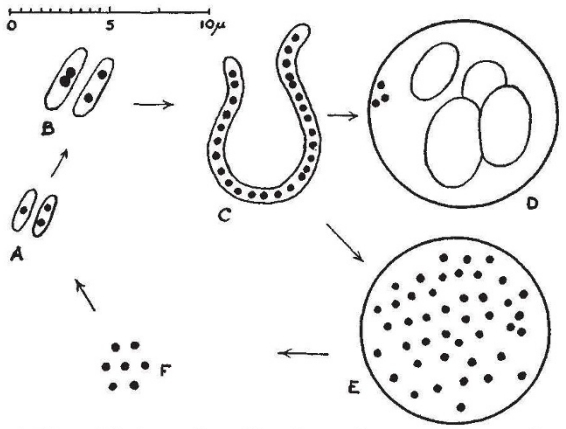
vulgaris (*P.*18 of our collection) on nutrient agar plates containing horse serum and a high concentration of penicillin, the appearance of microcolonies which may be easily identified, owing to their very special characteristics, as colonies of the type *L*. These microcolonies are derived from special large bodies (which, unlike most of the others, have not been lysed) containing numerous desoxyribonucleic granulations, each of them having the dimensions of a normal *Proteus* 'nucleus'. Ultramicroscopical observations and, in particular, histochemical study of the colonies after fixation *in situ* with Bouin's liquid, ribonuclease and desoxyribonuclease treatment[3] and coloration with Giemsa, show that pleuropneumonia-like organisms which constitute them are desoxyribonucleic granulations (isolated or clustered in unmembraned, round, plastic, ribonucleic masses) having the aspect and the dimensions of a normal *Proteus* 'nucleus' (about 0·2–0·3 μ). Such bodies derived from *Proteus* are different from the bacterium itself not only by their dimensions, but also by their high penicillin resistance and their great biochemical need. Serial transfers of microcolonies have been carried out by streaking on a penicillined serum agar medium a square of agar containing them or by incorporation into the new medium of a washing of the colonies with serum broth. In the case of a transfer to a medium without penicillin, quite normal *Proteus* cells soon appear, each of which seems to originate from one of the pleuropneumonia-like bodies.

Hence a bacterium as common as *Proteus* gives, under the action of penicillin, dwarf, submicroscopical, 'filtrable' forms with possible reversion from the dwarf to the normal form (see diagram).



A, Normal *Proteus* cells, resting phase; *B*, normal *Proteus* cells, lag phase; *C*, swarming filament; *D*, large body in lysis; *E*, large body with desoxyribonucleical granulations; *F*, pleuropneumonia-like body (desoxyribonucleical granulations)

Observations concerning such transformations from bacteria to pleuropneumonia-like bodies are not exceptional; probably, in the near future, they will become very common. Klieneberger-Nobel observed some years ago the production of such bodies in *Streptobacillus moniliformis* cultures. Also Dienes has shown that they appear in cultures of *Bacteroides* spp., spontaneously or under penicillin action, with possible reversion in the normal form[4]. He has demonstrated them in some Gram-negative and some Gram-positive sporulated bacteria seeded on a medium containing penicillin. The same author has recently cultivated *L*-type colonies from typhoid bacilli exposed to immune serum and complement[5]. Our observations show that they can also be obtained from *Pasteurella pestis* (E.V.) and *Salmonella enterididis* (*K.*64) in certain circumstances. Thus it seems to be clear that the appearance of such submicroscopical forms is a general phenomenon which is able to intervene more or less easily every time a bacterium is able to produce large bodies spontaneously or after appropriate injurious action.

We are of opinion that these submicroscopical forms of bacteria may be considered as normal resistance forms which the micro-organisms adopt against various noxious agents. They are selected by those agents but not produced by them. They are formed by bacteria which are nearly reduced to nuclei (we are carrying out chemical analysis which will elucidate this point).

The existence of such submicroscopical, filtrable forms of bacteria may have great importance for the pathology of infection. It is probable that they can be selected under various influences or appear spontaneously '*in vivo*', and it is quite possible that their pathological potentialities are different from those of corresponding visible forms. Indeed, it may be that the whole problem of the 'filtrable forms' of bacteria (especially those of *Mycobacterium tuberculosis* and of *Treponema pallidum*) should be entirely re-investigated. This may well lead to the solution of some outstanding general problems of pathology and epidemiology.

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Pneumatocyst of the Physophores

IT has always been supposed that the pneumatocyst of the Physophores is closed; but to-day I was able to observe the escape of the air-bubble from the air-cavity of a young *Stephanomia bijuga*, about 5 mm. in length. It had been placed in 50/50 magnesium chloride (7 per cent) and sea water to relax it; and the escape of the air-bubble took place some twenty minutes later. Twenty minutes after return to sea water, the air-cavity was 60 per cent full of air again.

At the time of expulsion I was examining the nectosac with a high-power objective, and the pneumatocyst was not in the field; so that I only observed the specimen heel over and sink quite suddenly. On examination, the pneumatocyst was found to have collapsed, and there was only a small bubble left at its base.

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