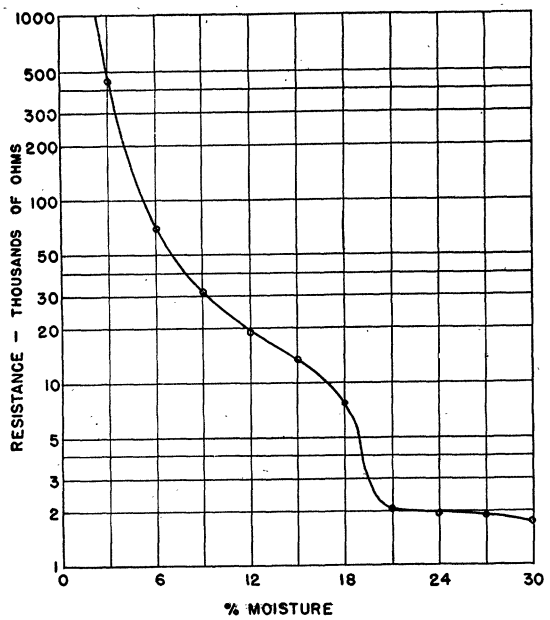

FIG. 2. Resistance of humidity sensitive element when located in an atmosphere in equilibrium with moist soil.

used since direct current would tend to polarize the chemicals, thus changing the properties of the film. The following procedure was adopted in taking readings. The element was stored in an enclosure maintained at 100% relative humidity. To take a reading the element was removed from the enclosure and allowed to dry in the air until its resistance was about 500,000 ohms. Such a resistance corresponds to a relative humidity of slightly less than 80% and so can easily be obtained in the open atmosphere. This drying process takes 2 or 3 min. The element is then put in the desired enclosure, and its resistance is read after a specified time interval. Five min is adequate, but the data herein presented were taken at 10 min.

In this manner the calibration curve shown in Fig. 1 was obtained. The sensitivity of the element is given by

$$S = (1/r)\,(\partial r/\partial H) = \partial \log r/\partial H,$$

where r is the resistance of the element and H is the relative humidity. The straight-line portion of the curve in Fig. 1 may be represented by

$$\log r = mH + \text{constant},$$

where m is the slope of the line. Upon differentiating this with respect to H, we find that the sensitivity is equal to m. Thus the sensitivity is a constant up to about 95% relative humidity. From 95% to 100% relative humidity the sensitivity increases approximately twofold.

The principal interest in this study was the indirect measurement of the free energy of soil moisture through the measurement of the soil atmosphere relative humidity. The possibility of measuring the free energy of soil moisture in this manner is based on the relationship between free energy of the soil moisture and the equilibrium relative humidity of the enclosed atmosphere:

$$H = 100e^{(f/RT)},$$

where H is the relative humidity in %, R the universal gas constant, T the absolute temperature, and f the free energy of the soil moisture ($f = 0$ for saturated soil, $f = -\infty$ for dry soil).

The desirability of measuring soil moisture in this way lies in the fact that the presence of soluble salts in no way interferes with the results. A curve of the element resistance as a function of percentage soil moisture is shown in Fig. 2 for a typical Hawaiian soil. It follows that the same method may be applied in other cases where it is desired to determine moisture content but where the usual conductivity method is unreliable because of the presence of soluble salts.

The increasing sensitivity is a desirable characteristic because the most important range in soil moisture work is between 98% and 100% relative humidity. For this reason an even greater sensitivity would be useful. This end might be achieved by a lower concentration of lithium chloride in the sensitive film, or even by the use of other salts. For achieving a more rapid equilibrium it is suggested that a construction be used in which the wires are supported intermittently rather than continuously, so that both sides of the film will be exposed to the atmosphere.

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The Inability of Thiourea to Modify Roentgen Ray Irradiation Mortality in Rats[1]

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Two recent reports (*1, 2*) showed that high doses of thiourea protected mice from the lethal effects of roentgen ray irradiation. The greatest protection was observed when the drug was administered by intraperitoneal injection immediately prior to irradiation. However, Limperos and Mosher (*1*) did show that oral premedication with 1% thiourea drinking water for 6 days prior to irradiation reduced the total mortality. As both the above reports dealt with dosages of thiourea that were within the toxic range, and because only mice were used, we decided to investigate the possible protection afforded rats who had received antithyroid but nontoxic doses of thiourea

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TABLE 1

RESPONSE OF HYPOTHYROID, NORMAL, AND HYPERTHYROID RATS TO ROENTGEN RAY IRRADIATION

Group	Mortality ratio 30 days*	Appproximate LD_{25} day†	Percentage survival	Effect of medication on rate of mortality
Normal (control)	9/20	12.9	55	None
Thiourea	9/20	11.0	55	Increased
Thiourea and thyroxin	11/20	9.0	45	"
Thyroxin	9/20	11.8	55	"

* Mortality ratio = number dying/total number in group.
† LD_{25} day = day on which 25% of the animals were dead.

over a longer time interval prior to roentgen ray irradiation.

