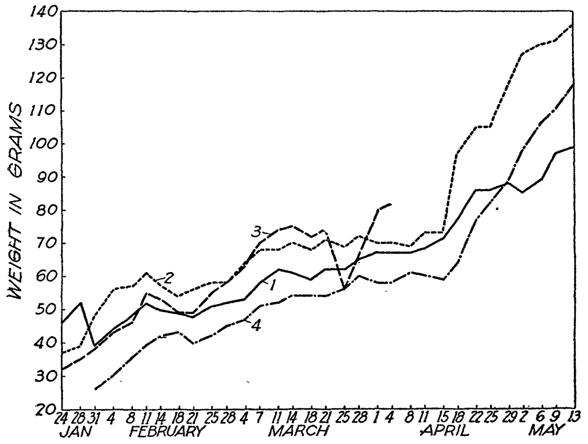

FIG. I IRRADIATED ERGOSTEROL, WITH AND WITHOUT IRRADIATION OF THE ANIMALS

FIG. 1. Lots and Treatment.

1. Sherman No. 380; ergosterol, animals irradiated, April 28.
2. Sherman No. 380; ergosterol.
3. Sherman No. 380; control.
4. Sherman No. 380; cod-liver oil, control.

but did not produce the striking effects on growth and longevity elsewhere described[2] when iodide of iron was added under similar conditions of diet and irradiation.

The chief purpose of our study was of course for comparison with the results obtained with various iodin combinations furnished under the same conditions as in these experiments. It should be noted, however, that the relatively short exposures to ultraviolet light, combined with irradiated ergosterol feeding, did not induce a marked hypervitaminosis.

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HYDROGEN-ION CONCENTRATION OF THE ALIMENTARY TRACTS OF FOWL, CAT AND RABBIT

INVESTIGATORS of biological subjects have long realized the importance of knowing the chemical reactions of biological fluids. Much critical work has shown the quinhydrone electrode and its many modifications suitable for these determinations.

Both in this country and abroad, determinations of the pH of the alimentary tracts of animals[1] have been made. With these observations in mind and having the necessary apparatus available, the writer has attempted to determine the pH of the alimentary tracts of the fowl, the rabbit and the cat.

Animals used in this work were dispatched in the most rapid and painless manner. In the case of fowls the cervical vertebrae were separated by sudden tension. Rabbits were stunned by a smart blow on the head with a blunt instrument, after which they were bled. Cats were rendered insensible by means of overdoses of chloroform. Their respective alimentary tracts were then rapidly and carefully removed to warm physiological salt solution where they were well washed, following which they were again well washed in several changes of distilled water.

Material taken from several points along the tract was then dissolved in distilled water, filtered and the determinations were made upon the filtrate according to the methods outlined by Clark and Collins.[2] The experiments with fowls were nearly all made in the afternoon after the birds had fed at will. Under these conditions, digestion was in active progress. An average of the results obtained from eight fowls shows the following: proventriculus, 5.59; gizzard, 3.39; duodenum, 6.295; ileum, 6.216; cecum, 1.917. These fowls were altogether upon a grain ration; it is possible that somewhat different results might have been secured had there been some meat in their diet.

The alimentary tracts of the rabbits used in these experiments were all healthy and in the absorptive state. Practically all experiments were made from one to two hours after a full feeding of alfalfa and rolled barley. The averages of determinations upon eight rabbits are as follows: stomach, 1.83; duodenum, 7.35; ileum, 7.99; cecum, 6.26.

Some difficulty was experienced in securing cats, which like rats appear not to thrive very well in this locality. Most of the cats were "tramps" of the wandering kind and appeared quite hungry. Some of them harbored ascarid worms and showed slight intestinal irritation. The averages secured from seven cats were as follows: stomach, 3.34; duodenum, 6.51; jejunum, 6.905; ileum, 6.79; colon, 5.25.

Because of the lack of uniformity in the case of cats, the writer does not consider the data secured as consistent and wishes to present it merely as preliminary. It is interesting to note that the intestinal contents of one cat which had been starved for 24 hours showed great uniformity throughout its entire length. In other cases, although the acidity in the

[2] *Proc. Soc. Exp. Biol. and Med.*, 28: 2, 1930.

