A. A. Sapar. *Interaction of Radiation and Matter in Stellar Atmospheres.* The atmosphere of a star is a transitional zone between the interior of the star and the interstellar medium. The interaction of radiation and matter in the stellar atmosphere determines the basic structural features of the atmosphere, its thermodynamic state, and the appearance of the star's spectrum.

A group of theoretical astrophysicists at the Tartu Astrophysical Observatory has completed calculations of the structure of hot extended stellar atmospheres with outflow of matter and of a grid of models of plane-parallel spectral class O-A stellar atmospheres for various effective gravitational accelerations and chemical compositions. Rational computing algorithms were developed, e.g., for solution of the transfer equation. Analytic solutions were found for several problems of radiation transfer in spectral lines. The recombination spectra of several ions were calculated for physical conditions corresponding to the envelopes of hot supergiant stars, and it was found necessary to calculate the wave functions of the C, N, and O ions in the multiconfiguration approximation in order to explain features of their spectra; the corresponding formulas were derived. The shaping of the spectral-line profile function was studied for hydrogen-like ions in the plasma. Quantum-electrodynamics considerations were used to derive a radiation transfer equation that gives the corrections to the opacity of the matter that must also be taken into account for the conditions of stellar atmospheres. Some of the results have been published, and others will appear in publications of the Tartu Astrophysical Observatory.

U. H. Uus. *The Appearance of Elements Synthesized in the Interior of a Star on Its Surface.* Stars with low surface temperatures and large radii—the red giants—often have anomalous surface chemical composition because these stars have thick convection envelopes that support the transport of nuclear combustion products