

Book reviews

Collins Guide to the Weather by Gunther D. Roth. (William Collins Sons Co. Ltd. 1981) 256 pages, numerous diagrams and illustrations.

This book is a colourful, well illustrated guide for the reader who has more than a passing interest in the weather. Its emphasis on European weather patterns and phenomena identifies it as being primarily designed for sale in western and central Europe. Complicated mathematical and physical explanations are carefully avoided yet an adequate understanding of major atmospheric processes is communicated.

The main text is divided into four sections. Firstly a brief introduction covers the radiation and heat budget and composition of the atmosphere and leads on to influences affecting regional climate.

The second section presents an alphabetical index of common or spectacular natural phenomena, each illustrated by a colour photograph. The accompanying text describes the phenomenon under four headings: Recognition, Causes, Effects on Weather and Forecast. The author points out the dangers of attempting to forecast future weather events from observation of a single feature, stressing that this heading only indicates a likely evolution associated with the particular feature. Nevertheless, the practising meteorologist may find argument with some of the generalisations.

The third section is entitled 'Basic Meteorology' and covers meteorological elements and their measurement, vertical motion and the construction of synoptic charts. This forms a lead into a selection of synoptic surface and 500 mb charts depicting common weather patterns over western and central Europe. The accompanying text describes each pattern and the resultant weather over the area.

'More Advanced Meteorology' follows and expands on concepts introduced in the previous section. A more detailed treatment is given of the differential heat gain and loss of land and sea surfaces and vertical motion. Explanation of pressure systems, coriolis force, orographic effects, local winds and air masses and fronts are given.

Local winds such as the Fohn, mistral, bora and sirocco are explained and a selection and description of local winds throughout the world is listed. In this list it is interesting to see that 'willy — willies' of Australia are described as tropical revolving storms.

Shorter supplementary sections follow. These include the influence of the weather on mankind, brief treatments of various weather legends and proverbs and the beginnings of scientific weather observation and forecasting, the World Meteorological Organization, weather satellites, availability of weather reports and forecasts in Britain, cloud classification, Beaufort scale and weather observations — including some historical examples. A chapter on climate statistics and a glossary of common meteorological terms conclude the publication.

The publication is comprehensively indexed and references are given throughout to relevant sections in other parts of the text. The reviewer feels that the fleeting treatment given to satellite imagery is a shortcoming. Except for one photograph from the Apollo 13 mission, no example is given of the use of this vital aid to forecasting. Similarly, no mention is made of vertical sounding data and enhanced imagery now routinely available to the meteorologist. The regular use of satellite imagery in television weather presentations would make this subject of interest to the reader.

The impact of numerical modelling is a noticeable omission. Its relevance to modern weather forecasting is considerable. Numerical modelling of the atmosphere is employed by the meteorological services of most nations and the technological advances made in the computing field allow increasingly sophisticated models to be used operationally. Clearly a detailed study is outside the aims of this publication; however, its importance demands at least a brief explanation.

D. Kupsch

Remote Sensing in Meteorology, Oceanography and Hydrology ed. A. P. Cracknell (Ellis Horwood Ltd., Chichester, U.K., 1981), 542 pages. Australian Distribution: Jacaranda — Wiley Ltd., Brisbane, \$105.00.

The satellite receiving station operated by the Department of Electrical Engineering and Electronics at the University of Dundee, U.K., has earned the Department a deservedly high reputation for the quality of satellite data which it produces, for continuing efforts in developing such signal processing techniques as image enhancement, and in data interpretation (often in collaboration with outside research groups). That the station was constructed largely from Departmental resources alone, in terms of electronic hardware, signal processing hardware and software, manpower and finances, serves to enhance this reputation even further.

More than that, it identified the University of Dundee as an ideal location for the three-week summer school in Remote Sensing held in September 1980 under the auspices of the European Association of Remote Sensing Laboratories (EARSeL). The work of the summer school involved the usual lectures as well as laboratory exercises, computing exercises in digital image processing, and field work, and this book contains edited versions of the courses, lectures, accounts of the field trips and work sheets for some of the laboratory work.

