Macroscopically, these foci have the appearance of miliary tubercles. Microscopically, the bronchial passage, the atrium, and parts of the air sacs contain leucocytes, often a small amount of fibrin, and large epithelioid cells. Some caseation of the contents is always found, but it need not be extensive. We may find the infection taking place not at the entrance of the bronchus, but at the bottom. At this point, however, the tubercles can scarcely be distinguished from those arising from blood infection.

Tuberculous Bronchitis.—Either in connection with bronchopneumonia or independently of it there may be an infection of the wall of a bronchus, due either to infection from within or to the extension into the bronchus of a tuberculous focus in the adjoining air cells, just as in the case of the tuberculosis of the vessels. The bronchus at this point loses its epithelium wholly or entirely; it becomes filled with an exudation which later becomes caseous. On section it appears as a round area of caseation more or less separated from the wall, or extending somewhat into the wall.

Tuberculous Pneumonia.—This is by far the most important of all the processes, and has always been recognized as such. The tuberculous infiltration of Laënnec was really a tuberculous pneumonia. The tuberculous pneumonia has more or less resemblance to foci of ordinary bronchiogenic pneumonia. It may affect at the same time a large area of the lung, or the large areas may be produced by the confluence of smaller areas. The lung varies in macroscopic appearance. In some cases it has a gelatinous, almost transparent, appearance, with scattered small and opaque areas within it; or it may have the granular appearance of lobar pneumonia, but it is usually more opaque; or it may have on section a homogeneous, opaque character. Microscopically a great variety of conditions may be found. In the parts which present a gelatinous appearance we may find the alveoli filled with a homogeneous or slightly granular material in which are large numbers of epithelioid cells. In the process of hardening this material contracts and so leaves an interval between itself and the walls. This seems to be the result of a serous exudation, which has changed the character of the affected tissues, rendering them more dense than is commonly observed when they are infiltrated with ordinary serum. They present somewhat the appearance of an œdematous lung, but the material does not flow from the lung so easily on section, though it can be squeezed out to some extent by pressure. The walls of the alveoli may be but little changed. There is a varying degree of hyperæmia. The vessels may be distended with blood, but most of them may be empty. In most cases the alveolar tissue appears to be thinner than usual, or it may be infiltrated with cells. Shreds of fibrin may be found mixed with this material in the alveoli, or the fibrin may be so great in amount that the exudation can scarcely be distinguished from that of lobar pneumonia. In both the serous and the fibrinous exudations there is a varying number of polynuclear leucocytes. In some cases they may be so numerous that the exudation has a distinctly purulent character. These foci have often a close connection with the foci of bronchopneumonia and bronchitis. The number of tubercle bacilli in them varies. In the most recent foci, in which there is no softening of the caseous tissue, they may be absent entirely. In cases in which there is a close connection with foci of bronchopneumonia the tubercle bacilli may be found in the bronchopneumonic foci, and entirely absent in the diffuse exudation in the surrounding lung.

The etiology of this tuberculous pneumonia is not completely cleared up. It has been attributed to the immediate action of the tubercle bacilli, or to the influence of other bacteria, representing a mixed infection, or to the influence of products of bacilli. I am inclined to consider it due chiefly not to the bacilli, but to chemical products of bacilli. The tubercle bacilli growing in the walls of cavities must produce there a quantity of tuberculin. We do not know how much products from the advancing necrosis of tissue have to do with increasing the action of the tuberculin. In the advance of the process there is a considerable difference as compared with the extension of bronchopneumonias. Foci of bronchopneumonia do not extend by continuity of tissue, but by the continuous involvement of new bronchial territories. They are often sharply limited by the septa of the lung. In tuberculous pneumonia the process is never so sharply limited; the extension may be by continuity without any reference to bronchial territories. Cultures may show

