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GROWTH AND DEVELOPMENT
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HEAT LABILE FACTORS NECESSARY FOR THE PROPER GROWTH AND DEVELOPMENT OF CATS*

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THIS report covers a three-year study of the effect of raw and cooked foods upon cats. The mother cats were placed on special foods four to six months before breeding. The diet of cats given raw food consisted of raw meat and dry feed raw milk; the diet of cats given cooked food consisted of cooked meat and dry feed raw milk. Other studies have shown that the properties of dry feed raw milk are similar to those of pasteurized milk. Both groups were given a liberal amount of cod-liver oil to insure an adequate supply of vitamins A and D. The study deals chiefly with the offspring produced from these mother cats.

All of the cats used in this experiment were kept in large outdoor pens. The sides and tops of the pens were screened with chicken wire only, so that the cats had the benefit of all the sunshine available. Each pen was divided into two portions—a yard 4 feet wide and 12 feet long, with a 7 foot ceiling, and a roofed section 6 feet square with a 6 foot ceiling, a wooden floor and bedding. The floor of the pen was bare earth covered with fine sand.

During this three-year period, 63 living kittens were born of parents fed raw food, with an average weight of 119 gm. at birth, and 47 kittens were born of parents fed cooked food, with an average weight of 100 gm. There were 4 dead kittens born in the raw-food group and 16 in the cooked-food group. An example of the effect of the diet of the mother upon the birth weight of the offspring is the following: Cat H. F. fed a cooked-food diet produced a litter of 4 kittens, whose average weight was 77 gm. She was then placed on a raw-food diet, and her litter for the next year consisted of 5 kittens, with an average birth weight of 116 gm., while the following year (still on a raw-food diet) the litter consisted of 3 kittens, with an average weight of 137 gm. The opposite result may be produced by taking a mother cat who has been on raw food and placing her on cooked food.

Cat D given a cooked-food diet produced a litter of 5 kittens, with an average weight of 105 gm., and the following year her litter consisted of 6 kittens, with an average weight of 91 gm.

If the mother cat is kept on cooked food for more than two years, she usually dies during delivery.

The cats fed cooked food occasionally produce a premature or full-term litter of stillborn kittens. In several instances mother cats on a cooked-food diet died during delivery. One cat was unable to deliver her kittens even though in labor for seventy-two hours. Delivery complications such as these have not been found in the case of cats placed on a raw-food diet.

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The cats fed cooked food were smaller in build; though the bones of their legs were smaller in diameter, they were frequently longer and their fur development was much poorer than that of the cats fed raw foods. Muscle tone and visceral development of cats fed raw meat was much greater than that of cats fed cooked meat. Disturbance in the genital development and descent of the testes was common in male kittens of mother cats on cooked food. Cats on cooked-food diet were of a much more nervous disposition than cats on raw-food diet; they paced the pens, they were not very friendly, and they were often quite vicious.

One of the first defects noticed in the cats fed cooked food was poor dental development. The temporary teeth of both the cats fed cooked foods and those fed raw foods seemed well developed. However, when the permanent incisors displaced the temporary ones, the cats on the cooked-food diet usually developed three or four irregularly spaced, uneven, crowded incisors instead of the usual six. This was true of both the upper and lower jaws. Although a few of the cats on the raw-food diet had this same condition, it occurred from three to four times as often in the cats on the cooked-food diet as in those on raw food. This condition became even more pronounced in the second and third generation of cats on the cooked-food regime.

The femurs of these animals were removed, and the entire bone analyzed for its calcium and phosphorus content. The kittens of both the mother cats who had been fed raw food and those who had been fed cooked food had approximately the same amount of calcium and phosphorus at birth; quite often this was within 2 or 3 per cent of that found in the femur of the mother cat. After the first two weeks a marked depletion of the calcium and phosphorus of the bone occurred. This no doubt corresponds with the period of greatest growth. Two months later the bones of the kittens on the raw-food ration were gradually approaching normal in respect to these salts while those of the kittens on the cooked-meat ration still lagged behind. This effect was still more pronounced in the second and third generations; that is, the bones of second and third generation kittens given cooked food, even after they reached adult life, were markedly deficient in calcium and phosphorus content. Corresponding litters of kittens fed raw food had from two to three times as much calcium and phosphorus in their bones. If the first, second, and third generations were kept on a cooked-food diet, the third generation kittens were in such poor condition that they lived at the longest only two months. We were unable to carry our experiments beyond the third generation on the cooked-food diet, because no cats survived beyond that time.

Our experience has been that once a deficiency is produced in kittens it cannot be reversed even under intense therapy. A well-developed cat can be maintained in a healthy state on deficient diets if thyroid and adrenal hormones are added to the dietary. A deficient kitten, however, even if given raw food, thyroid and adrenal hormones, insofar as we have seen, does not become a normal cat.

If a mother cat has been on a cooked-food diet from twelve to eighteen months, it takes at least three years on a raw-food diet before her kittens begin to approach normal.

Upon the death of the cats a complete post-mortem examination was made. A study of microscopic sections of the lungs of second and third generation cats showed that cooked food was responsible for the production of certain respiratory conditions. The lungs of these cats showed hyperemia, some edema, and partial atelectasis, while those most deficient showed bronchitis and pneumonitis. The kittens fed raw food had normal lungs, although occasionally a cat was found whose lungs showed a mild hyperemia.

Five of the cats given cooked food showed suppurative inflammation of the thigh. Smears of the pus showed the presence of streptococci and staphylococci. The femurs were fragile and showed marked osteoporosis, with marked thinning of the cortex. In 2 of these 5 cats the bone had been partially eaten away and only chips and fragments remained.

In several cases we found a hypothyroid condition among the cats fed cooked food. The thyroids showed scanty colloid, and the acini were small. This was not observed in the thyroids of cats given raw food.

The ovaries of the cats fed cooked food showed, as a rule, only a few developing follicles and primordial ova, while those cats fed raw food showed active oogenesis with normal and large numbers of developing follicles. In males the testes of the cats fed cooked food showed a lessened number of spermatozoa and many of them showed an absence of spermatozoa but with active spermatogonia. Cats fed raw food showed active spermatogenesis.