from the crude material by distilling in the presence of alkali. The fraction collected below 131° contains the commercial fusel oil. After this has been removed there still remains a small residue of higher boiling material. An attempt has been made to discover the constituents of this high boiling fraction in the hope of throwing some light on the biological activities of the yeast cell. The mixture is exceeding complex and great difficulty was experienced in obtaining the compound in a state pure enough for definite identification. Some progress was made in this direction, but the work was interrupted by unforeseen complications. We were able to draw the following conclusions from the investigation, and these are hereby set down as a record which may serve in the guidance of others who may be working in this extremely interesting but difficult field.

1. Crude fusel oil from the industrial fermentation of molasses contains in addition to n-propyl, iso-butyl, secondary butyl carbinol and iso-butyl carbinol, alcohols of the hexylic, heptylic, octylic, nonylic and decylic series.

2. It seems very probable that the alcohols of these higher series which are present are the normal and the two members of each series which have the same isomeric structure as the amyl alcohols, iso-butyl carbinol and secondary butyl carbinol.

3. Normal heptyl alcohol has been definitely shown to be present. This is the first time this alcohol has been isolated from fusel oil and definitely identified.

4. In addition to the above alcohols, three other decyl alcohols are present, one of which is possibly a terpineol.

5. In the fractions boiling higher than n-decyl alcohol there are small amounts of alcoholic material of still higher molecular weight.

6. These higher alcohols are very likely produced by the vital activity of the yeast cells.

7. For this investigation to lend support to Ehrlich's theory that the higher alcohols are derived from the amino acids present in the materials fermented, it would be necessary to isolate from molasses, amino acids which could give rise to the alcohols indicated. This is impossible in the present state of protein chemistry.

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PEOPLE ATTACKED BY OWLS

IN SCIENCE for November 1, Dr. Albert M. Reese, after telling of an owl attacking people in Morgantown, West Virginia, asks if such attacks have been noted by others. A few such occurrences are on record in the lumber camps of Eastern Canada, and I know of a shanty-man who bore a large scar on his forehead from a wound caused by an owl's claw. In no instance was the species of the attacker determined, but as the bird was usually described as large, it was probably the great horned owl. The victims were mostly teamsters whose work in winter takes them out before daylight in the morning and keeps them out at night after dark. It seems likely that the owl, looking down from above, mistakes the man's fur cap for some small mammal, and pounces on it. One story runs that in a certain camp the attacks were so frequent that at last no one would venture out in the dark without half a pork barrel over his head!

CHARLES MACNAMARA
ARNPRIOR, ONTARIO, CANADA

IN regard to Professor A. M. Reese's remarks concerning people being attacked by owls, I may mention that this happened to me several times during four or five years. There is a large gin house surrounded by young live-oaks near my dwelling. This gin house harbors many rats and mice, and no doubt is a good hunting-ground for the owls, which in the mating season often perch on the live-oaks with their young. These owls seem to be the small kind that usually frequents barns. I have often been bothered by them when walking around the trees, and once when my wife was with me she was attacked also and had an ear scratched. The owls fly around the head and hair, seemingly trying to scratch, and make a noise by snapping their bills. These attacks occur only when the birds have young and never before dusk. I do not believe they are caused by any inherent viciousness in the owls, but rather by a strong desire to drive one away from their young.

A. SION
KYLE, TEXAS

OWLS have frequently been known to mistake the human head for the small hair-covered animals upon which they prey. The "man with scant supply of hair" mentioned by the correspondent from West Virginia does not therefore come in for especial distinction though if a really bald man should be struck I should be moved to tell my story of a great snowy owl which struck the shadow on a tent wall one moonlit summer night in Montana.

It is a practice in the northwest, when sleeping in the open, to cover the hair with hat or stocking cap. The talons of an owl can put out an eye and almost scalp a man, as has happened in lumber camps. Usually the victim does not hear the soft-feathered wings and runs back to camp with a story of murderous assault. Unfortunately, we have not heard

the owl's account of his mistake, though I doubt not he is as badly frightened as the more injured party.

MAURICE RICKER
WOODSIDE, NEW YORK

THE writer was conducting some experimental work in orchards in west central Illinois and staying at a farmhouse several miles from town. One evening early in June the owner of the orchard, the farmer occupying the place and the writer were sitting in front of the farmhouse under a large tree just at dusk of evening. The weather was hot and none of the party were wearing hats. Suddenly a screech-owl flew from one of the trees to the head of the farmer and attacked him with claws and beak, inflicting several rather severe lacerations on the top of his head and his forehead. The farmer, not approving of this demonstration on the part of the owl, promptly retired to the house, secured his shotgun and to use his own expression "blew a hole through the middle of the owl."

This owl was the male of a common screech-owl *Otus asio asio*. Another owl, presumed to be the mate of the one killed, was noticed the same evening and on a number of other occasions in the trees in the yard but never showed any inclination to molest any one before or after the death of her mate.

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SYNCHRONOUS FLASHING OF FIREFLIES

DR. BROKENSHIRE, a medical missionary in Mindanao, in an article "Through Philippine Jungles" in the September *Missionary Herald,* concludes with the paragraph copied below which will appeal to those who are interested in the synchronous flashing of fireflies.

> It got dark. Then all one could see was now and then a flash of light from the shore where the Moros were living. The combination of darkness and the continual thumping of the paddles made me sleepy and I dozed off several times. I aroused once to see a strange sight. Off there in the darkness was a tree just filled with lightning bugs. The strange thing was that they all flashed at the same time. One second everything would be dark, the next second the whole tree would be aglow with a beautiful light!

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

"VITALITY" STAINS

As a preliminary report to work which is being continued on the physiological effects of vital stains, the following summary of observations is offered.

Methylene blue, neutral red, Bismark brown and Janus green were used in concentrations of 1/12,500 and 1/5,000 in sea-water with *Aurelia aurita* and *Gonionemus murbachii*. The largest and most active individuals were selected from a total of 75 Aurelia and 850 specimens of Gonionemus which were examined. Only the first two stains were used with Aurelia, which were stained for a period of two hours. The specimens of Gonionemus were stained for only forty-five minutes. In each case the animals were washed in several changes of sea-water before being placed in a running salt-water aquarium where observations were made.

The stains in each case had the effect of a stimulant, causing increased activity for a period considerably longer than was observed for the controls after being placed in the observation aquarium. In one case there was intermittent activity for over an hour, while the controls ceased activity within two minutes. With Aurelia the controls died before any of the stained individuals, twenty-one days after starting the observations. The stained individuals were normally active ten days later.

With a series of thirty-six individuals of Gonionemus, it was found that the individuals stained with Janus green died in about ten days while all the others lived at least three weeks. Relative activity was determined by response (pulsation of the bell) to pinching by forceps of a tentacle near the sucking disk. This stimulus was regarded as relatively uniform. At the conclusion of the observations the individuals in the order of decreasing activity (vitality) were as follows: neutral red, methylene blue, Bismark brown and the controls. The Janus green individuals had died.

References in literature to vital stains lead us to think that they are all toxic, but that some are less so than others. This is quite possible, but these few observations direct us toward further observations, for in each case the stained individuals either outlived the controls or were more active than the controls at the conclusion of the observation period. Certain ameboid cells of Aurelia were seen to contain concentrated masses of limited size of the stain, and it is suggested that vital stains may in some way increase the activity of these particular cells. These ameboid cells may have as their main function the protection of the individual against invasion by foreign substances.

These commonly known "vital" stains seem (except for Janus green) in the case of Aurelia and of Gonionemus to increase somewhat the vitality and