liminary experiment was readily undertaken with honey samples provided by Everett Oertel (*7*) of the U.S. Department of Agriculture, using a magnetostriction oscillator, made available by V. Williams, tuned to 9 kcy/sec. The treatment lasted 30 min. The samples were examined microscopically immediately after the treatment, and also after storage periods of 1 and 4 wk at various temperatures from +39°C to −40°C, in order to observe the effect of storage temperatures on crystallization phenomena in general. The results were astonishingly successful in every respect. Although we found crystals of different sizes and numbers depending on the storage temperature, in the control samples, not one of the treated and stored samples showed any.

These results are not only important from the practical standpoint of preserving honey, but they also have theoretical significance in view of the fact that treatment with ultrasonic waves has hitherto been supposed to promote crystallization in general (*8*). Furthermore, the treated honey was limpid and had a slightly tart taste that made it superior to the controls that were opaque and generally less attractive. The *p*H of the treated samples was a little lower than the *p*H 3.9 of the controls, but the total acidity was 2.4 mg of NaOH per milliliter of honey in the treated samples and 3.0 mg in the controls. The redox potential was 406 mv in the treated samples and 346 mv in the controls.

Since yeasts are implicated in the spoilage of honey, we thought it advisable to make exploratory tests on the effects of ultrasonic waves on these microorganisms simultaneously with our tests of their effects on the crystallization.

A portion of untreated honey was plated out on acidified potato dextrose agar, and many yeast cells were detected. A portion of the same honey following treatment was similarly plated out, but no yeasts were detected. Microscopic examinations of the treated honey, however, disclosed some isolated yeast cells but very few in comparison with the number found in the untreated portion of the sample, which had a large number of actively budding cells. These results of the effect of ultrasonic waves on the microorganisms in general did not surprise us in view of the extensive literature on the subject (*9*). In order to obtain quantitative data, a more extensive experiment is being undertaken to study in more detail the specific effect of ultrasonics on these microorganisms.

Because the changes brought about in the honey by the ultrasonic waves cannot be attributed only to their mechanical action but possibly also to some chemical effect, probably on the sugar polymers present there and to other oxidation-reduction changes (*10*), a further study of these aspects of the problem is being carried out.

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Recorded Calls of Herring Gulls (*Larus argentatus*) as Repellents and Attractants

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Herring gulls and other sea birds may become pests by feeding on crops (*1*), on fish waste destined for chemical conversion, or by resting on airstrips (*2–4*) where they endanger airplanes. None of the attempts to rid these areas of the birds (*2, 4, 5*) has been entirely satisfactory.

The failure of mere noise to repel these birds (*2, 4, 5*) is probably owing to its lack of biological significance. It seems better to use sounds that have meaning to the species one wishes to repel. Starlings (*Sturnus vulgaris*), for instance, can be repelled from roosts by broadcasting to them the recorded distress call of one of their fellows, and the clearance thus achieved has some permanence (*6*).

Unfortunately, herring gulls do not have a distress call—that is, a call given by an individual when restrained or maltreated. Captive gulls are generally silent; even when buffeted they emit only vague grunts. Gulls, however, have an alarm call which they give when they see a captive gull or detect danger. This call causes other gulls that hear it to leave the region, not precipitously, as in the case of starlings, but by slowly circling away after initially drawing near.

The alarm call usually consists of two parts. The first is a set of two piercing cries in a descending sequence. This alone seems to be an attention call. There follows the alarm call proper, usually of three sharp cries. This has been variously represented in print by earlier workers (*7*) and sounds to us like "cut-cut-cut," with accent on the first note. It may have two, four, or five notes instead of three.

This call, as given by gulls free in the air, was recorded with a tape recorder (*8*). The usual recording consisted of the attention call with two sequences of the alarm call. This unit of about 5-sec duration was used to produce recordings of any desired length by repeating all or part, separated by intervals of 5 to 10 sec of silence. These recordings were broadcast to gulls with a repeating tape player (*9*) through an ordinary amplifier and loudspeakers.

