vous system are hypertrophied. The nerve cells are atrophied and contain pigment. These changes are most marked in the motor centres. The most characteristic lesions, however, are seen in the cerebro-spinal ganglia, in which there is a proliferation of the endothelial capsule of the ganglion cells and a corresponding destruction of the latter cells (Van Gehuchten and Nelis).

The diagnosis of rabies presents no difficulty. It is true that the disease is simulated by tetanus arising from an infected wound in the regions supplied by the cranial nerves; then, besides, pharyngeal spasms are also a marked symptom of this affection. But the history of the injury would suffice in most cases for a diagnosis; this would be misleading only in case the tetanus bacilli are introduced into a wound caused by a dog bite, a contingency which is not at all probable. The different lengths of the periods of incubation of the two diseases also afford a point of differentiation. But the surest method of diagnosis is the inoculation of a rabbit under the dura mater with a bit of the cord or brain (rubbed up in bouillon or glycerin) of the animal that has inflicted the bite. If this animal was really affected with rabies, this inoculation would produce the disease in the rabbit in from twelve to twenty-one days. Consequently, if this step be taken promptly after the bite has been inflicted, there will still be time enough to prevent the development of the disease by a resort to the Pasteur method, to be described later. However, in cases of bites on the head or face, the treatment must be begun as soon as possible after the accident, and it would be very unwise to wait for the result of such an experiment. A diagnosis may be reached in twenty-four hours, if the dog died of rabies or was at least in the paralytic stage, by the method of Van Gehuchten and Nelis, *i.e.*, by the microscopical examination of some of the cerebro-spinal ganglia, especially the vagus ganglia which are easily found.

If facilities for inoculating a rabbit are not at hand, material from the animal should be sent for diagnosis to some convenient laboratory. It suffices fully for all purposes to send the medulla in a small vessel containing glycerin, as recommended by Kempner. This method not only possesses the advantage of great convenience, but the material arrives at the laboratory in good condition for inoculation, which is not always the case with the other methods of shipment that are recommended.

The disease can be cured, or, rather, prevented from developing, only during the incubation period, before any symptoms have developed; after this, the treatment is only palliative, and consists in keeping the patient as quiet and undisturbed as possible in a darkened room, and in the administration of quieting drugs. Curare is strongly advised by some, while by others it is not even mentioned in the list of suitable drugs. Chloral hydrate, potassium bromide, and similar drugs are also advised by some. Osler advises resorting to morphine hypodermatically and to the use of chloroform at the start. Dr. Rambaud reports that he has obtained the best results (experience of about thirty cases) from the employment of hyoscine hydrobromate in doses of gr. $\frac{1}{100}$ injected hypodermatically. Cocaine applied locally may be used to diminish the sensibility of the pharynx so as to enable the patient to take liquid nourishment where swallowing is otherwise impossible. Nutrient enemata are also recommended.

The disease may be prevented from developing by speedy excision, or by thorough cauterization with the actual cautery or the strong mineral acids, not with nitrate of silver. These are usually of no avail when not resorted to within a short time after the bite. But cauterization or excision would seem advisable, nevertheless, even several hours after the bite, for, as stated above, the absorption of the virus into the nervous system from the seat of inoculation is sometimes delayed as long as twenty-four hours. Moreover, as already stated, Babes has shown that even when the disease is not prevented in this way, the period of incubation is lengthened by excision or cauterization, a most desirable result when the Pasteur treatment is resorted to, as it should be, and indeed now universally is.