[1] Hedon and Bremond, "The pH of the Intestine of the Dog," *Bull. Soc. Med. Biol.*, 7: 484, 1926; C. Schwartz and associates, "The pH of the Stomachs of the Cow," *Pflügers Arch. ges. Physiol.*, 213: 587–592, 1926; Danninger, Pfragner and Schultes, "The pH of the Intestinal Tracts of Horses and Cattle," *Pflügers Arch. ges. Physiol.*, 220: 430, 1928; Grayzel and Miller, "The pH of the Gastro-intestinal Tract of the Dog with Relation to Diet and Rickets," *Jour. Biol. Chem.*, 76: 423, 1928.

[2] Clark and Collins, "The Quinhydrone Electrode and Soil Reaction," *Soil Science*, 24: 453, 1927.

stomach is greater than in the intestine, still the reaction always remains acid in the carnivorous cat as compared with the alkaline reaction in the herbivorous rabbit. Undoubtedly very interesting data might be secured from man, whose diet is of a mixed nature.

Summary

Herein has been presented the results secured in determining the pH of the gastrointestinal tract of the hen, the rabbit and the cat by means of the quinhydrone electrode.

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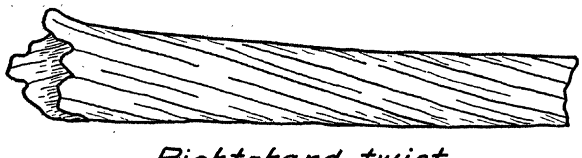
TWIST IN THE GRAIN OF CONIFEROUS TREES

Doubtless many people have noticed that the grain in the trunks of coniferous trees commonly shows a pronounced twist. Perhaps only a few have noticed that this twist is most commonly right-handed. A right-hand screw or helix is one in which clockwise rotation in a nut brings about motion along its axis away from the observer. Such a helix viewed in a horizontal position from the side shows threads sloping from upper left to lower right on the front side as shown in the accompanying sketch.

The writer first observed a preponderant right-hand twist in pine-trees during the field season of 1916 as an assistant with the U. S. Geological Survey in eastern Montana. He recalls making a count of somewhat over two hundred trunks among which were very few showing left-hand twist—not over a half dozen. At that time two or three tentative explanations of the twist were formulated and inquiry made of several botanists as to its cause. No positive explanation was offered. Since 1916 a predominant right-hand twist has been noted in a number of localities, not only in standing and fallen dead trees but also in telephone poles along roads and railroads.

Recently at a locality near the timberline in the Bighorn Mountains west of Buffalo, Wyoming, an exceptional number of bare, fallen trees suggested a careful count of the direction of twist. Four hundred trees, all that showed noticeable twist, were recorded. Three hundred and eighty-four showed right-hand twisting, thirteen had very slight left-hand twists and three showed very strong left-hand twisting. No attempt was made to measure the rate of twist but some impressions may be stated. The majority of the trunks show a twist making a complete turn in ten or fifteen feet. This distance is the *lead* of the terminology of machinists. A few are much more closely twisted, some making complete turns in one or two feet.



Right-hand twist

Fig. 1

In the locality mentioned probably three fourths or more of the trees are noticeably helical in grain. Without the data for actual statistical study the writer gained the impression that the central tendency in these trees was a moderate right-hand twist, and that extreme deviations from this tendency produced a fair number of strongly right-hand examples, a few slightly left-hand ones and very rare pronounced left-hand or closely twisted right-hand examples.

The twisting is not confined to trunks; branches of large size are twisted in some cases and seem to be especially liable to very close twisting. Recent observations at a few other localities indicate that in some places a much smaller number of trees are twisted, and at one place a considerable group of trees appeared to have an excess of left-hand twists. In the main, however, the right-hand twist appears to be far more common. No specific identifications of trees has been made; most of the trees noted in this connection have been pines or spruces. The phenomenon has not been consciously observed in deciduous trees but may possibly occur in some species.

What is the cause of the twist? Why does it show a predominant specific direction and why is that direction right-handed in most groups of trees met with? Several possibilities may be postulated. The twist may be due to a specific set induced in the process of sprouting or some other specific inheritance. Or it might be due to the prevailing counter-clockwise torque resulting from the asymmetrical pressure of prevailing westerly winds on trees with heavier foliage on the south side. Do such trees have asymmetrical foliage and do similar trees in the southern temperate zone show the reverse direction of twist as required by this hypothesis? May topographic control of foliage asymmetries and local anomalies of wind direction explain some of the exceptions noted above?

The above-mentioned facts and suggested interpretations are presented in the hope that others will be able to present more extensive and detailed data and that some reader versed in botany or forestry will offer an accepted or more plausible explanation of the phenomenon.

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