

should be preferred, especially castor oil and salines. When irritation of the intestines results from decomposition or fermentation, calomel is the best purgative.

2. To diminish hyperæmia of remote parts or organs, purgatives which act rapidly and produce semi-liquid or watery discharges are required. Mild purgatives deplete indirectly by hastening the intestinal secretions and partially digested food downward so rapidly that absorption is impeded. Saline purgatives, in strong solution, excite a copious secretion of watery fluid, and thus directly deplete the blood. Drastics act in a threefold manner, accelerating peristalsis, increasing secretion, and exciting intestinal hyperæmia. The choice of a purgative will, therefore, depend upon the intensity and duration of the disease to be influenced, the organ affected, and the character of the general symptoms. In congestion of the liver, calomel, followed by a saline laxative, is the most suitable purgative. In congestion or inflammation of most organs, saline cathartics and compound infusion of senna are usually employed; but in very severe congestion or inflammation of very important organs—such as the brain and spinal cord—drastics are preferred, especially croton oil.

3. To promote absorption of exudations and transudations, the hydragogues are most suitable. Generally the saline hydragogues, given so as to produce copious watery stools, soon cause rapid absorption. In cardiac dropsy they often diminish the dropsical swelling very notably in a few hours. Of the drastic hydragogues the compound powder of jalap and elaterin are the most useful. Generally the former is preferred on account of its mild action. But when it fails to act efficiently, or when an effusion of serum occurs rapidly, and in such large quantity as to produce extreme distress, such as alarming dyspnoea in pleuritis, elaterin is usually given. Sometimes it so rapidly induces absorption of the effusion as to give decided relief in a few hours.

4. To eliminate noxious substances, calomel, salines, and drastics are used. The utility of calomel in biliousness and congestion of the liver is in part due to the rapid removal of irritating and decomposing substances from the alimentary canal. Saline laxatives, especially sulphate of magnesium, are indicated in chronic lead poisoning, to remove the poison from the intestines as fast as it is eliminated by the liver. They are also suitable in cases of uræmia, especially if at the same time it is necessary to induce absorption. In uræmic coma, croton oil is sometimes preferred to milder purgatives.

CONTRAINDICATIONS.—All purgatives are contraindicated in peritonitis, intestinal hemorrhage, perforation of the bowels, strangulated hernia, and extreme debility. Brisk purgatives are generally inappropriate during pregnancy, especially if previous abortions have occurred, and during menstruation. They should not be used if there exist severe rectal lesions, or a tendency to looseness of the bowels. Even laxatives are contraindicated in habitual constipation, until all other known means have failed to establish a normal habit of defecation.

Samuel Nickles.

PURPURA.—(Synonyms: *Hæmorrhœa petechialis*; Fr., *Purpura*; Ger., *Blutflecken*.) Purpura is a disease characterized by the extravasation of blood into the skin. In many instances, however, it is not limited to this organ and may be encountered in almost any structure of the body. The parts coming most readily under visual inspection are naturally the skin and mucous membranes, although in severe and fatal cases the autopsy shows that the internal viscera are likewise involved. It may be asked whether purpura is not rather a symptom complex than a well-defined affection *per se*. It occurs under so many apparently varied conditions that one is at a loss to ascribe to it definite limitations. In this connection, however, it will be considered from a dermatological standpoint, the skin being the organ most extensively involved. The clinical manifestations of purpura vary; hence several varieties have been described, although

the essential feature is the occurrence of hemorrhage into the structures surrounding the blood-vessels. In severity purpura likewise varies greatly, being in some instances an exceedingly mild affection with extravasation only in dependent parts, as the legs; or it may be an extremely severe and rapidly fatal disease. Between these extremes numerous grades, both in appearance and in severity, occur. Usually purpura is accompanied by constitutional symptoms which to a great extent depend upon the amount of cutaneous hemorrhage.

For convenience of description the various lesions have received distinct names. Thus we speak of *vibices* when the extravasation of blood into the skin assumes a streaked or elongated form. *Echymoses* are irregular extravasations of blood involving considerable areas, and giving

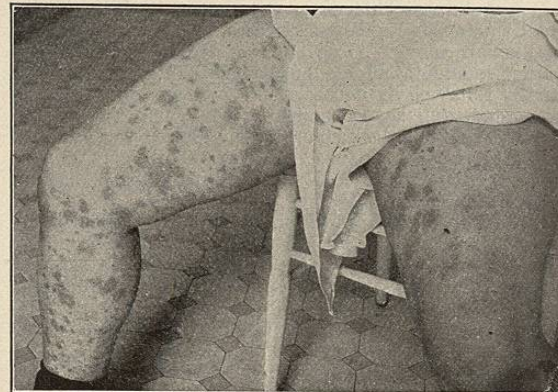


Fig. 3923.—Purpura Simplex. (Case of Dr. William T. Corlett.)

the appearance of bruises. *Echymomata* or *hæmatomata* are terms used to designate tumors formed by the extravasation of blood, usually occurring when a large vessel wall has given way. The term *purpura papulosa* is employed to designate pinhead-sized extravasations which are usually situated in the upper part of the derma. *Hæmorrhagic bullæ* are extravasations underneath or between the layers of the epidermis, while *hæmatidrosis* is a rare condition in which the sweat glands give forth a bloody exudate. *Petechiæ* are cutaneous areas of extravasation of various shapes and sizes.