Although the summer school involved both lecturers and participants from many parts of the world (including the New Zealand Met. Service: there must be a message for Australian meteorology in that!), it was, nevertheless, primarily a European affair. This has led, naturally enough, to biases in lecture content towards European interests and problems in data acquisition, data processing and data interpretation. Despite the obvious disadvantages for a non-European reader, there are also certain advantages, particularly in an Australian context. Specifically, these relate to the 'do it yourself' nature of much of the lecture material where, for example, the problems of constructing and operating a satellite data acquisition and processing facility are addressed from the point of view of a group or organisation lacking a large budget or even particularly extensive computing and laboratory facilities. Similarly, the chapters dealing with interpretation and applications (for example, to weather analysis and forecasting, to sea surface fronts and temperatures, or on the development of time-lapse film loops), while containing basic background theory (where necessary), are essentially practical in nature — to the extent of containing flow charts and check-

sheets for interpretation in some cases. In this context, the actual nature of the geophysical phenomenon being examined is of relatively minor importance.

Physically, the book is organised into twenty-six chapters (one for each of the lectures presented), notes on two field trips and work-sheets for eleven laboratory exercises. There is a natural progression in the chapters. The first four provide a general background to satellite remote sensing, to EARTHNET (the European data acquisition facility) and to METEOSAT (the European geostationary satellite), and a review of future prospects for geophysical satellites. The next eight cover in considerable detail the background theory to satellite remote sensing (including space cartography, atmospheric corrections, selected statistical techniques etc.) and the requirements for establishing a receiving station incorporating relevant image processing and data display systems. There is one chapter on legal aspects, including the UN draft 'Principles on Remote Sensing'. The final thirteen chapters deal more or less with application/interpretation problems, ranging from studies of dust storms and pollution, through synthetic aperture radar (the SEASAT-1 SAR) to cloud climatologies and meteorological forecasting.

The laboratory exercises are mostly concerned with interpretation of LANDSAT imagery, although there is one involving a case study of mid-latitude frontal cyclone structure using TIROS-N and other data. In general, since they are essentially classroom-oriented, these exercises are of lesser interest or relevance to the reader than the various chapters (lectures).

As one might expect, the material of the book is ideally suited to teaching institutions. Nevertheless, it should also satisfy a more general readership concerned with both research and operations in many branches of the geophysical sciences. For me the most interesting and valuable chapters were those covering what one might call the 'hardware' aspects (Chapters 5 to 12); but this is a personal bias and there is a wealth of material here to satisfy most requirements. Again as one might expect in a book of this nature, where each chapter is contributed by someone directly involved in that particular aspect of remote sensing, it is difficult to find fault in the accuracy of the material presented. Indeed, since much of the material is close to the present limits of our theoretical knowledge or technology, any

criticism is likely to involve differences in emphasis or interpretation, rather than errors of fact.

The presentation of the book is excellent, with a distinct lack of typographical errors and other gremlins and very handsomely reproduced plates (both colour and black and white). Both the editor and publishers are to be congratulated. Since one is, of course, expected to 'criticise' in a review, I offer the following — which concerns a sin of omission rather than commission. Both the title of the book, and the dust-jacket photograph (an impressive reproduction of a colour-coded digital radar display from the British Met. Office's rain radar network, showing an intense frontal band over southwest England) would lead one to believe that the contents cover a broad spectrum of geophysical remote sensing. Unfortunately, such is not the case — the treatment is almost exclusively of satellite-based sensing (albeit both active and passive). There is one chapter on ground-based HF radars, which represent an observational technique of great potential value but hardly operational. No mention at all (that I could find) is made of lidar or acoustic sounders, and weather radars only get a run in the context of the British Met. Office's integrated satellite-surface mesoscale observation and prediction system (where, incidentally, the dust-

jacket photograph is again reproduced — someone must like it). Obviously a single book (or summer school) cannot cover everything in such a huge and expanding field. Perhaps they should just change the title.

This is a relatively minor point, of course, and in summary the book represents an excellent compendium of what is essentially practical information on techniques and procedures for acquisition, processing and interpretation of satellite remote-sensed data from the earth's physical environment. I have no hesitation in recommending it to anyone either studying or working in meteorology and oceanography — I'm sure we all have a need to improve our knowledge and understanding of such techniques, and this book is a good place to start. Unfortunately, the Australian price of \$105.00 is likely to act as a considerable deterrent to many who might otherwise have considered 'Remote Sensing' an important addition to their library. While still high, the U.K. price of £35.00 is probably not excessive in view of the number of (and necessity for) high quality plates. However, a mark-up of around seventy-five per cent certainly is, and I fail to see why this should occur.

