COLLINS. (S. H.)
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YELLOW FEVER,

A Brief Sketch of Its Natural and Clinical History, Together with Some Practical Suggestions Relating to the Sanitary Control of Yellow Fever Outbreaks.

A Paper Read Before the Indiana State Medical Society May, 1889.

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presented by the author

WM. B. BURFORD, PRINTER, INDIANAPOLIS.

Yellow Fever.

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It seems that it will be not inappropriate, in view of the outbreaks of last summer and fall, at several points in the South, of this disease, to call your attention through this paper, to a few of its salient features, as regards symptoms, treatment and prophylaxis, especially as the mildness of our winter throughout the States has been such that there exists among many of those best qualified to judge, a grave apprehension of outbreaks at various points, and they early in the season. Yellow fever, deriving its name from a symptom, not always markedly present, and occurring in a late stage of the disease, is a disease of special type, infectious, perhaps somewhat contagious, consisting of one febrile paroxysm. Originating in tropical America, it has been known in medical literature as having prevailed more or less extensively since the latter part of the fifteenth century in tropical, sub-tropical and insular America; along the Atlantic sea coast, and occasionally ascending the valleys of the Mississippi, Red and Ohio rivers. It has occurred as far north as Portland, Me., upon the sea coast, and inland in the valley of the Ohio, to Gallipolis, Ohio. While pre-eminently a disease of the low lands, it has repeatedly raged at elevations varying from 3 to 14,000 feet above the sea. Once established in a territory where conditions favor, it will spread through rural as well as urban districts, although this is not generally believed to be the case; Yet it is undoubtedly true that its spread is specially favored in crowded communities, particularly among persons born in colder latitudes. Its spread seems dependent upon an average daily temperature

of not less than 65° F. Warm, damp weather is conducive to the rapid propagation and spread of the disease. Storms occurring during an epidemic, especially those accompanied by lightning, by clearing the atmosphere, lessen the number of new cases for several days; but such storms always exert an unfavorable influence upon those already sick. The ravages of yellow fever are checked by the advent of cold weather, but only checked, the disease lying dormant under the influence of cold, not killed, repeated and severe freezes have proved inadequate to render sterile the virus of this disease. Of this fact the w.iter has had ample proof. Heat, on the other hand will, and does effectually destroy the vitality of the poison, and whether this heat be applied dry or moist matters not.

The white races are most susceptible to the poison of yellow fever; sex is not a factor, nor occupation. The disease is rare in children under five. Whites, born in regions beyond the northern range of this disease, are more liable, when exposed, to be attacked than those southern born. The negro is less susceptible to the action of the poison of yellow fever, than the white; this immunity being weakened, in proportion to the amount of white blood, in the mixed race. The old theory that negroes could not have yellow fever, is now known to be untrue; they have it and die of it. One attack ordinarily affords immunity from the disease for life, unless perhaps in the cases of persons moving to colder latitudes, there residing for several years and then returning to an infected district. Still the writer has seen a second attack of yellow fever, occurring within sixteen months of the first, both attacks being characterized by unusually severe symptoms, the patient dying in the second attack. On the other hand, there are individuals who have been constantly exposed to the disease and who never have been attacked. The anatomical features as seen after death from yellow fever are quite constant. The body is often bloated, the conjunctiva, skin of the face and neck, and sometimes of the upper extremities is of a yellow hue, varying from a light lemon-color to an orange-bronze. The belly, back and lower extremities are mottled with dark, purplish-brown spots and patches. Putrification sets in immediately with death, and in some cases I have noted such changes before death. *Rigor*

mortis may or may not be present. The autopsy shows, almost always, fatty degeneration of the heart, the cavities filled with dark clots. Lungs congested, sometimes showing traces of localized hemorrhages. The mucous lining of the stomach is always more or less congested and softened; often there are spots of erosion. This organ generally contains a considerable quantity of dark, grumous matter. The intestines are softened and dark, distended with gas, and often contain large quantities of transuded blood of a tarry color and consistency. The liver is firm and yellow, and filled with fat. I have never failed to find the spleen enlarged, but as the subjects of my autopsies had been residents of intensely malarial districts, malarial poisoning may have been somewhat of a factor in these enlargements. The kidneys are infiltrated with fat. The bladder, as a rule, will be found to be empty.

