

Professor Dr Werner Rauh, (Figure 7) one of the most knowledgeable cactologists and succulent enthusiasts, passed away peacefully in his sleep on 7 April 2000, a few weeks before his 87th birthday. Werner was born on 16 May 1913 in Niemeck, near Bitterfeld in Saxony, one of the 16 states of Germany. He passed his university entrance examinations in 1932 at the local gymnasium. Even as a youngster he displayed an interest in geography and biology, which led him eventually to study botany, zoology, chemistry and geology at the Universities of Leipzig, Innsbruck and Halle. At the last-mentioned he studied under Prof. Wilhelm Troll, one of the world's greatest morphologists. This exposure to an exceptional plant specialist and keen observer no doubt further fired his interest in plant form, and the wonderful shapes of cacti, succulents and bromeliads became an almost full-time passion of his. After receiving a D. Phil. in 1937 and an appointment to a professorship in 1939, he moved to Heidelberg as an assistant to A. Seybold. For the following 61 years his name became inseparably associated with the University of Heidelberg. True to his classical botanical training, his academic activities were very much aligned towards taxonomy, systematics, morphology and biogeography. In 1947 he was appointed as lecturer at this University, in 1953 as Associate Professor, in 1957 as Extraordinary Professor, and then in 1960 as Professor and Director of the Institute for Systematic Botany and Plant Geography, and the associated Botanical Garden. After his retirement at the age of 68, he remained at the Institute as Professor Emeritus (Dorr 1997; Mortimer 2000).

Werner's first intercontinental excursions were to the Atlas Mountains in North Africa, but soon he was confidently travelling to more remote areas such as relatively unknown or unexplored parts of Peru and Ecuador (see Schwartz 1987 for a list of Prof. Rauh's expeditions). His appointment as an Extraordinary Professor at the University of Heidelberg in 1957 coincided with his first expedition to the island of Madagascar. At the same time he was offered the directorship of the world-famous Botanical Garden and Botanical Museum in Berlin-Dahlem. He, however, declined the offer. The Garden was one of his primary passions. From a small facility with three greenhouses at the time, it expanded to include no fewer than 15 greenhouses on his retirement. These were all filled with an amazing array of botanical treasures, many of which he collected on his countless expeditions to the world's tropical and subtropical regions. Today the Botanical Garden of the University of Heidelberg, under the directorship of

Werner's successor, Prof. Peter Leins, is a world-famous research, education and training and display facility. Indeed, Werner's efforts to establish the Garden as a leading institution will enable it to rise to the challenges of the new millennium.

Throughout his botanical career the cacti and other succulent plants of the arid regions of southern and northern America and southern Africa were his first loves as far as research was concerned. The material that he brought back from his numerous visits to remote and previously unexplored areas was put to good scientific use and extensively researched. For example, he was the first to show that representatives of the Didiereaceae and the Cactaceae could be successfully intergrafted (Rauh & Dinklage 1972, 1978;



FIGURE 7.—Prof. Dr Werner Rauh with a specimen of *Tillandsia fendleri* Griseb. Photograph taken ± 1974 by W. Barthlott.

Rowley 1992). He was also fascinated by the bromeliads of the South American rain forests and the plants of the high mountains of the tropics. These and other topics were addressed in more than 300 scientific and semi-scientific papers, as well as several lectures and some two dozen popular-scientific books. From a biogeographical point of view, Werner reserved a special place in his heart for the botanical world of Peru and, of course, Madagascar. On his regular collecting trips and expeditions he discovered numerous species new to science. Some of these were named after him, such as the genera *Rauhia* Traub. (Amaryllidaceae), *Rauhocereus* Backeb. (Cactaceae) from Peru, *Rauhiella* Pabst & Braga (Orchidaceae) from Brazil, and *Werauhia* J.R.Grant (Bromeliaceae). A number of species were also named after him, including *Tillandsia rauhii* L.B.Sm. (Bromeliaceae), an enormous pineapple plant from northern Peru, and the beautiful miniature *Aloe rauhii* Reynolds (Aloaceae) from Madagascar. Especially the last-named of these has become a popular species in numerous collections of succulent plants. The original set of herbarium specimens that he collected during his many expeditions are kept in HEID. Duplicates have been deposited in K, MO, MPU, MSUN, P, PRE, and TAN (Gunn & Codd 1981; Dorr 1997).

