For the first group, the estimate of β is given by:

$$\beta = \frac{(0{\cdot}7047)^{0{\cdot}1481}}{0{\cdot}8519 \times 0{\cdot}1046} = 10{\cdot}66$$

and for the second group, β is found similarly to be 10·86: the mean of the two values is thus 10·76.

Finally, we have:

$$\theta_0 = \tfrac{1}{2}[15{\cdot}708 + 31{\cdot}416 + (8{\cdot}1223 + 5{\cdot}7956)/0{\cdot}1481] = 70{\cdot}55$$

In the right-hand column of Table 1 are shown the 'predicted' values of R computed from equation (8), inserting the foregoing values of α, β and θ_0. The fit is reasonably good, even at the extremes of the range of θ.

Doubtless it will not always be profitable to complete the fitting process by computing β and θ_0. The first step would normally be to plot θ against $\log R$, to test whether the data can in fact be fitted by an ordinary logarithmic spiral. If a straight line is not obtained, a plot of θ against $(\tan \varphi - \varphi)$ will indicate whether the Huxleian growth model is likely to be useful.

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Historical Marine Levels in Italy

IN 1964, Gunther reported[1] *Lithodomus* borings in the columns of the Temples at Paestum at a maximum elevation of 18·5 m above sea-level. He explained them by a "fall of the land" and by subsequent uplift, and corroborated his hypothesis with numerous observations along the coasts of Italy, Sicily and Malta. His account of the evidence in the *Illustrated London News* of the same year prompted me to visit the site; I later discussed my findings with N. C. Flemming at Cambridge. I have now seen the letters written by Flemming[2] and A. N. Burton[3] to *Nature* in reply to Gunther's communication. Flemming considers that if there has been any earth movement it must have been very localized, which is possible in a seismic coast like that of west Italy; Burton states that, to judge from his own work on raised beaches in Calabria, uplift at the rates implied by Gunther is impossible.

I feel I must enlarge on a point hinted at by Flemming in his phrase "the supposed presence of *Lithodomus* borings in the columns". Gunther himself mentioned that the columns were made of travertine; this is the term generally used in Italy for what (in the present case) should more properly be described as tufa, a porous, spongy limestone deposited by running water on growing plants and thus bearing the imprint of leaves and stems[4]. The columns are thus riddled with holes which need not be attributed to *Lithodomus* and which could provide a determined investigator with evidence of former sea-levels at any height he pleased. The fault lies in the original observations rather than in their interpretation.

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CHEMISTRY

Catalysis by Alkali Metal Ions of the Racemization of the *Tris*-oxalato Chromium-III Anion

THE rates of racemization of the complexes $M^{\mathrm{I}}_3\mathrm{Cr(oxalate)_3}$ have been found to depend on the nature of the alkali metal ion M^{I} as shown in Table 1.

Table 1

M^{I}	Li	Na	K	Cs	
$k_1 \times 10^3$ min⁻	29·26	30·85	26·91	23·62	all ± 1 per cent

(pH 6·5; temperature 21·6° C; $[M^{\mathrm{I}}_3\mathrm{CrOx_3}] = 2{\cdot}3 \times 10^{-3}$ M; no added salt.)

It can be seen that the different cations affect the rate in the order Na > Li > K > Cs—an order of increasing size (if $\mathrm{Li^+}$ is assumed hydrated) and of decreasing co-ordinating power. Beese and Johnson[1] have shown that $\mathrm{Li^+}$ accelerated this racemization more than $\mathrm{K^+}$, but their results were obtained with a large concentration (0·5 M) of added salt (lithium chloride or potassium chloride).

Addition of sodium perchlorate increases the rate of racemization, but at concentrations greater than about 0·1 M added salt the rate of increase in rate against concentration falls off, as shown by the data in Table 2.

Table 2

[sodium perchlorate]	0·0	0·1	0·47	0·98	1·98	4·7 M
$k_1 \times 10^3\ \mathrm{min}^{-1}$	4·15	4·71	5·59	6·50	7·14	8·13

(pH = 5·8–6·6*; temperature = 0·1° C; ($\mathrm{Na_3\,CrOx_3}$) = 0·003 M.)
* The rate of racemization is independent of pH in this region.

This is similar to the acceleration, although much smaller, produced by addition of cupric ions, where it is clear that the initial acceleration is due to co-ordination of one copper ion, and the co-ordination of a second copper ion gives a species which racemizes at a very much slower rate[2]. A similar phenomenon has been observed by Hay and Harvie[3] for the nickel ion catalysed decarboxylation of dihydroxy fumaric acid.

The recent work of Ashley and Hamm[4] on the acceleration of the *trans-cis* isomerization of diaquo *bis* oxalato chromium(III)anion supports the 'one-ended' dissociation hypothesis[5], with the cation co-ordinating to the free end of the half-dissociated oxalate. Such a mechanism probably also operates in the alkali metal catalysed racemization of the *tris* oxalato complex.

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Measurement of Graphitic Acid Surface with Polar Molecules

WE have been carrying out sorption of polar molecules by graphitic acid, measuring the quantity sorbed in order to determine the interlamellar surface. The following experimental methods were used: (1) volumetric Brunauer–Emmett–Teller (B.E.T.); (2) gravimetric Joly balance[1]; (3) X-ray diffraction. The first two give a measure of the surface, the third technique gives a measure of the increase of space between the layers.