

## **THE LANARKSHIRE MILK EXPERIMENT. BY "STUDENT." Biometrika 1931**

In the spring of 1930 a nutritional experiment on a very large scale was carried out in the schools of Lanarkshire.

For four months 10,000 school children received  $\frac{3}{4}$  pint of milk per day, 5000 of these got raw milk and 5,000 pasteurised milk, in both cases Grade **A** (Tuberculin tested);

another 10,000 children were selected as controls and the whole 20,000 children were weighed and their height was measured at the beginning and end of the experiment.

It need hardly be said that to carry out an experiment of this magnitude successfully requires organisation of no mean order and the whole business of distribution of milk and of measurement of growth reflects great credit on all those concerned.

It may therefore seem ungracious to be wise after the event and to suggest that had the arrangement of the experiment been slightly different the results would have carried greater weight, but what follows is written not so much in criticism of what was done in 1930 as in the hope that in any further work full advantage may be taken of the light which may be thrown on the best methods of arrangement by the defects as well as by the merits of the Lanarkshire experiment.

The 20,000 children were chosen in 67 schools, not more than 400 nor less than 200 being chosen in any one school, and of these half were assigned as "feeders " and half as "controls," some schools were provided with raw milk and the others with pasteurised milk, no school getting both.

This was probably necessary for administrative reasons, owing to the difficulty of being sure that each of as many as 200 children gets the right kind of milk every day if there were a possibility of their getting either of the two.

Nevertheless, as I shall point out later, this does introduce the possibility that the raw and pasteurised milks were tested on groups of children which were not strictly comparable.

Secondly, the selection of the children was left to the Head Teacher of the school and was made on the principle that both "controls " and "feeders" should be representative of the average children between 5 and 12 years of age: the actual method of selection being important I quote from Drs Leighton and McKinlay's Report:

" The teachers selected the two classes of pupils, those getting milk and those acting as "controls," in two different ways. In certain cases they selected them by ballot and in others on an alphabetical system."

So far so good,

but after invoking the goddess of chance they unfortunately wavered in their adherence to her for we read : "In any particular school where there was any group to which these methods had given an undue proportion of well fed or ill nourished children, others were substituted in order to obtain a more level selection." This is just the sort of after- thought that most of us have now and again and which is apt to spoil the best laid plans. In this case it was a fatal mistake, for in consequence **the controls were, as pointed out in the Report\*, definitely superior both in weight and height to the "feeders" by an amount equivalent to about 3 months' growth in weight and 4 months' growth in height.**

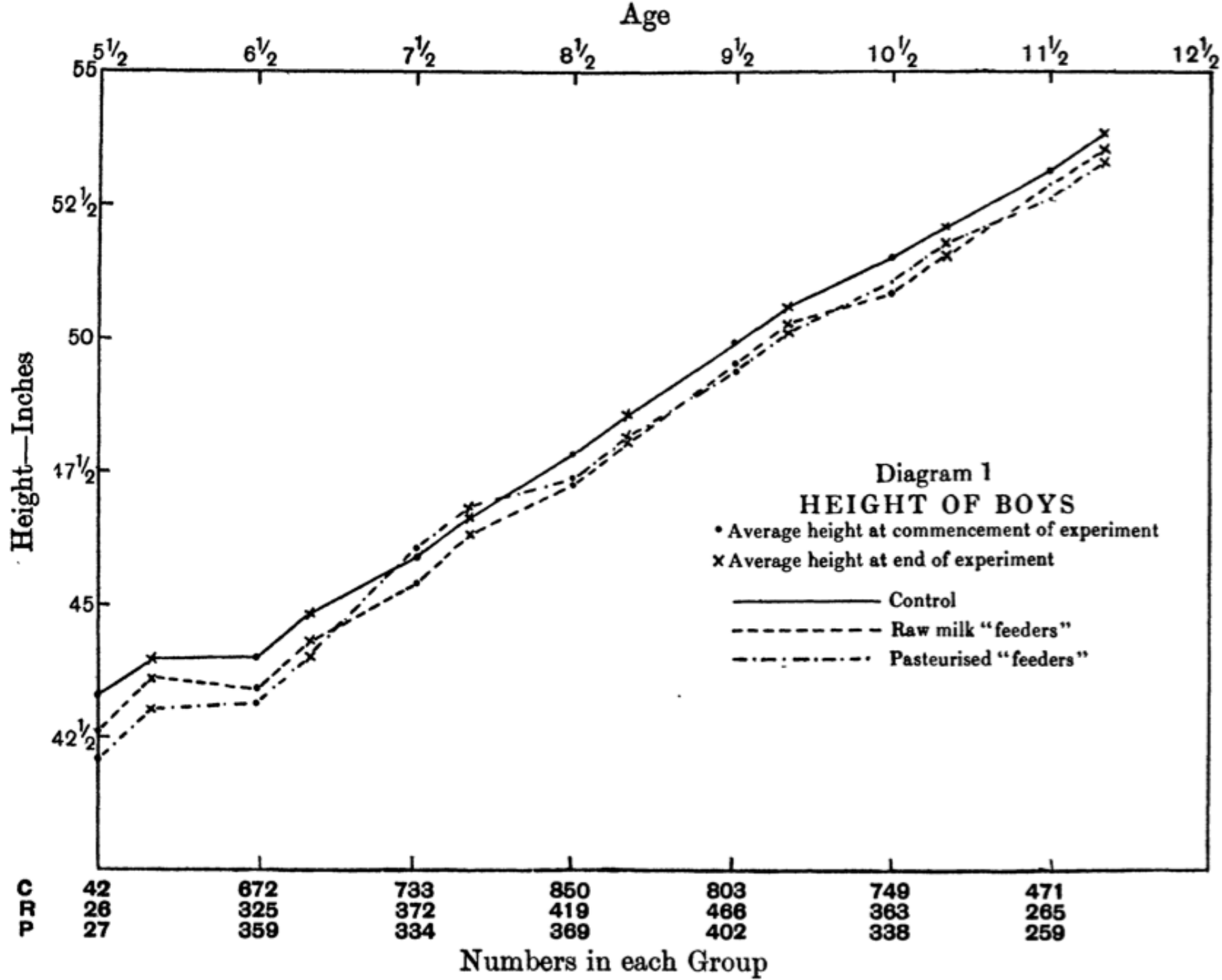
Presumably this discrimination in height and weight was not made deliberately, but it would seem probable that the teachers, swayed by the very human feeling that the poorer children needed the milk more than the comparatively well to do, must have unconsciously made too large a substitution of the ill-nourished among the "feeders" and too few among the "controls" and that this unconscious selection affected, secondarily, both measurements.

