

tially from the æstivo-autumnal intermittent which is liable to run into the remittent or continued fever.

Probably as good a classification of æstivo-autumnal fevers as we can give at present divides them into: (a) the irregular intermittent fevers, with long fever paroxysms which have a tendency to approximate and run into each other, thus giving continuity; (b) the continuous or remittent fevers, which often begin with a chill but are not characterized by repeated chills, and which are often accompanied by symptoms of gastric disturbance and slight icterus, the fever continuing, with remissions, for a period of two or three weeks, or even longer; and (c) the pernicious fevers, which may be intermittent and which either prove rapidly fatal or soon yield to treatment.

(a) The first form is not common in this country and will not be dwelt on, although it is important to bear in mind its existence. It yields, with reasonable promptness, to vigorous treatment. The great importance of having recourse to blood examinations by a competent microscopist, to determine whether, in such cases, we have to deal with an æstivo-autumnal infection, lies in the fact that we have here a much more grave disorder than a simple intermittent and one which is liable to end in a pernicious attack, perhaps terminating the life of the patient. Hence the imperative demand for an early diagnosis, which can be made unequivocal only by a blood examination. If, then, the patient is living in, or has just come from, a region where pernicious fevers prevail the most vigorous treatment is demanded to prevent the possibility of a pernicious paroxysm.

(b) The second class of æstivo-autumnal fevers consists of that form which we have been accustomed to designate as remittent malarial fever, and which has also been called "bilious fever," "gastric fever," etc.

The pathology of æstivo-autumnal fever of both the first and the second class, when not pernicious, is practically the same as that of ordinary intermittent fever, due allowance being made for the difference in form of the two species of parasites, and for the greater tendency of the red corpuscles containing æstivo-autumnal parasites and of the leucocytes containing both red corpuscle and parasite to mass themselves in internal organs. The essential lesion is the blood lesion, with its profound anæmia, its melanæmia, its enlarged and pigmented spleen and liver and other organs. In the more prolonged and graver attacks of this class the lesions, in individual organs, will more nearly resemble, or be identical with, those described under the head of pernicious fevers.

**Symptoms.**—The onset of remittent fever is usually abrupt, commencing with a chill of moderate intensity. If there are prodromal symptoms they will consist of lassitude and general malaise for a day or two, with headache and perhaps pains in the limbs and back, loss of appetite, a foul taste in the mouth, and sometimes nausea. The chill is not so prolonged nor so violent as in many cases of intermittent, lasting perhaps for half an hour or less, and followed by fever in which the temperature will range from 101° to 103°, or even 105° F., remaining for many hours at or near the highest point reached. It is not unusual for bilious vomiting to occur during the chill and during the first few hours of the fever, and in such cases there is often considerable irritability of the stomach for several days. The fever will continue without any marked remission for twelve, twenty-four, or forty-eight hours. During this time there are complete anorexia, sometimes great restlessness and vigilance with continued headache, sometimes a persistence of the vomiting; but more commonly these symptoms subside and the patient is drowsy.

The remission is marked by an amelioration of the distressing symptoms, if such have existed, and a fall of temperature to about 100° F. This may continue for from three to six or twelve hours, occasionally even being prolonged to twenty-four or thirty-six hours. If the attack is not severe, the patient will declare that he feels quite well, and will wish to get up. His appetite, however, does not return, and he is far from feeling as well

as during the interval of a quotidian intermittent, for instance. At the appointed time the fever rises again, gradually reaching its former, or a still greater, height. This rise is seldom accompanied by a repetition of the chill.

From this time on, if the progress of the disease is not arrested, there will be periodical remissions and exacerbations, usually occurring once or twice during the twenty-four hours, but sometimes at more prolonged intervals.

At the beginning of an attack of remittent fever the tongue will be furred, of a gray or yellowish tint, large, moist, and indented by the pressure of the teeth. Later, it is likely to grow dry, smoother, and brownish in the centre, red at the tip and edges, with sordes on the teeth. Nose-bleed is not very uncommon. The stomach may be irritable throughout the attack.