Male CFW rats weighing 140–179 g (average 155 g) were placed on Rockland rat diet and given 0.1% thiourea in drinking water for 37 days prior to irradiation. This was the time interval in which the animals reached a weight plateau. All animals were weighed weekly. They were arranged in groups of 20 as follows: Normal controls, thiourea controls, thiourea-irradiated, thyroxin controls, thyroxin-irradiated, thiourea-thyroxin controls and thiourea-thyroxin–irradiated. The thyroxin animals received 0.1 mg/animal/day Squibb thyroxin by intraperitoneal injection for 5 days before irradiation, and all of them showed the hyperexcitability and small weight loss usually observed after thyroxin medication. All animals in the irradiated groups were subjected to 600 r acute whole-body roentgen ray irradiation, administered with a 250 KVP Picker Industrial Unit calibrated before the experiment with a Victoreen Thimble r-meter. The technical factors were: 250 KVP; 15 ma; TSD 100 cm; filters: 0.21 mm Cu inherent, 0.5 mm Cu parabolic, and 1.0 mm Al; HVL 1.85 cm Cu; size of field, total; r/minute measured in air 9.9. Uniformity of dosage was assured by rotating the radiation cage during treatment. After irradiation the animals were maintained on their usual diet and received no further medication. Autopsies were performed upon all animals dying during the 39-day experimental period and upon all survivors at the end of that time. The usual signs of irradiation injury (diarrhea, bloody stools, petechial hemorrhages, pale mucous membranes, etc.) were observed in the irradiated groups. Gross examination of the thyroids in the animals medicated with thiourea alone showed the usual signs of antithyroid medication, whereas those that received thyroxin in addition to thiourea had normal appearing thyroids.

The average daily fluid intake per rat was 19 ml, equivalent to 19 mg thiourea. Table 1 indicates that ingestion of this amount of thiourea gave no protection. The slight increases in the rate of mortality seen with both the thiourea- and thyroxin-medicated groups were actually not significant. However, the increase in the mortality rate observed in those animals that had received both thyroxin and thiourea was significant. Inasmuch as none of the medicated nonirradiated control animals died during the experimental period, it appears that the lethal effects in the irradiated medicated groups were due to the irradiation received. However, there does appear to be a synergism between the irradiation and both the thiourea and the thyroxin insofar as the rate of mortality is concerned. Furthermore, it is quite evident that thiourea-induced hypothyroidism affords no protection against roentgen ray irradiation lethality.

Comparison of the results herein presented with those of Limperos and Mosher (*1*) and Mole *et al.* (*2*) indicates that the potential sulfhydryl group in the thiourea molecule is available, but a huge excess of thiourea must be present for protection against the lethal effects of roentgen ray irradiation. This would be in accord with the observations of Patt *et al.* (*3*) concerning glutathione and cysteine protection of irradiated animals. Further investigation of compounds containing potential sulfhydryl groups is now in the process of completion and will be reported in detail elsewhere.

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Should a "Law of Recency" Be Added to the International Code of Zoological Nomenclature?

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Proposal, counterproposal, and debate on zoological nomenclature have been presented in numerous zoological periodicals during recent years. Basically analyzed, the literature appears to represent a clash of opinion between two groups: those who feel that it is desirable to follow strictly Article 25 (the law of priority) and limit the commission's use of plenary powers, and those who advocate more extensive use of the plenary powers by the commission, with less strict application of Article 25.

Individuals in both groups admit that, at present, the procedures used are confusing and unwieldy. Each side concedes that there is some merit in the other's case. It is not the intention of the writers to enter into this debate; opinions of the two schools are perhaps irreconcilable in this generation.

The writers do feel, however, that constructive thought should be given by all zoologists to ways of preventing similar confusion in the future, especially by eliminating the words, too frequently found in the *Opinions* and the proposals in the *Bulletin of Zoological Nomenclature,* that such and such action "would clearly result in more confusion than uniformity." The debates being waged in all zoological literature