Although the disease is altogether beyond treatment after symptoms develop, and although cauterization and excision are uncertain, the Pasteur method of inoculation affords a means of prevention that very rarely fails. The principle of this treatment, or, rather the object aimed at, is the rapid production of immunity in the patient during the period of incubation of the disease. If immunity can be established before the termination of the period of incubation, before any symptoms have developed, the progress of infection is arrested. The method consists in inoculation once a day, for from fifteen to twenty-one days, with virus of graded potency. The virus employed consists of bits of the spinal cord of rabbits possessing such potency, by repeated passages through the central nervous system of these animals, that it produces death from rabies in nine or ten days in rabbits by subdural inoculation. As indicated on more than one occasion above, this constitutes the "virus fixe" of Pasteur. The graded potency which is required if the virus is to be used upon human beings, is obtained in the following manner: The spinal cord of a rabbit that has died of rabies on the ninth or tenth day after inoculation is carefully removed and hung up in a flask, at the bottom of which are placed a few pieces of caustic potash. Protection against dust, etc., is secured by stuffing sterilized cotton into the neck of the flask which is kept in a dark room, at a constant temperature. In this way the cord is subjected to a slowly advancing process of desiccation, as a result of which the rabies virus is rendered progressively less virulent. On the day following that on which the cord was introduced into the flask, it is spoken of as cord of the second day, or No. 2. On the third day it becomes cord No. 3; and so on up to the fourteenth day. After the fourteenth day what remains of it, if not entirely used, is discarded. It is customary, at the Pasteur Institute in Paris, to use for the first injection an emulsion made from portions of the cord of both the fourteenth and the thirteenth days. In the New York Pasteur Institute, however, the first injection contains portions of the cord of the twelfth and eleventh days. An emulsion is made by rubbing up a segment of cord measuring 0.5 cm. in length in 6 c.c. of normal salt solution (sterilized) for one patient. Two separate injections are made simultaneously, one in the right and the other in the left hypochondriac region. Each succeeding couple of injections is made with a stronger emulsion, that is, with an emulsion made from a segment of the cord that has been subjected to one day less of drying than the preceding one. The most virulent cord used in Paris is that of the third day; in New York, that of the second day. The time for using this is reached somewhere between the seventh and the tenth days, and then a return is made to the cord of the sixth or fifth day, after which a gradual increase is again made until cord of the third or second day is reached. But if the treatment has been deferred, for any reason, so long that there is danger of the disease developing before the entire series of injections can be administered one day apart, the interval between the injections is shortened, and two or more injections of increasing strength are given daily instead of one each day for the first three or four days. Finally, when the case comes for treatment very late, and the necessity for such treatment is therefore urgent, it is maintained by some that all the twelve or thirteen injections should be administered in twenty-four hours, or that the preliminary injections should even be dispensed with entirely, and virus of full potency administered at the start. The procedure mentioned last, the use of unattenuated "virus fixe" without any preliminary inoculation with attenuated virus, has been practised with good results in cases of persons bitten by wolves, the most dangerous of all forms of infection. This procedure, however, is condemned by the Pasteur Institute in Paris as well as by the New York Institute, as it has caused several deaths.

Babes has advanced the theory that the reason why the

"virus fixe" does not itself produce the disease in man is that the injections are always made under the skin of the abdomen where it is not likely, owing to the presence of abundant adipose tissue, that any nerves are injured. But Marx is quoted by Babes as authority for the view that the virus becomes attenuated for human beings and for monkeys by being passed through rabbits, although enhanced in virulence for rabbits themselves.

The writer desires to acknowledge his indebtedness to Dr. George G. Rambaud, of the New York Pasteur Institute, for assistance kindly rendered in revising that portion of the text which relates to preventive treatment.

B. Meade Bolton.

RACHISCHISIS. See *Spina Bifida.*

RACHITIS.—See *Rickets.*

RAG-WEED.—Ambrosia. *Ambrosia* is a genus of the Compositæ, containing about a dozen species, mostly North American. The best-known species is *A. artemisiifolia* L., the common annual rag-weed, and one of the most abundant and troublesome of weeds. It is best known to medicine because the presence of the pollen in the nares is believed to be the principal cause or occasion of the disease hay fever. This and other species contain small amounts of amaroid and volatile oil, and have been employed, especially in domestic practice, as aromatic bitters. The idea that a preparation of rag-weed can act as a specific in hay fever is in the highest degree fanciful.

Henry H. Rusby.

RAILWAY MEDICINE AND SURGERY.—While, as a matter of course, passengers and employees have been killed and injured ever since the inception of railways, and railway surgeons have been known over fifty years (Dr. W. W. Apply was appointed surgeon for the Erie R. R. in 1849), the recognition of railway surgery as a special branch of the healing art is a matter of the last twenty years, and has reached its highest degree of development in the Western United States. It seems as fully entitled to recognition as military surgery, with which it has many features in common.

Prior to the War of the Rebellion, the mileage was mostly east of the Mississippi; skilled assistance being as a rule easily obtainable, there was little demand for systematic surgical service such as is now met with. Even at the present day in the Eastern States, where railways traverse thickly populated communities, the stations are almost in sight of each other, and cities and towns with well-appointed hospitals occur at frequent intervals. In the extreme Western States, however, perhaps several hundred miles of unsettled or sparsely inhabited territory may intervene between the locations of properly equipped hospitals. Hence during the building of the great transcontinental lines, provision had to be made for the care of employees injured during the construction of the road, all of them away from their homes and in uninhabited districts. In many instances this hospital department became a permanent feature after the roads commenced operation.

Except for the fact that it will have a larger proportion of emergency cases, the practice of the railway surgeon will not differ materially from that of his surgical brethren in general. The injuries with which he has to deal are very similar to the severe crushing injuries from machinery or heavy vulnerating bodies in ordinary surgical practice. They, however, present some special features. Thus, for example, owing to the fact that the extremities often become engaged between two unyielding surfaces—the rail and the flange of the car-wheel,—these railroad injuries are often extremely severe in character, with great destruction and laceration of the soft parts, and comminution of bones. Again, they are attended by a high degree of mortality, and their effect on the nervous system is overwhelming, shock being especially noticeable in this class of injuries. In addition to the crushing force, there should be taken into account the weight and velocity of the moving train. The weight varies from ten tons for empty flat cars to twelve or fifteen for box cars; from twenty to sixty for coaches; and it amounts to one hundred tons or more for locomotives. The railway surgeon often has to exert his skill under the most unfavorable circumstances and the most depressing surroundings, laboring at night with no light but the trainmen's lanterns, far from skilled assistance or even habitations, and amid rain, sleet, and snow.

