

oxide, but 3 had this capacity. With 15 cultures of *E. aroideae*, 11 were negative in their action on trimethylamine oxide, whereas 4 were able to produce trimethylamine. Single strains of *E. carnegiana* and *E. nimipressuralis* had the property of reducing trimethylamine oxide.

All of the *Erwinia* cultures, except *E. carnegiana* and *E. nimipressuralis*, failed to grow or remain viable under the conditions of the Eijkman test (glucose was substituted for lactose in the medium employed). These two Eijkman survivors, which were also trimethylamine-positive, are like *Shigella alkalescens*, *S. dispar*, and *S. sonnei* in respect to the Eijkman test and trimethylamine oxide reduction. With *E. carotovora* and *E. aroideae*, however, no correlation exists between the trimethylamine-positive strains and the ability to withstand the conditions of the Eijkman test.

No comparative studies have been made between trimethylamine-positive and trimethylamine-negative strains of the latter two species. Nevertheless, the faculty to macerate carrot tissue is maintained by negative and positive isolates of both species. The existence of strains in the soft-rot group that have the power of reducing trimethylamine oxide preclude the use of the test in distinguishing these species from members of the genus *Aerobacter*.

## THE ANTIBIOTIC ACTIVITY OF VIOLACEIN, PRODIGIOSIN, AND PHTHIOCOL

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The water-insoluble pigments violacein, prodigiosin, and phthiocol are produced, respectively, by *Chromobacterium violaceum*, *Chromobacterium prodigiosum*, and *Mycobacterium tuberculosis*. The antibiotic activity of violacein has been reported (Lichstein and Van de Sand: *J. Infectious Diseases*, **76**, 47) but to our knowledge there have been no similar studies with phthiocol. Although whole cultures of *Chromobacterium prodigiosum* have long been recognized as possessing antibiotic activity, there has been a difference of opinion regarding the nature of the active substance. Hetteche (*Arch. Hyg. Bakt.*, **107**, 337) believes the pigment to be the active agent, but Eisler and Jacobsohn (*Z. Hyg. Infektionskrankh.*, **117**, 76) suggest that the substance is a nonpigmented material present in broth cultures of the organism.

Violacein, extracted and purified according to the method of Strong (*Science*, **100**, 287), exerts a bactericidal action against *Staphylococcus aureus* in concentrations of 0.001 to 0.01 per cent when the number of bacterial cells is approximately 5,000 per ml, and a bacteriostatic action against larger inocula. The pigment exhibits no *in vitro* antiphagocytic activity against guinea pig exudative polymorphonuclear leucocytes in concentrations of 0.05 to 0.5 mg. Mice (8.5

to 16 g) tolerate a single intraperitoneal dose of 1 to 2 mg of pigment. No *in vivo* protection against overwhelming type II pneumococcus infection in mice is exhibited by single doses of 1 to 2 mg, but a delayed death rate is noted with 2 mg against smaller challenge doses of organisms ( $10^{-5}$  dilution).

Prodigiosin, extracted and purified from potato slice cultures (Wrede and Hettche: Ber. deut. chem. Ges., 62, 2678) and tested against 10 representative species of bacteria in tryptose broth using an inoculum of  $10^4$  organisms, with suitable alcohol controls, exhibited no bacteriostatic effect in concentrations of 0.005 to 0.1 per cent. Both filtrates and heat-killed 18-hour and 3-week whole cultures of *Chromobacterium prodigiosum* were employed in order to test the effect of other metabolic products. Young cultures exhibited no activity, but the 3-week cultures, both pigmented and nonpigmented, yield a thermostable, water-soluble, nonpigmented substance that is antagonistic to the growth of *Bacillus subtilis*, *Corynebacterium diphtheriae*, and *Staphylococcus aureus*.

The stock solution of phthiocol was 2 per cent in 0.2 N sodium hydroxide, and, when added to tryptose broth, an equal volume of 0.2 N hydrochloric acid was required to maintain a suitable pH. In a concentration of 0.02 per cent this pigment inhibited the growth of *Streptococcus pyogenes*, *Diplococcus pneumoniae*, and *Bacillus anthracis*, whereas 0.05 per cent inhibited the growth of these organisms and moreover that of *Staphylococcus aureus*, *Streptococcus salivarius*, *Corynebacterium diphtheriae*, *Escherichia coli*, and *Shigella paradysenteriae*. A concentration of 0.1 per cent was bacteriostatic for *Eberthella typhosa* and *Neisseria catarrhalis*, but was not sufficient to inhibit the growth of *Pseudomonas aeruginosa*.

## THE OCCURRENCE OF SALMONELLA BLEGDAM IN THE PHILIPPINES

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Of 19 strains of *Salmonella* isolated during the first year of the U. S. reoccupation of the Philippines 4 proved upon full investigation to be *S. blegdam*. This organism was originally described by Kauffmann in 1935—a single isolation from the blood of a middle-aged patient in the Blegdam Hospital, Copenhagen, suffering from pneumonia of the right lower lobe. First given a varietal status, this species differs serologically from *Salmonella enteritidis* primarily in its possession of the “q” flagellar antigen in addition to the “g” and “m”; and from *S. enteritidis* var. *moskow* in its possession of the “m” factor.

Two of the four strains were isolated from the blood of American infantry soldiers showing distinct symptoms of paratyphoid infection; one from the stool of a soldier without apparent enteric fever; and the last from an ulcerative ankle