the presence of pyogenic organisms, and they possibly assist the process, but there is no reason whatever for assuming that such infections are primarily due to such organisms. Microscopic examination of the tissue fails to show them, or reveals their presence in very small numbers. We know that the tubercle bacilli are capable of producing these exudations. Exudations similar in character may be found in the meninges of the brain and elsewhere, without any suspicion being excited that their peculiar character is dependent upon the action of secondary invaders. The lesions differ from the ordinary pneumonia lesions chiefly in the changes which they undergo. Even if the action of other bacteria be assumed, the caseation which the tissue undergoes shows that the action of the tubercle bacilli predominates over any other action. Similar lesions cannot be produced by the injection of tuberculin into the lungs of a healthy animal; in animals, it is true, the conditions are different. The tuberculin when injected is rapidly absorbed, and produces generally toxic instead of local lesions. The material which acts here is in a state not capable of ready absorption, and must act locally. It represents the soluble products mixed with mucus, possibly with particles of tissue. In all cases it is in a condition which would not admit of rapid absorption by the lymphatics. I have repeatedly found in the accompanying bronchopneumonia great numbers of bacilli in the bronchi and none at all in the surrounding exudation. Caseation takes place first in the centres of these foci and advances. That the caseation is not due to an absence of vascularity is shown by the fact that it can take place in tissue which, so far as can be judged by the presence of blood in the vessels, still has a circulation, but how active it is, it is impossible to say. Softening takes place with more or less rapidity, and results in the formation of cavities of a different character from the primary cavities in the apices. These cavities are extremely irregular and represent large channels of softening. Their walls are often composed of the caseous pneumonia tissue without any demarcation whatever. Around the periphery of these foci there will usually be found some connective-tissue formation. This shows first as an organization of the process. Beautiful examples of organizing pneumonia may be found. There is a growth of connective tissue into the alveolar spaces, taking the place of the exudation. The connective-tissue formation may be widespread so that a section of a focus may show extensive organization taking place from the periphery and advancing toward the centre, which is represented by exceedingly irregular areas of caseation. When softening takes place, then the cavity will not represent a simple hollowing out in the pneumonic lung; but, however irregular the cavity may be, it will be bounded by cicatricial tissue. The distribution of the areas of pneumonia may be chiefly lobar. Single lobes of the lung are often found chiefly affected, and all parts of the lung are never found homogeneously affected. The infection is due probably not to masses of bacilli which come from the affected portions of the lung and flow on into other parts of the lung, but to spray particles of such material formed in coughing, these particles being formed chiefly, if not entirely, in the larger bronchi. The quick inspiration in violent efforts of coughing is particularly favorable for the injection of the material into the lung. There is always, in connection with these changes, emphysema in the surrounding lung—sometimes of a pronounced character.

Recently an attempt had been made to utilize the agglutination method in the diagnosis of tuberculosis, but up to the present time the success of this does not show it to be a method of practical importance. The agglutination only takes place in such low dilutions as to show its great uncertainty. It is possible that greater success may be attended by the use of certain strains of the bacilli which will agglutinate more rapidly than others.

W. T. Councilman.

TUBERCULOSIS, PULMONARY. See *Lungs, Diseases of: Tuberculosis.*

TUBERCULOSIS: SYMPTOMATOLOGY AND TREATMENT.—Symptomatology.—The general symptomatology of tuberculosis is practically that of all wasting diseases.

In the early history of the malady, often before it is possible to determine the point of its localization, there is a great loss of bodily strength; the patient loses in weight, perhaps even to the point of emaciation; the skin loses its natural color, growing pale; there is marked dyspnœa, due to the anæmia that exists, even though the respiratory organs be not involved; the pulse is habitually accelerated and feeble; the patient suffers from indigestion, either with anorexia, or having a good appetite which is gratified at the expense of subsequent suffering; and finally, sometimes not until later in the disease, there is fever, either constantly or during some part of the day. In addition to these general symptoms, the involvement of individual organs or parts, such as the lungs, the meninges, the peritoneum, the bones, or what not, gives rise to symptoms peculiar to the part involved.

