had a plate-like form dependent on cleavage. The largest grain encountered had an upper surface of c. $12,950 \mu^2$ in area and was c. 35μ thick, but there was a gradation of sizes down to individuals showing marked Brownian movement in aqueous suspension. The chief impurity was quartz as flattened chips; colourless and brown micas were occasional and calcium carbonate (probably of extraneous origin) was very rare.

Smooth pastes of appropriate water-content could be rolled between the hands to give balls which could be dried without marked loss of shape; when shaken, however, the moist globular masses collapsed, with a concomitant excretion of water, to form disks. This effect resembles passive dilatancy (Freundlich and Jones, *op. cit.*). The feldspar plates were unorientated in the balls, though the superficial layer was parallel to the surface, but showed parallelism to the broad surfaces of the disks.

The pastes exhibited ordinary dilatancy in that they appeared to dry when disturbed; this effect was seen markedly in the collapsed discoidal masses, with their supernatant layers of excreted water mentioned above. For these masses, disturbance of the ordered structure would cause migration of surface water into the augmented pore-space.

However, slight thixotropy was indicated qualitatively; for example, suspended 'stalactites' of paste elongated rapidly on shaking and set when the vibration ceased. Winkler³ stated that feeble thixotropy was shown by very fine-grained aqueous feldspar; his description of quartz or feldspar particles as "nahezu isometrischen" (p. 369), which he portrays diagrammatically on p. 370, does not, however, accord with my experience.

Feldspar sediment, deposited from water, shrank in bulk when the containing tube was rolled, in a vertical position, between the hands (cf. Freundlich and Jones, *op. cit.*). Presumably, as these authors suggest, this shrinkage accompanies a transition towards a more regular particle orientation; this hypothesis could not be definitely established as the initial sediment already evinced a tendency to horizontal arrangement of the plate-like grains.

Cylinders of feldspar paste, made by rolling between the hands, exhibited the 'backlash' effect (Macey⁴); it was necessary, however, to support the middle section to prevent sagging while the test-piece was alternately extended and compressed from the ends. It could be shown that the platey grains were disarranged by compression but followed the axis of the cylinder during tension; this latter orientation was also the initial one in the cylinders. Scott Blair⁵ states that backlash is certainly associated with dilatancy.

Aqueous feldspar is normally alkaline; indeed, the alkali-silicate produced by hydrolysis may be responsible for the slight coherence of the dried samples. Pastes made up with c. 2N hydrochloric acid again showed passive dilatancy and backlash, though deformation appeared rather easier. The large sedimentation volume in dilute hydrochloric acid (cf. von Buzágh⁶), together with microscopical examination, indicated that the acidic feldspar-system was flocculated.

Three separate batches of aqueous and of acidic feldspar paste were made up to the correct consistency for rolling into mechanically stable globules; the consistency was judged purely by touch. The liquid contents were determined by drying, with the following results:

	1	2	3
Aqueous pastes	23.3	22.8	22.9 per cent liquid by weight.
Acidic pastes	21.5	21.2	21.8 " " "

The figures for the acidic pastes are probably too low because of slight chemical reaction, for example, with the traces of calcium carbonate present; however, each set of results shows a remarkable uniformity.

In the foregoing experiments, particle orientation was determined microscopically in pyroxyl films stripped from smoothed surfaces of the dry coherent feldspar masses; the technique was that previously used by me⁶ for observing regularities of structure in ceramic 'bodies' but modified by rubbing down the preparations on glazed paper in the manner advocated by Weatherhead⁷ for certain clays.

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Oct. 18.

¹ Freundlich, H., and Jones, A. D., *J. Phys. Chem.*, 40, 1217 (1936).

² Winkler, H. G. F., *Kolloid-Beihfte*, 48, 341 (1938).

³ Macey, H. H., *Nature*, 147, 146 (1941); see also *J. Sci. Instr.*, 18, 159 (1941).

⁴ Scott Blair, G. W., "A Survey of General and Applied Rheology" (London, 1944), see p. 60.

⁵ Von Buzágh, A., "Colloid Systems", trans. by O. B. Darbishire (London, 1937), see p. 166.

⁶ Williamson, W. O., *Trans. Brit. Ceram. Soc.*, 40, 275 (1941).

⁷ Weatherhead, A. V., *Mineral. Mag.*, 25, 529 (1940).

The Forestry Commission

THE weakness in the formation and constitution of the proposed Forestry Commission during its passage through the Houses of Parliament and after the Act was passed, as well as the consequences likely to arise therefrom, were clearly pointed out by *Nature* in 1919¹. After more than twenty-five years experience it seems desirable to review again the manner of its constitution, the results that it has achieved, and to consider whether the country has gained the fullest possible advantage of so immense an expenditure.

