cutaneous; the point appears to be worthy of further investigation.

Lintz's observation that certain reactions followed immediately upon injection in his earlier cases (Freyberg observed similar effects in some cases), but ceased to happen when the method of preparation of the injection was altered, appears to indicate that some other factor than metallic gold played a part. It would be interesting to know if this reaction occurred after a first dose or only after later ones; in the latter case an acquired sensitivity to some constituent seems a possible explanation. If this is so, the administration of calcium with the gold which has been advocated by some would seem to be a good practice.

Gold has not hitherto been tried extensively in fibrositis, and the observations of Tarsy would appear to call for a more extensive trial of the colloidal form in suitable cases, preferably those which are apparently due to toxins of bacterial origin rather than to metabolic or traumatic causes. This is important in view of the probability that the diagnosis of fibrositis is made in cases of widely differing nature and aetiology.

While the bacteriostatic action of gold in the plasma must be regarded as of great importance, the fact that colloidal gold was found by Tarsy to be effective in a good proportion of cases, while no bacteriostatic effect could be detected in the serum, seems to indicate the importance of some other mode of action in addition.

The fact that some of the researches which have been discussed are still being carried on justifies the hope that the value of chrysotherapy will be clearly demonstrated apart from clinical experience, and that sound principles for its use will be established.

C. W. Buckley.

Effect of Influenza Virus on the Haemolytic Streptococcus.

There would appear to be abundant evidence that streptococcal infection of the upper respiratory tract, especially of the tonsils, may be closely associated with the genesis or recrudescence of rheumatism. Factors influencing the pathogenicity of this streptococcus, therefore, are of special interest because of their possible importance for arriving at a correct interpretation of the present evidence concerning the aetiology of rheumatism.
THE RHEUMATIC DISEASES

In a recent contribution to the British Journal of Experimental Pathology (1941, 22, 91-107) C. H. Andrewes and R. E. Glover describe the result of an experimental study of the conditions under which influenza produced in the ferret by human virus A is transmitted through the air. When material containing the influenza virus is instilled into the nares of the ferret, that animal after an incubation period duly develops the disease, proof of which is afforded by the temperature response, symptoms, and if need be by an immunity test. Careful experiments indicated that in still air, such as obtains in cubicles when windows and doors are closed, influenza virus could spread through the air from the respiratory tract of one ferret to that of another for a distance of 5 feet on the level, and even for 3 feet above the cage in which the "donor" ferret reposed. Screening and dilution of the air by opening the window appeared to reduce the risk of infection; but further observations on this are needed.

In the pandemic of influenza of 1918-19 that spread over the world and is estimated to have killed twenty million people, an increase in the severity of the disease in man was frequently observed when the haemolytic streptococcus became involved in the infection. It is of particular interest, therefore, that in course of the transmission of influenza virus A through the nasal passages of a series of ferrets Andrewes and Glover encountered a similar increase in the severity of the disease when a haemolytic streptococcus was found to be co-operating with the virus. The opportunity was taken by Glover to study the part played by this streptococcus in the combined infection, and also the extent to which it was sprayed out into the surrounding air by an affected ferret. The streptococcus belonged to Lancefield's Group C, and in Glover's view it was probably present in the respiratory tract of one of the ferrets in the transmission series, being stirred into activity by the influenza virus and carried on by the subsequent passage.

By instilling cultures of this haemolytic streptococcus into the nares of ferrets and then sampling their nasal secretion, Glover found that by itself this streptococcus was incapable of infecting the nasal mucosa. On the other hand, when influenza virus was also present, the streptococcus established itself on the nasal mucosa with ease and flourished there. Similarly, when normal ferrets were placed in close contact with doubly infected ferrets the streptococcus invariably established itself
in their noses, and when the animals were separated by an air barrier of 4 feet the streptococcus failed to infect normal ferrets, but did infect the nasal passages of those suffering from influenza A. A further point of interest was that when the presence of the virus enabled the streptococcus to become established, the streptococcus could be recovered from the nasal mucosa, the turbinates, and also from the tonsils in which it appeared to persist longest.

A previous experimental study of the effect of a virus on the pathogenicity of the haemolytic streptococcus was reported in a preceding number of the Annals (1939, vol. i, No. 1). The animal used was the rabbit, the route of injection the vein, and the lesion produced arthritis. The virus employed was the M4 strain of vaccinia of Tulloch with its pathogenicity brought to the maximum by recent passage and repeated dose. Foci of periarticular fibrositis were produced in the rabbit in which lymphocytes predominated and the virus was present in large numbers. In course of these observations definite evidence was found that the virus increased the pathogenicity of the streptococcus, and vice versa. In the tissues infected by a mixture of the two the virus appeared to be the stronger, the streptococcus disappearing. The suggestion was made that something similar might be taking place in acute rheumatism. The present observations of Andrewes and Glover, however, are of far more interest because there the normal nasal mucosa was the testing ground, and the other conditions were a closer approximation to those obtaining in man at the onset of rheumatism.

M. H. G.