

hours, when it is noted to gradually fade. This local reaction, of course, varies in different individuals from a very small urticarial elevation to one of three or four inches in diameter the erythematous base varying in proportion. Well-marked local wheals have been found in 23 per cent. of all injections.

*Etiology.*—At first I thought it was due simply to mechanical causes, the wheal being produced by the fluid injected filling the lymphatic spaces and causing the blood to be forced from the vessels in the immediate neighborhood and explained the redness and congestion which occurred about the wheal, in areas not directly exposed to mechanical injury, in the same way that injury to the cornea causes reaction in the conjunctiva by reflex vascular innervation; or to the excitability of the peripheral vasomotor nerve centres in the vessel-wall, being reflexly affected by nerve injury at the point of injection. At present I doubt very much whether simply the distending of the lymphatic spaces and the local injury can be counted to any great degree as a factor in producing the edema and surrounding erythema, as considerable time elapses before the true wheal is produced, and from the fact that in one type of general reactive disturbance we find urticaria widely distributed on different parts of the body. This one might attempt to explain as due to reflex causes produced by local injury; but they are too widespread and not symmetrical. The toxic theory is the most likely one and would explain both the local and general reactive disturbances. A substance foreign to the blood is taken into the circulation and it either acts *per se* or by some chemical change, possibly on the peripheral vasomotor nerve centres in the vessel-wall causing dilatation of vessels, slowing of the blood-stream and marginal derangements of the whites with exudation of blood plasma on account of increased permeability of the vessel-wall; but more probably, as Phillippson states in the *British Journal of Dermatology*, January, 1900, opposing the current opinion that urticaria is due to reflex nervous action on the blood vessels, agreeing with Heidenhain as to the secretory action of the vascular endothelium, and that the edema is caused by direct action on the endothelium of the vessels, due to excretion of toxin, and concludes that urticaria is a mild inflammation of low intensity exerting local action.

Now the question of susceptibility suggests itself, in which case these urticarial elevations produced at the site of injection are local manifestations of general constitutional effects, the manifestation at the one particular point being due to local injury and decreased vitality.

Let us consider now the general type of rash, and we find that this theory is further borne out by the fact that of the ninety-six injections which were made on July 10th, 1902, 16,