The present mileage of steam roads in the United States is over 200,000, on which over 600,000,000 passengers were carried last year (1901–02). To operate this system required in 1895 an army of 785,000 men; in 1901 this number had grown to 1,071,000. In the Middle Atlantic States the number of employees per one hundred miles is 1,140; next come the New England States with 827; and so on, the lowest being the Middle Northwestern States with 303. For the year ending June 30th, 1902, the total number of casualties to passengers and employees reported was 42,619 (2,819 killed; 39,800 injured). Passengers killed, 303; injured, 6,089; employees killed, 2,516; injured, 33,711. (Report of Interstate Commerce Commission.)

As regards the different classes of employees, brakemen are injured most frequently, then come switchmen, firemen, and engineers in the order named. In former years the largest number of injuries resulted from coupling and uncoupling cars. In 1893 the "Safety Appliance" law was enacted, requiring the use of automatic couplers. This law went into full effect in August, 1900, and the results from this humane legislation are both surprising and gratifying. The number of employees killed in 1902 as compared with 1893 is sixty-eight per cent. less, and the diminution in the number of those injured is no less than eighty-one per cent., notwithstanding the much larger number of employees. Other frequent sources of accidents to trainmen are getting on or off trains in motion, falling from the cars, collisions, and derailment. The principal causes of accidents to passengers are collisions, derailment, and falls from the cars. According to Herrick, about fifty per cent. of injuries to employees involve the upper extremity, thirty-three per cent. the lower extremity, twelve per cent. the head and face, and eight per cent. the trunk.

To furnish relief for sick and injured employees there are four principal methods in operation at present: (1) the relief system; (2) the surgical service without a chief surgeon; (3) the surgical service with a chief surgeon; (4) the hospital system.

1. The relief system is in operation on a number of roads, among them the Baltimore & Ohio, Pennsylvania, Reading, Burlington, and Plant System. Membership may be either voluntary or compulsory. Under this plan the employee is assessed monthly according to the amount of his wages—usually from twenty-five cents to two dollars. When injured, he receives a certain sum monthly during this period of disability. Provision is also made for death, and for benefits in case of permanent disability. In some associations membership lapses if the employee quits the service of the company, in others the death benefits may be retained. In others again, additional features are found in the shape of savings, building and loan departments, and old-age pensions. The scope of such a system on a large trunk line may be gleaned from the last annual report of the one in operation on the Pennsylvania west of Pittsburg. The membership was 23,179, an increase of 2,122. The average number of members disabled per day was 778, or 35 for each 1,000. The death rate was 13 for each 1,000. Applications for membership were 11,010, while the cessations of membership were 8,868, of this number 8,090 having left the service. The total receipts for the year were $415,643, the disbursements $349,104.

2. The local surgeons are appointed by the superintendent or general manager. Local surgeons are generally located at divisional or terminal points, and along the remainder of the route,—as a rule, about fifty miles apart.

3. A chief surgeon is appointed who selects his own

assistants. It is asserted for this plan that it reduces the number of damage claims. There being more miles of railroad in the rural districts than in cities and towns, accidents frequently occur at remote points. Consequently it is often the practice to locate, at convenient points, division surgeons who are subordinate to the chief surgeon and who in their turn have charge of a division or branch of the line, and of the local surgeons in their territory.

4. The hospital plan is in operation among other roads —on the Missouri Pacific, Chesapeake & Ohio, Wabash, Southern Pacific, Santa Fé, St. Louis, and San Francisco. It embraces the care of the employee whether sick or injured, and whether his illness occurs on duty or not. The chief surgeon is in charge, and the executive board or board of governors is composed of representatives both from the employees and from the railroad company. As in the relief system there is a monthly assessment, and in addition the company either makes an annual donation or meets a deficiency should one arise. Minor ailments and injuries are attended to by the local surgeons, but if the illness proves to be serious or lasting, patients are sent to the main hospital, or on the longer systems to a branch hospital which is located at some accessible point. The Northern Pacific Beneficial Association, which was founded in 1882, may be selected as a type of this plan. This body maintains two hospitals—one at Brainerd, Minn., for the eastern division, and another at Missoula, Mont., for the western. For the year ending June 30th, 1902, the receipts were $165,865.77, and the expenses $164,063.40. The cases treated at the Brainerd hospital were 3,150 in number, and by the line surgeons of the eastern division, 13,323. The Missoula hospital cared for 1,994 cases, and the surgeons on the western division, for 12,966 cases. A training school for nurses is maintained at Brainerd.