The bowels are usually constipated, the urine is scanty, high-colored, and acid.

The skin and the whites of the eyes often show a yellowish or jaundiced hue, especially in those persons who have lived long in a malarious region.

There is no petechial eruption. It is not unusual to see an outbreak of herpes about the mouth.

Delirium is not common in the simple remittent, but in the graver, more protracted form it often occurs, accompanied with the other symptoms of the typhoid state, such as dry, cracked tongue, sordes, subsultus, etc.

The course of the disease varies greatly in different cases. In the most favorable, under vigorous treatment, it is arrested in from three to five days. In severer cases the course is more protracted, running from two to three or four weeks, or even longer. Such cases present very varying degrees of gravity. In some of them the patient makes very little complaint, does not look very ill, eats and sleeps quite well, while still the temperature remains at from 100° to 102.5° F., and the patient grows quite weak. In others, with but a slightly higher range of temperature, there will be great gastric irritability or severe headache, great restlessness and vigilance, and many, though not all, of the symptoms of typhoid fever, such as dry, cracked tongue, sordes on teeth and lips, and muttering delirium. This is the "typhoid state," which may also occur in other diseases than specific typhoid fever or grave malarial remittent fever, and these are the cases which used to be reported as "typho-malarial fever." There is, however, no characteristic typhoid fever temperature in the first two weeks, no rose-colored rash, no marked iliac tenderness, or gurgling; as a rule, no tympanites or diarrhoea.

The simple form, when not arrested by suitable doses of quinine, runs its course in from ten days to three weeks without any alarming symptoms.

**Diagnosis.**—While in the majority of cases a reasonably positive diagnosis can be made from the environment of the patient, the prevalence of malarial infection at his place of residence or at some place which he has visited, together with the history of the attack, it still remains true that for an unequivocal diagnosis recourse must be had to a blood examination and to the demonstration of the presence of the æstivo-autumnal parasite. In order to make this test reasonably certain, however, it should be applied before the administration of quinine. Therefore we often prefer to prove the correctness of our diagnosis by the success of the treatment.

When it is necessary, as is frequently the case, to differentiate between remittent malarial fever and typhoid fever, we have, on the one hand, the demonstration of the malarial parasite, and, on the other hand, at a proper stage of typhoid fever, the *Widal test*, as our criteria. With these two aids, whenever the services of a competent microscopist can be secured, the diagnosis should not remain doubtful.

The differentiation from yellow fever calls still more imperatively for a blood examination, since the malarial parasite does not exist in yellow fever. Furthermore, in the latter, jaundice occurs early and is more intense, bleeding gums and black vomit are prominent, while

very rare in malarial fever. The enlarged malarial spleen is wanting in yellow fever.

**Treatment.**—In remittent or æstivo-autumnal fever, as in all forms of malarial disease, quinine is our sheet-anchor. No time should be lost in preparatory treatment. Whatever else needs to be done may be carried on at the same time, but the first requisite is to put quinine enough into the blood to arrest the development and multiplication of the parasite. Seven-and-a-half to ten-grain doses of quinine every three or four hours until thirty or forty grains have been taken during the twenty-four hours, or fifteen-grain doses every eight or twelve hours will often cut short a remittent fever in the first two or three days. If this happy result does not follow, the same treatment, slightly modified according to circumstances, should be continued for a week. The disagreeable nervous disturbances of cinchonism may be to some degree modified by full doses (thirty or sixty grains) of one of the bromides. Sometimes an irritable stomach rejects the quinine. This irritability may often be quieted by counter-irritation over the epigastrium, as by means of sinapisms, by the administration of calomel and soda triturates, or of broken doses of Seidlitz powders or other effervescent draught.

