

## Copper Cobalt Supplementation at Erap.

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### ABSTRACT.

*A trial to assess the value of copper and cobalt supplementation was conducted at the New Guinea Lowlands Livestock Station, Erap, in which four matched groups of eight steers were used. One group received copper supplementation, another cobalt, the third both, and the fourth was control. Weight gains were recorded for a little over 12 months. At the final weighing the copper-cobalt group was heaviest, but a statistical analysis of the results indicated that the benefits were not quite significant enough to be credited to the supplementation. Thus copper or cobalt supplementation of cattle cannot be regarded as a worthwhile measure in the Erap area of the Markham Valley.*

### INTRODUCTION.

AT the New Guinea Lowlands Livestock Station, Erap, 30 miles from Lae in the Markham Valley, slow growth rates, rough coats and low calving percentages have been observed in cattle. Although these problems could be attributed to the unsuitability of the Station Short-horn cattle for the tropical lowlands environment, they resemble some signs of copper and cobalt deficiency. Hence, it was decided to investigate the possible role of these minerals.

The essential physiological role of copper was first demonstrated in 1928, when it was shown to be necessary for the formation of haemoglobin. In the ensuing decade, workers in many parts of the world showed wasting diseases of domesticated ruminants to be caused by a copper and/or cobalt deficiency. Copper deficiency in the animal may result from soil or pasture deficiency and be complicated by interference of their uptake or utilization by molybdenum and organic sulphate levels.

The precise functions of copper in the animal body are not yet defined but it is believed to be

involved in the synthesis of haemoglobin and in several enzyme systems. Deficiency symptoms vary according to the severity of deficiency and whether complicated by cobalt and other deficiencies. Principal signs include progressive loss of condition in adult cattle, unthriftiness and retardation of growth rate in young stock and rough, dull coat. Some workers associate infertility, especially in heifers, with copper deficiency but further evidence is necessary to verify this.

Cobalt is utilized by rumen microflora in the elaboration of Vitamin B12 which contains 4 per cent. cobalt in its molecule. Thus cobalt must be given orally to be of any use to the animal. It has no other bodily functions. Deficiency symptoms range from lowered growth rate of young stock to wasting and death of even adult animals.

Copper and cobalt deficiencies were treated initially by supplementation in licks and drinking waters, individual drenching and later by addition of small quantities of copper and cobalt salts to fertilizers. These methods were all successful but more modern techniques are the intramuscular injection of copper glycinate which

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is slowly absorbed, satisfying the animal's copper requirements for several months and the lodging of a bullet of a relatively insoluble cobalt salt in the reticulum. The bullets sometimes become coated with insoluble substances so that a short brass grub screw is administered concurrently to prevent such a coating building up. Cobalt requirements for up to six months are satisfied in this manner.

### MATERIALS AND METHODS.

Four groups, each of eight Shorthorn and Africander-Shorthorn cross steers were chosen. The groups were as similar as possible with regard to age, breed, coat type, weight and conformation.

They were aged, at the commencement of the trial in November, 1962, from 8 to 17 months and weighed from 280 to 454 lb. One group was given 450 mg. copper glycinate intramuscularly, the second group was given a cobalt bullet, the