The cutaneous lesions of purpura are characteristic in that they are symmetrically arranged, are of a dark bluish color, and do not disappear on pressure. At first they may be of a bright red or claret color, although at an early stage they take on a purplish hue; as absorption goes on the color undergoes various changes from a brown to a greenish-yellow tint, such as may be observed in an ordinary bruise. The cutaneous manifestations occur in successive crops; hence various shades of color may be seen at the same time. Most cases of cutaneous hemorrhage may be grouped under three heads, which will be treated as varieties of the disease.

Purpura Simplex represents the mildest form of the disease. This is commonly observed in the skin, and is frequently limited to this structure. As a rule, it is unaccompanied by constitutional symptoms. It usually makes its appearance suddenly, and is first seen on the dependent parts, as the legs (see Fig. 3923), although in children the arms, neck, and other parts of the body may be involved. The most usual sites are the inner aspect of the legs, the dorsum of the feet, and the posterior surface of the forearms. In this form the mucous membranes may be involved to a slight extent, that most frequently implicated being the mucous membrane of the mouth, although we have reason to believe that the hemorrhagic process is not limited to these structures, but that, on account of the mildness of the symptoms, it escapes notice when occurring in parts not easily inspected. In this variety the lesions consist of variously sized and shaped petechiæ

which are at first roundish or oval, and which sometimes extend to the periphery; at other times they remain stationary until absorption takes place. A more infrequent form, in which the lesions are punctate (*lichen lividus* of Willan) and surround the exit of a hair shaft, is also encountered. The lesions in purpura usually continue to appear for several days or weeks, although the disease is self-limited and as a rule terminates in recovery within one or two months. The cutaneous lesions soon undergo resorption and deposition of hæmatin which leaves an indelible stain in the tissue.

Purpura Rheumatica, *Peliosis Rheumatica*, *Toxic Purpura* (*Purpura exanthématique* of the French) is a more severe form of the disease, so called because of its association with vague pains which are usually referred to the joints or muscles, and are supposed by some to be closely related to acute articular rheumatism. In this variety constitutional symptoms are more marked. In some cases distinct swellings occur about the joints, there is a slight elevation of temperature, the tongue is frequently coated, and usually there is anorexia, sometimes with nausea and vomiting. Extravasation of serum alone may likewise take place, giving rise to urticarial lesions in the skin (*purpura urticaria*). In very rare instances the serous exudate occurs in the epidermis, giving rise to bullæ and œdematous plaques. Stelwagon ("Diseases of the Skin," 1902, p. 466) has observed swelling of the lips and throat which he describes as a *febrile, purpuric œdema*. Sometimes the eruption becomes associated with symptoms of a multiform erythema, the lesions varying in appearance, although always associated with cutaneous hemorrhage. From the foregoing it may be seen that this form of purpura is closely allied to the exudative erythematæ.

This toxic form of purpura is sometimes associated with complications of a grave nature. Thus endocarditis and pericarditis, together with necrosis and sloughing of the mucous membrane of the mouth, have been observed by Osler.¹ It is sometimes recurrent and may appear annually throughout a period of several years. Henoch² has called attention to gastro-intestinal symptoms occasioned by hemorrhages into the intestinal mucosa; this has been accompanied by vomiting and diarrhoea, the stools not infrequently being tinged with blood. Hemorrhage may likewise take place to a slight extent into the bladder. This has been most frequently observed in children. In severe cases the kidneys are affected, giving rise to the symptoms of acute hemorrhagic nephritis. In these cases albumin is usually present in the urine. The spleen is sometimes easily palpable.

Purpura Hæmorrhagica, sometimes known as morbus maculosus Werlhofii (which see), and also as land scurvy. This is a more grave affection than the two preceding varieties. The severity of the disease, however, largely depends upon the cause as well as on the extent of the cutaneous hemorrhage. The onset of this variety varies; it may be insidious, appearing as a mild attack with few or no constitutional symptoms; soon gradual impairment of the health becomes manifest, and the patient becomes weak from loss of blood. The appetite disappears, assimilation is interfered with on account of intestinal hemorrhage, and diarrhoea with bloody stools finally occurs. The gums bleed easily, and there is not infrequently hæmaturia, epistaxis, or hæmoptysis. The lesions usually assume the form of large ecchymoses or ecchymomata, and the mucous membranes are apparently involved to an equal, if not greater, extent than the skin. In the latter the disease may appear on the more dependent parts, although the whole body soon becomes involved. In severe cases symptoms of collapse occur, and the disease may soon terminate in death (*purpura fulminans*). At other times the disease pursues an uninterrupted course for several months, when finally resolution takes place and the patient recovers. At other times extravasation of blood takes place into the brain or spinal cord, giving rise to symptoms referable to a tumor in these parts. There is usually but slight elevation of temperature in this form, although the disease is

sometimes noted to be ushered in with a slight fever, the temperature rising one or two degrees.

Cutaneous hemorrhage may also occur as a symptom of other well-recognized diseases, such as variola, the plague, and cerebro-spinal fever, and in cases of poisoning from the bite of poisonous reptiles.