If the stomach is utterly rebellious we may try the rectum, rubbing up double the amount of quinine we would use by the mouth with a little yolk of egg and tepid water and using it by enema.

If neither of these methods succeeds, or in any event if the case be urgent, as in pernicious fevers, we must resort to the hypodermic use of the drug. Thirty grains of bisulphate of quinine with five grains of tartaric acid in two drachms of water makes a good solution, one-half of which may be given at a time. Heat alone will dissolve five grains of any quinine salt in thirty minims of water. If this is quickly used in a well-warmed hypodermic syringe no added solvent will be required. Hypodermic quinine is somewhat liable to cause a puncture abscess, but in a grave emergency this is not to be taken into account.

If by means of such vigorous treatment an attack of æstivo-autumnal fever is brought to an end, the quinine is by no means to be withdrawn. Not less than five grains every four to six hours should be continued for a week, and after that two or three grains three or four times a day for at least two weeks longer.

In the treatment of these fevers, after the subsidence of the acute attack, which may have been accomplished by the use of quinine within the first week, there are no more valuable remedies than arsenic and iron used in combination with the continued quinine treatment above indicated. A liberal, blood-making diet is called for, and, if possible, an escape from the climate or the surroundings in which the malarial infection was acquired.

Other symptomatic treatment, both early and late, will be employed by the intelligent practitioner, according to the indications. But the great thing to remember is that no treatment of "biliousness" by mercury, nor of fever by antipyretics, nor any other treatment, not even change of climate, will accomplish the purpose unless accompanied by the use of suitable doses of quinine.

Medical men who have practised for years in malarious regions have heretofore been divided into two classes: one class believing that every continued fever which did not yield to quinine was typhoid fever; the other class holding that there were cases of continued malarial fever which would not yield to quinine. It seems probable, under the revelations of the microscope, that the second class will have to surrender their belief, without, however, granting the claim of the first class that all such cases are typhoid fever. Marchiava and Bigami ("Twentieth Century Practice," vol. xix., p. 418), say: "Physicians should rid themselves of the notion of the prolonged and obstinate resistance of typhoid-like, sub-continuous malarial fevers to quinine. When quinine is properly administered, the fever is not prolonged more than four, five, or six days." On the other hand, however, on page 300 of the same work, these authors say:

"In a detailed study of æstivo-autumnal fevers we shall see how, in malarial seasons and climates, infective fevers occur whose etiology is not yet known, and which, without an examination of the blood, might, even at the present day, be confounded with diseases of malarial origin."

(c) **Pernicious Fever.**—This form is rare in the temperate zone, although it may occur even there in newly settled regions. It is common in the tropical zone and frequently met with in sub-tropical countries. Although caused by the æstivo-autumnal parasite, pernicious attacks are not seldom distinctly intermittent, a period of twenty-four or forty-eight hours intervening between the paroxysms.

In the majority of instances there are no prodromal symptoms of the pernicious attack, but it either strikes the patient like lightning out of a clear sky, or else it follows a few lighter intermittent paroxysms.

The most common form of pernicious fever is the *comatose* or *apoplectic* form. This is rather more liable than some of the other varieties to be preceded, during the intermission, by drowsiness, hebetude, or severe headache. The chill may be more or less complete. During the hot stage the patient falls into a stupor or coma. He lies there with flushed face, pupils dilated and fixed, breathing stertorous, pulse sometimes fast and sometimes slow, muscles completely relaxed, skin dry and hot, temperature in the axilla 104° or 105° F.

This may last for six, twelve, or twenty-four hours, sometimes even for several days, the pulse and vital forces failing until the patient quietly ceases to breathe. Or at the end of a certain number of hours he may gradually rouse himself, confused in his ideas, still complaining of headache, perhaps even confused in speech, and with paresis in some one of his extremities, all these symptoms, however, gradually disappearing during the intermission.

