latest reduction based on a dynamic fit of all Lunar Orbiter data. Good correlations were found, with the prominent circular maria, Mare Orientale, shown to have a small positive anomaly surrounded by an annular negative anomaly.

Several interpretations were proposed for this. Dr M. J. O'Hara (University of Edinburgh) suggested that the mascons formed by the filling of depressions with the liquid phase of partially fused rocks. Because this phase concentrates the high density forming elements, subsequent solidification would produce the anomaly. The melt would rise to the surface if its density, while molten, were less than that of the surrounding rocks. Dr P. R. Bell (Oak Ridge National Laboratory) alternatively proposed that the surface of the Moon was originally molten due to an early "superluminous" phase of the Sun. Major impacts during the solidification of this layer produced pits into which the still molten fraction flowed, the fill and ejecta combining to form a positive gravity anomaly. Mare Orientale formed too late to have filled in this way. Professor H. C. Urey (University of California at San Diego) agreed that the surface must once have been molten, but pointed out that the presence of the mascons was difficult to reconcile with a molten or nearly molten interior. The interior must have a high degree of strength, for a subsidence of only one or two kilometres should eliminate the observed anomaly.

Dr G. H. Pettengill (Arecibo Observatory) reviewed recent radar studies of the terrestrial planets. Mercury seems closely to resemble the Moon in surface properties. Venus seems, on average, to be much smoother, though at least six anomalously rough areas have been mapped. Several small areas with heights of 1.5 to 2.0 km above the surroundings have been located, but there seems to be no large-scale relief. Mars seems to be even smoother than Venus, although there are large local variations in backscattering efficiency. There is a significant correlation between areas showing high echo specularly and those with low visual albedo, and there is considerable large-scale topographic variation in the northern tropics (the southern tropics have not yet been studied). Looking to the future, Pettengill predicted that, given adequate funds, it should be possible by 1974 to obtain radar echoes from the Galilean satellites of Jupiter, while by 1975 a 4 km radar resolution on the surface of Venus might be possible.

The description by Dr B. A. Smith (New Mexico State University Observatory) of the location of the satellite Phobos on several frames obtained from the Mariner 6 and 7 missions to Mars was a highlight of the proceedings. Phobos seems to be elongated (approximately 22.5 by 17.5 km) and to have a geometric albedo of about 0.065. If this figure is accurate, Smith pointed out, Phobos has the lowest albedo of any known object in the solar system, with the possible exception of some areas of the lunar surface.

When attention focused on the giant planets, the chief topic of interest was the magnetic field of Jupiter and the circulation of its atmosphere. Dr R. A. Stokes (University of Kentucky) warned that it is possible that a fluorescent or cyclic process could act in the atmosphere of Jupiter to produce infrared quanta with a non-equilibrium distribution. Some reported monochromatic temperatures may thus be significantly higher than the translational temperature of the source gas.

PROTEINS

Straightening out α -Keratin

from our Biomolecular Structure Correspondent

To be proposed independently by two Nobel laureates (and while both were in their model-building prime) might reasonably be taken to promise longevity for any structural hypothesis. Indeed, the coiled-coil structure for the α -fibrous proteins has been with us for more than seventeen years and the analysis on which it was based has influenced thinking on many topics in biomolecular structural analysis. Nevertheless, during the past few years there have been increasing signs of fundamental difficulties in the detailed fitting of the observed diffraction from the α -proteins with a coiled-coil model, and also indications that alternative models might account for the data reasonably well.

The most recent alternative to the coiled-coil model is due to Parry (*J. Theoret. Biol.*, **26**, 429; 1970) and brings together two proposals previously only considered separately. The first, due to Fraser and MacRae, suggests that each of the two or three α -helices which form the strands of the rope-like structure of α -proteins has a segmented structure. Each segment is a piece of undistorted α -helix typically ~ 20 Å long and the distortion resulting from folding of the strand is assumed to be confined to the few amino-acids in the region of the protein chain between segments. The second proposal derives from the work of Elliott and his co-workers, particularly the observation that in the paracrystalline phase of poly- γ -benzyl-L-glutamate in dimethylformamide the peptide backbone has the normal undistorted α -helical conformation, but the benzene rings at the ends of the side chains are arranged with quite different symmetry. The most striking feature in the diffraction from this structure is its similarity to that from α -proteins which have been identified as coiled-coils. This is particularly surprising because in the synthetic polypeptide structure the α -helical backbone in all the molecules is undistorted and all the molecules are parallel.

The segmented structure for the α -helical strands in the multi-stranded rope model for α -proteins allows each strand to assume a conformation reminiscent of a coiled-coil except that all the distortion from folding is confined to the part of the protein chain between segments. If the segment is not too long the favourable packing of side-chains in neighbouring α -helices, which provided the rationale for the original choice of the coiled-coil parameters, is largely retained in assemblies of segmented strands. The diffraction to be expected from such structures is in promising agreement with the observed "coiled-coil" data, and, possibly more important, that the intensity distributions in various regions of the diffraction pattern can be varied largely independently of each other. But this ability to adjust the calculated diffraction in such a regal way might be more a sign of the over-abundance of parameters in structures of this type than that the analyses are necessarily on a convergent track. Not only is the length of the segment largely undefined, so too is the number of strands in the multi-stranded rope and also their relative direction. Further allowance for the effect on the scattering of disordered material surrounding the molecules is fraught with difficulties although some progress is promised in this direction.