The disease is ushered in, after a period of incubation of from one to thirty days, by symptoms varying from a feeling of slight *malaise*, chilly sensations, pain in the head, back and limbs, to pronounced rigors, intense, bursting headache, pain in the back and limbs of excruciating severity. The attack being, as a rule, sudden. The eyes are suffused, the face is flushed. There may now follow a chill of light grade, or so deep as to numb the sufferer to temporary unconsciousness, and cause the skin to have a shriveled look. This stage of chill may be absent. The stage of invasion is hardly established before the thermometer shows a rise of body heat. This rise is rapid. The mercury ranges from 101 to 114 degrees F. The highest thermometric reading of any case, coming under my observation, was 109 degrees. Though this is a disease of but one febrile paroxysm, the type of fever may vary; it may be *simply continuous* and having reached its maximum, decline rapidly; it may be *remittent* in character, each succeeding wave of heat mounting higher until the crisis is reached thence, gradually downward; or the type may be *intermittent;* this last variety I believe to be rare, as I have never seen it but a very few times in many hundreds of cases of the other types. This stage of invasion, chill and febrile excitement, lasts from forty-eight to seventy-two hours. The pulse is remarkably slow in proportion to the grade of fever. The skin has a pungent feel

to the hand. The borders of the eyelids are red and raw-looking. The eyes are bright, but expressionless. The odor of the patient, once smelled, will never be forgotten. The conjunctivae show slight tinges of yellow. The bowels and kidneys are inactive. There may or may not be muttering delirum. Usually the patient is mentally clear in this stage of the fever. There is nothing characteristic about the tongue. The urine *always contains albumen*. The fever subsides rapidly. The skin is moist, sometimes clammy. The second stage is on. The pains have subsided. The pulse is soft, weak, quick. The face, neck and arms are now distinctly yellow. The kidney action still scanty. There is now either a rapid and marked improvement within twenty-four hours or hiccough sets in, the stomach becomes irritable and ejects without nausea or much effort; at first a glairy mucous which soon changes to the characteristic, grumous discharge, the black vomit; this stage lasts from five to thirty-six hours, and unless the vomiting is checked and the inactive kidney roused, the sufferer dies from heart failure, or in uremic coma or convulsions. Should convalescence set in, recovery is rapid; though great caution should be exercised to guard against relapses which are almost invariably fatal; indiscretions in diet, over-exertion, the untimely bath, have many times carried off a patient who was nicely on the way to recovery. Of the cause of yellow fever we know nothing definitely. Researches now begun, may throw light upon this question. Undoubtedly of germ origin; later investigators are coming to the opinion that the seat of attack is the stomach and intestinal tract. Of treatment I have little to say. Many remedies have been given, but one after another they have been discarded. Quinia is useless, I think worse than useless. The best treatment is what is known in the far South as the Creole, which consists in unloading the stomach, if necessary, at the onset of the attack, by some mild emetic, preferably warm mustard water. If the case is seen early a brisk purge of calomel followed by castor oil may be given, but this procedure is only advisable at the onset of the disease. A hot mustard foot-bath should be used and the patient lightly enveloped in wool blankets, put to bed in a well ventilated room free of draughts. If there is much back pain or gastric irritability, applications of mustard are useful.