Instead of pursuing the course described above, the coma may be preceded by violent delirium, even mania. Or the delirium may end in sudden collapse and death, or in sleep and recovery without the supervention of coma. Again, in other instances there will be nervous manifestations showing the involvement of the spinal cord as well as brain, such as clonic or tonic forms of spasm, of the eclamptic, epileptic, or tetanic variety. The more varied and violent the forms of nervous disturbance the more unfavorable the prognosis.

Two forms of attack, which are found especially in tropical climates, are the *choleraic* and *dysenteric*. In the former there are burning thirst, severe vomiting, watery stools, cramps in the calves of the legs, finally collapse, and death with all the signs of asphyxia. In the dysenteric form serous, mucous, and bloody stools occur during the paroxysm, and disappear during the intermission. The *algid form* may or may not begin with a chill and have a fever stage. Either following a rise of temperature or without it, the body temperature falls below the normal, even going as low as 90° F. The patient often complains of burning heat within and of great thirst. The skin is pale or livid, the pupils are dilated, the pulse is feeble and may be irregular. Consciousness is retained to the last, and the patient is strangely indifferent to his surroundings and his danger. Sometimes the choleraic and algid forms are combined. The urine is diminished in amount and may even be suppressed. This general condition may continue for several days with an occasional rise of temperature to normal or even to 100° F. or more, and the patient may then die.

This form of pernicious malarial attack seems to justify the popular term of *congestive chill*, so common in all malarial countries, although the name is often given by physicians, as well as by the laity, to any extremely severe or pernicious malarial attack.

In all the pernicious forms death may occur in the first paroxysm, within the first twenty-four hours, or there may be a fall of temperature with great, if not complete, amelioration of all the symptoms. Unless prevented by treatment, the paroxysm will, however, return at its appointed time, probably with increased severity, and in



the second or third attack the patient will perish. Other cases, not marked by intermissions, run a more continuous course for several days before the fatal termination or gradual recovery. The writer, many years ago, when the neighborhood of Kansas City was quite malarious, witnessed a number of deaths from pernicious fever, chiefly of the comatose form. One woman, after three or four apparently simple intermittent attacks during the week, for which she had taken small doses of quinine, fell into the most profound coma and lay in that condition for seventy-two hours. She was "as yellow as gold"; the insensibility was so great that the conjunctiva could be touched with impunity; the pupils were moderately dilated and fixed; the breathing was slow and stertorous; the urine, drawn by catheter, was very scanty, loaded with urates but not albuminous; the bowels were not to be moved by enemata nor by means of the calomel given her; it was almost impossible for the patient to swallow anything; the surface of the body was hot and dry, the temperature in the rectum remained steadily at from 105° to 106° F.; the pulse was slow. In spite of her apparently hopeless condition, under the persistent hypodermic use of quinine and whiskey this patient rallied and finally recovered.

*Pathological Anatomy.*—In addition to the blood changes found in all forms of malarial infection the pernicious forms give some tolerably well-marked local lesions. In the comatose form the leptomeninges are intensely hyperæmic as is also the cerebral substance, besides being very melanotic. Punctiform hemorrhages into the white substance are common. The endothelium of the capillaries is often swollen and in a state of fatty degeneration, the lumen of the vessels being closed by the swollen endothelial cells. In other cases there are actual thrombi of pigment matter, free parasites, and parasite-laden corpuscles. The same changes have been found in the spinal cord. The conditions in the spleen and liver are exaggerations of those found in malaria generally, the spleen substance is softened, the liver may present small areas of necrosis. In the choleraic form of fever the mucous membrane of the stomach and small intestines is swollen and of a dark-red, sometimes chocolate color. The capillaries of the mucosa are filled with parasites and sometimes its tissue, especially in the villi, is the seat of a superficial but extensive necrosis. Thrombosis of parasites and phagocytes in the intestinal capillaries is not uncommon.