For generations to come, professional botanists and interested amateurs alike will find the published legacy left behind by Werner, indispensable reference sources. His last two books on the Red Island, Madagascar (Rauh 1995, 1998), were exceptionally well produced by Strawberry Press, and although rather expensive, represent essential reading material for anyone interested in the natural history of this biological paradise. These volumes are excellent snapshots in time of a magnificent natural flora and fauna suffering from the ruthless transformation caused by human intervention. Werner was also an accomplished photographer, his photographs adorning the pages of many of his books. In some instances the pictures in his books are the only published ones of the species, and are often so good that they can be used to identify flowering or even non-flowering specimens.

Professor Rauh justifiably received extensive recognition for his research accomplishments. He was an honorary member of numerous societies as well as the Vice-President of the International Organization for Succulent Plant Study from 1976 to 1982 (Supthut 1999) and President in 1983. The Republic of Peru and the Principality of Monaco awarded him medals—on the occasion of his 65th birthday, Princess Grace of Monaco presented him with the first ever *Cactus d'Or*, conferred by the IOS, in Monte Carlo. This was the first and only *Cactus d'Or* made of gold (Rowley 2000). During the course of his tenureship as Director of the University of Heidelberg Botanical Garden, he was awarded the golden Veitch Memorial Medal by the Royal Horticultural Society of London and the Willdenow Medal by Berlin. In 1999, a year before he

passed away, the Republic of Madagascar, through its Ambassador in Germany, His Excellency Rabesa, made him a Knight of the National Order, and in November 1999 he received the Federal Distinguished Service Cross with Ribbon from the mayor of Heidelberg, Beate Weber. Since 1968 Werner was a regular member of the Academy of Sciences, and Literature in the city of Mainz and since 1980 he was a corresponding member of the Heidelberg Academy of Sciences.

In 1997 he suffered the loss of his wife, Hilde, while his own health was also failing rapidly. However, he remained mentally focused on the numerous manuscripts that he was working on and still paid regular visits to the Botanical Garden.

He was indeed a remarkable human being and scientist and with his death, an era of almost charismatic botanical exploration of tropical regions has come to an end. Interest in succulents from the tropics were, for the past 50 years, strongly influenced by Werner Rauh's numerous plant introductions, published and illustrated papers and lectures (Rowley 1997). Many scientists and hobbyists will remember him as an amazingly prolific author on these fascinating plants. Werner's death came as a shock, but was not unexpected, as he had been seriously ill with breathing problems for some time. His funeral on 28 April in Heidelberg was attended by family and close friends.

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W. BARTHLOTT* and G.E. SMITH**

* Botanisches Institut der Universität Bonn, Meckenheimer Allee 170, D-53115 Bonn, Germany.

** National Botanical Institute, Private Bag X101, 0001 Pretoria.

Book Reviews

RARE AND THREATENED PLANTS OF KWAZULU-NATAL AND NEIGHBOURING REGIONS, by ROB SCOTT-SHAW. 1999. *KwaZulu-Natal Nature Conservation Service*, P. O. Box 13053, Cascades, 3202 Pietermaritzburg, South Africa. Hard cover: ISBN 0-620-24688-X, price ZAR100.00.

Red Data Lists seem to be the feature of the month at the time this review is being written, with a project commencing to produce a book of this format for all ten countries of SABONET (Southern African Botanical Diversity Network), and involving almost all the scientists of the National Herbarium, together with many others. This project certainly has an excellent example in Rob Scott-Shaw's new book.

After minimal preliminary matter, the meat of the book commences. This is a species-by-species account of the 682 rare and threatened plants known in KwaZulu-Natal. Each report includes an assessment according to the new IUCN guidelines. Endemic status is given, as are a thumbnail description of the plant, distribution, habitat, population biology (if known), rarity, legal status, economic potential, threats, urgency for conservation, future needs and 'remarks'—in fact, all that conservationists and decision-makers need to know. After the tables explaining the IUCN categories of threat, ecosystems and plant communities, the plants are listed by class of threat, quarter-degree grid location and names of protected areas. Lists are also given of threatened plant hotspots (centres of endemism), threatened plants in traditional use and species afforded legal protection. There is an analysis of trends, a glossary, a bibliography and an index. One additional feature lifts the present book from the ranks of the merely excellent to the sublime. In the centre of the book are eight pages of colour photographs (92 pictures) of some of the more attractive species under discussion. A further 96 species are illustrated with line drawings by Heather Borchers in the text. An embarrassingly large number of these pictures illustrate plants never before figured in print.

