Galactic Shock Waves: The Perseus Arm. W. W. Roberts, Jr., Univ. of Virginia. It has been suggested that galactic shock waves form the fundamental connecting link between the interstellar gas and the spiral structure in a galaxy by providing a mechanism that could be capable of triggering out of the gas the formation of young optical objects along luminous spiral arms (cf. Roberts, W.W., 1969, Ap. J., 158, 113). An examination of (1) optical data on young galactic clusters, HI regions, O associations, and interstellar absorption lines and (2) 21-cm line hydrogen maps of the Perseus spiral arm indicates that the peculiar motion associated with the interstellar medium there may be a significantly more extended phenomenon than previously recognized, stretching in longitude from 100° all the way around to 195°. In light of the observational data, a model for the Perseus arm based on the galactic density wave and shock wave concepts is proposed. The model considered is the two armed spiral shock model that describes the large-scale motion of the interstellar gas, and the young optical objects born out of the gas, over the large-scale galactic disk. The Perseus arm, as viewed in this model, consists of a galactic shock wave embedded in a background density wave. In this model the peculiar motion along the entire length of the Perseus arm can be accounted for.

Of even greater significance is the fact that the apparent discrepancy in the spatial arrangement of the optical spiral arm and the neutral hydrogen spiral arm is found to disappear in this model, and all the heretofore apparently separate Perseus features now appear to actually coincide as one composite arm.