by a minimal quantity of oxidising agent (ferric chloride or hydrogen peroxide) in the presence of tissue extracts. The extracts are inhibitory to the oxidation, apparently through combining with the oxidising agent, and female extracts are typically more effective than male, *i.e.* the Joyet-Lavergne effect produced with the leuco-dye. This test is more obvious than the Joyet-Lavergne and more constant than the remainder.

(3) Oxidation of *p*-leucaniline by excess of oxidising agent in the presence of extracts. The inhibitory effect observed under (2) is now destroyed, and the female side usually presents the deeper colour of dye. Evidently there are at least two factors which set up the oxidation conditions of the extracts, and a reducing factor which is present in greater force in females is destroyed by the oxidising agent. This is the Falk and Lorberblatt test.

(4) Destruction of *p*-rosaniline by potassium permanganate in the presence of tissue extracts. Potassium permanganate enters into combination with the extractives, quantitatively more so in female extracts which may therefore be considered the more reducing, the remainder is free to destroy the dye, and does so more rapidly in the case of males probably because they remove less permanganate. It is necessary to destroy the excess of permanganate by introducing a reducing agent, sodium thiosulphate or allyl thiocarbamide (thiosinamine)—but these apparently do not themselves decolorise such dye as may be unacted upon, except on very long standing or heating.

This is the Manoilov test; it is, in general, the most brilliant of the series.

(5) Schiff's rosaniline and sulphur dioxide test for aldehydes. Minute quantities of aldehydes (which restore the colour to this colourless compound) are very rarely present in fresh extracts, and then usually in males. If the solution be heated, the colourless compound dissociates and the full colour of the dye appears, to disappear again by recombination on cooling if the whole of the sulphur-dioxide be not boiled away; in the presence of tissue extracts the same phenomenon takes place, but (typically) on the male side the colourless compound is reformed much more slowly and less readily, which may possibly indicate that a factor which is capable of combining with and so removing sulphur-dioxide is more predominant in the male sex.

The tests may be applied either to aqueous (trichloroacetic acid) or alcoholic extracts, but with the exception of No. 5 they are more successful when the reaction is strongly acid; I have failed to confirm Falk and Lorberblatt's observation that the presence of protein greatly enhances the disparity between the sexes, at least in trichloroacetic acid extracts. Alcoholic extracts still exhibit differences after keeping for eighteen months, but dried tissues do not keep well.

It must be clearly understood that the tests are so delicate that some noticeable difference between two extracts is almost always observed, and that equally differences can often be discovered between two samples of the same extract as a result of faults in technique; moreover, biological conditions such as nutrition and maturity themselves produce profound effects and may be compared by these tests one with another, so that the distinction between a pair of extracts which differ only in sex is occasionally not at all obvious and still more frequently is 'reversed.'

I cannot subscribe to the view that these methods are 'tests for sex'—they are tests for certain oxidising or reducing properties in the setting up of

which more than one chemical factor plays a part, although they are undoubtedly closely associated with sex and also with other biological conditions.

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Metallurgical Photomicrographic Apparatus.

THE article on Metallurgical Photomicrographic Apparatus which appeared in NATURE of Oct. 8 can scarcely be considered satisfactory to those who desire to know the essential requisites of such an apparatus.

While certain engineering details are minutely discussed, scarcely any attention is paid to the essential requirements of such instruments, namely, the quality of the optical train and the methods of illumination.

In photographing the extremely fine structure of metals, methods of illumination have been recently introduced which require adjustments on the apparatus which are not always provided. The method employed by Mr. Harold Wrighton in revealing structure of the order of 140,000 lines to the inch, and the new method of illumination devised by Prof. Carl Benedicks, are examples, and certain of the British instruments referred to are better equipped with these adjustments and are to be preferred.

With regard to the mechanical points which are discussed, the author, discussing the form of the optical bench, states that with the elongated triangular prism "freedom of movement and accuracy of adjustment might be obtained," and then makes the very definite statement that "it is impossible to machine the surfaces with the desired degree of accuracy to avoid shake." This is not the case if the triangular bar is machined with ordinary engineering accuracy, and the saddles bear on suitable surfaces unless the clamp is badly designed. The lathe bed type of a 'V' and a flat is an equally good design if the clamp is properly applied, as is also the parallel bar when properly constructed.

The geometric design depends for its accuracy on the accuracy of the bar, but the principle is not preserved when the apparatus has to be clamped securely in position. It must also be borne in mind that the design should be such that the apparatus can withstand wear, and to secure this sufficiently large bearing surfaces must be provided. The substitution of surfaces for points in a geometric design practically cuts out the geometric principle.

With regard to the focussing adjustments, it is difficult to see a convenient design in which both of the two focussing adjustments can be made without an overhanging weight, and as the coarse adjustment can be clamped and the fine adjustment cannot, it is much more desirable that any overhanging weight should be avoided on the fine adjustment. In a well-made fitting it does not cause any noticeable sag, but it has a marked tendency to cause 'sticking' in a fine adjustment, due to the lubricant being squeezed out from certain portions of the slide, causing metal to metal contact.

After all, there are various ways of providing convenient and efficient movements and adjustments for employing the optical equipment, all of which if properly made are satisfactory in use.

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It is, of course, well known that for satisfactory work in any branch of microscopy, excellence of the optical parts of the apparatus is a prime essential.