

the object in the form of a spatial frequency spectrum. In the spatial period spectrometer, Fourier analysis is done in such a way as to yield a spatial period spectrum. The advantage is that spatial period has the dimensions of length and the spatial period spectrum is, therefore, a true size spectrum. It avoids the problem of defining a unit entity.

Spatial period is a statistical parameter and therefore the spatial period spectrum may be used, like the Maxwell-Boltzmann distribution of statistical mechanics, to relate the macroscopic properties of a system to its microscopic structure<sup>2</sup>.

Two models of the spatial period spectrometer are already available. These are the PM3 and PM31, manufactured in South Africa by Talbot Research. The PM31 is an attachment for use with a PM1 series Image Analyzer.

A real-time, on-line, size spectrometer, designated Model PM303, has been under development for more than two years and is expected to be available soon. The basic instrument consists of a sensing unit and a display unit. The sensing unit contains a diffractometer of the spatial period type with a flow cell of rectangular cross-section 400 mm x 5 mm. This flow cell allows 5 litres of suspension to be processed in one second. A typical mill pulp sample containing 100 g of solids can be processed

in 30 seconds. To achieve more rapid processing, numbers of sensing units may be fastened together and their outputs connected in parallel to a single display unit. The sensing unit is 1 m long, 420 mm wide and 100 mm high.

Instruments can be provided for monitoring any of a number of normalised moments such as specific surface, mean linear dimension, mean volume etc. or for recording the spatial period spectrum in any number of size intervals.

Owing to the translational invariance of the spatial period spectrum, aggregation is not as serious a problem as with most other methods.

A novel feature of the PM303 is the use of variance detection, our proprietary system of signal-to-noise ratio improvement. With this system the variance of the parameter is measured as an estimate of the parameter itself. This method eliminates low-frequency noise such as ambient diffracted light due to imperfect optical components, the Schlieren effect and particles depositing on lenses and cell windows, which would otherwise require frequent re-setting of the zero.

#### REFERENCES

1. TALBOT, J. H. South African Patent No. 70/3652.
2. SCARLETT, B. Particle Size Analysis 1970, 101-112 (The Society for Analytical Chemistry: London 1972).

---

## ORANGE FREE STATE BRANCH

### MINUTES OF THE COMMITTEE MEETING HELD IN THE WELKOM CLUB ON WEDNESDAY, 8th NOVEMBER, 1972

#### Present:

C. J. Isaac (in the Chair), E. T. Wilson, J. M. Meyer, C. Mostert, P. L. Nathan, D. A. Smith, R. Sutherland.

#### Apologies:

G. Young.

#### MINUTES OF THE PREVIOUS COMMITTEE MEETING

The minutes of the Committee Meeting held on the 19th January, 1972 were taken as read and their adoption was proposed by Mr J. M. Meyer and seconded by Mr E. T. Wilson.

There were no matters arising from these minutes.

#### GENERAL MEETINGS FOR THE ENSUING YEAR

It was agreed that the format of meetings used for the past year be continued for this year.

The following meetings were decided on:

Tuesday 30th January, 1973 — A film show "Nickel Mining in Canada" and "North Slope Alaska".

Tuesday 6th March, 1973 — An address by Anglo American Research Metallurgists on latest Gold Extraction methods.

End August, 1973 — Annual General Meeting to be addressed by the President of the Institute.

#### PROPOSED VISITS FOR THE ENSUING YEAR

It was decided that a visit be made to Vierfontein Colliery and Power Station on or about the 11th May, 1973.

It was further decided that a local visit be held in early August, 1973 to the following:

President Steyn — 4 Shaft — Surface, Shaft and Underground Station

layouts.

Virginia — Task force training and Methane Fired Boilers.

#### NEXT COMMITTEE MEETING

It was decided that the next Committee Meeting should be held when Committee Members felt it necessary.

#### GENERAL

1. The Chairman read a letter from Professor Howat in which he thanked the O.F.S. Branch for his pleasant visit to Welkom.
2. It was suggested that the G.M.E. be approached to address a meeting of the O.F.S. Branch — Mr D. A. Smith to investigate.
3. It was suggested that the O.F.S. Branch hold itself responsible for the submission of at least 2 mining papers during the year. The Chairman declared the meeting closed at 5.45 p.m.