Range of radiation: This, of course, depends on the materials involved. Exposures at a distance of 3 in. produced the effect on the X-ray film. Using the usual extrapolation techniques, the indication is that the radiation may extend to as much as 6 in. Also at 3 in., the same results were obtained with the radiating materials above, below or to one side of the films. It is considered that this would not occur if the effect were due to a gas or vapour.

Also, the effect on the X-ray film has been obtained through thin sheets of aluminium foil, mica and up to 0·5 mil. 'Mylar' sheet. Whether the actual original radiation goes through these materials is open to question, for it may be another case of transfer as described here, the intervening materials re-radiating to the film on the other side.

Life of the radiating bodies: Experimental results indicate that, so long as the materials remain in the same condition, they will continue to radiate in the same way. Since, however, some oxidize, others such as plastic materials polymerize and set, etc., their radiating characteristics change.

All films referred to as X-ray films were Eastman 'No screen' X-ray films. A few attempts were made to use other films such as 'Tri*X*' and 'Panatomic', but without success.

The literature as listed here[1–3] mentions the 'Russell effect', which ascribes the effect of various materials on photographic films to the production of hydrogen peroxide, which reacts chemically with the films to produce the effect. In those cases ordinary films were used, and there is no doubt that hydrogen peroxide affects the films. In the above work, the effects were obtained only on X-ray film and were obtained under conditions such as vacuum, inert atmosphere and time where no such peroxide would be formed. This would indicate the presence of a radiation of a type for which these X-ray films are designed. It is therefore suggested that these radiations are a soft electron or β-type radiation with a range of as much as 6 in. from the source. The agency producing such radiations is somewhat obscure. It would have to be something which depends on the kinetic condition of the source, since production of the radiations is varied by conditions such as atmospheric content and pressure, vacuum, temperature, etc. More experimental work is needed to determine the exact nature of the agency causing these radiations.

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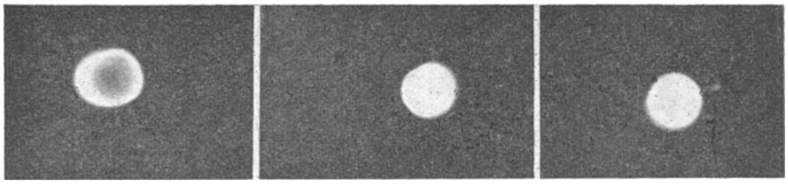

Fig. 1 Fig. 2*a* Fig. 2*b*

Fig. 1. Film exposed to hydrogen peroxide vapour for 1 hr.
Fig. 2*a*. As in Fig. 1
Fig. 2*b*. 'Transfer' from 2*a*. Time of transfer, 22 hr.

We wish to report the following experiments which were designed as a consequence of McLean's observations reported here.

In our experiments we also used X-ray film, Kodak 'Crystallex', which is a standard material for X-ray diffraction work. Two series of experiments were carried out. In the first, the film was exposed for various times to hydrogen peroxide vapour by placing it above a dish containing the liquid. The film was then processed in the normal way. An example is shown in Fig. 1. (Compare with Fig. 1 of McLean.) In the second series of experiments a film which was exposed to hydrogen peroxide vapour, but not developed, was placed in contact with a fresh film. The two films were then developed and a transfer effect was observed as can be seen in Fig. 2*a* and 2*b*. (Compare with Fig. 3 of McLean.) We believe that the vapour particles attached to the original film were transferred to the second, resulting in the same effect as in the first series of experiments.

We made no attempt to reproduce McLean's 'transmission' effect using hydrogen peroxide; little information is given in the original work. It would be interesting, for example, to have such data as the porosity of the aluminium foil used, also the relative intensities obtained.

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Initial Vibrations of a Supported Beam

The theory of steady flexural vibrations of a supported beam is well known, but that concerning the initial vibrations produced by impact seems to have received little attention. We have therefore carried out experiments on the subject.

Flexural vibrations of metal strips were initiated by striking the strips normally to the greatest area with pendulum-type hammers. The vibrations were examined by using a variable-reluctance transducer coupled through an amplifier to an oscilloscope. The movable component of the transducer was fixed to the beam or was formed by the beam itself when steel ones were used. The conversion characteristics of the transducer were found to be nearly constant with frequency for the small amplitudes of vibrations obtained in the experiments. The metal beams were all 2·54 cm. × 0·318 cm. × 40 cm., and were supported on knife-edges placed as closely as possible to their ends. Hammers made of various materials were used and were shaped to give approximately point contacts on the beams. Soft hammers, such as those made from cork or rubber, were found to result in a single impact, as shown by George[1] and Cliffe[2] for soft hammers striking pianoforte strings.

Figs. 1 and 2 show the oscilloscope trace obtained when a mild-steel beam was struck by a soft hammer at its centre, where the transducer was also located on the reverse side of the beam. In Fig. 1 the small timing pulses are spaced at intervals of 20 msec.