These individual symptoms will be described in detail in the articles which are devoted to the consideration of the diseases of such organs or parts, and therefore need not here be specified. It may be profitable, however, briefly to review the different methods of invasion of the several organs, especially with reference to the presence or absence of the general symptoms enumerated above.

Pulmonary tuberculosis is the most common and the most familiar form of tuberculous disease. It occurs under one of three forms:

First—Acute pneumonic tuberculosis, the onset of which is sudden, with a chill, quickly rising temperature, the physical signs of lobar pneumonia, sputum which may resemble that of lobar pneumonia, but is likely also to reveal the presence of the tubercle bacillus. This form may end fatally, even as early as the second or third week, and is generally mistaken for a severe case of simple lobar pneumonia. The importance of a correct diagnosis may be of more value in protecting others from infection than in saving the life of the patient.

Second—Acute tuberculous bronchopneumonia. This form is more frequent in children, often following other infectious diseases, as measles or whooping cough. The onset may also be sudden, with repeated chills, very high temperature, and death within a few days. Or it may run on for weeks, or even months, terminating in chronic phthisis.

Third—Chronic pulmonary tuberculosis. Here the onset is more gradual and insidious, accompanied with the general symptoms of debility, emaciation, rapid pulse, dyspnœa, pallor, indigestion, and moderate fever during a part of the day, before the pulmonary symptoms are severe, and long before night-sweats or a pulmonary hemorrhage alarm even the unwary.

It goes without saying, that the reverse of this picture may also be seen, when an alarming hemorrhage is the first sign of trouble, or a persistent cough long precedes the more general symptoms.

Tuberculous meningitis occurs more frequently among children than among adults. The prodromal symptoms are loss of appetite, loss of weight, great peevishness and irritability, without fever or local symptoms, until gradually or very suddenly and violently the true meningeal manifestations appear.

Tuberculous peritonitis presents a very varied picture, as a rule showing none of the general symptoms of tuberculosis. It may be entirely unsuspected and has repeatedly been found to exist when the abdomen was opened for the relief of other conditions. It may appear suddenly, with fever, severe pain, and the ordinary symptoms of acute peritonitis. Or the onset may be gradual, with abdominal tenderness, tympanites, and a low grade of fever not unlike the beginning of typhoid fever.

Tuberculous Pleurisy.—The ordinary form of this disease is subacute or chronic in character. The onset is insidious, with no grave general symptoms, and even the local symptoms are so little marked that the diagnosis of

a pleuritic effusion, which is usually sero-fibrinous, is often not made until it has existed for some time. Another form is that of *acute tuberculous suppurative pleurisy*. Of this, Professor Osler, in his "Principles and Practice of Medicine," says: "The fact is not so generally recognized that there is an acute, ulcerative, and suppurative disease which may run a very rapid course. The pleurisy sets in abruptly, with pain in the side, fever, cough, and sometimes with a chill. There may be nothing to suggest a tuberculous process, and the subject may have a fine physique and come of healthy stock."

Tuberculosis of the pericardium is not so common as that of other serous membranes. It has been found *post mortem* when nothing during life had led to a suspicion of its existence. In other cases it has been accompanied during life with the ordinary symptoms of cardiac insufficiency or cardiac dropsy.

Tuberculosis of the kidneys and of the genito-urinary tract, as a primary lesion, is not very uncommon. The disease of the kidney gives the ordinary symptoms of pyelitis, with the presence of tubercle bacilli in the urine. It may persist for years while yet the patient enjoys fair health and shows no other signs of tuberculosis.

Tuberculosis of the testis may also, apparently, be primary, although undoubtedly depending on the presence of some other tuberculous focus within the body. It is early associated with the general symptoms of tuberculosis and should not escape recognition.

