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

parts implicated; the floor of the mouth is hot and tender, the tongue is painful on motion, and under the jaw the submaxillary gland is swollen and tender.

The clinical features of the dermoid cyst are different; indeed, there should be no confusion between them, but inasmuch as, from its situation and gross appearances, it is sometimes described as ranula, it is well to point out the differences. The wall is usually thick and firm, the contents may be quite thick, even mortar-like, sometimes purulent, or the contained fluid may be thin or viscid. There may be fluctuation, but it is less distinct than in ranula, and the surface often pits on pressure. The tumor is situated more deeply under the muscles of the mouth, and, when presenting under the jaw, is embedded among those of the neck, and may penetrate even as far down as the larynx. In the mouth it arises nearer the median line, although as it grows its origin becomes obscured, and may not be readily determined at the time when the case comes under the observation of the surgeon.

TREATMENT.—No other than operative interference is of any avail in the treatment of these cysts, and it is usually necessary to do more than simply to evacuate their contents. If it be a *dilated Whartonian duct*, the removal of the concretion blocking up the orifice is usually sufficient; but this requires some care, as it is often very brittle, and if any fragments remain they set up a good deal of irritation in the duct itself, and serve as nuclei for further collections. Therefore an opening should be made in the duct sufficiently large to "shell out" the stone entire. As these are occasionally quite long, it may require a considerable incision in the length of the duct, but this is preferable to making a small opening and endeavoring to drag the stone out; for if this is attempted it is liable to break, to the subsequent annoyance of both patient and surgeon.

It is better, when practicable, to remove the *dermoid cyst* entirely, though, when it extends deeply and has very firm attachments, this will be difficult, and may be impossible with safety to the patient. When the cyst is not large it is usually easiest to make a free incision through its wall—whether in the mouth or under the chin, depends upon its accessibility—and evacuate the contents. When these are thick and tenacious this may be a matter of some difficulty. After this, the cyst wall being tolerably firm, it will bear considerable dragging upon, and may be enucleated with the handle of the scalpel, aided by occasional snips with the blade or with scissors. Cases are occasionally met, however, in which the operation of entire removal is both difficult and dangerous. In Mr. Mayo's[9] case the tumor extended down nearly to the clavicle, passing between the sterno-mastoid muscle and the trachea. After scooping out the contents and removing a part of the wall, he left the rest to suppurate, first filling the cavity with lint soaked in turpentine, in order both to arrest the hemorrhage and to hasten the suppuration. The patient recovered after a considerable time.

Sir William Fergusson's[10] case filled the mouth so as to threaten suffocation, keeping the teeth forcibly apart and projecting prominently under the chin. He feared to leave "a sac so large and thick to the certainty of a violent inflammation," . . and "resolved instead to attempt the extraction of the whole cyst." Incisions were made both in the mouth and in the neck, but "the sac was so amalgamated with the surrounding tissues that a free use of the knife was required." No large vessel was cut, but there was much loss of blood both at the operation and subsequently; the ultimate result, however, was entirely satisfactory.

The true thin-walled ranula requires a different treatment. Simple incision is not sufficient, for the edges of the wound usually reunite and the cyst forms again. The wall is also too thin to allow its enucleation *in toto*. A seton introduced through its walls, and allowed to remain for a couple of weeks, more or less, will sometimes, but not always, cure it, and is to be tried first. This failing, some surgeons recommend the removal of a large part of the thin wall, in the expectation that the remainder of the cyst will collapse and the walls unite, thus obliterating its cavity; but, like the seton, this often fails. A sort of plastic operation has, therefore, been tried, and it has usually proved successful. This consists in forming a triangular flap by a couple of converging incisions in the anterior wall, and fastening the apex by two or three sutures to the opposite wall; adhesions are thus formed, and the cyst is kept open until the wall shrivels up. Sonnenberg recommends that the remainder of the gland be dissected out of its bed in the apex of the tongue, thus preventing the development of any other cysts afterward. This is occasionally done, with very satisfactory results, when milder measures have failed. Hippel[11] advises the removal of both cyst and gland through an incision under the chin, as being more accessible and more sure against recurrence. Felizet[12] thinks that he simplifies the procedure of extirpating the sac by first injecting a solution of boric acid into the tissues around it; after which he opens and empties the cyst, stuffs it full with a sponge, and shells it out as a solid tumor (!) *William H. Carmalt.*

