THE OBSERVATORY

Vol. 101  1981 FEBRUARY  No. 1040

SUMMARIES OF PAPERS PRESENTED AT
THE RAS SPECIALIST DISCUSSION ON
THE STRUCTURE OF GALAXIES

1980 April 15
at University College, Cardiff

PERTURBATIONS OF GALACTIC ORBITS

By D. Lynden-Bell
University of Cambridge

It is the gravitational action of the stars populating one orbit on those populating another that is of primary importance in galactic dynamics. If there is a set of axes in which two orbits exactly close, then the orbits produce steady torques on one another so these gravitational actions are greatly enhanced. As I described in Monthly Notices a year ago, in certain conditions the resultant changes will align the orbits with one another to form bars. Such bars, and indeed any symmetrical oval distortion, will drive a spiral density distribution on any dissipative gas even without any self-gravity. I think it is this dissipation, not the propagation of density waves, that is responsible for the spirals we see in galaxies. Following earlier work—some of it done here in Cardiff—the thesis of M. P. Schwarz of Mount Stromlo fully explores the behaviour of gas in these circumstances, and I recommend its perusal to those studying spiral galaxies.

LEADING AND TRAILING STRUCTURE IN A SIMULATED GALAXY

By R. A. James and A. Wilkinson
University of Manchester

Following early work by Sellwood, we have performed three-dimensional particle-mesh simulations of disk galaxies to explore the effect of varying the initial velocity dispersion. Our model includes a rigid, spherical Population-II halo, contributing 80 per cent of the mass inside a radius of 20 kiloparsecs. The halo follows one of Michie and Bodenheimer’s models, which Lynden-Bell has shown to apply to collisionless systems. The rotation curve is nearly flat between 8 and 20 kiloparsecs.

A cold start, with the stars initially in circular orbits, gave variable structure up to $6 \times 10^8$ years and then a nearly featureless disk. We ran a warm-start