they had found to be required (after contact of from fifteen to thirty minutes) to inhibit the growth and activity of bacillus typhosus, they were quite palatable, imparting a subacid flavouring, which was agreeable to the taste, and would materially aid in quenching thirst. After reference to previous work on the subject, by Stutzer, Christmas, Reinsch, Schumberg, and Braithwaite, the authors gave details of experiments which they had performed.

In the case of tartaric, citric, and nitrohydrochloric acids, it did not appear that anything less than the maximum *B.P.* dose per pint of water was efficient to sterilise if the contact was not to last longer than fifteen minutes. Half the maximum dose (10 grains) per pint was inefficient in the case of citric and tartaric acids after 15 minutes contact, whilst the minimum dose (5 grains) per pint of citric acid had no effect after twenty-four hours' contact; and in the case of tartaric acid the minimum dose did not completely sterilise after the same period. Of the two, tartaric acid appeared to be the more potent in its destructive action upon bacillus typhosus.

As regards the dilute acids, nitrohydrochloric and sulphuric, the former appeared to be more efficient than the latter; but no further experiments were made with them, as it was considered essential that the substance to be carried by individual soldiers in the field should be a solid, which could be made up into small tabloids, and not a liquid, which would have to be carried in a bottle and be measured out with some exactitude when required for the purpose of sterilising the water to be used for drinking.

Acid sodium bisulphate was not a *B.P.* medicinal substance. It probably had no purgative effect, as the astringent properties of its free sulphuric acid would tend to counteract any laxative action of the sodium sulphate. The minimum purgative dose of sodium sulphate was a quarter of an ounce, and as the authors only suggested the use of $15\frac{1}{2}$ grains of the bisulphate to every pint of water, a man would have to drink 7 pints of water before a quarter of an ounce of salt, not known to be purgative, would be taken. Even if this quantity of water was drunk in a day, there is no evidence that a quarter of an ounce of the bisulphate would exert any harmful effect.

There was evidence that the bacillus typhosus was killed by only five minutes' contact with sodium bisulphate in the proportion of 1 gram ($15\frac{1}{2}$ gr.) per pint of infected water; but in their opinion it was better that contact should be made for fifteen minutes, in order that sterility might be ensured. Experimental trials were also made with acid sodium phosphate and with sodium sulphovinate, but these substances were found inefficient. It might be used as an argument against the deductions which the authors thought they were entitled to draw from their experiments, that in broth cultures of bacillus typhosus the organisms were living under artificial conditions, and that waters infected by natural means derived the living virus directly from the faeces or urine of an enteric fever patient. There would be reason in such a line of argument if it could be shown that the bacilli on emerging from the human body were more resistant to adverse agencies, such as their chemical solutions were, than those which had been cultured and subcultured in broth.

That this was not generally held to be so was now recognised, for the probabilities were in favour of the view that pathogenic organisms by propagation in artificial media outside the human body tended to become saprophytic; and whilst very probably losing in virulence, yet acquired higher resistant powers to agencies affecting their life and growth than they ever possessed when they flourished as parasites in the human body.

The authors thought there was every probability that the agency which proved fatal to the subcultured bacilli would have an equal if not greater effect upon organisms of high virulence immediately derived from the excreta of an enteric fever patient. Experiments were made by them to determine the dose of the poison or the number of bacilli that must be imbibed in order to induce the disease, a subject on which practically nothing certain was known. Their conclusions were that, on the whole, it would appear as if one might be justified in assuming that (1) water naturally infected with the virus of the disease did not contain so very large a proportion of the bacillus; that (2) this organism was not by any means resistant to acids

or other weak disinfectants; and (3) that the use of such simple means as suggested by the authors for combating infection had possibly a future before it, more especially under conditions of life where the means of sterilisation by boiling and filtration were not readily available.

As regards the use of sodium bisulphate during a campaign, they recommended its being employed in the form of tabloids, each tabloid to contain 5 grs. of the bisulphate. The tabloids should be made to dissolve quickly in water, and for this purpose the minimum quantity of gum arabic or other adhesive substance should be used in their manufacture. The tabloids should be put up in well-made light metallic boxes, to hold about $\frac{1}{4}$ lb. weight—equivalent to about 350 tabloids—enough to sterilise over 100 pints of water at the rate of 3 per pint. One of these boxes should be carried by every soldier in his haversack. Supposing the soldier to consume 5 pints a day when on the march, the $\frac{1}{4}$ lb. tin would suffice for nearly three weeks, at the end of which time he will probably again be in touch with his transport.

Instructions should be given by the medical officer to the rank and file as to the use of the tabloids, and more especially as to the desirability of allowing all contaminated water to remain in contact with the dissolved tabloids for at least fifteen minutes before being consumed.

The acid tabloids would be found to render the water much more effective in slaking thirst, and there would, in consequence, be less inclination to drink large quantities of water, a smaller quantity when acidulated sufficing. The tabloids might also be used as thirst lozenges when water was scarce, and would, they believed, be found useful by promoting the secretion of saliva, and so preventing parching of the mouth.

The authors were informed by an officer, recently returned from the war, that he found the "thirst lozenges" he took out with him from England most useful. There was an immense demand for them by the men of his company; and the men who took them were satisfied with much less water than those who failed to obtain any.

NOTES ON HEALTH RESORTS.

CLIMATE OF TENERIFFE.

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APPROPOS of the subject of climate as a factor in the open-air treatment of tuberculosis, I troubled you with a short communication which appeared in the BRITISH MEDICAL JOURNAL of July 15th, 1899. As I now have a year's complete record of thermometric observations, it may interest some of your readers to have the main facts laid before them. It will be seen that the special feature here is equability. We never here fall to within 15° above the frost line, and the occasions when the temperature has reached 90° in the shade can be counted on the fingers of one hand. The observations taken from January 1st, 1900, to December 31st of the same year give us the facts below stated expressed in the scale of Fahrenheit.

1900. Days of observation, 365. Mean temperature at 9 A.M. for the whole year, 66.63.

Winter (January, February, March, October, November, December), 63.07. Summer (April to September), 70.21.

Mean relative humidity (saturation=100) at 9 A.M., whole year, 64.93.

The lowest relative humidity of each month was, January, 50; February, 28; March, 20; April, 31; May, 43; June, 47; July, 38; August, 27; September, 48; October, 64; November, 45; December, 34.

Mean maximum temperature of each 24 hours for whole year, 72.89.

For the winter alone, 69.02; for the summer alone, 76.75.

The actual maximum attained in each month was, January, 70; February, 80; March, 73; April, 86; May, 85; June, 87; July, 87; August, 96.50;

September, 85; October, 89; November, 81; December, 74.

Mean minimum of each 24 hours, for whole year, 57.79.

The actual minimum attained in each month was: January, 47 (lowest recorded, January 2nd); February, 48; March, 51; April, 51; May, 54;

June, 56; July, 59; August, 59; September, 59; October, 55; November 52; December, 51.

Inches of rain, whole year, 13.67. The 13 inches were distributed as here given:

January, 4.34; February, 1.04; March, 2.26; April, 1.45; May, 0.18; June, 0.00; July, 0.00; August, 0.15; September, 0.22; October, 3.70; November, 0.25; December, 0.08; equal, 13.67.

The days on which the sun shone eight or more hours were:

In January, 24; February, 22; March, 18; April, 25; May, 24; June, 27;

July, 25; August, 22; September, 11; October, 20; November, 27; December, 23.

This means only 97 cloudy days in the year, and few of these had no sunshine at all.