

engaged nurse falling sick and being unable to attend at once. On her recovery the emergency nurse should relinquish the case.

When two nurses are at a case the first arrival takes precedence and is considered the senior nurse and should remain when further assistance is no longer needed. They should be careful to discuss nothing that concerns their work in the presence of the patient, friends or physician.

It will be found to obviate many disagreeable difficulties if in each city or district an uniform fee is decided upon and adhered to as closely as possible.

"The paths of pain are thine
Go forth with patience, love and hope,
The sorrows of a sin-sick earth
Shall give thee ample scope.
Besides the unveiled mysteries
Of life and death go stand,
With guarded lips and reverent eyes,
And pure of heart and hand."

AN OUTLINE OF TREATMENT OF TYPHOID FEVER.

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(*From the Therapeutic Review.*)

PRELIMINARY to my study of medicine it was my privilege to act in the capacity of helper in the bacteriological laboratory of Dr. Paul Paquin, formerly an assistant of Dr. Pasteur. A part of my work was the preparation of the agaragar and beef bouillon as culture media for bacteria. These, together with milk, served as most excellent culture media. Colonies of typhoid bacilli and other pathogenic germs planted in milk and beef bouillon grew luxuriantly. The same germs implanted in fruit juices resulted in an inhibition of their growth. Those planted in the stronger fruit juices were destroyed by the acids present in the fruit.

It has been nearly a universal custom to prescribe milk and some form of meat juice or extract as a diet in typhoid fever. These food elements meeting weak and viscid digestive fluids and being already more or less septic from age, and improper care in handling, serve as a medium for the rapid and abundant multiplication of bacteria. Such methods of feeding are responsible in causing that filthy condition of the mouth, thickly coated tongue, lips covered with sores, loathsome and offensive breath, fetid and diarrheal stool, and resulting in overwhelming the blood stream

with ptomaines and toxins. The foods are undoubtedly largely responsible in causing that mental stupor which we are pleased to term the "typhoid state." It has been my practice for some time to prescribe as a diet in this form fruit juices and marmalades, limeade and lemonade, varied to suit the pleasure and palate of the patient, with water gruels, broths and purees. I have not found it necessary to give a particle of milk nor meat juice of any kind and with the marked result of mental clearness and acumen, lessened fever and fewer complications.

The advantage of fruit and fruit juices may be remarked when we stop to consider what we have in fruits and their juices. The water present in fruit is sterile, distilled from the dews of heaven, absolutely pure and capable, as nothing else can compare, to act as a tissue solvent. The organic acids present, especially in those fruits which contain malic, citric, and tartaric acids, are fully digestible, and readily combine to form alkaline carbonates in the blood. The sugars are in the form of levulose and dextrose, the end products of digestion, and produce no disturbance of digestion as do beet and cane sugars. These sugars being in a form ready for absorption, enter quickly into the blood stream and can immediately be drawn upon as pabulum to nourish the system. The pectoses and pepsins present in most fruits serve as aids to digestion and may even extend their aid to the cell enzymes.

In selecting fruit for a diet, give attention to quality, neither over nor under ripe. Not too acid, as this will call for cane sugar. Such fruits as contain but little cellulose and about one per cent acid. As, for instance, apples, ripe peaches, prunes, grapes, blueberries, red raspberries, orange, watermelon, pineapple and grape fruit. In some instances only the juice will be allowable, in others the fruit may be baked, stewed or made into a marmalade. Mellow apples may be eaten raw if scraped with a knife and served in that manner.

Typhoid fever is an infection of the lymphatic system, chiefly of the small intestines, but also of the liver, spleen and mesenteric glands, due to the Eberth bacilli in conjunction with the bacilli coli communi. The infective material gains entrance to the body through water, milk, oysters, clams, raw garden truck as radishes and celery, by flies, by "typhoid carriers" who harbor the germs in their intestines for long periods, and of whom there are an unknown number, and last but not least, through dairy butter, which article of diet seems equally guilty, and even more so than milk in serving as a host for the bacilli. In butter their life is prolonged because of such favorable conditions. Butter being more than an

article of transit, they are carried to distant parts of the country, and in this way may be responsible for outbreaks of the fever remote from their genesis and consequently the infection from this source is harder to trace.