For transporting the injured, several roads have equipped hospital cars which are kept constantly ready for use, and are despatched wherever they may be needed. The first one to be placed in commission seems to have been that which was installed on the Baltimore & Ohio Southwestern in 1894. A general idea of their fittings may be derived from Fig. 3925 (from Herrick's "Railway Surgery").

Nussbaum's dictum that the fate of the wounded depends on the individual who makes the first dressing is now firmly established, and railway employees often infect wounds received by them by applying to them tobacco cuds, soiled waste, or dirty handkerchiefs. To guard against this, "first-aid" instruction, so successful in Great Britain, has been introduced into this country and is slowly finding its way into favor. Classes of the employees are formed at convenient points, and a course of lectures couched in simple language, and illustrated by a manikin, etc., is delivered to them by the surgeons. A course may consist of five lectures. The first one is devoted to elementary anatomy and physiology; the second, to arrest of hemorrhage; the third, to sprains, dislocations, and fractures; the fourth, to asphyxiation, artificial respiration, poisons, etc.; and the last to transportation of the injured. Instruction is also given in stretcher drill, and those employees who are found to be proficient are, after examination, formed into ambulance corps. To keep up interest in the work annual competitions in stretcher drill are held, and the winning team retains the trophy for the year ensuing. A small manual on first aid has been compiled by C. R. Dickson especially for railroad men.

In line with this work some roads equip their trains with "emergency boxes," containing a supply of gauze, bandages, etc., which are replaced when used. These are placed in depots, freight houses, or car shops. The contents vary somewhat; the following is an average assortment:

1 Heavy rubber bandage.
12 Assorted muslin bandages.
5 Yards sublimate gauze.
1 Ounce absorbent lint.
1 Ounce styptic cotton.
4 Ounces absorbent cotton.
25 Corrosive sublimate tablets.
2 Ounces bicarbonate soda.
4 Surgical needles.
1 Pair scissors.
1 Pair forceps.
1 Case carbolized silk.
1 Roll rubber adhesive plaster.
1 Dozen safety pins.
1 Pyramid of pins.
1 Esmarch tourniquet.
1 Ounce iodoform.
1 Case for scissors, forceps, needles, etc.
Splints.

The idea is to have wounds protected by clean gauze held in place by a clean bandage, in order that they may reach the surgeon in an aseptic condition, or as nearly so as possible. Directions for using the various articles are pasted on the lid of the box. The following are those used on the Southern Pacific:

"These supplies are for temporary relief, until a surgeon can be obtained.

"In case of a broken bone straighten out the limb by stretching it, and fit a splint on it by padding with sheet cotton. Apply a bandage over the splint to hold it on.

"In case the skin is broken, making an open wound, apply moist gauze, and cover with cotton or lint and a bandage.

"If there is severe bleeding, apply the strip of duck-webbing above or toward the body from the wound, put a stick under it, and turn until the bleeding ceases. Do not stop the circulation altogether. If bleeding does not cease apply bandage on other side of wound.

"For burns or scalds, apply the oxide of zinc ointment, and cover with moist gauze, cotton or lint, and a bandage.

"In case of a cut, where the wound gaps, apply a strip of adhesive plaster so as to hold the wound together, and apply gauze and a bandage over it.

"To relieve pain, give one or two opium pills every three hours, until it is bearable.

"For pain in the eyes due to cinder: Dissolve a cocaine tablet in a few drops of water and apply to the eyeball or lids by dropping, or by means of a bit of cotton wrapped

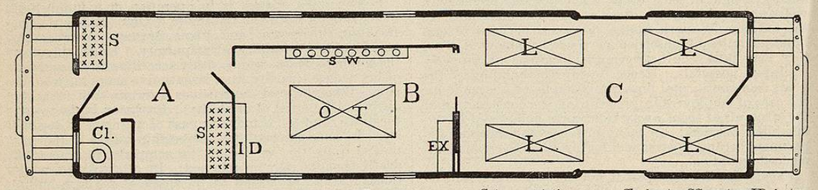

FIG. 3925.—Floor Plan of a Hospital Car. *A*, Sitting-room; *B*, operating-room; *C*, transportation-room; *Cl*, closet; *SS*, seats; *ID*, instrument and dressing case; *OT*, operating table; *SW*, sterilized water and solutions, in racks; *EX*, extra sheets, blankets, and other materials; *L*, *L*, beds. (Herrick: "Railway Surgery.")

around a piece of wood the size of a toothpick or match. The cinder will often come away with the cotton."

