

*The Effect upon Mental Disorder of Localized Inflammatory Conditions.* By EDWIN GOODALL, M.D.Lond., B.S., M.R.C.P., Pathologist and Assistant Medical Officer, West Riding Asylum, Wakefield.

Is the beneficial effect often produced in a case of recent and acute insanity by local inflammation (cellulitis) mainly due to the local disturbance or to a general, systemic disturbance? This question appears to me to have more than a mere theoretical interest, for the following reason:—If the effect noted be due mainly to the local inflammation we may go on applying blisters and equivalent chemical irritants on a sufficiently large scale to the skins of patients; but if the result is to be ascribed solely or largely to the accompanying general disturbance, it will be advisable to consider whether such cannot be evoked with greater certainty and thoroughness than is possible with the means now employed. I much doubt whether local inflammation, the result of chemical irritation, can be compared, from the point of view of influence upon existing mental disorder, with cellulitis\* of unknown origin, such as occurs in the insane. Upon this point it would be instructive to hear the opinions of experienced observers. No one probably will deny that a more profound general disturbance is associated with idiopathic cellulitis than with inflammation due to chemical irritation. If, then, cellulitis is capable of producing the more striking mental alteration, it seems legitimate to ascribe this to the more profound systemic disturbance referred to. The qualitative difference in the nature of the irritants in the two cases possibly entails some difference in the modes of local reaction; even if this be so one would still, I think, be justified in adhering to the conclusion reached, *i.e.*, that the greater mental effect produced by cellulitis is due to the greater systemic disturbance.

If inquiry be made into the causes of the latter, in the case of cellulitis, it is at once apparent that they differ essentially from those operative in the case of "chemical"

\* The occurrence of this cellulitis is a matter of great interest. In cases of general paralysis we may suppose that the vitality of the tissues is so much reduced as to permit the entry (by surface-wound or by the normal passages) and the development of organisms incapable of flourishing in the healthy body. In other cases this explanation is far less plausible. May not the ordinary othæmatoma be the product of bacterial activity?

inflammation. In cellulitis there is more than fever: toxic products are being conveyed through the body. With the degree of toxicity we are not now concerned—all that it is necessary to point out here is that pyogenic cocci are present at the site of inflammation, and are there producing a toxine, which we must suppose to be diffused over the system. In inflammation aroused by blisters, croton oil, etc., the question of an organism does not arise; we have not to do with a circulating toxine. A rise of temperature may occur, and this may or may not be an indication of fever.

The question as to the extent to which the circulation of toxic products is concerned in the production of the mental alteration often noted in cases of cellulitis amongst the insane is one capable of scientific determination. The necessary procedure involves a minimum of risk, for the amount of toxine introduced into the body can be absolutely estimated. Here is no question of the multiplication to an incalculable extent of a living organism. The quantity circulating is the quantity introduced, and no more. The direct transference from one patient to another of inflammatory exudate or pus from an acute abscess might be regarded as unjustifiable on the ground that, for all we know, the organisms producing these disorders are capable of causing pyæmia. But until it is shown that the toxins or metabolic products of these organisms are capable of producing inflammation and abscesses at parts remote from the seat of inoculation, the argument just mentioned cannot be urged against the proposal to inject the product of metabolism, freed from the organisms themselves. The chances of grave septicæmia must be but slight, otherwise we should meet with this complication oftener in cases of spontaneous cellulitis. By preliminary animal experimentation, by attention to technique, and by the injection, in the first instance, of minute doses, the risk of untoward consequences would, I believe, be rendered insignificant.

The material used for injection should be the product of organisms proved to be capable of provoking well-marked cellulitis. In a case in which the writer injected the products of metabolism of staphylococci from an acute and rather large boil into a patient there was practically no general disturbance; the slight rise of temperature ( $100^{\circ}$ ) and the malaise were adequately explained by the local inflammatory condition. The material injected was probably incapable of producing noteworthy systemic disturbance,

but some swelling and brawny induration around the seat of injection, with pain on pressure, bore testimony to a local reaction, though one mild in degree. This was not anticipated, as the culture had been carefully filtered, so that the presence of organisms was extremely unlikely. Even had an organism or two been present it is, I think, very improbable that such could have produced the local disturbance noted within the time which elapsed between injection and the appearance of local reaction (about 20 hours). But the likelihood is that the latter—which was but slight—was due to some irritating property of a chemical kind of the fluid injected, which, I believe, was quite sterile.

The following is in brief the procedure adopted in this case to obtain the products of growth of the micro-organism. It is not new, but may be of use if mentioned here. Pus was obtained from the boil after its surface had been cleansed (sublimite, alcohol, and ether). A cover-slip preparation of the pus showed diplo- and staphylococci. Tubes of broth were inoculated and kept in the incubator until they showed well-marked growth. Pure cultures of the cocci were obtained from these after the ordinary method of Koch, and from them a large quantity of broth was inoculated. After a couple of days in the incubator abundant growth was manifest in this. The bulk of the turbid broth was then filtered through a KITASATO porcelain filter, which had, of course, been sterilized. In this method the glass vessel surrounding the hollow porcelain cylinder is exhausted of air by a water-pump. The sterilized fluid falls from the porcelain at the rate of about five drops a minute. This is fast enough. A rabbit was injected with the filtrate (after cover-slip preparations of the latter had been made and shown to be free from bacteria) on two successive days. Altogether 25 min. were introduced. The animal seemed to eat less, but otherwise there was no evidence of local or general disturbance. The patient was then injected subcutaneously with 14 min. of the filtrate, the syringe (improved pattern used for tuberculin injection) having been properly cleansed.

The object of this paper is to put the question whether, by imitating what may be termed the method of nature, as displayed in the particular instance in point, we may not hope to bring about or accelerate cure in recent and acute cases of insanity, and to suggest that the imitation hitherto attempted is very imperfect and capable of considerable improvement.