ETIOLOGY.—The disease occurs in both sexes, and is met with at all ages. It is a fairly common disease in my experience, and has been most frequently encountered between the ages of sixteen and forty-five. The general health of the cases that have come under my observation, previous to the advent of the cutaneous hemorrhages, has been good, although, as has been stated, there is sometimes a tendency for the disease to recur from time to time during a period of several years. In a series of cases which I had the opportunity of observing a number of years ago, bad hygienic conditions with a defective food supply were undoubtedly the chief etiological factors in the disease. Of these the chief rôle must be given to the withdrawal of green vegetables from the dietary, most notably potatoes, cabbage, and greens; at any rate, on supplying these articles in moderation the disease disappeared from various families in which it had been observed to occur for a long time. Further, in my experience the disease has been met with more frequently in women than in men, the nationality most frequently affected being the Bohemian. It has occurred usually in people in the lower walks of life. Various drugs have been known to produce cutaneous hemorrhage, notably potassium iodide, chloral, belladonna, ergot, phosphorus, iodine, quinine, copaiba. These drugs do not produce the same effect in all people, there being in some individuals an idiosyncrasy by which the ingestion of certain substances, innocuous to others, gives rise to toxic effects. Again, toxic substances or their ptomaines, by acting on the nerve centres, are thought to be potent factors in the causation of purpura, notably in the erythematous or toxic form.

As malaria undermines the general health, it is thought by some to contribute to this condition. Other diseases contribute in like manner to purpura, most notably those which tend to profound anæmia, such as scorbutus, hæmophilia, pyæmia, sarcoma, nephritis, scarlatina, typhus fever, cerebro-spinal fever, variola, and rubeola, as well as various diseases of the nerve centres, such as locomotor ataxia and hysteria. The venom of serpents must likewise be mentioned in this connection. In new-born infants the sudden change to which the circulation is subjected may give rise to cutaneous hemorrhage, which should be looked upon as purely mechanical. Various micro-organisms have likewise been described as associated with purpura. Martin de Gimard,³ Letzerich,⁴ and Kolb⁵ have succeeded in producing the disease in animals by inoculating with pure cultures, and doubtless this accounts for some cases, especially among the severe forms. From the foregoing it will appear that the cause of purpura varies in different cases, and no one condition can be assigned as invariably producing the disease.

Stelwagon, in summarizing the various causes of purpura, believes that the etiological factors may be divided into classes, most conspicuous of which are the vasomotor, toxic, and infectious; and that some of the latter arise from auto-intoxications, which have their origin in the intestinal tract. This latter seems especially true in those cases which are marked by a multiform erythema and urticarial lesions. It is evident, therefore, that we have in purpura a condition of variable appearance and widespread distribution, affecting almost every organ and structure of the body and producing symptoms which vary according to the part attacked. What we know, therefore, is this: purpura is a symptom, in the broad sense of the term, of many conditions, many of which at the present time are wholly unknown.

PATHOLOGY.—The most constant findings in purpura are circumscribed areas of blood extravasation, which are usually found in the papillary layer of the derma. Less frequently the epidermis may be invaded, the latter occurring only when the blood extravasation has been

excessive, as from rupture of an arteriole, or when the disease assumes a toxic form (*peliosis rheumatica*). When the disease is not limited to the skin, the deeper part of the derma or even the subcutaneous structures (purpura hæmorrhagica) may be involved. Again, there may be only a few red blood cells surrounding the vessel (diapedesis), in which case the lesions are usually limited to the superficial stratum of the derma. If the disease has existed for some days the characteristic retrogressive changes are found, namely, the presence of coloring matter from the blood giving rise to a rust-like stain, which gradually fades away, leaving only a slight pigmentation. Frequently these are the only changes found. At other times the vessels in the area involved are markedly dilated (*purpura ectasique* of the French), and red blood cells are found outside the vessel wall. This Leredde regards as due to paralysis of the vaso-motor filaments distributed to the vessel. This form is supposed to be of toxic origin involving primarily the nerve centres. Aside from these changes there have been noted dilatation of the vessels with proliferation of the endothelium, together with an accumulation of blood cells, fibrinous thrombi, and microbic emboli. Furthermore, amyloid degeneration of the vessels has been noted, together with proliferation of the connective-tissue cells and necrosis of the vessel wall. The study of the blood has of late attracted close attention, and Lenoble⁶ holds that true purpura (*P. myélode*) or the toxic form is invariably due to alterations in the blood. The following, according to this observer, are always present and may be regarded as characteristic:

1. Absence of contraction of the clot and consequent expression of the serum. This is constant, and it is only after recovery that the expression of serum becomes normal. In light cases one can see a certain degree of contraction of the clot, although occurring a little later than usual.

2. The appearance of bone-marrow cells which are always present, sometimes abundant, and are characterized (a) by the apparition of nucleated red blood cells, few in the chronic, but more abundant in the acute form; in the latter case, however, they are not permanent. These red cells are in the group of Ehrlich's normoblasts, more rarely megaloblasts or even microblasts (one case); (b) by the appearance in the circulation of myelocytes which are usually neutrophilic, more rarely eosinophilic. This reaction is always slight or feeble, and varies from a fraction of one per cent. in the chronic type to six or seven per cent. in the acute form.