The physical examination of employees is becoming more and more important of late. It is claimed on one road, where the examination is rigid and great care is taken in the selection of new men, that the number of accidents and suits for damages has been lessened over one-half. Claims for damages are sometimes brought to recover for hernia or other conditions stated to have been received while at work, and proved to have been present before the litigant entered the employ of the company. Defective vision and color blindness are frequent causes of rejection, both for admission to the service and for promotion. Thus, on the Chicago & Northwestern, fifteen per cent. of the firemen, and ten per cent. of the brakemen examined were rejected for these reasons. Out of 21,473 examinations on this road since this plan was first adopted in 1895, some 2,785 applicants were found physically disqualified. Of these, 1,469 had defective vision, 664 were color-blind, and 652 were rejected for other physical defects. On some roads applicants are rejected for varicose veins, hernia, epilepsy, heart disease, and hemorrhoids; others exclude applicants with hydrocele, suppurative otitis, rheumatism, etc. The mental qualifications are generally taken into account also, and the examinations, as a rule, are repeated at stated intervals, or whenever occasion arises for promotion. In this connection the age at which applicants enter the company's employ is becoming important since the adoption of old-age pensions on a gradually increasing number of railroads. At present the extreme limit at which applications are received on most roads seems to be thirty-five years; on one road (Erie) it is forty-five. In the first two years' operation of the pension plan on the Pennsylvania road 1,574 employees were retired.

A constantly increasing field of usefulness for the railway surgeon is that of hygiene. The freedom of the ice and of the drinking-water from contamination; the disinfection of coaches after cases of contagious disease have been unwittingly transported, or where, as frequently happens on some roads, tuberculous passengers are carried to health resorts; the cleanliness of cars and depots —all these are subjects which come properly within his sphere.

In common with the members of other branches of medicine and surgery, the railway surgeons early felt the need of societies for the interchange of views and opinions, and as a result several national, state, and local societies have been organized. The first, composed of surgeons on the Wabash Railroad, was organized on January 25th, 1882, at Decatur, Ill.; in the same year the Pennsylvania system's surgeons met and organized. The National Association was formed mainly through the efforts of the late Dr. A. W. Ridenour, of Massillon, Ohio, and its first meeting was held June 28th, 1888. In 1897 it increased its scope to include surgeons from Canada and Mexico, changing the name to International, and at present it has a membership of nearly one thousand. The American Academy of Railway Surgeons, organized in 1894, limits its members, and is made up principally of chief surgeons. Flourishing state associations are those of Iowa and New York. There are numerous bodies composed of surgeons connected with the larger systems of roads; among them may be mentioned the Milwaukee & St. Paul, Wabash, Santa Fé, Pennsylvania, Erie, and Southern.

A few colleges in the West have chairs, either of railway surgery or of accident surgery in general.

The literature comprises two treatises, annual transactions of the national bodies, and a monthly journal, besides many contributions to current medical journals.

Louis J. Mitchell.

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RAILWAY SPINE. See *Nervous System, Traumatic Affections of.*

RÂLES.—This term is applied to certain abnormal sounds heard in the chest. It is customary with many authors to speak of *dry* and *moist* râles. Sibilant and sonorous breath sounds are called dry râles, although there is no more reason for calling these sounds râles than there is for applying the same term to cavernous breathing. Certain authors also call these forms of breathing rhonchi, and use the word râle to designate only the moist sounds. Rhonchus, again, by others, is used as exactly synonymous with râle.

The causes of these abnormal sounds vary considerably. We may have a considerable accumulation of exudation in the trachea and larger bronchi, producing large bubbles, or the smaller bronchi may be more or less filled, giving rise to small bubbles, or perhaps the sounds may be produced in the alveoli themselves. Râles may also be produced by the rubbing of roughened pleural surfaces, by the presence of fibrinous exudate on the pleura, and by the stretching of pleuritic adhesions.

COARSE MUCOUS RÂLES are coarse bubbling sounds produced in the trachea and larger bronchi. They are heard with both inspiration and expiration. They may sometimes be made to disappear for a time by causing the patient to cough. Sometimes, especially in children, they may produce a fremitus easily felt through the chest wall. They are heard most commonly with acute bronchitis in its exudative stage, and with bronchopneumonia, also with chronic bronchitis and phthisis, some cases of œdema of the lungs, lobar pneumonia, compression of bronchi or trachea due to neoplasm or aneurism, some cases of pleurisy with effusion, and empyema, especially with perforation of the lung.

FINE MUCOUS RÂLES are sounds of the same quality as the former, but finer. They are heard under the same conditions.

SUBCREPITANT RÂLES.—These are fine, high-pitched, bubbling sounds, heard during both inspiration and expiration. They may be produced by the bursting of small bubbles in the finest bronchioles or air passages, or they may be caused by fibrin on the pleura, and by pleuritic adhesions. The cause of this râle has been a matter of considerable dispute. On the one hand, it is held that the sound is invariably produced in the finer air passages; on the other, that pleural changes alone can give rise to it. The advocates of the former view hold that sounds resembling the subcrepitant râle may be produced in the pleura, but that a good ear can distinguish these from the true subcrepitant, by a slight difference in quality. Believers in the second dictum say that there is not enough motion in the air in the finer air passages to give rise to the râle. Both of these views are extreme. There are cases in which the subcrepitant râle is heard which show, post mortem, nothing but pleurisy as a possible cause, and there are cases of œdema of the lungs, with no pleuritic changes, in which this râle has been clearly heard, and in which the serum in the lungs is the only demonstrable factor in its production. It cannot be denied that the sound may be due to either of these causes. This râle may be heard in pleurisy, in bronchitis of the smaller tubes, in bronchopneumonia, in lobar pneumonia during the stage of resolution, and occasionally, during other stages, in phthisis, and in œdema of the lungs.

