Apart from the feeling of intense heat in the skin, which comes on during or immediately after the injection, and persists only a few moments, the intravenous injection of calcium thiosulphate has been uneventful. Where it was possible 0.6 gram was administered daily for three days, then bi-weekly injections were given. Where sodium thiosulphate was given the first injection was 0.6 gram, and subsequent injections 1 gram.

CONCLUSIONS

The results of the calcium thiosulphate treatment of six cases of intolerance to "914" or bismuth are reported; in these cases calcium thiosulphate appeared to exert a definite curative influence. The total number of cases treated is, however, small, and more widely extended observations are necessary before any final conclusions can be reached as to the place of this drug in the control of the sequelae of arsenicals and bismuth.

BIBLIOGRAPHY

- Blum, L.: *C. R. Soc. de Biol.*, December 18th, 1921, p. 1156.
Chiari and Januschke: *Arch. f. Exp. Path. u. Pharmacol.*, 1911, lxx, 120.
McBride, W. L., and Dennie, C. C.: *Arch. Derm. and Syph.*, 1923, vii, 63; *Journ. Amer. Med. Assoc.*, 1924, lxxxiii, 2082.
Ravaut: *Presse Méd.*, 1920, xxviii, 73.
Schamberg, J. F., and Brown: *Proc. Eighth Internat. Congress Derm. and Syph.*, Copenhagen, 1930.
Schamberg, J. F., and Wright, C. S.: *Syphilis*, 1932, 252, 286.
Schoch, A. G.: *Internat. Clin.*, 1931, ii, 227.
Wright, A. E.: *Lancet*, 1896, i, 153.

A NOTE ON MONILIA INFECTION OF THE RESPIRATORY TRACT

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In Jersey during 1932 568 patients had their sputa examined both by direct and by cultural methods. As a result, they can be classified as follows: T.B. + = 103, monilia + = 294; negative to T.B. and monilia = 171.

When the sputa from a patient are repeatedly examined over a long period, direct and cultural examination shows varying flora; the only organism which on culture is persistently present is monilia. Apart from the fact that monilia is frequently associated with pyogenic organisms, its action in the respiratory tract will here be discussed from two points of view—the mechanical and the allergic. When incubated at blood heat and in suitable fluid media, monilias can be divided into three groups, according to their method of growth:

1. Those which grow round the glass of the test tube in what is known as "collar" formation.
2. Those which grow over the surface of a medium in a continuous sheet.
3. Those which, starting as "islets" on the surface, grow into a sheet as under 2.

Monilias stain with all ordinary stains, and are practically all Gram-positive. When stained by the Ziehl-Nielsen method they are found to contain acid-fast granules. In the human being the ordinary condition of "thrush" (monilia) is to be seen on the mucous membrane of the mouth, and consists of the well-known whitish patches, which on removal frequently show ulceration of the underlying mucous membrane.

Mechanical and Allergic Manifestations

It should not be difficult to appreciate what is likely to occur when monilias infect the air passages. If we compare the bronchi and the bronchioles to test tubes we can visualize monilia growing in the air passages either in "collar" or in "surface" growth formation. Monilia growing on the mucous membrane of a bronchus would

give rise to a patch, and would tend to spread round the bronchus in "collar" formation. Ulceration is likely to occur, and haemorrhage will result, giving rise to blood-stained or pinkish sputum; the irritation of the condition sets up a cough, and results in a weakening of the bronchial wall and consequent dilatation. Where the condition has existed for a considerable time irregular thickening and dilatation of the bronchial tree occurs. This bronchiectatic condition is well seen on x-ray examination, and is referred mostly to the bases. In these cases the brunt of the infection falls on the bronchial tree. A second type of case can be referred to Groups 2 and 3 above, where, in the smaller bronchioles, the growth produces occlusion and collapse of the alveoli at the distal end, with consequent cavitation. Such cases show "fluffing" of lung tissue on x-ray examination. The above conditions are frequently found in combination.

The allergic manifestations connected with moniliasis are similar to those connected with other diseases of the lungs and of the respiratory tract where allergy is found to be present—hay fever, asthma and bronchiectasis, and tuberculosis. Allergy is due to the sensitization of the body to a foreign protein, and for the purposes of this paper it is not necessary to discuss whether the foreign protein concerned is of vegetable or of animal origin. Is it possible that there may be a common factor, a foreign protein, which gives rise to allergic manifestations? To attempt to prove this one must take each disease separately. In hay fever the chief pollen held responsible for the condition is that of Timothy grass. This grass has a well-known acid-fast bacillus associated with its name. Turning to asthma, Storm van Leeuwen has shown that many asthmatics give a positive von Pirquet—that is, they are allergic to tuberculin. True spasmodic bronchial asthma is recognized as not due to tubercle infection, yet these cases are sensitive to tuberculin, which contains acid-fast substance. As regards tuberculosis, the von Pirquet and the Mantoux reactions are recognized as pathognomonic of tubercle infection. Now, both in asthma and in bronchiectasis monilias are present, and, as recorded above, monilias on staining by the Ziehl-Nielsen method are found to contain acid-fast granules. The amount varies according to the strain of monilia and according to the medium on which it is grown. Cultures on agar give a far greater acid-fast granule content than do cultures grown on Sabouraud's medium. Cases of these monilia infections give rise to cuti-reactions when tested with monilia vaccine.

One common factor in these diseases, then, is that the organisms connected with them are recognizable by the presence of acid-fast substance, and it is suggested that the "foreign protein" which is common to all is this acid-fast protein, and that allergic manifestations are due to it.

CONCLUSIONS

The presence of monilia in chronic lung infections gives rise to pus formation. Apart from this, monilias have a mechanical action. This mechanical action is due to the local growth of monilia on the mucous membrane, similar to the growth of monilia ("thrush") in the mouth. Two types may be recognized, one affecting the bronchial tree and resulting in a bronchiectatic condition of the air passages, the other occurring as the result of occlusion of the bronchioles and collapse of the lung alveoli, the brunt of the infection falling on the lungs. Monilia infection gives rise to allergic cuti-reactions. Such reactions are known to occur also in hay fever, asthma, non-tuberculous broncho-pulmonary lesions, and in tuberculosis. A common factor in all these diseases is the presence of acid-fast substance in their respective causal organisms. It is suggested that the foreign protein which is responsible for allergy is this acid-fast substance.