o.m11.o3 Integrating biocrystallography into traditional biology and chemistry curricula. M. Jaskolski, *Dept. of Crystallography, Faculty of Chemistry, A.Mickiewicz Univ. and Center for Biocrystallogr. Res., Inst. Bioorg. Chem., Pol. Acad. Sci., Poznan, Poland.*
Keywords: biocrystallography in Central Europe, multiple-choice test.

Unlike in highly developed countries, protein crystallography in Central and Eastern Europe is still in its infancy and earns its recognition with difficulty. This underdevelopment on the research front is closely coupled with that in biocrystallographic education: there is insufficient professionally active cadre to raise a new generation and, consequently, the "critical mass" of young biocrystallographers who could work towards changing the situation cannot be reached. The paper will present our experiences of introducing protein crystallography into academic curricula in Poland, where the first center for biocrystallographic research in the country was created in Poznan about five years ago. Small-molecule crystallography in Poland has a very good tradition and respectable international level. As an academic subject it is offered mainly in schools of chemistry. In this context it is quite striking that protein crystallography was first offered (at least in this University) in the school of biology, where it was actually an important element of curriculum modernization, while the chemistry curricula included it with delay. Obviously, the programs that are offered to biology and chemistry undergraduates are quite different, almost complementary. The biology student has a very good understanding of the biological matter and of its fundamental structural properties but is thinking in "one dimension". What is lacking is a good training in "three dimensional" thinking and basic understanding of crystallographic concepts and methodology, at least at a level that is necessary for comprehension of protein crystallographic literature and exploitation of the information contained in structural databases. In the case of chemistry students, the general crystallographic knowledge is usually good. Much effort is needed, however, to explain the fundamental properties of biomolecules as well as the principles of their structure and folding. Because of the difference in the programs, there are also differences in the practicals offered to those students. The biology practicals are more of classroom-type while chemistry students are offered laboratory exercises where quite a few of them have their first opportunity to work with real proteins. Our effort to develop biocrystallography teaching began practically from scratch. One aspect of this development has been the creation of a "database" of examination questions for multiple-choice tests. This database, created after the example of SwissQuiz, holds several hundred questions and grows as the discipline and our experience develop. It is very helpful in efficient and objective examinations and mid-term tests. It is being converted to English to promote studying in this language among local students and to make it of more general interest.

o.m11.o4 Training in Laboratories as a Part of Teaching Crystal Growth for Students-Crystallographers. N.I. Leonyuk, *Department of Crystallography and Crystallochemistry, Geological Faculty, Lomonosov Moscow State University, Moscow 119899, Russia*
Keywords: teaching, training, crystal growth

This crystal growth course has evolved as a self-consistent curriculum for students of Moscow State University in collaboration with other universities, academic institutions and industry. There are three stages of our long-term teaching: (1) lectures and seminars for all students; (2) training and laboratory courses for all students; (3) research work for students-crystal growers. This paper concerns of the second part of this curriculum. The laboratories cover the following topics:
- Aqueous solutions: experimental determination of solubility curves for AlK-alums, ammonium phosphate and Seignette's salt ($KNaC_4H_4O_6{\cdot}4H_2O$);
- Crystal growth of AlK-alums from aqueous solutions doped with borax and various dyes;
- Low-temperature hydrothermal growth of rare earth phosphate crystals;
- Hydrothermal synthesis of rare earth silicates;
- Flux growth of rare earth phosphate crystals;
- Liquid-phase hetero-epitaxial growth of NH_4I, KI, KBr and KCl on mica substrate: microscopic observation;
- Czochralski growth of Pb-germanate crystals;
- Kyropolous growth of KBr crystals;
- Stockberger growth of bismuth crystals;
- Computer simulation and computer graphics of external and internal crystal morphology;
- The effect of supercooling and supersaturation on the morphology of NaCl, NH_4Cl, $KAl(SO_4)_2{\cdot}12H_2O$ and $HO{\cdot}C_6H_4{\cdot}CO_2{\cdot}C_6H_5$ crystals: in situ microscopic observation;
- In-situ observation of the $MgSO_4{\cdot}7H_2O$ and $KNaC_4H_4O_6{\cdot}4H_2O$ crystal growth morphology depending on the various admixture concentrations in aqueous solutions;
- Microscopic observation of spiral growth on the singular faces of moissanite (α-SiC) crystals;
- In-situ observation of etching faces on NaCl, Kbr and CaF_2 crystals;
- Morphology of germanium epitaxial films: microscopic observation;
- Morphological study of twin boundaries and gaseous inclusions in synthetic mica crystals.

Training in the university's laboratories is intended to demonstrate a crystal growth technique, and to teach the students to perform simple experiments and related procedures on the crystal growth of model materials which can be made easily and safely by students. It is primarily aimed at students intending to major in crystallography as an interdisciplinary field of science.