CREPITANT RÂLES.—These are very fine sounds heard only at the end of inspiration, and sounding very near the ear. They occur in abrupt explosions. They are much finer than the subcrepitant râles, and are usually compared to the sound produced by rubbing a lock of hair between the fingers. The causes of this râle are the rubbing together of inflamed pleural surfaces, the entrance of air into ultimate bronchioles or alveoli, the walls of which are partly stuck together by exudate, or perhaps the breaking of very fine bubbles. Of these

three possible causes the first seems most common, and it is not unlikely that this is really the only cause. It is conceivable that if the pleura be coated with a thin layer of sticky exudation, its surfaces will tend to stick together until the end of inspiration, and then, in slipping over one another, give rise to the sound. This râle is often said to be pathognomonic of acute lobar pneumonia. This is not so. The râle is frequently heard in the first stage of this disease, but it is also heard in pleurisy, bronchopneumonia, and phthisis. Taken in connection with a rational history of acute lobar pneumonia, the râle is of great value as a sign, especially if with it other signs be found, but it is not to be called pathognomonic.

Pleuritic Friction Sounds are râles produced in the pleura when it is diseased. They may be of a rather moist, grazing character, or may be creaking and dry. They may be heard in all diseases in which the pleura is involved. As has been mentioned, the pleural surfaces, when diseased, may give rise to crepitant and subcrepitant râles.

Pleuritic Adhesion Sounds.—In some cases of old pleurisy, with adhesions, peculiar sounds are heard, which may be accurately imitated by applying one end or a rubber band to the ear and stretching it. The adhesion sounds are probably produced by stretching of old adhesions.

The Metallic Tinkle is a sound resembling that produced by pouring water in drops into a bottle. It is produced either by drops of fluid falling from the roof of a large cavity in the lung, or from the walls of the cavity of a hydropneumothorax, or by bubbles breaking in fluid under similar circumstances. In different cases one or the other of these causes may produce the sound. It is heard over some large cavities, and, in some cases of pneumothorax, it may occur either when the patient speaks or while he is breathing.

Gurgles are coarse râles which are more liquid than mucous râles. They are sometimes heard in bronchitis, in some cases of solidified or compressed lung, and in some cavities.

The Mucous Click is a peculiar dry sound, occasionally heard at the end of inspiration. Its cause and significance are not clear.

Dry and Moist Crackles are sometimes mentioned. They are difficult to distinguish from subcrepitant râles.

Sibilant Breathing, sometimes called sibilant *rhonchus* or râle, is a whistling or hissing sound heard in cases in which a bronchus is narrowed by inflammatory thickening of its mucous membrane or by other causes.

Sonorous Breathing is produced in the same manner as the former. It is of lower pitch and softer quality.

J. West Roosevelt.

RAMSGATE AND MARGATE, ENGLAND.—These two popular though not the most fashionable English coast resorts are situated on the Isle of Thanet, about seventy-five miles east of London. Margate lies to the north, with an eastern sea exposure, while Ramsgate, about five miles to the south of it, has a southern as well as an eastern sea front. Similar but quieter resorts in the near vicinity are Broadstairs, Westgate-on-Sea, and Birchington.

The general climatic characteristics represented by these resorts are those of a cool marine climate, with moderate or quite considerable humidity. Owing to the influence of the Gulf Stream here, as throughout all England, the mean temperature is much higher than is due to latitude. The winters are mild, the summers cool; there are no great extremes of temperature; and there is great seasonal and diurnal equability. There is only a moderate amount of sunshine, and there is always wind. Such a climatic combination is stimulating and bracing, and has been found valuable for anæmia, malaria, convalescence from various diseases, dyspepsia resulting from debility, certain nervous affections, and particularly scrofula and tuberculous conditions other than pulmonary.

These resorts are available all the year, although they are naturally most frequented in the summer.

The soil is of chalk covered with a foot or two of earth, and, consequently, is dry and quickly absorbs moisture.

Ramsgate, like its neighbor Margate, presents to the sea high chalk cliffs, with an abrupt descent to the "sands," which, being thus sheltered from the winds, affords an attractive resort for the invalid and visitor, and good bathing. In general, however, here as at Margate, the winds are frequent and trying, particularly at certain seasons of the year. By the construction of terraces and crescents a certain amount of artificial shelter is obtained. Nevertheless, "even in its stillest corners the keen Thanet air is constantly moving." The southern exposure affords more sun, though the general percentage of cloudiness is 6.7. On account of its situation it is a little warmer here than at Margate.