While the Bill was passing through the House of Lords in 1919, Lord Haldane pointed out "the danger of erecting an authority of the kind proposed, which would not be subordinate to any Minister"², and further "the lack of Commissioners possessed of sound technical training". When the Bill was before the House of Commons, it was said in *Nature*³ that "The Commissioners will have powers to expend 3,500,000 pounds during the next ten years in afforestation. This sum

* A review of the first twenty-five years of the Forestry Commission was published in *Nature* of March 17, 1945, p. 317, and a leading article on the subject appeared in the same issue, p. 311.—EDITORS.

of money is to be at their absolute disposal, and will be subject to no control by Parliament or any Minister responsible to Parliament", and later, "if the Bill represented a company prospectus involving the control and expenditure of three and a half million pounds, little of this amount would be subscribed in the absence of any assurance as to the satisfactory constitution of the directorate. This, however, is exactly what the Bill neglects to supply. There is nothing to ensure that any of the Commissioners—paid or unpaid—shall have any knowledge of forestry, so that . . . the Forestry Commissioners may similarly become purely political appointments". On the same date, in the House of Commons, "Sir Philip Magnus pointed out that the chief defect of the bill lay in its silence on the necessity of having on the central authority a preponderance of fully qualified scientific experts".

As a result, on the third reading of the Bill another Commissioner was added, with the condition that one Commissioner must have technical knowledge of forestry.

It is now proposed to embark upon an expenditure of another three and a half million pounds under the same administrative conditions, with the same absence of safeguards, with the minimum of scientific technical knowledge on the part of the Commissioners. There can be no doubt that the desperate condition of our forest woodlands, resulting from the War, demands immediate attention; but the proposal before Parliament has the same fundamental weakness to which *Nature* directed attention in 1919. The Commissioners are not to be appointed by virtue of their special technical knowledge or peculiar suitability for the task, or by the election of the shareholders (in this case the tax-payers). No inquiry has been instituted showing the manner of their previous stewardship, the only difference from the former state being that the Commission is to be placed under the Minister of Agriculture and Fisheries. Under the control of the Minister of Agriculture forestry may be swamped by the overwhelming preponderance of agricultural interests.

In practically every civilized country to-day, a sound forestry service is established producing admirable results. Freed from all political influences under one Minister with the help of the two national forest institutions and with the hearty goodwill of every landowner, our woodlands might be placed again in the same condition which we formerly enjoyed, but not otherwise.

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4 Stanhope Street, Euston Road,
London, N.W.1. Jan. 8.

¹ *Nature*, 103, 441 (1919).

² *Nature*, 103, 431 (1919).

Pigments of Fresh-water Triclad

WITH reference to a previous communication¹ in which it was suggested that the colours of *Polycelis nigra* and *Planaria lugubris* are due to different depositions of melanin in the skin, the fact that a red intermediate compound is formed in the oxidation of melanin from tyrosine is significant. Pink specimens often occur (8 per cent), and a large proportion of the *Polycelis cornuta* found at Cambridge are pink in colour.

J. L. CLOUDSLEY-THOMPSON.

63 Lensfield Road, Cambridge. Nov. 11.

¹ Cloudsley-Thompson, J. L., *Nature*, 156, 294 (1945).

Value of π

IN 1853 there appeared, in a paper by W. Rutherford, the value of the constant π to 530 decimals, calculated by W. Shanks. This was eventually extended by Shanks to 607, and in 1873 to 707 decimals.

For more than seventy years this has been accepted as the value of π , apparently without any doubts having been expressed in print.

Recently, I decided to test numerically a series found by a colleague, R. W. Morris, namely,

$$\pi = 12 \tan^{-1} \frac{1}{4} + 4 \tan^{-1} \frac{1}{20} + 4 \tan^{-1} \frac{1}{1985}.$$

The value so obtained agrees with Shanks's value only to the 527th decimal place; from that point it seems that Shanks's value is incorrect.

The values from the 521st to 540th decimals are given below

86021 39501 60924 48077 (Shanks).
86021 39494 63952 24737 (D. F. F.).

It is of interest to note that the discrepancy occurs at about the point to which Shanks's first published value extends, that is, in the 530th decimal.

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Importation of Scientific Apparatus and Material into Britain

ON behalf of the Department of Scientific and Industrial Research, which is now responsible for the British Commonwealth Scientific Office, Washington, may I assure Dr. J. A. V. Butler that the difficulties he mentions in his letter published in *Nature* of February 23 about transactions with American suppliers are fully realized.

It is hoped that these are only temporary, but meanwhile the Department will be glad to give such help as is practicable, either to institutions or individuals, in obtaining apparatus or materials from the United States or elsewhere if cases of difficulty are brought to its notice.

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