

and after an average interval of 13 days, the cycle was resumed. Further injections caused a second cessation of oestrus which persisted until from 4 to 10 days after the last injection. Four rats (14, 15, 16, 17) were given only 1 dose (2 cc.) and no effect was produced. Rat 18 was injected repeatedly with 2 cc. of veal broth without affecting its cycle. Nine rats (19, 20, 21, 22, 23, 24, 25, 26, 27) were given 5 injections of 1 cc. each of a 1-100,000 solution of adrenalin. Then the dose was doubled for 8 daily injections. This caused no effect in 6 rats. In one, oestrus did not take place. Another rat had no cycle. This one died on the 13th day of pneumonia. Four rats (28, 29, 30, 31) were injected daily for 7 days with 1 cc. (representing 30 gm. of adrenal cortex) of an extract made after Swingle's method. This caused no change in the sex cycle.

From these experiments we can conclude that the adrenal cortex contains a substance which inhibits the activity of the gonads of mature animals and that, while the lipoid extract of Swingle contains the principle necessary to maintain life, it does not contain the sex-affecting portion of the adrenal gland.

5762

A Method for Studying the Microscopic Structure of Bacterial Colonies.

S. A. PEOPLES. (Introduced by M. S. Marshall.)

From the Department of Bacteriology, University of California Medical School, San Francisco.

The study of bacterial colonies has in recent years been stimulated by investigations of microbic dissociation. The existence of variant strains, variously developed, which differ in pathogenicity, in biochemical reactions, in antigenic structure, and in colonial characteristics can no longer be doubted. Furthermore, almost no attempts have been made to explain the mechanism whereby bacterial cells pile up to produce colonies varying widely in gross morphology. The relation of pleomorphic bacteria, and of organisms having abnormal staining characteristics, to the development of cells into masses containing tremendous numbers and representing a considerable number of generations is largely unknown. Technical difficulties are responsible for many of these omissions. The ordinary

smear is crude. The impression colony is clumsy, and it is limited to certain types of very small colonies. Legroux and Magrou¹ described a method for making paraffin sections of old colonies of *V. cholerae*, but they found that their method failed with surface colonies because they were washed off by the solutions used. The method to be described overcomes these difficulties, and may be applied to any type of bacterial or mold colony.

Colonies on or in agar medium are used. For surface colonies the medium is warmed to 45°C., and over it is gently flowed 1% agar, melted and cooled to 60°C. Thus a protective layer is formed over the colonies without distortion, the upper layer adhering to the lower. Mold colonies should first be wet with 80% alcohol to prevent the formation of bubbles. When the agar hardens the desired section is cut out and dropped into the fixative. Deep colonies need no preliminary handling. Both 10% formalin and Zenker's solution have been used, with 12 to 24 hours' exposure, with equally good results. From this point the block of agar is treated as any delicate piece of tissue by the usual histologic technic of dehydrating, clearing and embedding. Great care must, however, be used in removing all water by frequent changes of absolute alcohol and in removing all alcohol. Otherwise the agar shrinks and hopelessly distorts the colony, and it becomes rubbery when embedded. In order to bring out individual cells sections must, of course, be cut very thin. With good preparations sections 1 to 3 micra in thickness are possible. Mold colonies, being less compact, are satisfactory in sections of 5 to 7 micra. Sections are spread and mounted in the usual way, and when firmly fixed on the slide they are put through xylol and the alcohols to water. Then any of the usual stains may be applied. The agar does not take a definite stain, but if eosin is put in the dehydrating alcohols a pink background will be obtained. Only a few of the many stains which suggest themselves in this technic have been tried. After staining, the section is mounted in balsam.

The only observations which have been made, using this technic, have been those noted incidentally in the development of the method. Sections of mold colonies reveal diagonal and transverse sections of hyphae and possibly of spores which may be of cytologic interest. Sections of *B. subtilis* colonies, cut transversely, reveal suggestive patches of Gram negative cells on the colony surface, as well as some tendency to pleomorphism on the same surface. A cross section of *Bact. paratyphosum* B, using a rough variant colony, gave a picture of a very densely packed mass of cells, with relatively wide

¹ Legroux, R., and Magrou, L., *Annales de l'Inst. Pasteur*, 1920, **34**, 317.

bands, the significance of which has not been determined. A deep colony of anaerobic species, *Vibrion septique*, in contrast presented a loose or mesh structure composed of filaments of cells bent in an interesting fashion.

5763

Change of Dexterity with Age.*

W. R. MILES.

From Stanford University.

It is a common impression that old age is accompanied by a slowing down of the voluntary processes both muscular and mental. Industrial experience and every-day observation of older adults seem clearly to indicate this change. When decrement begins, the rapidity with which it proceeds and the amount of slowing generally to be expected by the chronological ages of 60 or 70 years, are all, at present, largely matters of personal opinion. The developmental increase, for example, in motor facility from early childhood through adolescence and into adulthood, has been studied extensively. But adults in middle age and in the period of later maturity have not been conveniently available for laboratory investigations and moreover, they seem to have been actually neglected as subject material for psychological experimentation.

For the present study, a "laboratory annex" was set up in a small city and people were secured for experiment and measurement through the coöperation and solicitation of clubs, lodges, churches, and many similar agencies. An individual who came to the annex for the 2-hour series of tests was not paid but the club that sent him was paid proportionate to the person's age. The person himself knew just how much he was contributing to this club. The study includes 166 men over 50 years of age, and 169 males, younger; 302 women over 50 years and 226 women and girls younger than 50.

The total period of measurement was 2 hours in length and included several short tests and experiments.^{1, 2} The present report

* Part of a study on Later Maturity conducted in the Psychology Department of Stanford University, and made possible through a grant from the Carnegie Corporation of New York.

¹ Miles, W. R., *J. of Psychol.*, 1931, **43**, 377.

² Miles, C. C., and Miles, W. R., *Am. J. Psychol.*, 1932, in press.