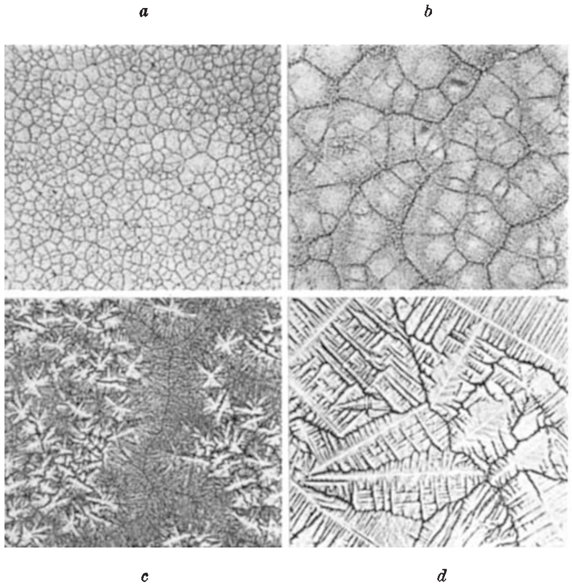

Fig. 1. *a*, Pure lead, treated in Worner and Worner's reagent and then in concentrated nitric acid, s.g. 1·42; *b*, as *a*, but finally treated in nitric acid, diluted 20 per cent; *c*, as *a*, but finally treated in nitric acid, diluted 30 per cent; *d*, as *a*, but finally treated in nitric acid, diluted 40 per cent. (All × 300)

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[1] Hooker, E. J., *J. Inst. Metals*, **86**, 98 (1957–58).
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Anomalous Atmospheric Refraction at Sea

During the Atlantic crossing on Research Yacht *Princess Waimai* in 1954, to increase the accuracy of navigation astronomical sights were taken, as a rule, in series of observations: the noon sight series, extending usually for about an hour, with the Sun's culmination in its middle, 9 a.m. and 3 p.m. series, extending for about 20 min. Observations were taken about every minute. In all, 46 noon sight curves were obtained and 72 others, all in good weather conditions, within the tropics. The sextant used was a Henry Hughes instrument, with a recent class *A* National Physical Laboratory certificate. The height of the eye varied for different series of sights between 6 ft. and 10 ft.; estimated accuracy of observations within $\pm 0 \cdot 5$ min. of arc.

Considering all the material, it appears that 24 per cent of sight points deviate by 2 min. of arc or more, and ½ per cent by 5 min. of arc or more, from interpolated curves.

Deviating points rarely appear at random, but rather in groups of three to five consecutive points, showing the same sign of deviation. But when a deviating group covers the culmination, there is often change of sign of deviation when the culmination is passed, that is, when the azimuth changes very quickly and the telescope sweeps over large stretches of the horizon between two consecutive sights. Groups of points deviating on either side of the curve are equally frequent. Morning sights show the lowest deviation frequency, namely, 15 per cent. There is little difference in frequency between noon and afternoon sights.

A plausible explanation of this phenomenon seems to be fluctuations of horizon height due to anomalous atmospheric refraction.

Some experiments have also been devoted to sextant optics. It was found that polarizing optics are superior to standard coloured glass 'shades', with which the sextant is normally equipped. Such optics often allow better horizon definition and also provide continuity in dimming incoming light. A 'Polaroid' disk, attached to one end of a sextant telescope so that it could be rotated, and another one, also with free rotation, in place of standard sun 'shades', was used. By rotation of the telescope 'Polaroid' one obtains the horizon contrast, and then the rotation of the sun 'Polaroid' provides the continuity in dimming the Sun. As any glare coming from the sea surface can be cut out completely by the telescope 'Polaroid', there is little need for additional horizon 'shades'; but, if desired, a third 'Polaroid', also with free rotation, can be attached in their place.

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Effect of the Metallic Ion on the Infra-Red Spectra of Salts of Carboxylic Acids

A full analysis of the infra-red spectra of salts of carboxylic acids requires an interpretation of the effect of the metallic ion. Although a theoretical study of the formate ion has been published, a fundamental investigation of the perturbation caused by the presence of the metal ion has not yet been attempted[1]. Therefore, at present it is necessary to rely on empirical correlations.

The strong absorption bands attributed to the unsymmetrical (ω_2 at 6·2–6·6μ) and symmetrical (ω_1 at 7·1–7·7μ) vibrations of the carboxylate ion (COO^-) have been the most thoroughly investigated[2].

Recently, Kagarise[3] reported that for mono- and di-valent metals there are linear relationships between electronegativity and wave number of the ω_2 band for eight metallic phenyl stearates. Theimer and Theimer[4] have claimed that there is a relationship between the ionic radius of the metal and the Raman ω_1 band for the salts of five fatty acids.

The relationships claimed by Kagarise must not be regarded as general. Preliminary results on eight

Table 1

Metal	Electro-negativity	Ionic charge	Radius (A.)	Wave-length of ω_2 band (μ)*
Li	1·0	+	0·78	6·348 (*S*); 6·442 (*M*)
Na	0·9	+	0·98	6·362 (*S*); 6·421 (*W*); 6·503 (*S*)
Mg	1·2	++	0·78	6·368–6·386 (*S*) broad band
K	0·8	+	1·33	6·415 (*S*)
Ca	1·0	++	1·06	6·362 (*S*); 6·510 (*S*)
Zn	*c*. 1·6	++	0·83	6·510 (*S*)
Ba	0·9	++	1·43	6·625 (*S*)
Pb	—	++	1·32	6·627 (*S*)

* The spectra were determined in 'Nujol' mulls with a Grubb Parsons double-beam infra-red spectrometer, with rock salt optics. Strength of band: *S*, strong; *M*, medium; *W*, weak.