The town contains about 25,000 inhabitants, and appears to be very healthy, as the death rate in 1891 was only 14.6, and more than one-third of the deaths occurred at over sixty years of age; the infant mortality was 118 per 1,000 births. The drainage is thorough and good, and the water supply is constant and pure. If one desired to live long this would appear to be a desirable resort, as in 1890 one-twelfth of the total number of deaths was of individuals at or upward of eighty years.

Besides the cliffs and sands there are piers for promenading; and the marine view, and the almost daily arrival of foreign fishing smacks afford a constant source of interest. There are also attractive drives in the vicinity. The temperature of the sea water is 61° F. in the summer, thus affording opportunities for bathing. Ewart ("Climates and Baths of Great Britain," 1895) says that Ramsgate has an "admirable winter climate for most invalids," and "many," he continues, "are so fortified by a winter residence as to be able to meet the spring winds without risk."

A climatic table of Ramsgate is appended; it also substantially represents that of Margate, which is only about five miles distant:

Climate of Ramsgate, Lat. 51° 19′ (from "Climates and Baths of Great Britain").

	Jan.	Mar.	May.	July.	Aug.	Oct.	Nov.	Year.
Temperature—								
Average or normal ...	38.8°	40.3°	52.2°	61.2°	61.4°	49.8°	45.0°	49.3°
Mean daily range.....	8.9	11.1	14.2	15.2	15.4	11.8	9.7	12 0
Mean of warmest	43.3	45.8	59.3	68.8	69.1	55.7	49.8	55.3
Mean of coldest.....	34.4	34.7	45.1	53.6	53.7	43.9	40.1	45.3
Highest or maximum .	55.2	63.6	77.3	83.6	83.2	72.9	61.3	83.6
Lowest or minimum ..	20.3	20.1	32.9	42.3	44.2	27.8	22.2	19.0
Humidity—								
Mean relative at 9 A.M.	89%	83%	76%	74%	74%	86%	88%	82%
Precipitation—								
Average in inches.....	1.76	1.44	1.73	2.32	1.35	2.86	2.84	24.23
Days in which rain fell	15	14	12	13	9	15	16	163
Wind—								
Prevailing	The so Ju	pre uthw ne.	vaili est e	ng w xcep	ind is t in	from Apri	the l and	S.W.
Weather—								
Cloud at 9 A.M	7.3	6.9	6.1	6.3	6.0	6.6	7.5	6.7

Margate (about 19,000 inhabitants) has been noted for a century for the treatment of scrofula and tuberculous diseases, especially in children, and here is situated one of the oldest and most famous seaside sanatoria for those suffering from these diseases—"The Royal Sea-Bathing Infirmary." There are also many other similar institutions. The town stands on two hills separated by a valley, and facing the north are high chalk cliffs at the base of which is a shallow beach that is quite covered at high tide. It is upon these cliffs that the new portion of the town is situated. The town also stretches some distance back from the sea over undulating ground, affording opportunities to gain a certain amount of protection from the winds. The water supply is good, and the

drainage is efficiently accomplished both by natural and by artificial means.

The table shows the various meteorological data in detail. Fogs are not frequent. It is rarely uncomfortably hot or cold in summer. January is the coldest month in the year, the average temperature being 38.9° F.

Large numbers of children are sent to this resort for the effect of the sea air and sea bathing, the majority suffering from scrofula and tuberculous diseases other than pulmonary tuberculosis. The benefits obtained in these maladies in some cases are said to be extraordinary. At the Royal Sea-Bathing Infirmary the following percentages of cures are given: 1886, 23.5 per cent.; 1887, 27.84 per cent.; 1888, 38 per cent.; 1889, 46.1 per cent.; 1890, 52.35 per cent. As it requires a certain vigor of constitution to endure this climate, weakly children would probably do better in the milder climate of the Mediterranean shores.

The accommodations at Ramsgate and Margate are good and of varying price, and there are excellent facilities for all sorts of sea-baths.

For a more extended description of this region and its climate the reader is referred to the article of Ewart in "Climates and Baths of Great Britain," to whom the writer acknowledges his indebtedness.

Edward O. Otis.

RANULA.—A cystic tumor in the floor of the mouth, formed by the dilatation of one or more of the acini of the anterior lingual glands (Ward [1]), which are known also as the "Blandin-Nuhn" glands (von Recklinghausen [2]), and are situated at the under side of the tongue on either side of the frænum linguæ, near the apex.