*Treatment.*—The treatment of pernicious attacks is the same as that of remittent fever, except that there is more urgency in the former and more vigorous interference is demanded. The early recognition of æstivo-autumnal intermittent paroxysms, by means of blood examinations, should so put the practitioner on his guard as to enable him to forestall the graver seizure. When the attack is on, the important points are, first, not to mistake it for ordinary apoplexy or cholera, and, second, to begin early with full doses of quinine, hypodermically, and to keep this up to the last, no matter what else is done, even under the most discouraging circumstances.

**TROPICAL MALARIA** does not differ, in kind, from the malaria of more temperate regions. The severe, frequently fatal malarial fevers of Panama or West Africa, which sometimes take the pernicious forms described above and sometimes drag out a longer and more continuous course, are found to depend on the same æstivo-autumnal parasite as the milder fevers of more temperate climates. An admirable work on æstivo-autumnal fevers by Charles F. Craig, Acting Assistant Surgeon, United States Army, published in 1901, gives many points of interest with regard to these fevers as occurring especially in Cuba and the Philippines and the blood conditions found in soldiers who have returned from the Philippines.

**MALARIAL CACHEXIA.**—This is a condition very often met with in malarial regions; sometimes in those who have suffered with innumerable paroxysms of intermittent fever, sometimes in those who have never had a chill, but have long been subjected to malarial influences.

Persons so affected may complain of every imaginable symptom known to medicine, but they will almost all agree in the following: loss of appetite, a bad taste in the mouth, indigestion, a constant sense of weariness, unrefreshing sleep, dragging pains in the loins or small of the back, shortness of breath on exertion, and vague pains in the joints or muscles of the extremities. Such persons are usually more or less emaciated, pale, and fallow. The pulse is a little rapid, there is no elevation of temperature, and generally there is nothing periodical about the case. The spleen is greatly enlarged, hard, and somewhat tender on pressure, or may even be spontaneously painful in certain positions of the body, or after lying in one position for some time. In leukemia there is also an enlarged spleen, although not so hard, and in malarial cachexia there is no increase in the number of white blood cells, so characteristic of leukemia. In addition to the presence of malarial parasites, especially in the blood of the internal organs, the most striking lesion in malarial cachexia is a profound secondary anemia which may readily be distinguished from an essential or pernicious anemia by a blood examination. In the severer forms the sallowness is greater, amounting to actual jaundice, the urine is scanty and often icteric, the bowels are irregular, the abdomen is often greatly distended, and finally there may be edema of the face and extremities, while the general feebleness of the individual and his cachectic appearance are most marked.

Much more might, and perhaps should, be said on this subject, but I must content myself with only a few words concerning treatment. Many such cases still need quinine along with their other treatment, but most of them will be found to have lived on this drug for years, as well as to be thoroughly familiar with the domestic use of calomel or blue mass, and various cathartic "liver pills." They will, however, be greatly benefited by the judicious administration of arsenic in ordinary, not in antiperiodic, doses, combined with iron and nux vomica, or by the use of the mineral acids, especially the dilute nitro-hydrochloric acid. Iodine preparations also do them good for a while. Care must be taken to aid the digestion, and to insure a sufficiently varied and nourishing diet. Above all things, if possible, such people should be induced to move away, even if only for a time, and if only for a short distance, from the place where they have become thus contaminated with malaria.

Edward W. Schauffler.

**MALARIN**, acetophenone phenetidin citrate (C<sub>14</sub>H<sub>17</sub>OC<sub>2</sub>H<sub>5</sub>N.C<sub>6</sub>H<sub>5</sub>.C<sub>6</sub>H<sub>5</sub>.CH<sub>3</sub>), is a condensation product of acetophenone and parphenetidin, and is a crystalline insoluble powder of acidulous taste. As another of the phenetidin combinations, malarin resembles phenacetin in its antipyretic and antineuralgic properties, but Erdmann reports it as dangerous on account of the untoward effects of acetophenone. The dose is stated to be 0.3 to 1 gm. (gr. v.-xv.).

