disappointing from the point of view of the 'chemical' hypothesis, but it does not exclude the conception suggested by the phrase 'virus-enzyme', as such a substance might be expected to be insoluble in acetone.

E. M. FRAENKEL.
C. A. MAWSON.

John Burford Carlill Laboratories,
Westminster Hospital Medical School,
London, S.W.1.
Jan. 19.

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Measurements of Oxide Films on Copper and Iron

RECENT letters from Dobinski[1] and Nelson[2] report the rapid appearance of oxide upon unheated copper and iron on exposure to air. This oxide, which doubtless causes the rapid change in the behaviour of these metals to silver and copper nitrates respectively[3], can be estimated by measuring the number of millicoulombs needed for its cathodic reduction. The principle was formerly used to measure silver iodide films[4], and gave numbers agreeing with both gravimetric and iodometric methods. For oxide films it has yielded results in reasonable accord with optical[5] and gravimetric methods (see accompanying table), and consistent with early chemical determinations made on the films after stripping[6]. Former disagreement between gravimetric and optical methods has been largely due to neglect of invisible films, or to different meanings attached to the term 'thickness' as applied to a non-uniform film on an uneven surface.

THICKNESS (MEAN GENERAL INTERCEPTS*) OF OXIDE-FILMS.

Iron tinted to:	Electrical (New)	Optical (Constable)	Gravimetric† (New)
Straw	440A.	460A.	390A.
Reddish yellow	530	520	470
Red brown	560	580	500
Purple	625	630	560
Violet	695	680	625
Blue	725	720	650

Copper tinted to:	Electrical (New)	Optical (Constable)
1st Order		
Dark brown	370	380
Red brown	410	420
Purple	460	450
Violet	485	480
Blue	520	500
Silvery green	800	880
2nd order		
Yellow	940	980
Orange	1,170	1,200
Red	1,240	1,260

* We believe that both electrical and optical methods give the mean of the intercepts made by normals to the *general* plane of the surface. Some authorities prefer to use the word 'thickness' as denoting the mean intercept made by the *local* normals; if so, it is necessary to divide by the specific surface.

† The invisible oxide present on the surface during the first weighing must be determined electrically; the effect of *embedded* oxide will be considered in the Carnegie Scholarship Memoirs, vol. 25.

Having thus been tested on films of the interference colour range, the method has been applied to measure the invisible oxide produced on copper in a desiccator at 18° or in a furnace at 62° C. The points on Fig. 1

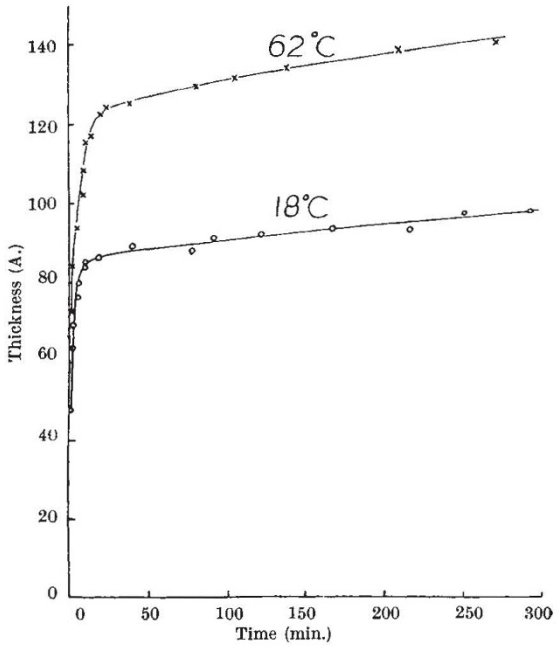

Fig. 1.

(each the mean of at least four determinations) may all be affected by a constant 'zero-error', due to eutectic oxide or other causes; this will not influence the shapes of the curves.

Additional results on iron will appear later in the Carnegie Scholarship Memoirs, vol. 25.

U. R. EVANS.
H. A. MILEY.

Metallurgical Laboratories,
University, Cambridge.
Jan. 18.

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Exchange Reactions of Iodine Compounds

JULIUSBURGER, Topley and Weiss[1] found by the artificial radioactive indicator method that an exchange takes place between sodium iodide (*c.* 0·5*M*) and methyl iodide (*c.* 2*M*) in alcoholic solution at room temperature; the exchange is complete in a minute or two. Under similar conditions, allyl iodide exchanges with sodium iodide, but ethyl, propyl, isopropyl and methylene iodides do not; nor does iodoform exchange in acetone solution. Further, Glückauf and Fay's[2] successful concentration of active iodine from methyl iodide after neutron bombardment shows that no appreciable exchange occurs between iodine and methyl iodide in the absence of a solvent.

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