# ANDREW LENARD

Andrew Lenard, who grew up in Hungary and narrowly survived in a concentration camp during the last years of World War II, came to the United States in 1947. He eventually received a PhD in theoretical physics at the University of Iowa, working under the advisor Josef Jauch.

After serving in the Army Engineers, Andrew had stints at Berkeley, Columbia and Princeton, before arriving at Indiana with a joint appointment in the mathematics and physics departments. Together with Roger Newton and John Challifour, Andrew was part of a formidable math physics group at Indiana.

Andrew's research covered an unusually broad area with the core of his work on quantum many-body problems and statistical mechanics. In 1964, he gave a highly non-trivial proof that the hardcore one-dimensional Bose gas has no Bose-Einstein condensation, answering a question that had evaded previous attempts. Following this, a major scientific impact came with his collaboration with Freeman Dyson at IAS in Princeton during 1965-1966 on the Coulomb Stability Theorem for ordinary matter.

During the summer of 1967, while revisiting the Princeton Plasma Physics Laboratory, where he had been a member of the applied mathematics group before IU, Andrew was in a discussion on wave stability in the KdV equation involving Martin Kruskal, who asked whether there was a systematic way of generating more equations with similar properties. Within a short period of time, Andrew came up with a generating function for an infinite number of KdV-like equations with the same conservation law behavior. Even though this result was never published, it is part of the standard framework of bi-Hamiltonian systems. Also in 1967, during a discussion with
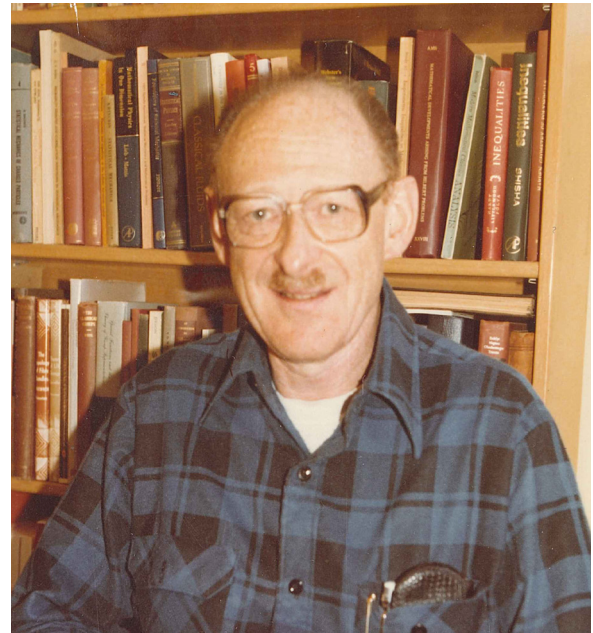
Elliott Lieb who had calculated the number of 'ice' configurations for a square lattice of size N to be $(4/3)3N/2$, Andrew recognized this as the number of ways to color the squares of a checkerboard with 3 colors (no adjacent squares with the same color), thus solving one of the few non-trivial coloring problems. With Andrew's modesty, it was left to others to make this known.

While at IU, Andrew collaborated with colleagues in the department, particularly Seymour Sherman. Andrew also delighted in providing interesting problems on quantum mechanical spin systems for the physics qualifying examination, in addition to teaching undergraduate and graduate courses in mathematics. Even in his retirement years, Andrew was an active participant in departmental seminars, frequently peppering the speaker with insightful questions and raising interesting new directions for the audience to consider.

Born: Balmazujvaros, Hungary July 18, 1927
Died: Bloomington, Indiana March 17, 2020
Years at IU: 1966-1993