Tuberculosis of the lymph glands (formerly called scrofula) is one of the most common of the tuberculous affections and the one most likely to result in a spontaneous cure. The cervical glands are the ones most frequently affected. The general symptoms of tuberculosis do not appear, or do so only to a very slight degree. Fever is absent unless the extension of the disease is rapid or suppuration takes place. When the mesenteric glands are involved (tabes mesenterica) nutrition is seriously interfered with and rapid emaciation ensues, with the characteristic enlarged and tympanitic abdomen, diarrhœa, etc.

No reference need here be made to tuberculosis of the larynx, pharynx, nasal cavity, intestinal canal, or other parts, the involvement of which is secondary to pulmonary or other forms of the disease.

Bone Tuberculosis.—With regard to the general symptoms of this form of disease we quote from Tillmann's "Text Book of Surgery": "The general health in tuberculosis of bone is very often but little, or not at all, affected. There is frequently a slight fever, varying with the extent of the process. It is a common occurrence to find that the general health is only slightly disturbed, even when extensive multiple tuberculosis is present. In general the fever is most pronounced before the tuberculous inflammation has extended beyond the bone, but it is usually slight and, as a rule, disappears more or less completely when the inflammation has worked its way to the surface of the body." . . . "Quite often it happens that for a long time symptoms peculiar to bone tuberculosis are absent; severe pain, especially, may long be missed, unless a neighboring joint, the periosteum, or overlying parts, are attacked by the tuberculous inflammation. Symptoms generally do not appear for months."

Acute miliary tuberculosis, of the general or typhoid form, is a disease in which the various organs of the body generally are invaded by the tubercle bacillus and filled with miliary tubercles. The patient presents the symptoms of a most profound infection with few local manifestations of a characteristic kind. After a brief period of general indisposition, not unlike the prodromal stage of typhoid fever, the patient enters on the febrile stage, his temperature quickly reaching a height of 102° to 104° F. One of the main characteristics of the fever is its irregularity, with perhaps a morning rise and an evening fall, or two crises during the day, with a fall below normal, but, as a rule, with no chill. Some cases are said to run their course to a fatal termination entirely without fever. Leucocytosis is usually present. Pulse and respiration are quite rapid. Pulmonary symptoms may appear. Jaundice is not infrequent. Coma usually terminates the scene. In very rare instances tubercle bacilli are found in the blood.

TREATMENT.—Even without treatment, in any strict sense of the term, the restoration to health of people who have suffered from tuberculosis is no very unusual occurrence. As a matter of course this is more likely to occur under favorable hygienic conditions, but it does also occur, at times, under very unfavorable conditions. Much as it has been sought, and often as its discovery has been claimed, there is as yet no specific for this malady. Very much, nevertheless, has been accomplished during the past twenty years in limiting the spread of the disease, in prolonging life, and in effecting cures. When Koch announced his discovery of the tubercle bacillus, and shortly afterward introduced his tuberculin treatment, great hopes were entertained that "the white plague" was to be banished from the earth. Great as our disappointment has been, it must still be confessed that Koch's discovery has placed in our hands the power, to a great degree, of limiting the spread of the plague, and of thus, at least, beginning its extermination.

Prophylactic or preventive treatment, therefore, offers to-day the greatest field for activity, and holds out the best promise for favorable results. This implies, in the first place, the furtherance of everything that contributes to good hygiene; the abolishment of crowded tenements for the poor; the admission of fresh air, and above all of sunlight, into living-rooms and working-rooms everywhere; the limitation and regulation of child-labor and of the hours of labor for old and young; food inspection; instruction in cooking; provision for bathing facilities; and a thousand things besides that go to make healthy living possible. Not only must this possibility be placed within their reach, but the ignorant must be instructed as to the importance of these measures for health and for life. All this and much more belongs to the department of public health in states and municipalities, aided by the efforts of benevolent organizations, supported by the voice of the public press, and ceaselessly agitated by the medical profession everywhere.