[1] Ward, Nathaniel: Article Salivary Glands, in Todd and Bowman's Encyclopædia of Anatomy and Physiology, vol. iv., pt. I, p. 426.
[2] von Recklinghausen: Virchow's Archiv., Bd. 34, p. 425.
[3] Sultan: Deutsch. Zeitschrift für Chirurgie, Bd. xlviii., 1898.
[4] Mintz: Deutsch. Zeitschrift für Chirurgie, Bd. li., 1899.
[5] Besanez, Dr. Gorup: Heller's Archiv für Phys. und patholog. Chemie u. Microscopie, vol. ii., quoted by Dr. Owen Reis in the article Saliva, in Todd and Bowman's Encycl. of Anat. and Phys., vol. iv., pt. I, p. 420.
[6] Födert: Langenbeck's Archiv, Bd. 49, 1895.
[7] Chelius's System of Surgery, vol. iii., p. 121. Edited by J. F. South, Philadelphia, 1847.
[8] Butlin, Henry S.: Diseases of the Tongue, p. 239. Lea Brothers & Co., Philadelphia, 1885.
[9] Mr. Mayo, of Winchester, England: Lancet, 1847, i., p. 667, quoted in Druitt's Surgery, p. 423, Philadelphia, 1860.
[10] Fergusson's Practical Surgery, p. 445, Philadelphia, 1853.
[11] Hippel: Langenbeck's Archiv, Bd. 55, 1897.
[12] Felizet: Bull. de Chirurgie, 1891, October 21st, p. 603.

RAPE, MEDICO-LEGAL ASPECTS OF.—Rape may be defined as the carnal knowledge of a woman through force and without her consent; or, as it is generally expressed, "forcibly and against her will."

The physician is concerned but little with the legal aspects of the subject. Only the more important facts will therefore be stated, greater space being given to the duties of the medical examiner.

General Considerations.—Rape has always been regarded by civilized nations as one of the most heinous crimes. It is a felony in all the United States, and its punishment varies from fine and imprisonment for a term of years to life imprisonment or death. The severest penalty is imposed in several of the Southern States.

Assault with intent to rape is recognized as a distinct offense in some of the States, but not in others. Where so recognized, it is punished with fine and imprisonment. Handling, touching, or attempting to touch the genital organs of a female, or her breasts, forcibly and without consent, is regarded in some States as a felony or criminal assault; in others, as a misdemeanor.

If it can be shown that the woman gave her consent, the guilt of the man is removed, providing the woman is capable of legally giving consent. Under the old "common law" the age limit, under which a female was not capable of giving consent, was thirteen years. In most of the States this limit has been raised to fourteen or sixteen years; in Wyoming, to eighteen years. Carnal knowledge of a girl under this limit, even at her solicitation, is a felony. An idiotic or insane woman cannot give consent, and an assault or rape committed upon one in a state of anæsthesia or in a hypnotic sleep is generally regarded as being committed against her will. Consent obtained by fraud, as when a man represents himself, in the dark, to be the husband, or when the woman unwittingly assumes that he is her husband, does not mitigate the offense, although a decision was once given in England in which such deception was permitted to pass without punishment. Previous repeated cohabitation between the man and woman does not remove the guilt

of rape, if force has been used, for the common law holds that even a prostitute may reform or withhold her consent. A woman cannot charge her husband with rape, for the marriage contract involves her consent. Finally, all persons aiding in the commission of a rape or assault are regarded as principals in the second degree.

