their respective integrals. Comparisons made on this fundamental basis will then indicate whether some substance "x", under investigation, has altered growth resistance ρ, inductance λ, permittance κ, or that it has failed to do so.

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Physiology of Shigella paradysenteriae var. Sonne.

C. S. MC CLESKEY, H. REYNOLDS AND C. H. WERKMAN.

From the Iowa State College, Ames, Iowa.

The dissimilation of lactose and sucrose by *Shigella paradysenteriae* var. Sonne has been studied to gain additional knowledge of the phenomenon known as "delayed" or "slow" fermentation. The culture (A.T.C. 31) shows in lactose and sucrose the delayed fermentation characteristic of the Sonne type. In Durham fermentation tubes about 4 days are required for acid formation in lactose broth and about 7 days for sucrose. Colonies on lactose or sucrose agar plates are alkaline or neutral but after a few days develop small secondary colonies as papillae which become acid. If a papilla on sucrose or lactose agar is suspended in sterile broth or saline and plated on agar containing the same sugar, 2 types of colonies appear. One type is acid and does not form papillae even after long incubation, the other type is like the original, alkaline and develops acid papillae. Sugar broth inoculated with the acid type colony is promptly acidified, whereas the alkaline type causes the characteristic delayed fermentation.

Attempts to decrease the time for acid formation in the slow culture by transferring once or twice daily to fresh medium with the same sugar have failed, though this procedure has been carried through 60 transfers. One may easily obtain the rapid variant, however, by plating out a culture which has developed acid, the types of colonies developing on the plates being of 2 types, acid and alkaline, as when the papillae from plate cultures are used.

In order to study the fermentation of lactose and sucrose in more detail than was possible using Durham tubes, flasks have been used, and examination made at least once daily to determine pH, titrable acidity, oxidation-reduction potential, sugar utilized, total population and per cent of population composed of the rapid fermenting variant. In sucrose daily determinations have also been

made of formic, acetic, lactic and succinic acids, ethyl alcohol and carbon dioxide.

The typical delayed fermentation of these sugars shows only slight utilization of the carbohydrate until shortly before acidity develops, when the sugar is suddenly attacked. When the culture is aerated 50 to 75% of the sugar may be utilized in a few days, but when not aerated the population remains at lower levels and much less sugar is used.

Following the enhanced utilization of carbohydrate there is an appreciable increase in the total population, and at this time the rapid variant appears. From this time on both types were observed in the cultures, with the rapid variant predominating during the latter phase of the fermentation.

Flasks inoculated with the rapid variant reached a maximum population, greatest utilization of sugar and the medium was acidified on the first day.

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Isolation of a Herpes Virus from Several Cases of Epidemic Encephalitis.*

FREDERICK P. GAY AND MARGARET HOLDEN.

From the Department of Bacteriology, College of Physicians and Surgeons, Columbia University.

The principal reason that militates against acceptance of the one positive hypothesis of etiology in epidemic encephalitis, namely that it may be due to a neurotropic strain of Herpes virus, is the fact that this easily identifiable virus has been isolated in less than a dozen cases of the disease. The only positive isolations in this country are, so far as we know, those briefly referred to in connection with other work.[1] These first American isolations occurred in 3 successive cases of encephalitis after measles in children. The peculiar conditions explain, we believe, 2 of the reasons why more frequent success has not been obtained by others. In each instance the encephalitis occurred immediately after the exanthem, was clinically charac-

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[1] Gay, F. P., Infections of the Central Nervous System, A.R.N. and M.D., 1932, **12**, 191, Williams and Wilkins Co., Baltimore.