3. Marked changes in the blood platelets, which are diminished in number and increased in volume, but whose chief alteration is in the more or less complete loss of their characteristic grouping. This loss of the power of clumping explains the lack of contraction of the clot, the special anemia, and the profuse hemorrhages which are characteristic of the disease.

These changes, which are constant, may persist indefinitely in the chronic form. In the subacute form the duration is variable, and normoblasts may be found long after recovery is apparently complete.

The following are given as accessory and inconstant blood changes:

1. Leucocytosis with increase of the polynuclear eosinophiles and especially of the lymphocytes. These last are always increased, and were omitted from the primary changes mentioned because they are found in all forms of purpura. Their presence is as important as is that of the myelocytes, whose office it is to repair the constant loss of the large mononuclears which undoubtedly act as macrophages. According to the Dominici these cells also give rise to parent cells of the elements which are destroyed by the circulating toxins.

2. Frequent but inconstant is the appearance in the pure blood of a reticulum either with a coarse or with a fine network.

3. Contrast between the number of red corpuscles, which may be much increased, and the amount of hæmoglobin per cell, which may remain small.

This disease is thus controlled by a double cause, viz., an infection and an anemia. The intensity of the symptoms varies with the intensity of the infection. The blood shows few changes in chronic, subacute, and transient types, but in the acute form the blood appears disorganized and shows the presence of bone-marrow cells, while the red blood cells have become very vulnerable. This is shown by the large number of pseudoparasites whose importance has been dwelt on by Hayem.⁷

DIAGNOSIS.—Little difficulty need be experienced in recognizing a well-marked case of purpura. In purpura simplex the lesions sometimes resemble flea-bites or the bites produced by other insects (*purpura pulicosa*). In the latter, however, there may be seen a characteristic inflammatory halo surrounding a deep red punctate centre, which is never present in purpura. Erythema nodosum might, late in its course, be mistaken for purpura, especially when the dark-red inflammatory nodules of the erythema have receded, leaving bruise-like areas. The location and history of the affection should enable one to differentiate between them. It should be borne in mind that erythema is an acute affection of two or three weeks' duration, with large, elevated, slightly inflamed and painful nodules, usually limited to the anterior surface of the legs and to the forearms; while the lesions of purpura appear in successive crops lasting from four to twelve weeks, are of a dark color, usually not elevated except in the form of bullæ, and are not inflammatory nor painful. In erythema the redness disappears on pressure, while this does not take place in purpura. Pain has been experienced on pressure in erythema, but pressure does not cause pain in purpura. From trauma purpura may be distinguished by the multiform character and distribution of the lesions, and by the absence of any history of injury.

The late manifestations of syphilis likewise give rise to pigmentation, but they are also preceded by inflammation, and are always chronic, which offers a sharp contrast to the lesions of purpura. Even in the necrotic form of purpura the lesions are smaller, are multiform, and are of comparatively shorter duration than those of syphilis. From the various drug eruptions, noticeably that of cubeba and copaiba, the erythema is of a brighter red and disappears on pressure. In the acute infectious exanthemata cutaneous hemorrhages are not uncommon, notably in variola and rubeola; but in the former we have a grave affection which, as a rule, rapidly advances to a fatal termination, and in measles the coryza and other characteristic features of the rash would enable one to exclude purpura which has a slower evolution and less often terminates fatally.⁸

PROGNOSIS.—This depends on the extent of the cutaneous hemorrhage, the cause of the disease, and the complications present. In simple purpura the prognosis may be considered favorable, whereas in toxic cases, or in those accompanied by marked involvement of the viscera, the prognosis must be guarded. In purpura simplex the majority of patients recover in from four to twelve weeks. In purpura rheumatica the disease is liable to return, although it is seldom from the primary affection that a fatal issue ensues. In severe forms the disease is always grave, if not fatal.

TREATMENT.—The first consideration is rest in a horizontal position. Except in very mild cases this should be maintained very strictly throughout the whole course of the disease. Many cases are reported in which fresh crops of eruption have appeared after the patient assumed the erect posture. When the lower extremities are mainly involved, it is well to elevate the feet above the horizontal plane by means of pillows. When the extremities are the chief seats of predilection, flannel bandages may be applied so as to give support by gentle pressure. The room should be well ventilated and an abundance of direct sunlight admitted. The diet should be simple, nutritious, and easy to digest. In toxic cases diffusible stimulants may be indicated. The drugs which have given the best results are: turpentine, in doses of five drops three times a day, or by inhalation; ergot, or the

subcutaneous injection of ergotin, which is highly spoken of by Crocker; silver nitrate, gr. $\frac{1}{4}$ to gr. $\frac{1}{2}$ in pill form; aromatic sulphuric acid; and chloride of lime in doses of from fifteen to thirty grains three times a day. The latter remedy should not be given for a longer period than two or three days, as it acts directly on the coagulation of the blood. Astringents in the form of iron or a four-per-cent. solution of hydrochlorate of cocaine have been resorted to in severe cases. Ice in the mouth, or elsewhere, may be indicated as a local application. Bouloche⁹ recommends the injection of artificial serum, and relates a case of fulminating purpura in which death seemed imminent, but which, under this treatment, made a complete recovery. In this case 120 c.c. were given. Absolute cleanliness should be insisted upon, and some mild astringent and antiseptic gargle may be applied to the mouth and fauces. Further than this the treatment depends largely on the cause of the disease and the complications which are encountered.