The testimony of the prosecuting witness is accepted as competent through recognition of the fact that the crime is generally committed in secret when no other persons are near. But the character of the prosecuting witness is important and may be impeached. The witness is required to answer all questions put by the defence without privilege.

Duties of the Examiner.—The testimony of the medical examiner is generally employed to corroborate that of the prosecuting witness, and there are few positions in which greater care and discrimination must be used. It is the duty of the physician to make an impartial examination and to submit the facts just as he finds them. The statements of the victim and those of her friends are matters for the consideration of the court and should not in the least influence the examiner. In a large majority of all cases of alleged assault the allegation is accidentally or maliciously false. Amos was doubtless correct in his estimate that there are twelve false charges to every true one. The estimate is true also of cases in which a child is the principal witness. Even young children are taught by designing women to tell the story of an assault; but they are often taught to use language most unnatural to their age, and the absolute precision of their statements is often a ground for suspicion. It is rarely indeed that an adult can reiterate a false story without introducing discrepancies. The motives for such deception need not be discussed. The chief of them is revenge, and this is often for the most trivial offense, an unpaid debt, a fancied slight or insult, or a cessation of improper relations with the mother. In such cases the report of the examiner should prevent the case from coming to trial. In cities where these examinations are entrusted to a medical officer of the court or Police Department, his decision is usually accepted and the case is disposed of accordingly, but a physician is generally found by the friends of the prosecution whose sympathy masters his judgment, or one who may innocently err through lack of experience. The inexperienced physician should be exceedingly careful in all cases.

The examiner, on the other hand, would often err if he confined his opinion too rigidly to the physical condition of the victim. He can often further the ends of justice by carefully interrogating her apart from her friends and the officers in charge of the case. For his own protection, however, he should never examine her alone in a closed room. A child when privately questioned may admit that she has been instructed and perhaps injured by her mother; but the testimony of a young child is so unreliable that even this admission may be false. The slightest discrepancy should arouse suspicion, especially in the case of a girl approaching the age of consent, and in all cases a careful inquiry should be made into the possibility of a motive for false accusation. In a case examined by the writer, a girl of fifteen years charged her father with incest on two occasions. Her condition suggested more frequent intercourse, and she finally admitted that the charge had been brought through revenge for being forbidden the attentions of the young man who had been guilty of her downfall.

The examination should be made at the earliest possible moment after the assault, but in the case of an adult woman only with her consent. Refusal to submit to examination may be taken as an indication of false accusation, but no more extensive injuries were ever found by the writer than in a young woman who, after reciting a most incredible account of imprisonment and rape by five young men, was with the greatest difficulty persuaded to undergo an examination.

A complete record should be kept of the examination, including the name, residence, age, and apparent age of the subject, the exact time and place at which the assault is alleged to have been committed, and the place and exact time at which the examination is made. The injuries, if any, should be described with minuteness. The most trivial circumstances often prove of value in the hearing of the case, but particularly the time at which the crime is said to have been committed and the time which was permitted to elapse before complaint was made. An excellent form for this record is given in the "Medical Jurisprudence" of Witthaus and Becker, vol. ii., p. 419.

The principal facts to be established by the physician's examination are: (1) Marks of violence on the woman's genitals; (2) marks of violence on her person or on that of the accused; (3) stains of blood or semen on the person or clothing of either; and (4) the presence of venereal disease, gonorrhœa, syphilis, or chancroid in one or both. It is better to make the examination of the defendant with his consent and under full knowledge of its purpose, for it may otherwise be excluded as being in the nature of an involuntary confession. For the same reason the consent must be obtained without threat or promise. In a recent case the victim, a child of four years, was found to be infected with gonorrhœa, and the accused in a late stage of the disease. The latter, distinctly degenerate, willingly submitted to the examination, and admitted, in the presence of the examiner and an officer, that he had had the disease and had committed the assault. The case was closely contested, but the evidence was finally admitted entire as a voluntary confession, for it was shown that he had been informed beforehand of the purpose of the examination and of the official position of both witnesses.