This definition, the correctness of which has been confirmed by later investigations,[3, 4] is founded on the result of a characteristically thorough investigation, by the accomplished Strassburg pathologist, of a typical ranula accidentally found at a necropsy made in his pathological institute. The cyst, about the size of a pigeon's egg, was found on the under side of the left half of the tongue; it extended to a little beyond the median line upon the right side, and penetrated into the intermuscular spaces in different directions. The wall of the cyst was of a nearly uniform thickness of from 1 to 3 mm.; the internal surface was nearly smooth, except in the upper part, where, anteriorly, toward the apex, there was a prominence of some 5 mm. in height, upon which were two furrows; one of these, situated near the top of the prominence, allowed the passage of a bristle to the depth of 2.5 mm., while the other, situated near the base and away from the apex, was impervious. The cyst was everywhere colorless and translucent, except at the inferior part, where there was an opaque spot of about 20 mm. in diameter, of a brownish color, having at its edges two more cysts, each about the size of a pin's head. The ducts of the various salivary glands, Wharton's and Rivinus', as well as Bartolini's, were all to be traced outside of the cyst, having no other relation with it than that of proximity. The microscopic examination showed that the epithelial lining of the cyst wall was in two layers, the inner one of ciliated cylindrical epithelium, and beneath this a layer of small polygonal cells with large nuclei. The cyst contained a clear, somewhat thick, glairy, and viscid mucus, faintly yellow in color. The morphological elements were cells of an epithelial character in various stages of "colloid" degeneration, large brownish granular bodies, and numerous hyaline corpuscles, among which were some quite large, of a diffused, faint greenish-yellow shade, permeated with countless "vacuoles." The chemical examination showed a considerable amount of mucus, but no evidence either of sulphocyanide of potassium or of any fermentative material for the saccharine conversion of starch; therefore the fluid was not saliva. This confirmed the investigation of Besanez [5] made in 1845. Föderl [6] describes a ranula which he dissected as consisting of the dilated duct of the Blandin-Nuhn gland.

Ranulæ, in general, present themselves as translucent pink or bluish tumors, generally globular in shape and fluctuating, lying either wholly in the mouth or between the mouth and chin, according to their size. They project into the floor of the mouth from beneath the tongue, at first quite to one side of the frænum linguæ; but as they increase in size toward the mouth they elevate the tongue, push it over to the opposite side, and in time present themselves against the teeth in front, and may even prevent their closure. They push the frænum toward the opposite side, but may project beyond it, giving the appearance of two tumors, or of one tumor divided into a larger and a smaller portion. As the tumor increases in size the interference with speech and deglutition becomes steadily more noticeable. The elder Cline [7] relates the case of a person who was in great danger of immediate suffocation by a large ranula which thrust the tongue back into the fauces. When not interfered with the tumor will project in the neck below the angle of the chin, and fluctuation may be felt in this situation. When the tumor is large the alteration of the patient's expression is marked; the region of his mouth looks like that of a frog, the pale bluish, translucent hue increasing the resemblance. Hence the name, from *rana*, frog Ger., *Froschgeschwülste;* Fr., *grenouillette*).

Cysts of other organs than the Blandin-Nuhn glands are also found in this situation. Wharton's duct may be dilated by the damming back of the secretion of the submaxillary gland from the formation of a salivary concretion in the duct, either at its orifice or in its course; and dermoid cysts, often of considerable size, are also found. The latter are especially interesting pathologically, as they undoubtedly represent here the remains of a fœtal organ which normally entirely disappears. The branchial fissures of the fœtus are normally obliterated early in fœtal life, but occasionally a fold of the tegumentary or epiblastic layer becomes included in the deeper tissues in the process of closing in from the sides to form the face, and finally it becomes entirely separated from its attachment to the external skin. It may remain quiescent, giving no evidence of its presence, or the cells of the epithelial lining may be excited to growth and the interior become filled with the products, consisting of broken-down epithelium, fat, cholesterin crystals, and débris, *i.e.*, the usual contents of cysts developed from the dermoid layer. Indeed, hairs, bone, and teeth have been found in them.[8] These dermoid cysts, however, do not spring from the same point as do true ranulæ. They are situated either in the median line, between the two geniohyoglossi muscles, or between one of these and the mylohyoid; but as they grow they extend upward into the floor of the mouth, or downward in the neck, as far, perhaps, as the larynx.[9]

Diagnosis.—These various tumors present points of differentiation sufficiently marked, usually, to allow them to be recognized, and as the treatment of each is different, it is important to have them well in mind. The positions of true ranula and of the dilated Whartonian duct are, by the time they have aroused sufficient attention to be brought to the notice of the surgeon, very nearly the same; they both lie just under the tongue, to one side of the frænum, and fill up the floor of the mouth, elevating the tongue above it, and appearing as a thin-walled, fluctuating, and translucent tumor. In the case of the ranula, this tumor has upon its surface Wharton's duct, the orifice of which can usually be detected near the median line, and into which a fine probe or bristle may be passed, and be seen to glide along the surface to the submaxillary gland, external to and beyond the cyst. Careful search will often also reveal the orifices of the sublingual gland, the ducts of Rivinus. Blood-vessels are frequently seen coursing in waving lines over the cyst. When Wharton's duct is the seat of the tumor, the entrance of the probe into it will be prevented by the obstacle which is blocking it, be it salivary concretion or inflammatory product, and removal of the obstacle will usually allow the escape of the fluid. In these cases there are usually considerable pain and circumjacent swelling, with other evidences of inflammatory action in all the