In order that the tuberculous, and especially the phthisical, patient may become as little as possible a menace to the health of those about him, such cases should in all municipalities be reported to the board of health, not for the purpose of subjecting them to annoying surveillance, but that they and their friends may be instructed in a few simple rules for the safety of those who are well. Furthermore, after the death of a phthisical patient the room which he has occupied should be thoroughly disinfected.

Patients and friends should be instructed as to the vital importance of the destruction of all sputa of a phthisical person. Such persons should never spit anywhere except into a receptacle containing a germicide solution or into cloths or pasteboard cups which are afterward to be burned. The phthisical patient should, if possible, sleep in a well-ventilated room by himself.

Children or young people who have shown any suspicious symptoms, or those who are suspected of a possible predisposition to tuberculosis, should be brought up, as much as possible, in the open air and the sunlight. They should be hardened against exposure by daily cold sponging, be warmly clothed and well fed, sleep with open windows, and avoid all crowded rooms. The first signs of nose or throat troubles should be vigorously treated. Even the trifling ailments of such subjects should be given attention, and during convalescence from serious illness they should be carefully watched.

In cities and towns, and even in many villages, much of the regulation of public hygiene above referred to belongs to the boards of health. Even here such regulations will fail of their legitimate end unless faithfully and actively supported by the medical profession. But in all rural districts the practising physician is the board of health, the sanitary inspector, the police officer, as

well as the friendly counsellor of the family. When the entire medical profession in any land wakes up to the importance of the preventive treatment of tuberculosis, and takes the field in an active and relentless campaign against the spread of the disease, the results will be such as the greatest enthusiast has hardly dared to dream of.

In the treatment of tuberculous patients, where anything may be expected in the way of cure, or of the arrest of the symptoms, our main reliance, again, is on *good hygienic surroundings, proper and sufficient feeding, fresh air and out-of-door life*. By hygienic surroundings we mean absolute cleanliness, the avoidance of all dampness in dwellings, and the free admission of sunshine. The feeding problem is a hard one, since we have to do so often with people of small and capricious appetites. The diet should be simple, varied, and nutritious—milk, eggs, meats, cereals, breadstuffs, vegetables, with as much as possible of fats. Many patients who cannot eat very heartily at any one meal may gain in weight and in strength by eating six times a day—that is, by taking nourishment between meals in the shape of milk, broth, raw eggs, etc. As much of the daytime as possible should be spent out of doors, not in wearing one's self out by undue exercise, but much of the time by sitting or lying in the sunshine. Bedroom windows should be wide open at night, or, better yet, the patient, warmly bedded, should sleep out of doors, on a veranda, or on the roof, if need be, and if the roof happens to be flat. *No tuberculous patient ever died of out-door living, by day or by night, while thousands of lives have been saved by nothing else.*

Because of the difficulty of carrying out the methods above indicated in cities, or in regions where the climate is unfavorable to out-of-door living, we come to the question of the *climatic treatment* of tuberculosis, and of *sanatorium treatment*. Both of these subjects will be fully discussed, under their respective headings, by other writers in this HANDBOOK. Suffice it here to say that the best climate for the tuberculous patient is the one that furnishes pure, dry air, without excessive heat or dust, and the greatest number of days of sunshine during the year. If to this be added a more rarefied atmosphere, such as is found at an elevation of from three thousand to six thousand feet above sea level, and the conditions which supply a reasonable degree of comfort and good food, we have the ideal resort, at least for the consumptive. Such a climate and conditions are to be found notably in Colorado, in portions of New Mexico and Arizona, and in Western Texas.

Because of the extreme difficulty and often the impossibility of carrying out hygienic, dietetic, and other regulations while the patient remains at home, it might be expected that great advantage would accrue from the treatment of such patients at well-regulated sanatoria, whether private or public, and experience has proved that this expectation is realized. Even under unfavorable climatic conditions the results of sanatorium treatment have been most favorable, especially for that class of patients who cannot secure the best conditions at home. There is no charity that will so well pay the community for the capital invested as the establishment and maintenance of such institutions.