Mild perspiration may be induced by drinks of warm orange-leaf tea, or hot lemonade. For reduction of temperature, frequent and careful spongings with tepid water are most effectual. Opiates should be used with the greatest caution, in fact my experience is that opium in any form is dangerous. If there is too little action of the kidneys, mild diuretics may be used, but on account of the irritable condition of the stomach great care should govern their use. For the vomiting, applications of mustard, and cold, over the epigastric region. Internally, pellets of ice, oxalte of cerium, etc. I have seen very happy results in obstinate and copious vomiting from Mur. tinct. ferri, in teaspoonful doses. In view of the probable germ origin of the disease; the treatment lately suggested by Dr. Geo. Sternberg, U. S. A., of minute doses of *Hydrarg-Bi-chlorid*, repeated hourly; should be given a full trial. In the stage of recovery, rest of mind and body, and the greatest caution with regard to diet, is all that is necessary. I now come to that part of my subject which deals with the proper disposition of the dead, the disinfection of infected houses and household goods, and the isolation and care of the sick. First, the public, through the medical profession, should be taught if possible the folly of the unreasoning shows of terror, which are so often brought to our notice. Too often do the members of our profession add fuel to this fire of terror, by their personal exertions to flee the plague. Honesty in dealing with the public with regard to suspicious cases, in districts liable to yellow fever, and prompt reporting of each and every case would do much in stripping off some of the unnecessary terror attached to the announcement of yellow fever in a town or city. Once known to be in any given community, a quiet and orderly retreat is right and proper. Those able, and not protected by a previous attack, should go away from and out of the infected district. Those not able to leave, and not protected, should be moved at public expense to camps of detention and observation. The sick should be taken to fever camps, properly selected with regard to elevation, drainage and water supply. Such camps should be strictly guarded, absolute non-intercourse between a fever camp and the outside should be enforced. When in camps of detention and observation, cases appear, as they generally do,

such cases should be quickly and quietly moved to the fever camps. In both varieties of camps, the *lodgings should be tents.* Where cases occur in detention camps, and such cases have been removed, all others at the time living in the newly infected tent should be removed to the outskirts of the observation camp and lodged in tents by themselves for observation; the lately infected tent and its bedding should be burned. Should no cases develop within thirty days, those under observation may be allowed to return into camp. There should be no passing between a camp of detention and an infected town. All supplies for both varieties of camps should be brought to some designated point at least a half mile outside the picket line and there left to be taken into camp one hour later by camp messengers. In a town where the disease has made its appearance, after the removal of all occupants, infected houses should be thoroughly disinfected so far as their walls and wood-work are concerned, by fumigation with burning sulphur for 12 hours, each room being as tightly closed as possible. The house should then be open to free ventilation for 48 hours. All bedding, carpets and wearing apparel should be included in this process of fumigation; the clothes worn by a patient dead of yellow fever should be destroyed by fire, as should his bedding, if much soiled; otherwise it should, after fumigation, be thoroughly boiled. Cellars, out-buildings, damp places about the premises should be thickly strewn with slacked lime. No re-occupation of a house so disinfected should be allowed until after the disease has been stamped out of the town. The bodies of those dead of fever should be stripped of all clothing, enveloped in a sheet or shroud wet in a saturated solution of sulph. of zinc, and immediately buried in graves or trenches not less than six feet in depth, the bodies being covered with slacked lime, before refilling the grave.

During the existence of yellow fever in any town, although its remaining inhabitants are supposed to not be liable to attack, all public gatherings or public burials should be absolutely prohibited. Now, gentlemen of the society, I am aware that I have told you nothing new. I have presented no theories, but have called your attention, in plain language, to this subject, because, before the summer is over, we may have it brought

to our attention in a more forcible manner. Because it is a subject with which the great majority of the members of this society have no practical experience. Because if yellow fever should be introduced into our State at a sufficiently early date, during the summer its ravages would be of untold damage; and if I have slightly refreshed your memories, or outlined a method of treatment (the best now known), with some easily applicable rules for the governance of health authorities with regard to the proper sanitary management of fever outbreaks, I shall have accomplished what I had hoped to do. I have not drawn my information from books. What I have to day given you is the result of a large practical, personal experience, having been through three epidemics of yellow fever, having had the disease, and from having seen hundreds of cases, as physician and sanitary officer.