The immediate reaction of groups of gulls to the sound is striking. At the attention call they rise into the air; they approach the speakers when the alarm notes sound. After this they slowly circle away and leave. The broadcast of only 1 or 2 unit calls will produce this reaction; the gulls continue to fly away even after the call is ended.

This call was tested for immediate repellent effect against gulls feeding on 3 dumps (16 trials), at a sardine cannery (2 trials), on the seashore at 5 different places (7 trials), and at a fish-meal factory (2 trials). At an intensity of approximately 95 db at a distance of 1 m from the speakers, the call was effective in lifting all gulls within a radius of at least ½ mi. At distances of about 100 ft, lower intensities drove all gulls from food. The gulls remained away, after one sequence, for 15 to 90 min, but mostly 30 to 45 min, equalling the repellency obtained by displaying a captive gull for a few minutes.

The most extensive tests (*10*) were made at a dump near Salisbury Cove, Me., where the gulls had fed regularly for many years. At the time of the tests, about 300 gulls were present at all times. The alarm call was broadcast to the gulls in a 1-min sequence consisting of five repetitions of the unit call separated from each other by about 7 sec of silence. This was sounded only when the birds tried to return to the feeding area. The gulls were driven from the dump at 8:45 A.M. EST 9 Aug. 1954, and were denied return until nightfall, 6:45 P.M., the next day. The total potential feeding time during the two days, since the gulls do not feed at night, was 25 hr. The call was broadcast 29 times during that interval. The longest time of clearance was 3 hr, 27 min, the shortest 10 min. For the most part the gulls did not try to return to the feeding area until 30 to 45 min after each treatment. On the afternoon of the second day, the times of individual treatments were reduced to 10 to 20 sec. These worked just as well. Other tests, of 3- to 4-hr duration, at a sardine cannery in McKinley, Me., and a fish-meal processing plant at Eastport, Me., gave similar results.

This call is effective for other gulls. Great black-backed gulls (*Larus marinus*) in Maine and laughing gulls (*Larus atricilla*) on a dump at Atlantic City, N. J., were also repelled. This cross-reactivity is probably the result of the fact that these species often feed together and have similar calls. The alarm call of great black-backed gulls, for instance, is like that of herring gulls, except that it is pitched about one octave lower.

During these tests, a study was made of the food-finding behavior of herring gulls, and a food-finding call was noted. When recorded and played to gulls this proved to be highly attractive. With this call, 20 to 30 gulls could be drawn within a few minutes. These were driven away equally rapidly with the alarm call at the same intensity. The alarm call, therefore, does not depend upon intensity alone for its effect. The biological significance of the call gives it power far beyond that conferred merely by high intensity.

It may be that birds will cease responding to warning sounds. Only long-range tests will show whether this is the case with gulls. Tests with permanently installed, automatically repeating tape players are planned. If habituation to the alarm call sets in, a shift to the attractive call, broadcast from some spot away from the area to be cleared, may give the desired result.

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Behavior of Two Species of Worms in the Same Maze

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Yerkes (*1*) demonstrated that, in the course of learning a T-maze, the manure worm *Allolobophora foetida* (*2*) learned an avoidance response to stimuli in close spatial contiguity to noxious stimulation. Yerkes interpreted this result as being indicative of association of stimuli and further concluded that learning in worms could be adequately described in those terms. However, in a recent experiment, Robinson (*3*) found that the earthworm, *Lumbricus terrestris,* exhibited a generalized avoidance to many maze stimuli remote from noxious stimulation under comparable conditions. Robinson criticized Yerkes' conclusion about association of stimuli, and suggested that there are two factors in the learning of a T-maze by annelids: generalized avoidance and correct turning. The problem at issue in this report is whether or not the results of Robinson's investigation with *L. terrestris* are an adequate basis on which to evaluate Yerkes' study with another species of annelid.

Two species of worms were observed with respect