animals from the control group and the group receiving 10 per cent calcium cyclamate were killed at 6 months and examined histophathologically.

So far (9 months), body-weight and food consumption data have illustrated an effect of feeding calcium cyclamate in the diet, whether on full feed or on restricted feed intake. Animals receiving 10 per cent calcium cyclamate consumed approximately 10 per cent more diet than control animals. This increase in food intake compensated for the non-caloric cyclamate in the diet. Thus the 10 per cent calcium cyclamate rats' calorie intake was equal to the control animals. Despite equal calorie intake animals receiving calcium cyclamate at the 10 per cent level grew at a rate 20–30 per cent less than control animals. This growth depression results from the inclusion of the calcium cyclamate in the ration, but whether this is due to toxicity *per se* or an interference with nutrient absorption in the gastro-intestinal tract is being determined. Possible effect on metabolic rate is being examined. The same growth depression was noted to a lesser degree in animals receiving 5 per cent calcium cyclamate in their diet.

Animals in all groups were in good health. The faeces of animals receiving calcium cyclamate in the diet were soft and moist. Initial diarrhoea during the early weeks of the experiment disappeared after 8 weeks on test. No remarkable variation was noted among the rats during haematological or urine examination. Animals receiving calcium cyclamate consumed 25–40 per cent more water daily.

Animals receiving *ad lib.* feed conceived and were able to raise their young to weaning (21 days) during both breeding trials. In the first litters the control young averaged 50 g in weight at 21 days of age, the 5 per cent calcium cyclamate young averaged 42 g, and the 10 per cent calcium cyclamate young averaged 32 g.

In the second litter, control young averaged 52 g, 5 per cent calcium cyclamate young 45 g, and 10 per cent calcium cyclamate young 32 g.

Reproduction investigations using animals receiving restricted or limited food intake were carried out. These animals conceived, bore their young, but were unable to maintain them beyond 5 days of age.

In an effort to understand the reduced growth rates in animals receiving calcium cyclamate in the diet despite equal calorie intake a balance study was set up. This investigation indicated complete utilization of the ration based on nitrogen retention and faecal and urinary nutrient excretion.

Other parameters to understand these effects, including possible increased metabolic rates and ultimate fate of cyclamate, are being investigated.

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Carbon Dioxide Production of Whole Blood *in vitro*

A recent publication[1] has shown the mean oxygen consumption of whole blood *in vitro* at 37° C to be $8{\cdot}5 \times 10^{-5}$ ml./ml./min, and the mean rate of increase of P_{CO_2} to be 0·11 mm mercury/min. The addition of sodium fluoride was found to reduce the oxygen consumption by 26 per cent and to prevent completely the rise of P_{CO_2}. The authors commented that their findings were paradoxical "because oxygen could not be consumed without production of carbon dioxide".

We believe this statement to be incorrect. Working in separate centres, we have reached the conclusion that carbon dioxide production of whole blood *in vitro* at normal P_{O_2} is negligible compared with its oxygen consumption. We have, in fact, found the carbon dioxide content of blood to fall during storage, although our values for oxygen consumption are of the same order as those of Lenfant and Aucutt[1].

Table 1

	Temp. (° C)	Method	Rate of fall of O_2 content ml./ml./min	Temp. (° C)	Method	Rate of fall of CO_2 content ml./ml./min
Capel and Fletcher	37	Modified Haldane	$10{\cdot}4 \times 10^{-5}$	30	Modified Haldane	$2{\cdot}1 \times 10^{-5}$
Nunn	38	Polarography at 100% saturation of haemoglobin	$10{\cdot}5 \times 10^{-5}$	38	Van Slyke	$5{\cdot}6 \times 10^{-5}$

Our results suggest a negative respiratory quotient for whole blood at normal P_{O_2} although we agree closely with the rate of rise of P_{CO_2} reported by Lenfant and Aucutt[1]. We believe that this rise cannot be due to carbon dioxide production and suggest that it is due to the production of non-gaseous acids. We have found that blood stored at 37° C develops a metabolic acidosis of the order of 0·03 m.equiv./l./min, a figure which is in close agreement with the rate of increase of lactic acid[2]. It can easily be shown by the addition of lactic acid to blood (*in vitro*) that the production of lactic acid is sufficient to account for the rise in P_{CO_2} without invoking the production of carbon dioxide.

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Transplantation Experiments on Placental Ageing

Krohn[1] has recently re-emphasized the role that transplantation studies can play in the elucidation of the process of ageing in organs and tissues. He has shown that skin and ovary have intrinsic life cycles, to a large extent independent of central mechanisms. These techniques have not been successfully used in the study of rapidly ageing transient tissues like the placenta. Earlier transplantation studies of placenta have always used allogeneic tissues, since the importance of genetic differences in such experiments was not appreciated[2]. The present experiments, to be described in detail elsewhere, were designed to demonstrate the evolution of syngeneic transplants of mouse trophoblast with age.

Adult mice of the highly inbred strains *C3H* and *C57* were mated (*C3H* female × *C3H* male, *C3H* female × *C57* male, *C57* female × *C3H* male). The gestational age of each pregnancy was calculated from the day of the appearance of a copulation plug. The pregnancies were interrupted on gestational days 2, 7, 10, 15, 18 and 20. Recipient animals were adult male mice syngeneic to the donor tissue in all cases. At two and seven days, the fertilized ova and the ectoplacental cone were transplanted into the spleen or under the kidney capsule as previously described[3]. The placental rims of the older pregnancies were divided into 1-mm fragments and implanted into the spleen and under the kidney capsule. The recipients were killed 5, 10, 15 and 20 days after transplantation, and the tissue fixed in formalin. Haematoxylin and eosin staining was routinely carried out.

Trophoblast underwent active proliferation from the implanted ova and ectoplacental cones of the 2- and 7-day-old pregnancies and it was actively invasive of host tissue. A large amount of haemorrhage was present from eroded host vessels by five days after transplantation. Such transplanted trophoblast cells were of large size with long cytoplasmic processes, giant nuclei and prominent nucleoli. Living cells from such transplants could occasionally be found as long as 25 days after transplanta-