The examiner is generally expected to testify that he has found, or that he has not found, evidence of the penetration of some blunt instrument. It is sufficient that the penetration has been only slight, as a separation of the labia. A recent rent of the hymen is one of the most positive signs that force has been employed and that penetration has been effected, but it is not essential. The fact that the hymen is intact is of little value as negative evidence, for its firmness must be taken into account. Repeated intercourse is sometimes possible without its rupture. And, on the other hand, the membrane may be torn in many ways other than by sexual intercourse. It is probably congenitally absent in rare instances. The vaginal wall may also be torn. Comparatively few examinations are made early enough to discover a recent bleeding rent of the hymen, and after the third day it is extremely difficult to determine the recentness of an injury. More than one examination should generally be made, and the statements made at each should be carefully compared. In many cases the injury is limited to one or more abrasions just within the labia minora. The examiner should see that this corresponds to a possible injury by sexual contact, and that it is not an excoriation such as might be made with the finger-nail. He cannot, of course, testify as to the manner in which the injury was inflicted, but he may state that the injury corresponds exactly to an injury inflicted in a forcible effort at sexual intercourse.

Complete penetration of the vagina of a young child by an adult male penis is impossible without the most extensive laceration, and this is generally prevented by the outcry. In more than one hundred examinations of young girls the writer has seen but one case in which such injury had been inflicted. When there has been recent complete defloration, complete penetration of a virgin, there are generally well-marked signs of violence. The hymen is lacerated and the external genitalia are inflamed to a variable degree. There may be only slight redness, heat, and sensitiveness, or the swelling and tenderness may be so great as to render a thorough examination almost impossible. The woman walks with difficulty, and separation of the thighs causes intense pain. In the course of from forty-eight to seventy-two hours these conditions may subside or they may become more marked as suppuration develops in the lacerations. Other evidences of a struggle are generally revealed in cases of

extreme injury, especially contusions, abrasions, and lacerations of the thighs.

Evidence of seminal emission was formerly required as a proof of guilt, but it has been abandoned. Such evidence, if present, however, is of great value as corroborative of the other facts. If stains are found upon the clothing a small piece should be cut out and submitted to careful microscopic examination. Spermatozoa may be found also in the vaginal mucus, on the skin, or on the pubic hair. (See article on *Seminal Stains.*)

Marks of violence on either person are of value chiefly in determining that consent was not given and that force was employed. They are of greater importance, therefore, in the case of a woman above the age of consent. In the case of the prosecuting witness it is necessary to exclude the possibility that the wounds were self-inflicted. This is to be suspected especially in the case of a neurotic or evidently erotic girl, and when the marks consist of parallel lines corresponding in size and position to possible positions of her own fingers.

The much-discussed question of the possibility of rape upon an able-bodied woman by a man unaided resolves itself into a question of the comparative strength and endurance of the two individuals, allowance being always made for the influence of fright and excitement upon the woman.

The presence of venereal disease in both persons is highly corroborative of the charge, providing the disease has appeared in one at a time corresponding to probable inoculation at the time of the alleged assault. Great care must be exercised, however, in the diagnostication of a muco-purulent discharge. Microscopic examination is generally necessary. It is especially important when the defendant is accused with having inoculated the victim with gonorrhœa. Such inoculation is possible after the discharge from the male urethra has become extremely scant and has even lost its purulent appearance. The discovery of gonococci in it is sufficient evidence of the inoculability of the disease and goes far toward establishing the guilt of the defendant.

James M. French.

RASPBERRY. See *Rosaceæ.*

RAVENDEN SPRINGS.—Randolph County, Arkansas. Post-Office.—Ravenden Springs. Hotel Southern, and numerous smaller hotels and inns.

Access.—Viâ Kansas City, Fort Scott & Memphis Railroad to Ravenden Station, thence five miles by coach or hack to springs.

