merozoites take an abnormally long time to develop, or whether numbers of parasites are destroyed and others from the internal organs take their places, it is impossible to say. The increase as the parasites developed from the ring to the half-grown stage was present, at some period, in ten out of fourteen cases, but in 60·9% of the number of transitions from the one stage to the other.

In four patients the parasites remained very scanty during the first few days, suddenly to increase later. In five out of ten patients a relationship was found between the numbers of parasites and the degree of fever. In these five cases the same number of parasites was not accompanied by the same degree of fever in different patients, but as the temperature became greater the parasites increased, and decreased as the rises of temperature became smaller.

The number of gametocytes was enumerated in cases in Series 2 and 3. The error in Series 2 is 25%, as with the asexual forms. The curves are more regular than in the case of the asexual forms, but there is a tendency for the numbers of the gametocytes to vary with the numbers of the asexual types. J. R. LORD.

Basal Metabolism as Determined by the Respiratory Exchange. (*Proc. Royal Soc., B, vol. ci.*) *Pickworth, F. A.*

SUMMARY.—The numerous determinations of the basal metabolic rates by the bag method have involved certain variable and preventable factors, such as muscular tonus and attention, which may have considerably obscured the results; and the usual accepted limits by this method of up to 15% are too large, so that more refined methods of investigation are needed.

The paper shows how figures can be obtained which approach more nearly the true basal rate; and by reducing the magnitude of certain variable factors results more than 20% lower than those by the bag method are obtained with normal subjects.

The effect of various factors upon the metabolism has been studied and figures illustrating the effect of relaxation of mind and body sleep, fatigue, diet, irritation, hot baths, etc., are given.

J. R. LORD.

The Pathological Effects of Hypnotic Drugs upon the Central Nervous System of Animals. (*Brit. Journ. Exper. Path.*, 1926.) *Mott, Sir F. W., Woodhouse, D. L., and Pickworth, F. A.*

The occurrence of mucinoid material in such remarkable amounts in the nervous system of the treated animals is the most interesting feature of the effects of continued treatment with hypnotic drugs.

Although the drugs sulphonal and veronal have been isolated from brain-tissue (Russel and Parker, 1914), and might be present in the nervous systems of animals treated as above, the mucinoid substance does not consist of these, but it shows entirely different physical properties. It also appears improbable that substances of such widely different chemical constitution as the barbitone and sulphonal groups of drugs would combine with the mucinoid material.

So far we have not been able to demonstrate the substance in living tissues, and it is only after formalin fixation that it appears in characteristic form.

The mucinoid substance occurs sometimes actually within the nerve-cells; it is therefore probable that it is a metabolic product of the nerve-cells themselves which have been damaged by the drugs; also many cells have the Nissl substance much diminished, whilst others are disintegrated completely, leaving only an outline with masses of mucinoid lying adjacent to them, and phagocytic glia-cells apparently digesting the remnants. Possibly the mucinoid substance is itself a product of the ordinary metabolism of the neurones, which normally is quickly removed and thus never accumulates into large masses. Under the action of the drugs, however, either much larger quantities of the material are produced, or it is not removed so readily, therefore accumulating within the cells and adjacent to them, and in time aggregating into large masses filling the perivascular and lymph-spaces in the neighbourhood.

The experiments show that it disappears on ceasing administration of the drugs, and the animals soon regain their activity and intelligence.

The permanence of the damage done is, however, difficult to estimate, since histologically we have shown that many nerve-cells are damaged beyond hope of recovery.

Scharlach R and other fat lipoid reagents do not stain the substance in formalin-fixed sections, consequently the material described above shows differences from the lipoid excretions described by Orr and Sturrock (1922), Buscaino (1914) and other workers.

It is submitted that incidental to the demonstration of this material in formalin-fixed sections in drug-treated animals, the presence or absence of this material suggests further research into the metabolism of the neurones, and we are continuing investigations upon these lines.

SUMMARY.—(1) In all cases where hypnotic drugs are administered over a period of seven or more days, numerous masses of a peculiar mucinoid material 5 μ to 60 μ in diameter are found distributed throughout the central nervous system. Normal control tissue shows complete absence of this material. The fixed material in its staining reactions shows properties somewhat similar to amyloid.

(2) Chromatolysis, loss of Nissl substance and signs of cell degeneration are observed in the cerebellum, mid-brain and spinal cord after intensive treatment with any of the hypnotic drugs. The cell degeneration is accompanied by the appearance of numbers of phagocytic cells, which appear to digest the nerve-cells.

J. R. LORD.