W. A. Bastedo.

**MALIC ACID.**—(C<sub>4</sub>H<sub>6</sub>O<sub>5</sub>.) An organic acid widely distributed among plants, especially in fruits, and more especially in those related to the apple. It occurs in odorless and colorless crystals, deliquescent in the air, freely soluble in water, and of a pleasant acid flavor. Its general properties are much like those of citric acid. It has been very little used.

Henry H. Rusby.

**MALIGNANT GROWTHS, THE STARVATION OF.**

—The attempt to control the advance of cancer and sarcoma by depriving them of blood supply is not a new thought. Ligation of the chief vessels, for this purpose, has not infrequently been tried in instances in which the growth is too far advanced to permit of extirpation. The carotid system seems that best adapted to test the principle. In 1878 Dr. John A. Wyeth, of New York, collected and analyzed all the cases then obtainable of ligation of the carotids, and he claimed that a large number of malignant tumors had thus been cured. But a careful study of these cases and his own clinical experi-

ence confirm the writer in the belief that by ligation of the nutrient artery alone tumors of this class are never permanently checked in their advance. They appear for a few weeks to cease growing, but after this brief interval of time they again resume active development.

Some idea of the difficulty of shutting off the blood supply of any part fed by arterial branches of the carotid system may be gained by simply considering how many of the eight branches of the superficial carotid freely intermingle blood with other arterial systems—*e.g.*, that of the internal carotid and that of the subclavian.

In order to overcome the difficulties just referred to and to secure a more permanent anæmia of the new growth which it was hoped in this way to subdue, the writer, about seven years ago, began his search for some method which would effect these results. The idea of completely extirpating the external carotid then first suggested itself. It was feared, though, that if this plan were carried out, the patient might lose his nose, tongue, or some other part through sloughing. In order to obtain more light upon the effects of such a serious interference with the blood supply of the head and neck, the writer made repeated trials upon dogs; tying the external carotid first upon one side of the neck and then upon both sides. As a result of these experiments one fact became perfectly clear, *viz.*, that the normal tissues can continue to live even when supplied with a surprisingly small amount of blood—an amount much smaller than that which is required by so vascular a thing as a malignant tumor, if it is to continue growing. In no instance, during these experiments, did any normal part thus deprived of a large share of its usual nourishment undergo sloughing.

The first opportunity for testing the matter upon a human being presented itself in June, 1895. The patient, who was affected with a round-celled sarcoma of the naso-pharynx, had previously been subjected by me to a simple ligation of one external carotid. On the occasion of which I am now speaking I excised the external carotid of the other side. A rapid shrinking of the tumor followed this operation, and for a period of several months the shrinkage thus gained persisted. In the following January, however, I was compelled—as the tumor had again begun to grow, and as the patient would not permit me to excise the carotid which had previously been ligated—to excise the superior maxilla, in order to remove what I could of the tumor.

Since the date named above I have had the opportunity of testing thoroughly the safety and the beneficial effects (upon malignant growths in this region) of a complete extirpation of both external carotid arteries. The operation has now been performed in over eighty cases (over forty of them by myself). Among those who have performed it may be named: Drs. Keen and Da Costa, of Philadelphia; Drs. Weir, Brewer, Bristow, Blake, Johnson, Meyer, Erdmann, Gibson, Collins, Lilienthal, and Woolsey, of New York; and Nicolson, of Atlanta, Ga. All of these operators agree in the statement that the operation presents no special difficulties. Upon an average a half-hour easily suffices to complete the carotid excision upon one side of the neck. If the operation is properly done, the loss of blood is almost nil; and hence the danger is so slight that, were not many of these patients already advanced in years and cachectic from having a malignant growth too far advanced to warrant its ablation, the mortality from the operation might rightly be expected to be insignificant. As it is, we may estimate it roughly, for cases in which there are no complications such as adherent masses of diseased lymph nodes, or in which no attempt is made to remove the tumor itself, at from one to two per cent. In no case yet reported has the pulse ever returned in any of the branches of the excised carotids—a result in striking contrast, as to permanency of the anæmia, to the speedy return of pulsation always observed after double ligation of the same vessels. In Zuckerkandl's "Operative Surgery," Dr. Da Costa, the American editor, states (2d edition, p. 48) that he has verified my observation that the shrivelling of the malig-

nant growth which follows extirpation of the artery is greater than it is after mere ligation.