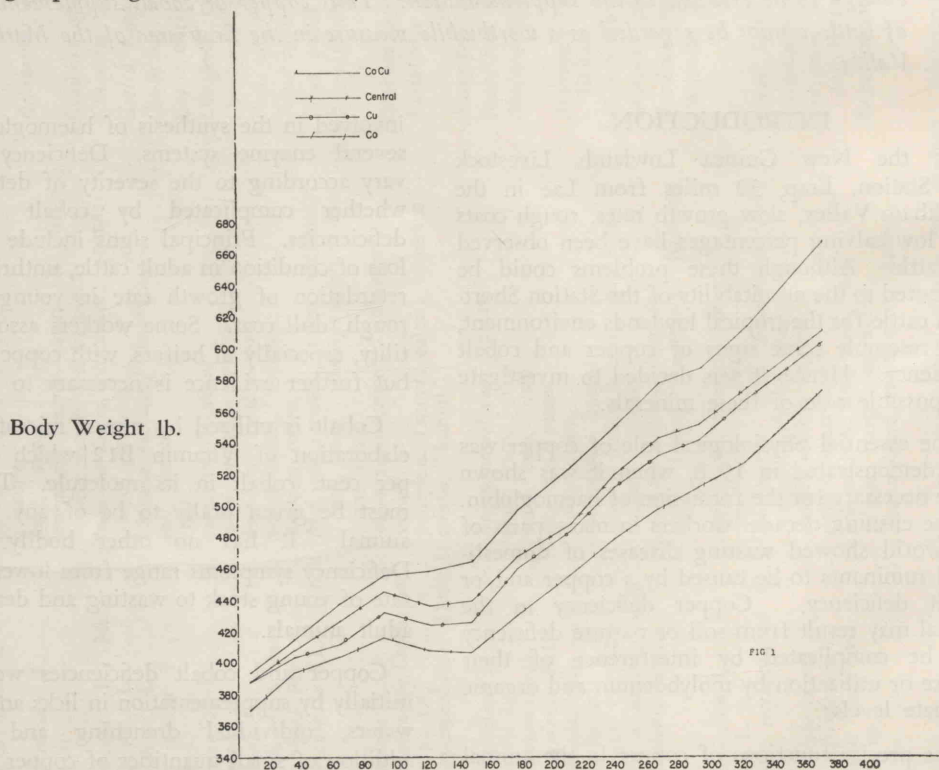
third group was given both treatments whilst the fourth constituted the untreated control.

The treatments were repeated after eight months. The four groups were run together and received a supplement of coarse salt. They were weighed on days 8, 36, 65, 93, 121, 149, 177, 212, 239, 267, 295, 322 and 375 after commencing the trial.

### RESULTS.

The average weights of each group at each weighing are given in Table 1 and graphed in Figure 1.

A linear regression on time was fitted to the weight data to determine the mean rate of increase in weight per day for each animal. Analysis of the data took into account differences in gain due to differences in initial weight. The regression of rate on initial weight was .0001257, which was not quite significant at the 5 per cent. level.



Days  
Figure 1.

Table 1.—Average Body Weights of Trial Groups.

|           | Cobalt<br>Group.<br>Lb. | Copper<br>Group.<br>Lb. | Copper-<br>Cobalt<br>Group.<br>Lb. | Control<br>Group.<br>Lb. |
|-----------|-------------------------|-------------------------|------------------------------------|--------------------------|
| 8.11.1962 | 370                     | 386                     | 393                                | 387                      |
| 6.12.1962 | 383                     | 404                     | 415                                | 409                      |
| 4.1.1963  | 405                     | 413                     | 439                                | 427                      |
| 1.2.1963  | 417                     | 422                     | 457                                | 446                      |
| 1.3.1963  | 409                     | 423                     | 459                                | 436                      |
| 28.3.1963 | 408                     | 426                     | 465                                | 439                      |
| 26.4.1963 | 433                     | 459                     | 499                                | 469                      |
| 31.5.1963 | 456                     | 484                     | 526                                | 489                      |
| 27.6.1963 | 479                     | 511                     | 551                                | 520                      |
| 25.7.1963 | 500                     | 532                     | 578                                | 543                      |
| 22.8.1963 | 510                     | 542                     | 588                                | 552                      |
| 19.9.1963 | 529                     | 569                     | 614                                | 575                      |
| 9.11.1963 | 572                     | 615                     | 668                                | 624                      |

## CONCLUSION.

The results indicated that no significant gains resulted from giving copper or cobalt or both as supplements to cattle grazed in the Erap region of the Markham Valley.

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