bacterial flora of cheese. Then again gas chromatography is being applied to determine the volatile components of milk, and this may ultimately provide the basis of a rapid and reliable creamery platform test of milk quality. In another example a spectroturbimetric method has been devised which enables the mean fat globule diameter of homogenized milk to be rapidly determined. Indeed, it is abundantly clear from the report that every effort is being made to apply the most up-to-date scientific knowledge, methods and equipment to the art and practice of dairying in all its branches.

The report includes a list which gives the titles and authors' names of the 165 papers which were published by members of the staff between October 1959 and September 1960. The Institute is to be congratulated on the variety, amount and high quality of the work reviewed in its report. J. A. B. SMITH

FISHING IN MADAGASCAR

WITHIN the last decade, the fish *Tilapia melanopleura* has brought about a radical change in the diet and social habits of a large proportion of the population of Madagascar. Fish supplements the otherwise protein-deficient diet of the islanders, and fishing has become a useful and pleasant occupation practised every day by whole families.

The fish, along with other species of *Tilapia*, was first introduced by the Government ten years ago. The aim was to provide a source of much-needed protein to balance the Malgache menu of rice and manioc, fruit and a little honey, enlivened only occasionally by a small amount of meat or fish.

The *Tilapia* soon established itself in the rivers and lakes and multiplied rapidly. Fishing became popular. Encouraged by the success of this initial venture, the Government was stimulated to extend the output of fish still further by creating fishponds in the central part of the island where there is abundant water. Government agents went from village to village showing the inhabitants how to construct the ponds. By 1958 there were 40,000 village ponds; to-day there are 80,000, providing nourishing meals where formerly fish was seldom eaten.

A recent survey by Dr. Rudolph Kreuzer, Food and Agricultural Organization, Fisheries Division expert, shows that the average catch per adult is about 11 lb. of small fish each day, and even a small child can catch 4 lb. (*Sci. afrique*, **23**; February 1961). Not surprisingly, the people who live near the rivers and lakes eat more fish daily than Europeans do in a week. But the quantities caught are related only to the fisherman's needs. There is still malnutrition in the dry areas of the island. Before this can be eliminated, it will be necessary to develop a fishing industry and overcome the distribution problems inevitable in the hot African climate.

A government pilot station on Lake Alaotra is already successfully producing smoked fish and fish meal. Dr. Kreuzer's investigations have shown that drying and salting would also be successful in the fishing villages along the western coast. There, shielded by a coral reef, a primitive technique, closer to hunting than fishing, is practised. First, a flotilla of outrigger canoes forms a semi-circle near the reef. By beating the paddles on the water, the men drive the fish inshore. Then the fishermen leap overboard to spear the catch in the water. Nets are used only to prevent the quarry escaping seawards.

Better methods of fishing and the development of economic methods of processing the catch would help towards correcting dietary deficiency where it still occurs. But formidable transport problems would still have to be solved, for dense bush isolates the west coast fishing villages from the rest of the island.

TERRESTRIAL EXOSPHERE AT HEIGHTS OF 1,000–1,700 km.

By MAX RÖMER
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THE successful launching of the satellite iota 1, 1960 (*Echo* I), with its extremely small ratio of mass to area $m./A. = 10^{-2}$ gm./cm.^{2} first offered the opportunity of deriving atmospheric densities above a height of 1,000 km. For the time-interval August 12–December 19, 1960, it was possible to determine the densities for the heights 1,700 km. down to 1,000 km. Considering the large amplitude of the diurnal effect[1] and the relatively small eccentricity of the orbit it is impossible to use the density scale height H_ρ in the well-known air density formula by D. G. King-Hele, G. E. Cook and D. M. C. Walker[2]. The acceleration of a satellite is caused by the actual air density along the orbit. Therefore the 'individual orbital scale height' H characterizing a linear approximation to the logarithmic density function in the individual orbit was calculated[3]. For this calculation a model of atmospheric densities by H. K. Paetzold[4] was used augmented with the diurnal variation derived by W. Priester, H. A. Martin and K. Kramp[1]. The knowledge of the exact shape of the auxiliary model is not important because in the density formula only $\sqrt{H}$ is used. The computed densities hold for the orbital points of highest density, that is, for 14 hr. true local time.

The choice of the drag coefficient was discussed in detail[3] including the interaction of the charged satellite with the ionized component of the exosphere, and $C_D = 2{\cdot}5$ was adopted as a reasonable value[5]. According to R. W. Parkinson, H. M. Jones and I. I. Shapiro all orbital elements are disturbed by the solar radiation pressure during one revolution[6]. For orbits of small eccentricity the secular perturbation of the semi-major axis is very small. But for the calculation of air density by means of satellite accelerations all periodic variations of the orbital energy are important, the period of which is greater than the mean distance between consecutive orbital data. Considering the unequal time-intervals of acceleration and deceleration due to the non-uniform orbital