A NOTE ON THE ABSOLUTE VIABILITY IN WATER OF *S. TYPHI* AND THE *DYSENTERY BACILLI*

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The genesis of this minor investigation was an inquiry by a clinical colleague about the maximal survival times of the dysentery bacilli in water. Our failure to find any precise figures for these times in the reference works that we consulted led us to make the following experiments.

Experimental Tests

Suspensions of *Salmonella typhi*, *Shigella sonnei*, *Shigella flexneri* Y, and *Shigella shigae*, each at a concentration of 1,000 million organisms per ml.—measured by opacity standards—were made in tap-water, in distilled water, and in normal saline. Ten-millilitre volumes of each of these suspensions were then kept in diffuse daylight at room temperature under aerobic conditions, and were tested for viability by the removal, at regular intervals, of a standard loopful of each suspension, which was inoculated into a tube of glucose nutrient broth. The loop employed was one of 4-mm. diameter. These transplants were incubated at 37° C. and their growth was confirmed, and checked for purity, by plating on MacConkey's agar. The plate cultures were then identified by their sugar-fermentation tests and their agglutination reactions with standard sera. If no growth was obtained from the loop transplant, 1 ml. of the suspension was withdrawn in a sterile pipette and inoculated into a fresh tube of glucose nutrient broth, which was incubated for 72 hours at 37° C. and then plated on MacConkey's agar, before the suspension was discarded as non-viable. Temperature readings were taken daily of the small room in which the suspensions were kept. The minimum temperature recorded was 45° F. (7.2° C.) and the maximum 95° F. (35° C.), giving a mean over the whole period of the experiments of 70° F. (21.1° C.).

The suspensions had evaporated to approximately half their original volume after 90 days, and to dryness after 236 days, and no growth was obtained from any of them after the addition of glucose nutrient broth to the dried residue. Before this occurred the following observations had been recorded, the figures in Table I representing the particular length of time in days.

TABLE I

	Tap Water		Distilled Water		Normal Saline	
	Viable	Dead	Viable	Dead	Viable	Dead
<i>Salm. typhi</i> ..	211	236	211	236	153	188
<i>Sh. sonnei</i> ..	68	86	211	236	153	188
<i>Sh. flexneri</i> Y ..	86	118	118	153	118	153
<i>Sh. shigae</i> ..	2	8	2	8	68	86

As this experiment was vitiated to some extent by the evaporation of the suspensions to dryness before the presumptive death of the organism in three instances, a second experiment was performed under the same storage and test conditions. Two suspensions of each organism were made in distilled water to a volume in each case of 200 ml. One of these (A) had a concentration of 500 million organisms per ml.; the other (B) had a concentration of 1,000 million organisms per ml. The readings are given in Table II.

TABLE II

	A		B	
	Viable	Dead	Viable	Dead
<i>Salm. typhi</i> ..	24	59	443	474
<i>Sh. sonnei</i> ..	82	107	168	197
<i>Sh. flexneri</i> Y ..	197	238	364	391
<i>Sh. shigae</i> ..	2	7	2	7

Conclusions

It would seem, from these observations, that an important factor in the absolute viability of *Salm. typhi*, *Sh. sonnei*, and *Sh. flexneri* Y in a chemically inert medium, such as distilled water, is the size of the cell population, at any rate up to a larger population than we have tested.

We offer no explanation of our inconsistent readings with *Sh. sonnei* and *Sh. flexneri* Y, we merely record them; but they suggest that the problem of the absolute viability of bacteria in water is a complex one that is worthy of a more profound study than we have attempted.

The strains of the four bacteria used in this study were obtained from the National Collection of Type Cultures.

A CASE OF MYOSITIS OSSIFICANS PROGRESSIVA

BY

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Myositis ossificans progressiva is a rare congenital disorder producing progressive crippling in childhood and adolescence. The subject has been reviewed by Mair (1932) and more recently by Fairbank (1950), who recorded two further cases.

This report adds another case to the literature and illustrates the characteristic course of the disease and the distressing immobility to which the patient is reduced.

Case Report

This patient, a woman now aged 24, the youngest of five children and the only member of the family to suffer from this or any relevant disease or abnormality, was normal at birth, and for three years after was in excellent health. At the age of 3 she fell while playing and injured the left side of her neck. The next day a painful red lump developed in the region of the left sterno-mastoid muscle. A week later, and without further trauma, she developed a similar mass in the left mastoid area. This was thought to be mastoiditis, and as such was submitted to operation, but no pus was found. There was no aural discharge.

Later, numerous other masses developed in the muscles of the back and arms. Some of these were likened to "bunches of grapes." As the swellings disappeared the spine was left rigid and the arms remained extended.

At the age of 7 she was quite unable to bring her hands to her mouth to feed herself, but gradually the elbows flexed, allowing a restricted range of movement, so that by the age of 9 she could feed herself, could comb her hair, and could walk without assistance.

When 11 she fell on to her left knee. This became red, tender, and swollen, and this condition persisted for six weeks. As the swelling dispersed the knee became ankylosed and has remained so. Three years later her left hip became painful and ankylosis developed. As her right knee and hip were still mobile she was able to walk, and she worked as a telephonist.