TABLE 1

EFFECT OF TRACE MINERALS ON WEIGHT GAIN AND FEED EFFICIENCY OF PIGS

Lot No.	I	II	III
Treatment	Iodized salt	Cobaltized salt*	Trace-mineral salt†
No. of pigs per lot	5	5	5
Initial wt, avg lb	52.6	53.2	51.4
Final wt, avg lb	163.8	184.2	192.6
Days on feed	98	98	98
Daily gain, avg lb	1.13	1.34‡	1.44‡
Feed in lb per 100-lb gain	431.3	389.0	394.9

* Cobalt chloride added to iodized salt to supply 0.026% cobalt.

† Trace-mineralized salt used contained the following amounts of minerals: manganese, 0.45%; iodine, 0.019%; cobalt, 0.026%; iron, 0.48%; copper, 0.048%; and salt, 96.0%.

‡ Differences from control lot significant at 5% level.

and its possible relationship to vitamin B_{12} (APF).[1] These pigs were self-fed on a basal ration of ground yellow corn, soybean oil meal, ground alfalfa, steamed bone meal, and salt. Lot IV received 8% meat scraps at the expense of soybean oil meal, and the corn was increased. Each lot was weighed at the end of the experiment when the lot average was approximately 180 lb. The pigs in these lots were fed in concrete pens, which were washed out daily. Table 2 summarizes these two experiments. The differences in gain are significant at the 5% level.

These results demonstrate that additions of cobalt to these rations stimulated weight gains more than additions of 8% of meat scraps and almost as much as the APF supplement. The differences in gains between lots I, II, and IV are not large enough to be significant but these differences were of about the same magnitude in both experiments. The results on feed per 100-lb gain were more erratic, with lots II and IV requiring slightly less feed per lb of gain.

TABLE 2

EFFECT OF COBALT, APF, AND MEAT SCRAPS ADDED TO A CORN, SOYBEAN MEAL, ALFALFA MEAL RATION FOR PIGS*

Lot No.	I	II	III	IV
Ration	Basal + cobalt†	Basal + APF‡	Basal	Meat scraps 8%
No. of pigs per lot	10	10	10	10
Initial wt, avg lb	28.7	28.7	28.7	28.8
Final wt, avg lb	180.5	180.8	176.8	181.4
Avg days to reach 180 lb	108	106	119	111
Avg daily gain, lb	1.40§	1.43§	1.24	1.37§
Feed in lb per 100-lb gain	377	365	375	358

* Average of two experiments.

† Salt (0.75 lb) containing 0.026% cobalt added per 100 lb of ration.

‡ Merck and Company supplied APF Supplement No. 3 that furnished about 0.42 μg vitamin B_{12} per lb of ration.

§ Differences from basal lot significant at 5% level.

[1] APF is the animal protein factor.

It is not known how cobalt functions. It is possible that cobalt is used in intestinal synthesis of vitamin B_{12}. Briggs (*3*) suggested, on the basis of preliminary studies, that under certain conditions cobalt is at least partially effective in counteracting a vitamin B_{12} deficiency in the chick. This action of cobalt is perhaps due to intestinal synthesis. It is less likely that the beneficial results of cobalt feeding in the present experiments were due to coprophagy, because the pens were washed daily and the pigs were never observed to be consuming feces. Neither is it probable that there was some synthesis in the feed mixture, although the ration was mixed in a spiral mixer in amounts to last 5–6 days.

Further research is under way to obtain additional information and to ascertain whether a combination of cobalt and APF, or of cobalt, APF, and meat scraps would further increase gains above that of any ingredient alone.

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Evidence of a Homing Instinct in the Bermuda Spiny Lobster[1]

Edwin P. Creaser[2] and Dorothy Travis[3]

During the summer of 1949 the authors,[4] in connection with various other investigations at the Bermuda Biological Station on the spiny lobster, tested local migration in this species by the use of tags or by telson and uropod markings. In the original studies, various combinations of uropod and telson punches were employed for identification, but subsequent use of plastic tags was undertaken for individual recognition. The plastic tags were made with a barb which penetrated into the muscle when thrust through the intersegmental membane between abnominal segments. The tag used was of the same general type developed by Smith (*1*) in the Florida and Caribbean spiny lobster investigation.

Intensive trapping operations were conducted through special arrangements with a Bermuda commercial fisherman, Egbert Spurling. The gear employed was a grappling hook and 20 fish traps, the latter of typical Bermuda design, made of chicken wire and supported by spicewood. The trapping operations were conducted from motorboats, and all work was conducted in the

[1] Contribution from Bermuda Biological Station No. 164.

