best tests of quantum electrodynamics at small distances (high energy), where departures from the theory (if any) are most likely to show up. This practically guarantees that the theory for the electron is good enough for a precise measurement of α to be trusted.

A new muon $(g-2)$ apparatus is now being prepared at CERN. It involves a ring magnet 14 m in diameter in which the muon will turn thousands of times, and should give g to about 1 part in 10^8. At this level quantum fluctuations involving heavy particles will be seen clearly, and may well lead to some surprises. Nobody can be sure that the effect of strong interactions between these particles has been estimated correctly, and of course undiscovered particles have not been taken into account, although obviously the muon itself may be aware of them. In particular somewhere, some day, one expects to find out why the muon is so heavy. If this can be attributed to a private particle coupled only to the muon, it could show up as a correction to the g factor.

From a Correspondent.

ENERGETICS

What Price a Weasel?

from a Correspondent

LONG, thin mammals like weasels need more energy to run than do compact mammals like rats, according to James H. Brown and Robert C. Lasiewski (*Ecology*, **53**, 939; 1972). By comparing metabolic rates of weasels (*Mustela frenata*) with wood rats of the same weight (*Neotoma* spp.) at various temperatures, they found a 50–100 per cent increase in the metabolism of weasels. Three factors seem to govern this difference—the surface area of weasels is greater in proportion to the mass of the body than it is in the wood rat; their fur is less than half as long as that of the wood rat and has a correspondingly lower insulative quality, and, third, weasels are unable to attain a spherical or near spherical resting posture. Combined, these factors make the cost of thermoregulation rather high for the weasel as so much energy is dissipated as heat.

The high cost of thermoregulation, however, must have been offset during evolution by the advantages of a long thin body able to penetrate small cracks and burrows in pursuit of prey. The fact that many species of weasels and their relatives inhabit northern temperate, sub-arctic and even arctic regions is proof of their ecological fitness. Brown and Lasiewski suggest that energetic efficiency has been sacrificed for enhanced predatory ability and, presumably, efficiency. A correspondingly greater amount of predation is necessary to support the energetically inefficient body shape. The application of Bergmann's rule, that animals evolve more compact shapes in cold climates to protect against undue heat loss, does not seem therefore to apply to weasels.

Brown and Lasiewski hit on a most interesting ecological point when they discuss sexual dimorphism of weasels. Males are significantly larger than females and may weigh up to twice as much. Ecologically this means that male and female weasels occupy virtually different feeding niches. Small fissures and burrows and the prey within them are exploited by the females, and larger crevices and the like are exploited by the male. Thus intersexual liaison benefits the species in that a territory is more fully exploited, as if by two species. Intrasexual competition, necessary for the maintenance of spacing patterns and population stability, is enhanced because of the weasels' increased energy requirement. The spread into a second niche through the agency of sexual dimorphism is not unique in the animal kingdom; in some deep sea fishes it is normal for the male to be parasitic upon the female. (Not only does this make the union of male with female easier, but it has important economic advantages in energetically impoverished environments.) The impact of *M. frenata* on the environment is essentially like that of two separate species.

Among the Mustelidae only those species with an elongate body form show marked sexual dimorphism. Obviously the elongate form and the sexual dimorphism evolved together, and now are totally dependent upon one another. It seems that only by evolving into a secondary, sex specific niche by means of sexual dimorphism, can sufficient energy be harvested to allow the energetically inefficient body shape to function as a more efficient predatory machine. This has the effect of increasing the rate of energy flow in the environment—a useful feature in regions of intrinsically slow turnover—and of increasing the number of filled ecological niches without requiring the introduction of additional species. Bergmann's rule, if it applied in this instance, would be prejudicial to the development of the community, and to the expression of maximum ecological vitality.

TRANSFER RNA

Through Fields of Clover

from our Molecular Biology Correspondent

WHETHER it is a good idea for physical chemists to seek to bend the bow of the crystallographers by the pursuit of structural information about biological molecules is no doubt a matter of opinion. It is safe to say, however, that protein models based on ultraviolet difference spectra, optical rotation and the like have not proved the most enduring monuments of modern science. In the RNA field the prospects of extracting relatively hard, if modest, information, such as the degree and composition of base pairing, have seemed altogether more propitious, and much effort, more some might feel than the objectives justify, has gone into the development of methods to do just this, and to apply them to species of known sequence, particularly the tRNAs. The answers have in general been compatible with the pairing schemes imposed by the celebrated cloverleaf structure, and

Correlating Genetic and Translational Maps

IN *Nature New Biology* next Wednesday (January 31) Celis, Smith and Brenner report a set of those experiments in which molecular geneticists display their sophistication. Celis *et al.* have correlated the translational map and the genetic map of gene 23 of phage T4 (this phage has long been one of the happiest hunting grounds of molecular geneticists) and they find that for at least 40 per cent of this gene 0.012 recombination units of the genetic map correspond to one amino-acid residue in the gene 23 protein.

Gene 23 of phage T4 specifies a major polypeptide of the head of this phage. Furthermore, it has been shown that the polypeptide in the phage arises from the primary product of translation of gene 23 messenger from which an N-terminal fragment is cleaved. To compare genetic and translational maps of gene 23, Celis *et al.* measured the molecular weights and characterized by fingerprinting the fragments of gene 23 precursor protein specified by a set of amber mutants which had previously been genetically mapped. A plot of the molecular weights of the fragments of polypeptide against the recombination distances between these amber mutants yields a straight line, the slope of which is 0.012 recombination units per 100 daltons of polypeptide, in other words per amino-acid. In spite of one anomaly —the polypeptide specified by a mutant E161 is about a third smaller than predicted—Celis *et al.* believe they may have hit on a constant physical unit of recombination. Further studies of other genes should decide whether or not this is the case.