Medicinal Treatment.—As before stated, there is no specific treatment for tuberculosis. Tuberculin and all its modifications have, on the whole, proved failures. The same is true with regard to all the antitoxic serums and antiseptic injection preparations from which, one after the other, something has been hoped, but nothing realized. Medicated inhalations benefit a bronchitis, but never cure phthisis. Pneumatic cabinets have had their day. And so one might go on through a long list of disappointments.

Cod-liver-oil, that old stand-by, still does good where the stomach will tolerate it, and helps much in maintaining the general nutrition, which is a most vital point. It is undoubtedly of most marked value in bone and gland tuberculosis, especially in the young. It is best digested when administered in connection with malt extract.

Arsenic is the most valuable general tonic that can be given to the tuberculous, whether or not the claim holds true, which has been put forth by some, that it tends directly to make an unfavorable soil for the development of the bacillus.

Creosote and *guaiacol* have had the same claim advanced on their behalf, probably with no very good reason. It is not probable that any drug which is administered ever reaches the tissues in sufficient amount to modify their value as a culture ground for bacteria. But there is no denying the fact that these drugs lessen the amount of expectoration and relieve cough, without disturbing digestion or constipating the bowels, and so are a source of great comfort and benefit to the phthisical patient.

Iodine preparations are of undoubted value in gland tuberculosis. Lugol's solution, administered internally, iodide of potassium, or iodide of iron, are the forms most commonly used.

Surgical interference at certain stages of glandular involvement and in bone tuberculosis is imperative, and will be treated of elsewhere. Of late years operative procedures, in bone and joint tuberculosis, have been largely superseded by injections with or applications of *iodoform emulsion*, with most admirable results. In these cases iodoform seems to have a direct anti-tuberculous action. It is not too much to hope that before long similar injections into tuberculous lung cavities or areas may yield better results than they have in the past.

Details with regard to the treatment of individual symptoms of pulmonary or other forms of tuberculosis, however, do not belong to this article and will be given elsewhere. The general principles laid down above are applicable to all forms of the disease. It has been within the experience of the writer to see cases of tuberculosis of glands, of the urinary tract, and of the testis (the latter of which did not seem to have been arrested by operative removal), as well as of pulmonary tuberculosis, apparently cured by a change of climate, change in methods of living, good hygiene, and an outdoor life.

Edward W. Schauffler.

TUMENOL.—This compound, which is very similar to thiol, has also been proposed as a substitute for ichthyol. The mineral oils obtained by the fractional distillation of coal-tar are supposed to contain a class of unsaturated hydrocarbons, which are readily acted upon by sulphuric acid. These hydrocarbons, treated with concentrated sulphuric acid, constitute the active ingredients of tumenol. The hydrocarbons undergo sulphonation and are separated as a dark, thick liquid, containing sulphone and sulphonic acid, known as *commercial tumenol*. It is a dark brown, almost black fluid of a syrupy consistency, acid in reaction. *Tumenol-sulphone* and *tumenol-sulphonic acid* may be separated from the commercial tumenol by the addition of soda lye, which combines with the acid to form a soda salt. The tumenol-sulphone is a dark yellow, thick liquid. Tumenol-sulphonic acid is a dark powder having a peculiar, faintly bitter, taste. The therapeutic uses are the same as those of ichthyol and thiol. The commercial tumenol is that which is generally used. From this two forms of solution are prepared for use, one containing ten per cent. of tumenol in equal parts of ether and rectified spirit and water, and the other containing glycerin in the place of the water. It may also be used as an ointment. The tumenol-sulphonic acid is employed as a powder, or in solutions, of the strength of one or two per cent.

Beaumont Small.

TUMORS.—(Synonyms: Common synonymous terms are new-growths, neoplasms, malignant disease, blastomata.)

DEFINITION.—It is difficult to give a clear, exact definition which will apply to the term *tumor* under all conditions, because the word, which etymologically simply means increase in size, has a clinical and a general as well