[2] Hofstra College, Hempstead, New York, and Bermuda Biological Station, Bermuda.

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[4] The cooperation of all persons at the Bermuda Biological Station is acknowledged, especially that of Tommy Gleeson, Brunell Spurling, and Egbert Spurling.

TABLE 1

Date caught	Place released	Date recaptured	Remarks
7/21/49	Castle Harbor near causeway	7/25/49	13 released 3 recaptured
7/22/49	where caught	7/30/49	
7/21/49	Castle Harbor near causeway	7/30/49	
7/25/49	Castle Harbor near causeway	7/30/49	20 released 4 recaptured
7/21/49	Castle Harbor near causeway	8/2/49	
7/27/49	where caught	8/2/49	eggs shed when caught; when recaught, with newly laid eggs
7/22/49	where caught	8/2/49	
7/30/49	deep water, 2 miles off Castle Roads	8/4/49	released in water 1,500 ft deep
7/30/49	deep water, 2 miles off Castle Roads	8/6/49	released in water 1,500 ft deep
7/22/49	where caught	8/6/49	
7/27/49	where caught	8/11/49	
8/6/49	wharf of Frick estate on Castle Point, Castle Harbor	8/13/49	eggs when recaptured; newly shed when released
7/21/49	Castle Harbor near causeway	8/13/49	new eggs when recaptured; eggs when released
8/2/49	Castle Harbor near causeway	8/26/49	
7/21/49	Castle Harbor near causeway	8/26/49	
8/26/49	Ferry Reach at Biological Station jetty	9/28/49	

quarter-mile square outside area off Nonsuch Island, near the mouth of Castle Harbor. The waters in this area are rough and stormy, with swells, and have abundant coral heads and boiler reefs. Trapping operations were conducted throughout 2 months, and the traps were visited about twice a week.

Spiny lobsters, *Panulirus argus* (Latreille 1804), caught in this area were transported to various sites and released. The tagging experiments were considered as entirely preliminary in nature, but have produced such interesting results as to warrant discussion at this time.

In the first experiments on migration, the spiny lobsters were taken from the Nonsuch area and released 2 miles up Castle Harbor at a point in the middle of the harbor opposite Castle Harbor Hotel. Later experiments entailed releases behind land masses at various situations in Castle Harbor or in Ferry Reach, where the causeway largely obscures free passageway. Some lobsters were released where caught. In one experimental release the lobsters were carried 2 miles out to sea, where the waters were 1,500 ft deep, and were released there.

The dates and points of release and of recapture at the original site off Nonsuch Island are shown in Table 1.

The high incidence of recovery of specimens released at various sites (about 20%) indicates that we are probably concerned here with a remarkable homing instinct in these crustaceans. The recoveries of the specimens released in deep water 2 miles out at sea seem particularly significant. The return to the original site after release at the Biological Station jetty entailed migration against tides conflicting with those originally prevailing, and migration around land masses for about 5 miles.

It seems apparent that the lobsters are fully "aware" of their locations and can return to their original summer feeding grounds when released elsewhere. How this is accomplished remains an unanswered and puzzling biological mystery. The degree and nature of these local migrations are of very great scientific interest and equally important in a consideration of the management of the species commercially.

More detailed and extensive experimentation is planned for the future.

Reference

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Acetaldehyde Accumulation in Excised Wheat Roots Induced by Plant Growth Substances[1]

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It is commonly held that the observed effects of indole-3-acetic acid and other compounds of similar physiological activity must be referable to some basic influence of these compounds on the metabolism of the plant cell. Attempts to reveal this primary effect of the plant growth substances have led to postulated mechanisms concerned with the plasticity of the cell wall (*3*), a relationship between the 4 carbon dicarboxylic acids and auxin (*2*), a coenzyme function for auxin (*9*), a shunt mechanism for 2,4-D (*7*), and others (*1, 9*). Respiratory effects range from stimulation to inhibition (*6*), and may be insignificant at concentrations that have other marked effects (*7*). Current interest in compounds that inhibit pyruvate oxidation because of their similarity to a postulated 2 carbon derivative of pyruvate (*4*) suggested that a number of plant growth substances characterized by side chains of acetate or related to acetate might also affect pyruvate oxidation. Since a convenient and sensitive method for acetaldehyde exists (*11*) it appeared that the formation of this compound from added pyruvate would be a desirable subject to study.

Excised roots of 4-day-old wheat seedlings of the White Federation variety grown in redistilled water according to a technique previously described (*7*) were used. Each sample contained 24 roots cut to 45 mm in length. Before the roots were counted out, all the sections were

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