William Thomas Corlett.

REFERENCES.

- ¹ Osler, William: Practice of Med., Philadelphia, third edition, p. 815.
² Henoch, Ed.: Vorlesungen über Kinderkrankh., Berlin, 1897.
³ Martin de Gimard: Du Purpura hæmorrhagique Primitif, Paris, 1888, cited by Stelwagon, *loc. cit.*
⁴ Letzerich: Untersuchung ü. die Aetiol. u. die Kenntniss des P. hæm., Leipzig, 1889, *ibid.*
⁵ Kalle: Arbeiten aus dem Kaiserlichen Gesundheitsamte, vii., 1891, *ibid.*
⁶ Lenoble, E.: Annales de Derm. et de Syph., December, 1902, p. 1097.
⁷ Hayem: Leçons cliniques sur les maladies du sang, Paris, 1900.
⁸ For a more complete discussion of this subject the reader is referred to the writer's treatise on the "Acute Infectious Exanthemata," F. A. Davis Co., Philadelphia, 1901, pp. 48 et seq., 292 et seq.
⁹ Bouloche: Bulletin et mém. de la soc. méd. hôp. de Paris, vol. xvi., 1890, p. 800.

PUS. See *Inflammation*, and *Exudation*, *Pathological*.

PUTREFACTION. See *Bacteria*, and *Plasmains*.

PYÆMIA. See *Septicæmia* and *Pyæmia*.

PYELOTOMY. See *Kidneys*, *Surgical Affections of*.

PKYKNOSIS (also spelled *Pyknosis*) is the term applied to that condition of the nucleus in which, in the early stages of necrosis or just preceding necrosis, it stains more intensely with nuclear stains. At the same time there is usually a contraction of the nucleus; but the nucleus may remain of normal size or even swell. *Karyorrhæsis* may follow pyknosis, or there may occur a gradual *karyolysis* without a disintegration of the chromatin elements. In sections stained with hæmatoxylin the pyknotic nuclei may appear almost black. This phenomenon is usually explained as due to a condensation of the chromatin. Pyknosis may be observed in necrosing cells of all organs and tissues; it is seen particularly in necrosing syncytial cells, bone-marrow giant cells, muscle cells, sarcoma cells, etc. Pyknotic cells are sometimes mistaken for newly formed cells; and in some cases the differential diagnosis is difficult. This is particularly the case in striped muscle. Undoubtedly many of the cells regarded as evidences of muscle regeneration have been cells in a condition of pyknosis.

Aldred Scott Warthin.

PYLORECTOMY. See *Stomach*, *Surgery of the*.

PYOKTANIN.—(*Methyl violet*.) An aniline dye introduced in 1890, by Prof. J. Stilling, as a powerful antiseptic for surgical purposes.

Dr. Stilling summarized its qualities as follows: (1) Pyoktanin is an antiseptic surpassing all others. The bacteriological researches have shown blue pyoktanin to be about three times as strongly antiseptic against anthrax bacilli as sublimate is, and to be quite as efficacious as sublimate toward the staphylococcus aureus. (2) It is an absolutely non-toxic substance. (3) In consequence of this non-toxicity it is a matter of indifference in many

cases of wounds, etc., whether somewhat weaker or stronger solutions, or even the pure drug, be used. (4) It does not coagulate albumin—a negative quality of high value physiologically, which pertains to no one of the antiseptics heretofore known. (5) It possesses an extremely high degree of diffusibility, permeates the interior of the eye like atropine, and acts similarly in other tissues.

It was recommended to be used in all inflammatory affections accompanied by the formation of pus. Conjunctivitis, urethritis, and inflammation of mucous surfaces were especially benefited, but it was also used with success in the treatment of ulcers and other suppurating wounds. Methyl violet failed to prove itself of particular value, and has fallen into disuse. In many instances favorable results were not obtained, and it frequently produced marked irritation. Its intense coloring properties also proved particularly objectionable. Probably its most important use has been in the treatment of inoperable malignant disease.