This resort is located in the northern part of Arkansas near the White River Mountains, the range in which the Eureka Springs have their origin. The elevation is twelve hundred feet. The geological formation is the same as that at Eureka, but the mountains are not so high or so rugged. The surrounding scenery is, however, exceedingly fine, and many features of interest are pointed out to visitors. The place takes its name from the "Raven's Den," a small cave with a circular opening a few feet from the top of the highest mountain. In this cave it is said that many of the feathered denizens of the forest, particularly the raven, or black crow, made their homes and hatched their young for a long period of time. Fish and game are abundant, and it is stated that many deer are killed in the vicinity during the winter months. The following analysis of the water was made by Messrs. Wright & Merritt, analytical chemists of St. Louis, in 1885: One United States gallon contains (solids): Lithium carbonate, gr. 1.26; calcium carbonate, gr. 4.61; magnesium carbonate, gr. 4.48; calcium chloride, gr. 1.24; magnesium chloride, gr. 2.99; sodium chloride, gr. 2.19; alumina, gr. 2.36; silica, gr. 0.83; iodine, iron, and calcium sulphate, of each a trace; organic matter, gr. 1.86. Total, 21.82 grains. Gases: Carbonic acid, 21.5 cubic inches; atmospheric air, 13.3 cubic inches. Temperature of water, 59° F.

James K. Crook.

RAWLEY SPRINGS.—Rockingham County, Virginia. Post-Office.—Rawley Springs. Hotel.

Access.—Viâ Baltimore & Ohio Railroad to Harrisonburg, thence a two-hours drive over a macadamized turnpike to springs.

This is one of the famous old Virginia mountain resorts, and it unites many of the best features of a summer resting-place. The elevation is two thousand feet above the sea-level, and the climate peculiarly dry and equable. The surrounding scenery is wild and rugged, but at the same time picturesquely attractive. The hotel at the springs is a comfortable and handsomely furnished building containing seventy-seven rooms, with a dining-room capacity of one hundred and fifty guests. It is well supplied with modern comforts and conveniences and facilities for amusement. The springs here are three in number. The water of each fountain seems to possess the same general characteristics. It is without odor, and possesses a strongly marked chalybeate taste. It exhibits a faintly acid odor from the presence of carbonic-acid gas. This disappears as the paper saturated with it dries. The water is perfectly clear and transparent as it flows from the earth, but on exposure to the air it soon begins to deposit a rust-colored precipitate of the oxide of iron. The temperature of the main spring is about 51° F. According to the analysis made by Prof. J. W. Mallet, one United States gallon contains: Iron protoxide, gr. 1.09; organic matter, gr. 0.03; and very small amounts of manganese protoxide, alumina, magnesia, lime, lithia, soda, potash, ammonia, sulphuric acid, chlorine, and silicic acid. The qualities of the water are improved by the presence of carbonic acid. It is a very useful, lightly carbonated, chalybeate water, and has an extensive sale even at distant points.

James K. Crook.

RAWLINS SULPHUR SPRINGS.—Carbon County, Wyoming. Post-Office.—Rawlins. Hotels.

These springs are pleasantly located about two miles from the enterprising town of Rawlins. The situation is on an elevated plateau, at an altitude of sixty-four hundred feet above the sea-level. The surrounding country is rugged and mountainous. The following analysis was made in 1894 by E. E. Slosson, of the School of Mines of the University of Wyoming, at Laramie: One United States gallon contains (solids): Potassium chloride, gr. 1.40; sodium chloride, gr. 12.18; sodium sulphate, gr. 854; magnesium sulphate, gr. 18.23; calcium sulphate, gr. 19.28; calcium carbonate, gr. 7.41; silica, gr. 8.23; carbonic acid, gr. 0.82. Total, 76.09 grains. Temperature of water at spring, 48° F.