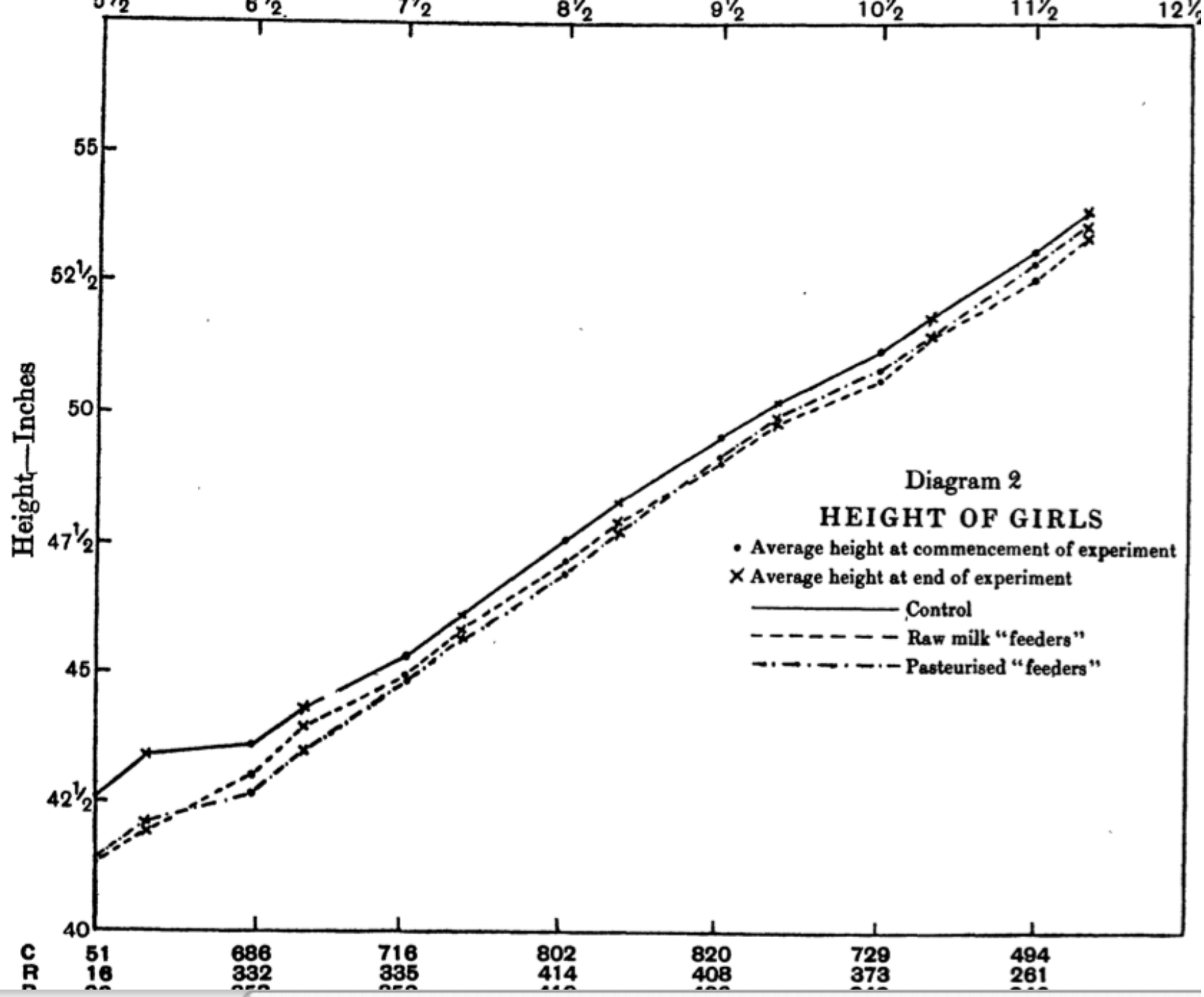
Thirdly, it was clearly impossible to weigh such large numbers of children without impedimenta. They were weighed in their indoor clothes, with certain obvious precautions, and the difference in weight between their February garb and their somewhat lighter clothing in June is thus necessarily subtracted from their actual increase in weight between the beginning and end of the experiment.

Had the selection of "controls " and "feeders " been a random one, this fact, as pointed out in the Report, would have mattered little, both classes would have been affected equally, but since the selection was probably affected by poverty it is reasonable to suppose that the "feeders" would lose less weight from this cause than the "controls." It is therefore not surprising to find that the gain in weight of "feeders" over "controls," which includes this constant error, was more marked, relatively to their growth rate, than was their gain in height, which was fortunately not similarly affected.

Fourthly, the "controls" from those schools which took raw milk were bulked with those from the schools which took pasteurised milk.







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