It would be helpful if the meanings of the sun symbol in each species text, and the flower symbol in some texts, were described more explicitly than they are. It seems that the sun symbol precedes coded notes of bioclimatic regions, biomes or veld types in which the plants occur. The codes are explained in Table 3 on page 149, and we are informed in the section on 'Habitat and ecology', on page ii, of the existence of such coded information, but nowhere could I find a note stating that it is marked with a sun sign. Evidently the flower indicates notes on populations protected in KwaZulu-Natal nature reserves. Unfortunately this, too, is not made explicit.

There are two points which concern me about this book and the SABONET Red Data Project. The first concerns the exposure of sensitive data to unscrupulous users. One reads in the introduction to this book that 'to avoid unscrupulous use of wild plants by illegal plant collectors, precise localities are not generally given'. This assurance seems to be relatively well kept for some plants of high monetary value (cycads). However, one reads in the discussion of one species of 'a disjunct population in [a named, small] Nature Reserve'. The reserve in question is traversed by a public road open 24 hours a day, and scandals concerning illegal harvesting of cycads, though frequent, do not represent more than a small fraction of this illicit trade. My disquiet increases on seeing maps indicating which quarter-degree square/s the various species inhabit. Match a good (1:50 000) map—cheaply obtained from the Government Printer—with the notes in the book on habitat, add the lack of moral sense and scruples seen by collectors on television and ... exit one species? I hope not. But the dilemma persists: conservationists need this information, and in order to raise funds they need to demonstrate activity by publishing; but how does one keep the plants one is supposed to be protecting safe from those who, like a certain Bruchus, would 'gather golden fruit from the sale of fruitless flowers' (Ferrari 1633; Glen 1991) unhindered by any regard for the law?

The second concerns the choice of taxa. The decision as to what to include or leave out must necessarily be subjective; the southern African flora is simply too diverse for any other course to be viable. A subjective choice of candidates is not necessarily wrong, indeed my limited knowledge suggests that in almost all cases the author of the book reviewed here has made the right choice. But in one area I find his choice inexplicable. The account of Rhizophoraceae is graced by the inclusion of *Bruguiera gymnorhiza* and *Rhizophora mucronata*,

two of the commonest and most widespread trees on the shores of the Indian and Pacific Oceans. Although both are over-exploited throughout their range, they are still among the most widespread of mangroves in KwaZulu-Natal and are given a rating of Lower Risk (conservation dependent), which is arguably correct. Yet *Ceriops tagal* (Rhizophoraceae) and *Lumnitzera racemosa* (Combretaceae), which are almost as widespread globally as the first-named two species, but only extend as far as Kosi Bay in KwaZulu-Natal, are not mentioned at all.

Red Data lists are necessarily in a permanent state of flux, as they reflect ongoing changes in plant populations. Because Red Data List assessments are based on the most recent available information, it is important to incorporate new information in future updates. It is a point of concern that nowhere does this book invite comment for changes and amendments.

Normally one would end a book review by considering who should acquire or read the book. In this case I would rather, in view of the doubts expressed above, ask who should be granted the privilege of being allowed access to this information. Conservationists and those charged with the making and enforcement of conservation laws, each need at least one copy within easy reach of their workplace—on the desk or in the police vehicle rather than on the bookshelf. On the other hand, the information presented here is so good that it needs to be kept locked, bolted and barred from 'enthusiast growers' like Bruchus in the Ferrari story referred to above. Congratulations are due to both author and publisher on an excellent first contribution to a comprehensive understanding of KwaZulu-Natal's threatened flora.

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H.F. GLEN*

* National Herbarium, National Botanical Institute, Private Bag X101, 0001 Pretoria.

TAXONOMY OF CULTIVATED PLANTS, edited by SUSYN ANDREWS, ALAN LESLIE and CRINAN ALEXANDER. 1999. *Royal Botanic Gardens*, Kew, Richmond, Surrey TW9 3AE, England. Pp. xix + 553, 250 × 158 mm. Hard cover: ISBN 1 900347 89 X, price GBP 27.00.

Sagan (1997) makes the point that 10 000 years ago, when there were no cultivated plants and no man-induced weed problems, the maximum carrying capacity of the world was about 10 million humans. Now there are over 6000 million people, which means that over 99.9% of us owe our lives directly or indirectly to cultivated plants. Yet when I moved into the taxonomy of cultivated plants in 1992, it was considered something to be done in private between consenting adults, and certainly not Respectable. The collection of cultivated plant specimens was PRE's equivalent of a Siberian salt mine, and no decent person went there voluntarily. Fortunately, times have changed.

