Polyisoprenoids. (Series: Biopolymers, Vol. 2.) Edited by *Tanetoshi Koyama* and *Alexander Steinbüchel*. Wiley-VCH, Weinheim 2001. 425 pp., hardcover € 259.00.—ISBN 3-527-30221-2

This volume deals with the occurrence, biosynthesis, and application of those natural substances that have been termed polyisoprenoids and are polymeric condensation products of the C_5 building block isopentenyl diphosphate. The main emphasis is placed on natural rubber, the most abundant and widely applied polyisoprenoid biopolymer, of which about 7 million tonnes per year are obtained from the rubber tree *Hevea brasiliensis*. However, terpenoids, steroids, carotenoids, dolichols, and prenylquinones also belong to this group of natural polyisoprenes, and some of these are mentioned too.

The first chapter is a short overview describing the structure of naturally occurring rubbers from various plants, with particular emphasis on latex and rubber from *Hevea brasiliensis*, *trans*-polyisoprenes from chicle and guttapercha, as well as *cis*-polyisoprenes from guayule and other higher plants. Chapter 2 introduces the reader to the chemical structure and synthesis of synthetic polyisoprenoids, including hybrid polyisoprenoids (aroisoprenoids).

Chapter 3, by Michel Rohmer and coworkers, reviews the two biosynthetic pathways for the formation of the active C_5 carbon skeleton isopentenyl diphosphate (IPP) and its isomer dimethylallyl diphosphate (DMAPP), which are the starting points and building blocks for the head-to-tail (or in some cases tail-to-tail) condensation to form the many primary and secondary polyisoprenoids found in plants and also in fungi or bacteria. The recently discovered deoxyxylulose-phosphate/methylerythritol-phosphate (DOXP/MEP) pathway for the biosynthesis of carotenoids, phytol, diterpenoids, and other chloroplast isoprenoids in higher plants and other photosynthesizing organisms is described in detail, together with the presently known enzymatic steps and the role of the inhibitor fosmidomycin. Plants produce their sterols and most sesquiterpenoids via the cytoplasmic classical acetate/mevalonate pathway, whereas the photosynthetic isoprenoids and diterpenoids are made via the plastidic DOXP/MEP pathway.

Chapter 4 is entitled "Biosynthesis of natural rubber and other natural polyisoprenoids", and includes the enzymes and elongation factors of the later steps of rubber biosynthesis as well as defense-related proteins and the perspectives for transgenic plants. Unfortunately the important question whether the C_5 units for rubber formation are solely made via the classical acetate/mevalonate pathway or can at least partly be provided from the DOXP/MEP pathway is not addressed, despite the long report on the existence of the DOXP/MEP pathway in Chapter 3.

Chapter 5 describes the various biosynthetic steps in the formation of sterols, carotenoids, ubiquinones, and polyprenols in plants. Chapter 6 deals with interesting aspects of the "Biochemistry of natural rubber and structure of the rubber latex", including latex allergens and latex flow factors. Further chapters concentrate on more practical topics, such as "Technical production of synthetic rubbers", "Processing of natural and synthetic rubbers", and "Producers and the world market of synthetic rubbers", which are of essential interest and relevance to the practical application of rubbers and polyisoprenoid materials of different origin.

Finally, chapters of "more" technical significance on "Biodegradation of natural and synthetic rubbers" and on "Biotechnological processes for recycling desulfurization of rubber products" round off this comprehensive book on polyisoprenoids. A comprehensive index provides quick access to the different topics and interests of the reader.

The book is an appealing introduction to the large field and the many different aspects of polyisoprenoids and their biosynthesis, composition, and applications. It is a great achievement of the editors to cover all this in one volume. The chapters are well structured and consist of several subchapters such as introduction, historical outline, presentation of data and facts, as well as outlook and perspectives. Each chapter provides a list of valuable references to original papers for further information. The chapters were written by experts in the particular fields, but these did not include a plant physiologist/plant biologist. Thus, several chapters are not fully up-to-date. For example, the authors failed to point out that polyisoprenoid biosynthesis in plants exists in two forms, and is bound to two different compartments, with different regulating mechanisms, as has also been documented in the existence of different genes, etc. Here the editors should have consulted a plant biologist to bring in various plant-specific aspects and literature references, and to better interconnect the different chapters in this respect. Moreover, the title of the book is "Polyisoprenoids" and this should have been printed in bold face on the cover, rather than the series name "Biopolymers". The latter is only of secondary interest and should appear only "in petit".

The book is of general interest to scientists, particularly in biochemistry and chemistry, but also to those in plant biology, agriculture, and biotechnology, as well as to all those who are involved and interested in the production and practical application of natural and synthetic rubbers.

Hartmut Lichtenthaler
Botanisches Institut II
Universität Karlsruhe (Germany)

Flüchten, Mitmachen, Vergessen. Chemiker und Biochemiker in der NS-Zeit. By *Ute Deichmann*. Wiley-VCH, Weinheim 2001. 596 pp., softcover € 34.90.—ISBN 3-527-30264-6

Fifty five years after the end of the National Socialist era a comprehensive account of the expulsion of Jewish chemists and the behavior of their non-Jewish colleagues is at last available. Ute Deichmann has recorded the 535 chemists who were active at universities and MPIs in Germany at the beginning of 1933 and in Austria at the beginning of 1938 on the basis of university curricula and progress reports of the Kaiser Wilhelm Institutes. Of the 141 (26%) who lost their positions or who emigrated 87% were Jews or of Jewish ancestry. In a detailed work, the author has compiled from a number of sources the life histories and research activities of the chemists who were dismissed and who emigrated as well as of their colleagues

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who remained. For this purpose she has evaluated many archives and questioned a large number of contemporary witnesses, either by letter or in personal conversation.