P. E. Dexter

World-Climates, with tables of climatic data and practical suggestions by Willy Rudloff. (Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart, 1981) 632 pages, 50 figures, 1474 climatic tables, 116 hygrothermal diagrams, 30 other tables and reviews, 1 bicoloured map.

Willy Rudloff retired from the Marine Meteorological Office (Seewetteramt) Hamburg in 1974 after some 38 years involvement with meteorology in the German Weather Service. For more than 15 years he provided reports, consultation and advice in response to requests for climatological information from all sources, especially tourism. This book is his attempt to provide a relatively concise reference which could be used by the potential world traveller. The data presented allow even the non-professional meteorologist to answer questions which arise when climatic conditions of places in foreign countries are being considered. The tables are supplemented by short descriptions of the predominant form of the general weather. He makes extensive use of the renaissance of Köppen's climatic classification — simplified extensively by Trewartha — and proposes it with a view to global survey and public use.

The content of the book first covers a good general introduction, aimed at the tourist, to give an indication of normal weather at numerous locations.

I liked his optimistic view that: 'There is no such thing as bad weather, providing you wear the right clothes'. Rudloff then goes on to describe and define the various meteorological elements and climatological controls. He provides some useful general world maps of some elements to emphasise his discussion.

His second chapter extends his interest in bioclimatology and presents a neat summary of the work of various authors along with his own concise interpretations. This chapter may not appeal as much to the layman, but is extremely useful for the professional meteorologist/climatologist. The only criticism I could offer here is that the section could have been somewhat shortened and perhaps more clearly presented.

In Chapter 3 Rudloff briefly reviews Köppen's climatic classifications with Trewartha's simplifications and introduces his hygrothermal diagrams which are used extensively later in the chapter on data.

Chapter 4 is the basis of the book. In it some 1474 tables of climatic data are presented for individual locations, grouped by country and climatic classification. He presents for each month, and year, mean maxima and minima temperatures as well as average temperatures. The fourth line is his advice on clothing as defined in the chapter on bioclimatology, while the fifth line refers to the amount of heat stress. Rainfall and rain days are shown in the sixth and seventh lines, while sunshine hours with the percentage of possible sunshine round off the table for each site.

In each of the six sub-chapters (one for each continent: Europe, Asia, Africa, North America, South America and Australia and Oceania) he describes the predominant general weather situation for both summer and winter and presents hygrothermal diagrams for selected stations; then climatic descriptions and tables are given for each climatic area.

As the book is aimed at the potential tourist it is understandable that Rudloff has only briefly referred to Antarctica by giving only mean temperatures for some eight locations. The book is rounded off with various general appendixes and lists of the countries and stations in alphabetical order to assist the user in locating the data for the place of interest.

I was somewhat perturbed to learn that Mount Gambier has shifted from South Australia to Victoria and that the Australian Capital Territory

had been renamed the Federal District. I also noted some difference in the meaning of temperature data for Australian locations when compared with figures available here. For example, the average temperature figures are accurate but the mean maxima is really the mean of the highest maximum temperature each month, rather than the mean of the daily maxima. Similarly for the minima temperature data. I felt that this was not clearly spelt out in the text. I feel more comfortable reading means of mean maxima/minima rather than the means of the extremes.

There is only the occasional misspelling of names (quite understandable when the original was written in German) but this does not detract for a moment from the overall presentation. When limited by the size of the book and possibly by the availability of data, it is appreciated that Rudloff has restricted his tables to 1474 locations. However, from Tashkent in USSR to Thessaloniki in Greece and Ghanzi in Botswana as well as other places such as Yatung in Tibet and Easter Island, sufficient climatological information is presented to allow the traveller to decide on whether he takes an umbrella or swimsuit, an overcoat or sun-hat when venturing forth.

In all, I found the book to have fulfilled its main aim in alerting would be travellers like myself to the average or expected conditions in exotic parts of the world. The information is concise and if used wisely can provide much of value to its intended audience.

D. M. Lee