Just how much they have changed is shown by the volume under review. It is the proceedings of the third symposium on the taxonomy of cultivated plants, held in 1998 in Edinburgh, and sponsored by the Royal Botanic Gardens in Edinburgh and Kew, and the Royal Horticultural Society. The symposium attracted about 130 delegates from all around the world, including two South Africans, and was one of the best-organised and most informative events this reviewer has ever attended. This excellence is reflected in the proceedings.

The attention to detail and creative thoughtfulness that was such a feature of the symposium is seen even in the dust-jacket of the proceedings volume. Dust-jackets are important sales features in modern publishing, and this one is surely one of the best come-ons that has ever

graced a botanical tome. Rows of garden pelargoniums stretch to a curved horizon (the scope of the proceedings is world-wide), and in the foreground, on a stake, is a sturdy garden label bearing the title of the book.

Opening the book does not disappoint. The very first paper is by H.A. McAllister reminding all and sundry of the importance of living collections for taxonomy. He includes all plants in his comments, but curiously omits the most three-dimensional and least amenable to pressing of all, the mesembs, from his survey. Other authors in this section of the proceedings bring to our attention the importance of *ex situ* conservation of rare and endangered species, and of national collections of various plant groups. To take but one example, it would transform the identification of waterlilies from a nightmare to a practical possibility if we had access to a national collection like that described by B.J. Davies. This section also contains methods which many taxonomists would do well to consider. J.D. Twibell describes the value of vapour profiling in elucidating the taxonomy of *Artemisia*. But why should this method be used only by horticultural taxonomists? Ion Williams (pers. comm.) told a group of which I was a member years ago that he could identify species of Diosmeae (Rutaceae) in the field by smell alone, and I am sure that the same is possible in Apiaceae and Lamiaceae, to name but two obvious examples. Capturing this information in a form intelligible to others is problematic, and it seems to me that the choice lies between following Twibell's example or degenerating into a form of qualitative 'winespeak'.

In the present climate where anything not immediately profitable is likely to disappear forever, it may behave those who wish to preserve our wild flora by breeding and selling selections, to read the sections on nomenclature in ornamental plants, intellectual property rights and registration of plant names. Most of the lawyers contributing to these sections are American and Swiss, but the principles are governed by international conventions to which South Africa is a signatory. Mrs Sadie's paper on cultivar registration in South Africa shows that the system operating in this country is a model that other, nominally more advanced, countries may aspire to emulating.

Naming cultivated plants can be a difficult process. Most ornamentals are surprisingly close to the wild forms of the species to which they belong, and the problems these present are firstly to persuade the library to buy the necessary set of world floras, revisions and monographs to use as tools, and secondly to know which one to use in each case. But some plants, of which beets and brassicas are outstanding examples, resemble no known wild plants. How does one attach names to these? Cultivated-plant taxonomists have not one but two codes under which to work (Greuter *et al.* 1994 and Trehane *et al.* 1995), which raises the problem of which code applies when (addressed by R.D. Spencer in this volume). Hettterscheid and his co-workers explore in three papers the consequences of regarding cultivated plants not as evolving biological entities but as industrial products to be named as such. One can see their cultion concept working in the numerous man-made forms of beets, cabbages, kohlrabi, pak-choy, cauliflower and similar crops, but Stirton (also in this volume) shows that it does not tell the whole story in the case of invasive garden escapes such as *Lantana camara*, and this reviewer's impression is that while the cultion concept has its place in understanding the origin, naming and derivation of cultigens, it has little if anything to add to one's understanding of the majority of taxa a horticultural taxonomist such as myself actually sees.

Contributions not mentioned specifically in this review are numerous, and include all the 53 posters, as well as discussions of techniques in breeding and taxonomy, case studies and Prof. Stearn's invited paper on early introductions from Japan into European gardens. I cannot, however, resist the thought that if certain breeders in this country had ever heard of the necessity of DUS (Distinctness, Uniformity, Stability) trials before cultivars can be formally registered, the National Herbarium's collections would not be cluttered with specimens from the only plant ever of hybrids named for no discernible purpose other than vanity.