The considerable amount of material investigated is sensibly divided: 1. Jewish scientists in academic research and teaching in Germany up to 1933. 2. The year 1933: the expulsion of Jewish scientists and the behavior of their non-Jewish German colleagues. 3. The dismissal and emigration of chemists and biochemists. 4. The scientific importance of chemist and biochemist emigrants in their respective haven countries. 5. Membership (of the remaining university teachers) in the NSDAP, careers, and research support in chemistry and biochemistry. 6. International comparison of natural product chemistry and biochemical research from the background of developments up to 1933. 7. Careers and research of individual chemists and biochemists in National Socialist Germany. 8. The influence of National Socialism on chemistry and biochemistry in Germany after 1945.

Decisive for the dismissals was the act on the reestablishment of the permanent civil service passed on the 7th of April, 1933 with which the dismissal of racially undesirable and politically unpopular state employees was given a mantle of legality. The special ruling for Jewish frontline forces and former officials pushed through by Hindenburg was abolished after his death by the "Nuremburg Laws" of 1935.

This "cleansing" of the civil service of undesirables was the first step in the "harmonization" of universities, the second was the introduction of the "Leadership Principle" in the autumn of 1933 according to which the earlier jurisdiction of the faculties was transferred to the rector as "Leader" of the university. The initially independent Kaiser Wilhelm Gesellschaft was first harmonized in 1937, after Max Planck had retired as president. However, a process of "self-harmonization" had already taken place and in "precipitate obedience" co-workers were dismissed before the respective laws demanded this.

In Ute Deichmann's opinion three reasons were responsible for the silence of non-Jewish colleagues and the absence of solidarity: obedience opposite the measures of the state, anti-Semitism, and, above all, the opportunity of advantage. It is astonishing how low the resistance of non-Jewish scientists was in respect to the dismissal of their Jewish colleagues. It appeared that non-Jewish scientists were not prepared to take a stance against the anti-Jewish political science in 1933, when it would still not have represented a risk for prominent representatives. Only a few professors behaved with a lack of conformity. Adolf Windaus offered his resignation after demonstrations against a Jewish postgraduate student, and by this achieved a cessation of harassment. Hildegard Hamm-Brücher, who gained her doctorate under Heinrich Wieland in Munich, considers him as one of the few anti-Nazis, a great exception amongst the leaders of institutes in Munich. She considers her work in his institute as a lifesaver when he protected her from interrogation arising from the fly sheets of the "White Rose". Max Volmer tried to protect his former assistant Briske, and in a disciplinary hearing he was consequently sentenced to a reduction in salary. The pharmacologist Otto Krayer was the only non-Jewish scientist to refuse a position which had become vacant after the expulsion of a Jewish colleague. That led to his immediate dismissal. In 1943 Fritz Strassmann hid the Jewish pianist Andrea Wolffenstein in his apartment. He never belonged to a National Socialist organization, and in 1933 he resigned from the harmonized Verein deutscher Chemiker. He is the only German chemist to be honored in Yad Vashem with a tree in the Avenue of the Righteous.

After 1945 normalization of relationships of German scientists with their displaced Jewish colleagues was very limited. A general recall by the ministries of education as a sign that the dismissals were recognized as an injustice did not take place. Only four university chemistry teachers, for example, Alexander Schönberg, returned to Germany. Whereas many politically incriminated university teachers retained their positions after 1945, or were later reinstated with full earnings and pension rights, emigrants had to take recourse to law to gain such rights. This left a feeling of bitterness, skepticism, and mistrust amongst those affected.

Ute Deichmann has produced a most valuable book that is worth reading and which not only makes clear the considerable injustice inflicted upon Jewish colleagues, but also the damage done to German research in the area of chemistry by the Nazi regime—for example, 11 of the emigrated (bio)chemists were awarded the Nobel Prize. The book is an encyclopedic historical document of enduring value.

A few facts could be supplemented, and omitted personalities, such as Gerhard Herzberg, considered in a future edition. Accounts of forgery, mistakes, and self-deception which do not represent typical National Socialist behavior could be omitted, or at least described in less detail. One can only hope that a similar document on science in the GDR will soon be published, not like this, more than half a century after the events.

Bernhard Schrader
Essen (Germany)

Solid Support Oligosaccharide Synthesis and Combinatorial Carbohydrate Libraries. Edited by *Peter H. Seeberger*. John Wiley & Sons, Inc., New York 2001. xii + 308 pp., hardcover £ 71.50.—ISBN 0-471-37828-3

Oligosaccharides are of central importance in bioorganic chemistry, and a familiarity with them is essential for the chemist involved in synthetic work. Combinatorial approaches to synthesizing oligosaccharides on solid supports or in solution is a field of research occupying many laboratories worldwide. Nevertheless, combinatorial carbohydrate chemistry is still at a pioneering stage, in contrast to the situation for peptides and oligonucleotides. This monograph provides scientists working in the area and advanced students with the first thorough and up-to-date survey of the subject.

The book contains articles by a large number of well-known authors, reporting on synthetic and analytical work from 1966 to the beginning of 2000, and providing a thorough and comprehensive overview of developments and strategies in this highly topical area. A

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