In 1891, Professor von Mosevig reported a number of cases treated by injections of pyoktanin, with very favorable results. For some time he had used the different forms of aniline as an injection, with the purpose of staining the nuclei of the cells and thus checking their growth, but the constitutional symptoms produced had always been a hindrance to the treatment. When Professor Stilling introduced methyl violet he at once began to use it for this purpose. The germ-destroying power of the agent, in connection with its diffusibility in healthy and diseased tissues, made it a very promising agent, especially as it was also harmless and devoid of any injurious effect on the human economy. The first case was in a woman, sixty-six years of age, with a large tumor of the lower jaw which prevented her from swallowing and caused great suffering. After thirty-five injections of 6 gm. of a 1 to 500, and afterward of a 1 to 300, solution, the tumor was so much reduced without ulceration that the patient could eat without discomfort. In the case of a man, fifty-eight years of age, with a cystosarcoma of the chest wall, measuring 13 cm. in width by 18 in length, after twelve injections of 6 gm. of a 1 to 300 solution, the measurements were reduced to 10 by 12 cm. In two cases of adenocarcinoma of the neck, the same treatment proved so effectual that the patients considered themselves cured. Another case was that of a woman, sixty years of age, with papilloma of the bladder; for which 20 gm. of a 1 to 1,000 solution was injected into the bladder every second day. After the injections there was notable improvement, the hæmaturia had ceased, and there was little or no pain. Professor Mosevig also cited a case of a man, sixty years of age, with an enormous sarcoma of the pelvis; colotomy had been performed. After sixteen injections of 6 gm. of a 1 to 500 solution into different parts of the mass, it had shrunk to one-half its former size, and the patient was greatly relieved and able to walk about for a few hours daily.

Since Professor Mosevig's announcement numerous cases have been treated and reported. The results have varied greatly, some surgeons claiming very remarkable cures, while others have failed to observe any signs of benefit, and look upon it as a perfectly useless procedure. The greater number of those who look with favor upon the treatment, including its author, do not claim that it is a curative agent for cancerous diseases, but simply that during its use the progress of the growth is checked, the local condition improved, and a temporary relief obtained. The following directions are given for its employment: Under proper antiseptic precautions the part is to be carefully curetted until all the diseased tissue that is accessible is removed. When there is no ulceration of the surface, the curetting is omitted. After the curetting, a tampon of iodoform gauze is placed in the wound and allowed to remain for forty-eight hours. The surface is then washed and carefully dried and the injections are made into the tissue, to the depth of the needle if necessary, according to the extent of the tissue involved. Other injections are made into the surrounding tissues, as many

as fifteen punctures being made at one sitting. It is advised to begin with the deeper injections, in order to avoid a discoloration of the tissues on the surface in the early stages. After the injections have all been made, pure pyoktanin powder is introduced into the cavity, or gauze or cotton, medicated, may be used. The tampon is left in position until the second day, when it is removed and the parts are thoroughly washed and the injections repeated. The introduction of the solution exerts an analgesic action, and also checks the profuse hemorrhage that is frequently present.

Intrapulmonary injections have also been used for the treatment of pulmonary tuberculosis. The liquid employed was a 1 to 500 solution, of which eight to sixteen minims were injected. The injections are reported to have been well borne, but when the liquid penetrated to the bronchi, a violent attack of coughing was provoked. Therapeutically, it is said to have produced a lessening of the hectic condition and reduced the number of bacilli in the sputa. *Beaumont Small.*

PYRAMIDON—dimethyl-amido-dimethyl-phenyl-pyrazolon, dimethyl-amido-antipyrin, $C_{12}H_{13}N_2(CH_3)_2CO \cdot CH \cdot NCH_2 \cdot CCH_3$ —is a yellowish-white, tasteless crystalline powder, which is soluble in ten parts of water. With ferric chloride it gives an evanescent deep bluish-violet color, a distinction from antipyrin which gives a red color.

Employed in smaller dosage than antipyrin it has an antipyretic action like that body and a more sedative action on the nerves. Robin et Bardet found prompt relief in trigeminal neuralgia. Laudenheimer praises it in the pains of tabes, alcoholism, chorea, neurasthenia, and hysterical conditions. Pollak notes sweating and some flushing of the face, but reports the drug specially applicable in the hectic fever of pulmonary tuberculosis. Horneffer found it effective in facial neuralgia but not in sciatica. Bertherand ascertained that doses of 0.3 gm. (gr. v.) increased the coefficient of nitrogen elimination ten per cent. in eight days. In a diabetic who was excreting 2-3 gm. (gr. xxx.-xlv.) of sugar a day, pyramidon sent the sugar up to 15-20 gm. (gr. ccxxv.-ccc.); so it is contraindicated in this disease. This investigator found the profuse sweating an objection, especially in tuberculous patients. In sciatica he obtained good results from hypodermic injection. Albrecht was able to shorten and modify severe asthmatic attacks in emphysema by doses of 0.3 gm. (gr. v.) two or three times a day for several days. In pneumonia, typhoid, scarlet and other fevers the drug has been used with asserted good results. The dose is 0.06-0.65 gm. (gr. i.-x.), and 3 gm. have been given in one day without ill effects.

The *pyramidon camphorates*, both the acid and the neutral salts, are preferred by some therapists in tuberculosis. Bertherand recommends these compounds for preventing the excessive sweating of pyramidon. The dose of the neutral salt is 0.5-0.75 gm. (gr. viij.-xij.), the larger dose representing 0.5 gm. (gr. viij.) of pyramidon; the dose of the acid salt is 0.75-1 gm. (gr. xij.-xv.).

Pyramidon salicylate is claimed to be especially valuable in neuralgia and rheumatism in dose of 0.75-1 gm. (gr. xij.-xv.). *W. A. Bastedo.*

PYRANTIN. See *Phenosuccin.*

PYRIDINE (C_5H_5N)—a liquid base present in coal tar and separated by fractional distillation. It is also obtained from bone oil, or Dippel's oil. It is a decomposition product of various alkaloids, and is present in tobacco smoke.