*Technique.*—The external carotid is exposed from end to end. The incision in the skin is made fully 2 cm. nearer the median line of the neck than commonly is taught; this being a gain in both safety and speed of work. A ligature is passed about the external carotid, close to its origin, but is not yet tightened, as it is easier to expose and recognize its branches when large, being full of blood, than when collapsed and reduced to mere threads. Each branch, in order, from below upward, is tied twice, as far from the carotid as possible, and divided between the ligatures. The veins draining the same regions are also treated similarly, in order to increase thereby the difficulty of restoring anastomoses. When all but the terminal two branches are controlled, the parent trunk is tied twice and cut, as near to its origin as seems safe. The distal stump of the external carotid is now made to dive beneath, and reappear above, three structures: the twelfth cranial nerve, the posterior belly of the digastric, and the stylo-hyoid muscle. By this manoeuvre the work of reaching the terminal two branches—the internal maxillary and the superficial temporal, buried in the parotid gland—is facilitated; and by stretching the gland tissues surrounding the end of the external carotid with the jaws of a slender pair of dressing forceps, the artery is freed and its bifurcation exposed. In this way the danger (incident to the use of the knife) of establishing either a facial paralysis or a salivary fistula is avoided. In some cases, by drawing down firmly upon the carotid terminal stump, we can slip a ligature over this vessel high enough up to shut off the supply of blood to the branches just named. Usually, however, we can tie off only the external carotid just below them.

*Results.*—These have been encouraging; in sarcoma, surprisingly so. Several cases of subperiosteal and extremely malignant sarcoma—of the sort deemed practically hopeless by Butlin—have now remained shrunken far beyond the three-year period of Volkmann, after which we may with less hesitancy claim permanency of results. The tumor, it is of course understood, does not wholly disappear. It is, as we assume, too large to be cut out, or it is so placed that this is not practicable; but, by the plan here advocated, it is caused to undergo great shrinking and then remains inactive. Furthermore, the operation is not a deforming one. Only two thread-like vertical lines, one on either side of the neck, remain to indicate that any surgical work has been done. As to carcinoma, the results are less strikingly good. Nevertheless, we may confidently expect that the operation will, in every case, add several months, perhaps even a year, to the patient's lease of life. It should be remembered, however, that only the very worst—the most advanced and hopeless—cases have been thus far subjected to this plan of treatment. If we consider the nature of sarcoma as contrasted with that of carcinoma, we shall be able to understand why this plan of attack by starvation should be more successful in the former disease than in the latter. In sarcoma the growth depends for its extension chiefly upon the blood-vessels; the lymphatics commonly are not involved, sometimes they even stop at the surface of the tumor. In carcinoma, on the other hand, extension occurs mainly through the medium of the lymphatics. Lack of space prevents amplification of this important subject.

About eighteen months ago (in April, 1901) Dr. Wyeth suggested to the writer the idea that perhaps it might be of value either to replace excision of the carotid, or to supplement it, by injecting into the lumen of the vessel, and into that of its branches, boiling water, to cause an obliterating endarteritis; or else to inject some plastic material which, upon setting, will permanently obstruct the calibre. In following up this suggestion I have spent months of time and experimentation upon dogs and cadavers, and I have even applied the principle in a few patients. Dr. Bristow, of Brooklyn, N. Y., and the writer are the only surgeons who have, up to the present time, made use of it in actual practice. Briefly, it

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