The water is said to be highly sulphureted as it flows. The above analysis having been made at a distance from the springs, this gas was lost by volatilization. Therapeutically, the water has been fully tested in only one disease, viz., rheumatism. In this affection it is stated to be very efficacious, both when taken internally and when used in the form of hot baths. The water, as shown by the analysis, should possess very good diuretic and laxative properties. A first-class hotel and bath-house are much needed to put the resort on a good footing. The natural advantages of the place appear to offer excellent inducements for the establishment of a sanatorium.

James K. Crook.

RAY FUNGUS. See *Actinomycosis.*

RAYNAUD'S DISEASE.—Laveran was the first to apply to this disease the name of its discoverer. To the literature of the condition Raynaud made three contributions: his thesis in 1862, his article on "Gangrene," 1872, and his "New Researches," 1874. His attention was first attracted to the subject by a case of spontaneous symmetrical gangrene which came under his observation in 1861. As the result of personal observation and a searching of medical literature he brought together twenty-five cases (Monro) upon which he based his thesis. After a study of the varied phenomena of these cases, he elaborated his theory of spasm of the arterioles and venules in the

affected parts, and suggested that, therapeutically, electricity might be of value. He believed symmetry of the lesions and absence of demonstrable changes in the vessels to be two essential features in the disease. He also thought that the larger arteries might be affected by the spasm to such an extent that the radial pulse might be temporarily lost.

In the "New Researches" he describes a contraction of the arteries of the fundus oculi observed in two cases. He also elucidates more fully the theory of abnormal irritability of the vaso-motor centres with consequent vascular spasm of a reflex nature.

It has long been known that under the influence of cold the fingers may undergo a change of color, becoming white and even blue. The former condition has been designated the "dead finger" (*digitus mortuus*); Raynaud called it "local syncope," and other names, such as "local anæmia" (Hardy), or "regional ischæmia" (Weiss) have been used to describe it. Raynaud applied the term "local asphyxia" to the affected part when it manifested a blue appearance; Weiss suggested the term "regional cyanosis" and Barlow that of "local cyanosis" as more appropriate than Raynaud's appellation. The same condition was called by Boiseau "uterine cyanosis" because of its relation to the suppression of the menses. Monro thinks that, one tymological grounds, Sir George Johnson's criticism of Raynaud's use of these terms was correct, viz., that "local syncope" should be called "local asphyxia" and "local asphyxia" should be termed "local apnœa," but that the attempt to put this into practice would cause much confusion. Symmetrical gangrene is the culmination, and one of the most distinctive features, of Raynaud's disease. Raynaud's clinical tripod, then, is local syncope, local asphyxia, and symmetrical gangrene. Writers have multiplied terms in their endeavor to describe the various phases of this syndrome, but the clarity of our conception of the subject will be greatly enhanced by utterly disregarding the same.

Symmetrical gangrene is a rare condition, but "Raynaud's phenomena" (Hutchinson), local syncope and local asphyxia or either, may occur for years, finally disappearing without any gangrenous manifestation. An illustration of this is Mrs. M., now under my observation. When nine years of age, were she to write, knit, sew, or do any work requiring the dexterous use of the fingers, the first phalanx of the fingers of the right hand would become white, cold, and numb, eventually assuming a purple of bluish aspect; she could not again use them until the attack had passed and feeling had returned. This condition continued until her fifteenth year when it ceased and did not again show itself until a few months ago.

Raynaud's disease usually develops before the thirtieth year. Children, even infants, may be subject to it, but I have known it to occur after the seventieth year as well. Females are more susceptible to it than males. According to Monro the ratio, as found in the medical wards of the Glasgow Royal Infirmary, has been about one in three thousand cases, but this proportion he regards as an underestimate,—*i.e.*, if the disease be considered purely as a neurosis, and not in its relation to other diseases of which it was an incident only. In my own experience "Raynaud's phenomena" constitute a not very infrequent condition.