It is a colorless liquid, with a peculiar empyreumatic odor and pungent taste. It is very hygroscopic and mixes freely with water, alcohol, and oils. Its specific gravity at 32° F. is 0.9858. Pyridine resembles alkaloids in its property of forming salts with acids. In toxic doses pyridine is a powerful depressant, causing paralysis and death from failure of respiration. The blood is also altered and destroyed. Germain Séé has studied its

action in various forms of asthma and recommends it when the disease is of a nervous origin. One drachm is placed in a saucer in a closed room, at a temperature of 68° to 77° F. In about an hour evaporation will have taken place, and the patient should then inhale the impregnated atmosphere for fifteen or twenty minutes, which may be repeated two or three times a day. The drug may also be inhaled by placing ten or fifteen drops on a handkerchief.

The drug has not, however, established itself as a remedy of much value, and is rarely employed in this country. It must not be confounded with pyridine, which is a preparation of hydracetone. *Beaumont Small.*

PYROGALLOL: PYROGALLIC ACID.—Pyrogallol is a triatomic phenol, $C_6H_3(OH)_3$, producible by the action of heat on gallic acid, whence the common name "pyrogallol" is derived. It is official in the United States Pharmacopœia under the title *Pyrogallol*, Pyrogallol. It occurs in long flattened prisms, or in needles; colorless, odorless, but with a bitter taste. It dissolves in 1.7 parts of cold water, and very readily in boiling water and in alcohol. In solution, exposed, it oxidizes, turning brown. Pyrogallol possesses the poisonous property, more or less common to the group of phenols, of affecting the blood and bringing about hæmoglobinuria. Administered by injection to rabbits, this medicine has speedily caused chill, dyspnoea, tremor of the extremities coming on in paroxysms, and death. The urine in such cases has shown the characteristic features of hæmoglobinuria, and the blood has exhibited discoloration and destruction of the red blood corpuscles. In rapidly produced death by large doses, the blood has turned black or, in some cases, of a chocolate color and jelly-like consistence. In the human subject death has resulted, in one instance, from the application, to one-half the body at once, of a ten-per-cent. pyrogallol ointment. In this case a violent chill, with vomiting and collapse, set in six hours after making the application of the salve. The patient rallied, but forty hours later a second attack ensued, ending in coma, with great reduction of temperature. Death occurred on the fourth day. During the illness the urine was much diminished in quantity, and showed, in highest degree, the condition of hæmoglobinuria, being dark brown in color and, upon standing, depositing a thick sediment of amorphous, blackish material. The blood was found, post mortem, disintegrated, and the kidneys bluish-black and stuffed with the same material as the urinary sediment. Pyrogallol has been used in medicine almost exclusively as a local application for the relief of certain skin diseases, notably *psoriasis*—an application often successful when other remedies may have failed. Applied in solution or in ointment, pyrogallol stains the skin somewhat, but the stain speedily disappears. Linen clothing, however, may be permanently injured by the action of the medicine. To avoid this latter effect, a solution of pyrogallol in flexible collodion has been proposed (Elliot). Such preparation, when dried to a film upon the skin, seems still to exert the therapeutic action of the medicine, but, being dried, is without action upon the clothing. Pyrogallol may be applied in ointment or in solution, and strengths are used ranging from five to fifteen per cent. of the remedy. The higher percentages, in ointment certainly, may irritate severely, and should be used with caution. Applications should never be extensive at any one sitting, for fear of enough absorption to bring about constitutional poisoning. *Edward Curtis.*

PYROSAL—antipyrin salicyl-acetate—occurs in colorless crystals of acidulous taste and difficult solubility in water. It contains fifty per cent. of antipyrin and thirty-seven per cent. of salicylic acid. Introduced by Riedel, this compound has been used as an antipyretic and analgesic in rheumatism, influenza, migraine, sciatica, etc. The action is prompt, and no untoward effects have been noted. The dose is 0.3-0.7 gm. (gr. v.-x.), repeated frequently. *W. A. Bastedo.*

QUARANTINE.—The term "quarantine" has its origin from the Italian "quaranta," meaning forty, this being the number of days for which vessels were, in the fifteenth century, held under observation on account of epidemic disease. It is now applied to what should more properly be known as maritime sanitation. In addition to this, it is also applied to restrictions against the advance of epidemic disease on land.

While it may be fairly assumed that all who are in anywise interested in the subject of quarantine are already fully conversant with the history of such measures as have been taken in the past for preventing the spread of epidemic disease, nevertheless, for the sake of comparison with what is now considered proper, and to set forth more clearly the great strides which have been taken in sanitary science and in the methods employed in the exclusion of exotic disease, a short *résumé* will not be amiss.

It is generally understood that the quarantine which was established by Venice in 1403 for the exclusion of plague was the first systematic attempt to exercise any kind of surveillance over commerce for the conservation of public health. It may be remarked, however, that a species of land quarantine, namely, the isolation of lepers, was certainly existent fourteen centuries before that time, possibly at a much earlier period.

