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## Objective Analysis Methods

by D.Jenssen

Mr.Jenssen of the Department of Meteorology, University of Melbourne, first described the current methods of numerical objective analysis. The necessity for non-subjective means of preparing daily weather charts and especially that for 500 mb arises, he said, from their use in Numerical Forecasting where initial values determine to a large extent the final forecast chart. Such methods fall into two groups: those using a semi-empirical approach, and those using strictly mathematical routines.

In the first category the methods of Bergthorsson and Doos, and Cressman, were dealt with. In both, an initial field, derived from the forecast field for that day, is successively modified at each point of a grid so as to conform with the actual observations. These modifications are made using formulae whose form has been chosen by preliminary experiments to provide best fits for a number of different situations.

Mathematical methods, such as those of Bushby, Johnson and Huckle, and also that of Cressman, are based on the least-squares technique. A cubic or quartic surface is fitted to both the observed data and a preliminary chart (again derived from the forecast chart) at every grid point by this method, which seeks to minimise the standard deviations of the final heights, and vorticities, from the observed values. Unfortunately these techniques involve a great amount of computer time and have the further disadvantage of being too inflexible for applicability to specific situations.

Mention was made of Sasaki's method of ensuring consistency of the final field with the forecast equations to be used. This involves replacing some of the least-squares equations with a set obtained from the forecast equations, and minimising the standard deviations by calculus of variations. It was suggested that Sasaki's method be applied to the objectively analysed field immediately before forecasting.

### References

- Bushby, F.H. and Vera Hucle 1957 "Objective Analysis in Numerical Forecasting" Q.J.R. Met. Soc., 83 p.232.

- Cressman, G.P.            1959        "An Operational Objective Analysis System" Mon.Weath. Rev., 87 (10), p.367.
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### Meteorology in Retrospect

by F.Loewe

A large audience gathered on the evening of 24th November to bid farewell to Dr.Loewe who retires from the position of Head of the Department of Meteorology, University of Melbourne, at the end of the year. The chairman of the meeting Mr. L.J.Dwyer in introducing the speaker, traced Dr.Loewe's career in meteorology from his early days in the German Weather Service to his work in Australia, emphasizing his co-operation with the Bureau, in particular the part he played in the training of its meteorologists, and his work in Antarctica. All present joined the chairman in wishing Dr.Loewe happiness in his retirement.

Dr.Loewe then presented his talk which covered impressions gained during his career from his early days in Europe to his recent years in the University of Melbourne. Remembering the "prefrontal" times of his first studies, he described the life of Margules as an example of a man ahead of his time. He deplored the increasing separation of meteorology from the neighbouring earth sciences, particularly geography and physical oceanography, and that of even the meteorologist from direct study and observation of the atmosphere. Viewing the problem in a wider frame he stressed the failure of the educational institutions in Australia, among them his own university, to produce a group of persons of wide culture and many-sided intellectual curiosity. The system tended to produce mainly efficient blinkered technicians. He blamed the excess of formal examinations for hampering the liberal education of the Australian student at school and at the university.

The speaker then recounted his share in the earliest stages of aviation meteorology and on his research flights from 1925 onwards, which gave him a deeper insight into the interactions between the different atmospheric phenomena and the unforgettable pleasure of dangers overcome and beauty revealed.