A large book (over 500 pages) packed with information useful to many more workers than only horticultural taxonomists, deserves a long review, and so I make no apology for the length of this one. Indeed, it would take twice as many words to do justice to the good things found between these covers. Buyers using southern African currencies may be horrified at the cover price of this volume, but calculated per page it is close to the cost of an illicit photocopy (about 50 South African cents per page at the time of writing). For this, one gets a hefty, well-printed and excellently bound volume.

The question any review should attempt to answer is, who needs this book? Horticultural taxonomists, undoubtedly. As I have indicated above, wild-plant taxonomists will also find useful information here on methods that they would not readily discover elsewhere. Conservationists need to examine the studies of national collections. Taxonomists interested in the philosophy of their science will find much of interest in the writings of the Hettterscheid school here. Horticulturalists and garden administrators needing to manage a breeding program should examine the property rights section. I am tempted to say that there is something here for almost everybody who thinks seriously, on entering a garden, a farm, or a plantation.

Here are the reviewer's obligatory quibbles, neither of which detract from the value of the work. First, one could wish for a longer account of the International Association for Cultivated Plant Taxonomy (IACPT) than the two lines it received in the introduction. However, inside information offers the reviewer a suggestion as to why more extensive coverage of IACPT was probably not possible. Second, is a certain paper on *Lantana* in the book really the same as that presented at the symposium? Both title and abstract differ from those in the symposium handout. Again, I can think of a valid and honourable reason for any divergence, but cannot help wondering what the limits of divergence between verbal presentation and printed paper should be. In this case, one is left looking forward to both the next symposium and the next instalment of *Lantana*.

In conclusion, one can do no less than to praise Crinan Alexander, Susyn Andrews and their team for a flawlessly organised symposium and, to quote Sir Ghilleen Prance in the preface: 'I commend the ... editors of this volume for producing a milestone publication which will be of considerable use to all interested in the naming of cultivated plants'.

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H.F. GLEN*

* National Herbarium, National Botanical Institute, Private Bag X101, 0001 Pretoria.

OXYANTHUS (RUBIACEAE-GARDENIEAE-GARDENIACEAE) EN AFRIQUE CENTRALE: ÉTUDE SYSTÉMATIQUE, by B. SONKÉ. 1999. Opera Botanica Belgica 8. *National Botanic Garden of Belgium, Meise*. Pp. 106. Soft cover: ISBN 90-72619-39-0, ISSN 0775-9592, price 900 Belgian francs.

The genus *Oxyanthus*, described by De Candolle in 1807, is endemic to Africa. According to Sonké, *Oxyanthus* comprises 35 species, of which 17 are described in the publication. One species, *O. latifolius* Sond., and different infraspecific taxa of *O. pyriformis* (Hochst.) Skeels and *O. speciosus* DC. (type species of genus) occur in southern Africa (Herman 1993). Only *O. speciosus* subsp. *stenocarpus* known from the Northern Province and Mpumalanga in South Africa, is found in the study area covered by the author. Sonké used the difference in inflorescence structure as the main character to divide the genus into two groups. An outstanding feature of the actinomorphic, pentamerous, hermaphroditic flowers is the corolla with tubes long and narrowly cylindrical and contorted lobes. There is practically no placenta hull in the mature dry-walled fruits, a character which is aberrant in the Gardenieae-Gardeniaceae.

The publication presents a classical taxonomic revision, based on field observations and a study of herbarium material of the genus in central Africa. It is divided into two main sections. The first section deals with the history, taxonomic position, anatomy, biology and chorology of the genus. A formal taxonomic treatment of 17 recognized central African species of *Oxyanthus* forms the second section. Two

identification keys permitting determination of species by flowering or fruiting material are given. A concise treatment of each species supplemented with information relating to important references, type collections, synonymy, morphological observations, notes on infraspecific variability, ecology, distribution, citation and localization of specimens examined, are given.

Black and white photographs, various line drawings, graphs and tables are used to explain the different morphological features discussed in the first part. Three of the 17 species in the taxonomic treatment, are accompanied by accurate line drawings, done by two artists. Distribution maps are also provided for each taxon described and are conveniently placed with its description.

A discussion of problematic material and imperfectly known species, a list of excluded names and a list of the 35 species recognized for the entire genus *Oxyanthus* are also provided at the end of the publication. This work adds to the list of several other publications on the

Rubiaceae that appeared in *Opera Botanica Belgica* (see Retief 1999), and is a valuable contribution to our knowledge of *Oxyanthus* endemic to the African mainland.

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E. RETIEF*

* National Botanical Institute, Private Bag X101, 0001 Pretoria.