The general idea in the fifteenth century seems to have been that no measures of purification were indicated, but that detentions for a period of forty days would suffice to allow the disease to die out; and in truth this was what frequently happened. The unfortunate individuals comprising the *personnel* of a vessel in quarantine had to take their chances, and these were admittedly slight, of escaping the scourge while they were huddled together with its already stricken victims, the authorities believing that the lives of a few were well sacrificed in the interest of the many, and that their duty ended with providing food for these unfortunates and keeping them within fixed bounds.

The foregoing statement may be said to sum up the maritime quarantine system as it existed five hundred years ago. Of land quarantine there seems to have been none, or, if it existed at all, it was of the same brutal character as that applied to the shipping.

When the bubonic plague swept over Europe with such appalling results in this same fifteenth century, the people fled unrestrictedly from any stricken community and scattered death in their wake. Abject cowardice and sublime courage shone out in vivid contrast to one another.

Coming down to more recent times, we find that as late as 1850 a very nebulous idea held sway in the minds of men as to proper methods for preventing the ingress of pestiferous diseases, and the forty-days detention period which was instituted by Venice four hundred and fifty years before, and which Spain adopted against yellow fever from the West Indies a century later, was still in vogue and constituted practically the sole maritime guard of most states against disease; while, on the other hand, some few advanced communities, in sheer disgust at measures which, while destroying their commerce, gave no adequate protection against the ravages of yellow fever, smallpox, and cholera, the preventable diseases then uppermost in men's minds, had thrown off all restraints and were willing to risk the disasters incident to an epidemic, rather than the ills of ruined commerce. And this indeed was a rational decision; for, however we may view the matter from a theoretical standpoint, the question practically put is this: Can a community better afford to take a slight or even a pronounced risk of disease which will destroy a certain percentage of its population, than to take the risk of commercial death which will annihilate it as a community? The former risk is the more rational, and especially when we bear in mind that all quarantine must of necessity involve a certain feature of necessary risk; for, even were it possible to evolve an absolutely safe system, no community would allow such a system to stand, involving as it would most serious hindrances to commerce.

One of the most talented editors of the American press, some years ago, denounced the then existent system as "sanitary savagery," and we must admit that there is some justification for this appellation.

The sole aim, the very *raison d'être*, of a quarantine is the exclusion of exotic disease. If it does much less than this it fails to fulfil its obligations to the community; and, by doing more than this, it retards commerce, interferes with legitimate vested right, and becomes an object of well-merited aversion.

Quarantine is the sanitary vidette and skirmish line, and it may, and often does, fail to keep out exotic disease even though carefully and scientifically conducted. Nothing short of correct laboratory methods (absolutely inapplicable to practical quarantine) could under all conditions exclude disease. Such being the case, we must view a proper quarantine, to express the matter in homely parlance, very much as a sieve, which will exclude the major part of the solids from a given volume of water passing through. Now, if we apply such a sieve to a river, so long as the water can pass by, leaving behind most of the detritus carried in suspension, all will be well; but substitute for that sieve an impervious dam, and so surely as you do, that dam will be swept away. So, likewise, if we place a quarantine of scientific accuracy at the gateway of any of our large commercial cities, we shall have built practically a sanitary dam, and we shall soon find that commerce, having submitted to what it considers a reasonable amount of obstruction, will refuse to accept further restriction, and our sanitary dam will be swept away by the overwhelming onflow of public opinion, which will, rightly or wrongly, tell us, and tell us in unmistakable terms, that the public is willing to take some slight risks for the sake of commerce, and does take these risks, and will not submit to any system which seriously interferes with the community's means of obtaining a livelihood.

We must bear in mind that while the sanitary aspect of a quarantine is undoubtedly of primary importance, commercial interests demand and should be granted consideration in such matters, and while commercial interests are secondary, they are entitled to careful thought; for we must not forget that the condition brought about by a stoppage or even a slowing of business in any large community means suffering and privation to thousands. When you stop the wages of the breadwinner, you inevitably, though indirectly, produce sickness, the very thing we propose to prevent, and it matters little to the victim whether that sickness be of an epidemic or a non-epidemic character.

When, in the early eighties, the Marine Hospital Service assumed the small quarantine functions previously assigned to the National Board of Health, and with these functions took over the quarantine stations which had been established by the National Board of Health at Ship Island, Mississippi, and Blackbeard Island, Georgia, the system of long-drawn-out detention, plus a fumigation with sulphur dioxide and some spraying with solution of bichloride of mercury, was still in vogue; but there was no clearly defined idea as to how, or why, or when things should be done.

Dr. A. N. Bell, who was at the time an officer in the United States Navy, had indeed in the fifties made a most valuable contribution to sanitary science in the shape of a report of the disinfection done by steam on board a United States man-of-war, which had become infected by yellow fever during a cruise in the West Indies, but no one seems to have taken any particular interest in the matter, and it had been practically forgotten until about 1883, when Dr. Joseph Holt, of New Orleans, the president of the Louisiana State Board of Health, inaugurated a system of disinfection near the mouth of the Mississippi River, the mainstay of which was the application of steam. It is probable, however, that the first really scientific application of live steam to the disinfection of textiles, etc., was made by Dr. H. R. Carter, Surgeon of the United States Marine Hospital Service, at the Gulf Quarantine, Chandeleur Island, Mississippi, in 1888.