The voluntary nature of membership in the Institute, the existence of rival organizations competing for members and a voice in government councils, and internal divisions within the Institute itself point to the conclusion that chemistry in Britain has never possessed the essential characteristics of a profession as Russell and his colleagues define it. In this sense, *Chemists by Profession* is an account of a development that has not occurred. It richly documents the difficulties, perhaps insurmountable, that confront those who would shape a unified profession from the diverse groups who call themselves chemists.

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Galactic Dynamics

Structure and Properties of Nearby Galaxies. Papers from a symposium, Bad Münstereifel, Germany, Aug. 1977. ELLY M. BERKHUIJSEN and RICHARD WIELEBINSKI, Eds. Reidel, Boston, 1978. xviii, 308 pp., illus. Cloth, $38; paper, $24.50. International Astronomical Union Symposium No. 77.

The Large Scale Structure of the Universe. Papers from a symposium, Tallinn, Estonia, U.S.S.R., Sept. 1977. M. S. LONGAIR and J. EINASTO, Eds. Reidel, Boston, 1978. xx, 464 pp., illus. Cloth, $46; paper, $29. International Astronomical Union Symposium No. 79.

Extragalactic astronomy advances simultaneously on two fronts. For nearby galaxies, high-resolution studies reveal a wealth of details concerning the optical, infrared, radio, and x-ray properties of their nuclei, their distribution of light and mass, their past history of star formation, and material in their vicinity. In contrast, observations to the outermost distance limits reveal the large-scale distribution of matter in small groups, in large clusters, and in superclusters, the dynamical evolution of clusters, the cosmical evolution of matter, and the formation of structure in the universe. In recognition of the rapid progress in both of these directions, the International Astronomical Union sponsored the two symposiums in 1977 whose proceedings are reviewed here. In a standard format of invited papers, short notes, and floor discussion, the volumes present a wealth of recent observations, accepted theories, novel ideas, and sheer conjecture, all of which lead to a model of the universe that is both exciting and beautiful, and that could not have been presented ten years ago.

Nearby, as *Structure and Properties of Nearby Galaxies* demonstrates, the surprises are few, but the breadth of facts is impressive. In the Andromeda galaxy (M31), for example, although the detailed form of the spiral pattern still cannot be deduced (Athanassoula), the kinematics is better understood. Neutral hydrogen can be traced beyond the optical image to a distance of 30 kiloparsecs, and the rotational velocities remain high (Roberts, Whitehurst, and Cram), implying a significant mass at large nuclear distance. Closer to the nucleus, motions are complex and may arise from an earlier nuclear explosion (Shane), a warped or corrugated disk (Emerson and Newton; Whitehurst, Roberts, and Cram), or high-velocity clouds surrounding M31. Dwarf spheroidal galaxies in the vicinity of M31 are shown to resemble those in our own Local Group of galaxies (Kinman). Radio continuum observations (Berkhuijsen) detect intense radio emission from the nucleus and from the optically bright arms, with the peak intensity of the radio continuum, of HI, and of HII generally coincident and often following the dust lanes. Many concepts concerning the dynamics and evolution of galaxies are now well understood (Tinsley; Strom and Strom), although whether a heavy halo exists is still uncertain (van den Bergh).

In *The Large Scale Structure of the Universe*, the picture that emerges from studies of distant groups of galaxies begins to be revealed through studies of nearby small groups of galaxies (Tully and Fisher): there is no evidence for significant numbers of isolated "field" galaxies. More striking, there are large voids in the galaxy distribution, encompassing about one-half of the region surveyed; the number density here is down by a factor of 10^3. DeVaucouleurs, who taught us that we live in a supercluster, now has a plethora of colleagues (Rudnicki and Zieba; Abell; Tarenghi *et al.*; Tifft and Gregory; Huchra) who report on the large-scale distribution of extragalactic objects. Their work, plus that of Jõeveer and Einasto ("Has the universe the cell structure?"), but especially that of Peebles and his school, is changing our picture of the large-scale clustering of galaxies. Peebles's analysis, which is based on galaxy counts by Shane and Wirtanen, shows that the galaxies distribute themselves in interlocking lace-like cells, cells with scale lengths of 50 to 100 megaparsecs. The voids are a significant feature of the arrangement and will have to be accounted for in any theory of matter distribution.

The dynamical evolution of clusters of galaxies, with emphasis on the roles of accretion, cannibalism, violent relaxation, and interactions with the intercluster gas (Ostriker) and observational evidence for cosmical evolution of quasars (Schmidt), radio sources (Longair), and galaxies (Tinsley) also now lend themselves to some measure of observational understanding.

Widely differing theories of the large-scale structure and evolution of the universe from the several Moscow groups (Zeldovich; Doroshkevich, Saar, and Shandarin; Ozernoy; Chernin) are imaginative and exciting. The points at which they mesh with observations must still be established; whether the physics of the very early universe can be understood is not yet clear.

Both of these volumes contain a wealth of information accumulated only in the last few years, and the index to the galaxies and clusters discussed in *Structure and Properties of Nearby Galaxies* deserves a special thanks. The proceedings make informative and interesting reading. The problems are far from solved, and these papers serve to illuminate the questions as well as to provide their present answers. Zeldovich, the optimist, concludes that at "the next symposium somewhere in the early eighties one can be pretty sure that the question of the formation of galaxies and clusters will be solved." We'll see.

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Cosmogony

The Origin of the Solar System. Papers from a NATO Advanced Study Institute, Newcastle upon Tyne, England, March 1976. S. F. DERMOTT, Ed. Wiley-Interscience, New York, 1978. xviii, 668 pp., illus. $69.

For much of its history, cosmogony was a field for the entrepreneur. The goal was to explain the large-scale structure of the solar system. With only dynamical constraints, this seemed within the powers of the individual; collaboration and specialization were rendered superfluous by the scarcity of data. Within the last two decades, new observational techniques, especially the use of spacecraft, the development of subtle chemical and isotopic analyses, and increases in computational capacity, have radically al-