Preface

By V. Kopský and D. B. Litvin

This volume is divided into two sections. The first, covered in Parts 1–4, can be considered as an extension of Volume A: *Space-Group Symmetry*, in this series of *International Tables for Crystallography*. As Volume A treats one-, two-, and three-dimensional space groups, this Volume treats the two- and three-dimensional subperiodic groups. That is, it treats the frieze groups, two-dimensional groups with one-dimensional translations, the rod groups, three-dimensional groups with one-dimensional translations, and layer groups, three-dimensional groups with two-dimensional translations. A reader familiar with Volume A should readily recognize the format and content of the tables of Parts 1–4 of this volume. The information presented for the subperiodic groups is in the same format and consists of the same content as that provided in Volume A for space groups.

A relationship between space and subperiodic groups is considered in Parts 5 and 6: given a crystal of a specific space-group symmetry and a plane transecting the crystal, one can enquire as to what is the layer subgroup of the space group which leaves this plane invariant. The physical motivation for answering this question is discussed in Chapter 5.2. This is followed by the 'Scanning Tables' in which the layer symmetries of 'sectional' planes are tabulated for all crystallographic orientations and for all positions (locations) of these planes. These tables also contain explicitly the orbits of these planes and implicitly, *via* the so-called 'scanning groups', information about the rod symmetries of straight lines which penetrate through the crystal.

A new feature of this second edition is the addition of Seitz notation. In the symmetry-operations section of each table in Parts 2–4 the Seitz notation for each symmetry operation is given below its geometric notation. Minor additions to the text and tables, and corrections of a few typographical errors, have been made.

The history of this work dates back to 1972 when one of us (DBL) was asked by a fellow post doc, John Berlinsky, if there existed International-like tables to classify arrays of hydrogen molecules on a surface with the molecules not constrained to be 'in-plane'. Tables for the layer groups were subsequently derived in the content and format of the *International Tables for X-ray Crystallography*, Volume 1 (1952). It was later pointed out by a referee of *Acta Crystallographica* that such tables had already been published by E. Wood in 1964. Work on these tables remained dormant until 1983 with the publication of Volume A of *International Tables for Crystallography*, and the extensive addition of new features in the description of each space group. Work began then on including these new features into tables for the layer groups.

During this same time one of us (VK) was asked by Dr V. Janovec to investigate the group-theoretical aspects of the analysis of domain walls and twin boundaries. Thus, work began on the relationships between space groups and subperiodic groups and standards for the subperiodic groups.

It is our subsequent collaboration which has led to the material presented in this volume. In the many decisions concerning the choice of symbols, origins and settings for the subperiodic groups, the final choices were made based on relationships between space groups and subperiodic groups. While these relationships are not all explicitly given here, they have been implicitly used.

As with any major work such as this, there are those to whom we must give our thanks: Dr E. Woods is thanked for her encouragement during the initial stage of this work. Dr Th. Hahn has provided advice, comments and encouragement dating back to 1983. Constructive feedback on reading parts of this work were received from Drs Th. Hahn, H. Wondratschek and V. Janovec. The drawings in Parts 1–4 of this volume were done by Steven Erb, a Mechanical Engineering Technology student at the Berks Campus of the Pennsylvania State University. The drawings in Parts 5 and 6 were done by V. Kopský Jr, a biology student at Charles University. We also thank M. I. Aroyo, P. Konstantinov, E. Kroumova and M. Gateshki for converting the computer files of Parts 2, 3 and 4 from WordPerfect to LaTeX format.

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As to the dedication, we would like to point out, to quell any rumours to the contrary, that Mary and Tikva (זכרונה לברכה) are our respective wives. Their unending patience and constant encouragement are indeed due recognition. The parenthetical Hebrew means 'may her memory be blessed', and Professor W. Opechowski is included as DBL's scientific 'father'.