Raynaud's disease may occur as a pure neurosis or it may be associated with a great variety of morbid conditions such as hysteria, insanity, epilepsy, tabes dorsalis, syringomyelia, myelitis, neurasthenia, spinal tumors, chorea, Graves' disease, lead poisoning, syphilis, phthisis, infectious fevers, Bright's disease, chlorosis, anæmia, diabetes insipidus, and a congenitally small aorta; it sometimes appears also in connection with certain dermatoneuroses, as urticaria, scleroderma, and erythromelalgia. Heredity is present in about eight per cent. of the cases (Monro). The most important causative agent is cold. Emotional influences, malaria, diseases of the female generative organs, and the breaking off of the morphine and chloral habits are all important etiological factors.

Local syncope comes first in the trinity of symptoms which characterize Raynaud's disease. It may exist alone or it may be associated with local asphyxia, a very frequent combination; or, as is more usual, all three symptoms—local syncope, local asphyxia, and gangrene—are present. Numbness and stiffness in the digit affected may usher in an attack, or there may have been in the extremity or parts involved, for days or even weeks previous, severe pain which is intensified as the attack develops.

The seizures are paroxysmal. The parts involved become pale or even corpse-like; they do not bleed when pricked, are cold, and movement is difficult. This latter, Raynaud suggests, is due to a defect of afferent impulses and not to muscular weakness. The nose, cheeks, chin, and ears are but seldom invaded. The case of Mr. G., who consulted me a short time ago, well illustrates this phase. In September, 1902, he noticed that the first phalanx of the thumb, first and second phalanges of the index, and first phalanx of the ring finger became cold and white when exposed to the air or on touching something cold. The local syncope was at first attended by pain in the thumb and index finger, and there were also isolated white spots distributed over the unaffected surface of the ring finger. Occasionally, should the hand become very cold, local asphyxia would occur on its dorsal surface. Sometimes, as the local syncope disappeared, local asphyxia would take its place. The involvement of the thumb here observed is very exceptional; it is usually unaffected.

Local syncope may be unilateral or bilateral. The upper extremities are more frequently involved than the lower. The syncope may attack one finger or all, or it may attack the different phalanges in an irregular manner. There is no regularity in the frequency of the seizures; they may occur once or many times daily, or there may be intervals of uncertain length. They may occur for weeks, months, or years and then cease, either absolutely or for an indefinite period. In my case of Mrs. M., already referred to, there was an interval of twenty-seven years.

The part affected is cold to the touch, tactile sense is impaired, and the various forms of sensibility are irregularly and unequally involved. Temperature sense and pain sense may be lost, or that of temperature may be present and those of touch and pain lost. Local syncope may disappear without leaving any trace or causing any pain. Frequently there occurs a decided reaction accompanied by pain and by annoying paræsthesias.

Local asphyxia constitutes the second stage of this symptom complex. Usually it is preceded by local syncope, but not invariably so. As already stated, local syncope may disappear, leaving no trace and causing but slight discomfort, or it may be followed by a blue, bluish-black, bluish-white, purple, violet or reddish discoloration of the skin affecting, sometimes symmetrically, sometimes unilaterally, the hand, fingers, feet, and toes. A livid marbling of the adjacent parts may be associated with this characteristic discoloration.

Local cyanosis differs from local syncope in not being confined chiefly to the limbs, but in attacking as well the ears, face, lips, chin, tongue, and trunk. Raynaud describes a lividity of the breasts, a painful neurosis which merits the appellation of local asphyxia of the mammæ. The extreme sluggishness of the circulation in the cyanotic area is shown by the slow disappearance of the white spot made by pressure.

The manner in which the parts are involved is most irregular, there being no definite order of sequence. The lower extremities are less frequently attacked than the upper. Sometimes an œdematous condition develops in the asphyxiated parts and instead of a blue or black discoloration of the skin, with a lowered temperature, the affected area assumes a bright red hue, is hot, and becomes covered with perspiration. The œdema pits upon pressure and may precede or even take the place of the cyanosis. One part may be cyanotic and swollen, while at the same time another may be only swollen. The œde-