20.1–10 COLOUR GROUP THEORY AND TABLES IN CRYSTAL PHYSICS. By J.N.Kotzev, Faculty of Physics, University of Sofia, Sofia-26, Bulgaria.

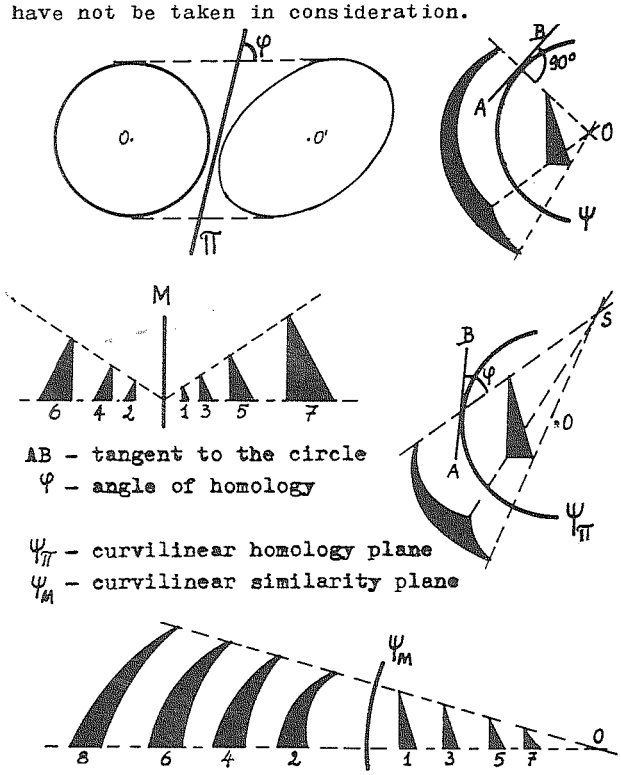
In a series of our papers with V.A.Koptsik the general theory of colour symmetry was proposed on the basis of group extension theory (using direct, semidirect and wreath products) and full tables of all generalized point groups (including permutations of colours and rotations of magnetic and electric moments) were given (see Comm. JINR-Dubna, 1974, P4-8067, P4-8068, P4-8466, a review in MATCH (1980) 9,41). We applied the colour groups in the classification of magnetic structures and phase transitions (Kotzev, 1975). Extensive tables of permutational colour space groups were published by Koptsik, Zamorzaev, Harker and others. Their practical application becomes possible only after our recent papers in Physica A (1982) 114,576,588; Phys.Rev.B(1982)25 7523, 26,6974; Group Theoretical Methods in Physics, Nauka, Moscow, 1983, v.1, p.332. For example, in the symbol of the colour group $G/H'H(F,F')_n$ of $n=/G:H'/$ colours is concentrated all the symmetry information for the phase transition from symmetry G to its subgroup H' and $H=\mathrm{Ker}\, D^J_G$ is the kernel of the irreducible representation D^J_G of G, responsible for transirion. A number of similar transitions are classified on the base of the "chromomorphism" determined by the image $\mathrm{Im}D^J_G = (F,F')_n \leq S_n$. Colour groups known as "spin-groups" are effectively applied in the analysis of the magnetic structures in exchange approximation. Permutational representations of colour groups are very useful in describing the tensor fields in crystals, in the normal vibration problems, in the spectroscopy of crystals etc. Comparisons with other methods and other authors are given.

20.1–11 ON THE CURVILINEAR HOMOLOGY AND THE CURVILINEAR SIMILARITY SYMMETRY. Z.Durski and H.Nowaczek, Department of Chemistry, Warsaw Technical University, Warszawa, Poland

As the result of the combination of homology /Mikheev, 1961/ and similarity symmetry /Shubnikov, 1960/ with curvilinear symmetry /Nalivkin, 1925/, we have got a new kinds of generalized symmetry. Fig. 1,2,3 are showing the results of the symmetrical operations for homology, similarity symmetry and curvilinear symmetry, which correspond with reflection across a plane. Those figures are showing different reflections: fig 1 - reflection across homology plane π; fig 2 - reflection across similarity plane M; fig 3 - reflection across curvilinear plane ψ.

The curvilinear homology is formed /fig. 4/ by the connection of the homology with curvilinear symmetry, and the curvilinear similarity symmetry is formed /fig. 5/ by the connection of the similarity symmetry with curvilinear symmetry.

On the fig. 3 and 5 - 1,2,3,... are the parts of the figure generated one after another. On the fig. 5 /scheme/ the changes of distances and dimensions of the parts of the figure have not be taken in consideration.



20.1–12 LOCAL SYMMETRY APPROACH TO CRYSTAL STRUCTURES - SYMMETRY OF STRUCTURES CONSISTING OF BLOCKS. By D. Mikloš, Institute of Inorganic Chemistry, Centre for Chemical Research, Slovak Academy of Sciences, 842 36 Bratislava, Czechoslovakia.

The basic ideas of K. Dornberger-Schiff (Abh. Dt.Akad.Wiss., Kl.f.Chem.3(1964)) on the layer OD structures and the generalized definition of a crystal (Dornberger-Schiff, K., Grell, H., Kristallografia(1982)27,126) are used as a starting point for a systematic derivation of possible (or probable) structures consisting of block building units of one kind.
The structures are built up in the following way: From the point symmetry of a building unit and a defining relation between two successive building units (represented by a symmetry operation, which transforms the first building unit into the second one) all equivalent pairs of building units are derived. According to a selection code, which indicates allowed configurations consisting of all, several or one of these pairs, the structure is constructed and checked for not allowed configurations. If adequate, the total symmetry is determined for the resulting structure, which may be an isolated block, an open or closed "chain", a layer or a three-dimensional structure, either ordered or disordered.
Only crystallographic point groups and symmetry operations are used to describe the building unit symmetry and the defining relations, respectively.
Results of the analysis are presented for lower symmetries of building units and several examples are discussed.