The microbes develop chiefly in the walls of the small intestine, invading the glandular structure where they multiply in countless numbers, producing a poison known as typho-toxine. It is to the absorption of this poison into the system that the chief symptoms in typhoid are due. Preceding the typhoid germ there is usually a gastro-intestinal catarrh, a quite favorable condition for the development of the specific bacilli. There has been, however, a previous lowering of vital resistance through exposure, over-work, loss of sleep, dietetic errors or excesses, fear, foul gases, anything in fact that lowers the general health. Doubtless, most of us are harboring the typhoid germ in our intestinal canals, but conditions are not favorable for their development. The non-resistant are the ones to succumb. Lowered vitality is accompanied by local congestion, a stagnation, if you please, of the blood stream in the intestinal walls, which, through the specific infection passes into the stage of inflammation. One indication for treatment made apparent is to rush blood to the part, blood which has been made pure by a proper and correct dietary, and, laden with leucocytes, serums, opsonins and antibodies, is able to repel the invasion and destroy the intruding germs. Methods of accomplishing this, of causing an active flow of arterial blood, through any local means we have at hand in rubifacients, fomentations and skin frictions, any means, in fact, which will equalize the flow of the blood currents. Who knows but that in Bier's cupping and constriction bands in thus producing an alternating passive and active hyperemia we may have present a method that will in the future work surprises in our handling of typhoid infections, as it has in other diseases. This method deserves a trial. We know that the life of the body, or any part of it, depends upon the elements contained in the blood reaching every part, at all times, and in unstinted quantities. Any interference with the circulation of the blood in a part means at once a lessening of life's forces in the part and a consequent lowering of vitality and therefore lessened resisting powers against an invasion of disease germs. Even a venous stasis in an organ or tissue means that arterial blood richly laden with the elements of life cannot flow there and the parts besides being deprived of nourishment become impeded with waste products. Guard against this stasis of circulation in vital parts and you will not be subject to infection. This

gives an indication for treatment in typhoid, *i. e.*, equalize the circulation by restoring the surface glow.

Recent experiments go to show that in fever there is not any great increase in heat production, but that the rise of bodily temperature is due rather to decrease of heat elimination and what is desirable then is not a drug by which the heat production shall be checked, but rather the employment of means by which heat elimination shall be increased. The fever is nature's reaction to the presence of poisons retained or produced in the system. Nature to bring about elimination raises the temperature of the body and by this means oxidizes and prepares these poisons for removal. A fever is nature's effort of finally disposing of these poisons by burning them up. Fever, therefore, is a friend of the patient. He needs some fever. So long as these poisons remain in his system it is a mistake to eliminate the fever. There should be some reduction of the temperature so that in the oxidation of these poisons the tissues do not suffer too greatly. Our aim should be not to consume the man, but his poisons. The best means of increasing heat elimination are the various methods of applying cold to the surface and when the fever is thus brought down it remains at a low point for several hours and unaccompanied with the toxic effect produced by antipyretics of a drug nature. When brought down by the administration of a drug it quickly rises again.

What about intestinal antiseptics? Do we not in this case need to call to our aid drugs of this nature? Dr. Kerr reported in the *Edinburgh Medical Journal*, July, 1906, extended observations in the use of betanaphthal in doses of 6 to 9 grains in typhoid. "There was no evidence that the drug lessened the duration of the fever, the progress of the ulcerations or the occurrences of relapses." Many other intestinal antiseptics were tried with similar results.

But happily, we have at hand a method of obtaining intestinal antiseptics in the method aforementioned of the use of fruit juices. The first week fruit juices and acidulated waters should be the sole diet, a pleasant way of applying the starvation plan of treatment with equal and even better results. These act as antiseptics and diuretics; afford some nourishment and enable the patient to drink more fluid than he otherwise would.

The first week is the week of cleansing the alimentary canal and blood stream. At the end of the week we have a blood comparatively free from all poisons but the typho-toxine; and because of lessened septic conditions in the intestinal tract less of this

poison. The beginning of the second week, or even as early as the fourth or fifth day, the height of the fever will have been reached and a more liberal diet is then allowable such as stewed and baked fruits and raw scraped apple, also gruels, broths and purees, with zwieback and gluten biscuit.

The auto-intoxication of typhoid is partly due to the putrefactive processes in the colon. By avoiding such foods as eggs, beef preparations and milk, which promote putrefactive processes, and by limiting the proteid substances to the actual needs of the body (which we get in the purees and broths), avoiding animal products which are so prone to decay, we greatly lessen the intoxication and mental stupor. "The fires of the fever are sooner exhausted when new material is not fed the patient." These foods, containing much proteid and hardened caseine curds, which an inert gastric juice cannot dissolve, simply decay in the alimentary canal, and these products which are not digested serve as good material for culture media *inside* the body as well as *out* of it. The liver becomes overwhelmed with these poisons, the whole body is saturated with them. The system suffers a profound toxemia and we enter the "typhoid state." On the other hand in fruit, fruit juices and fruit-soup, in strained gruels made from oatmeal, barley, rice or gluten, in the broth of baked potatoes, lentils and peas, we have foods that afford the nourishment required in an easily assimilable form, and such as the system will readily appropriate.

De Lesseps, who afterwards became a vegetarian reported that "he could not have built the Suez canal without the aid of the date and barley eating Arabs, who were almost immune to typhoid." It is noted in this connection that vegetarians are not so prone to suffer from gastro-intestinal catarrh. Here we have a hint as to how to avoid the disease.

"The presence of glycogen in the liver has been shown by Bouchard to be essential to the ptomaine destroying function of the liver, a function that should be promoted and supported by feeding starches and sugars from which the glycogen is derived." Sweet fruits serve admirably the purpose as they are readily taken up by the portal circulation, besides entailing no labor on the part of the digestive organs, as the starch of the fruit has been cooked and digested by the sunlight, and is already in the form of dextrose and levulose and ready for absorption and conversion into glycogen.

(To be continued)