internal interactions. Song is not to be sought in one organ or in two, constituting any one of its dissected and exposed physiological or morphological levels, nor in the complexities of any chemical level involving hydrogen-ion relations, blood plasmas or corpuscular affinities. Let us finally decide to study life in the properties of proteins, sugars, starches. We find no hint of the manifestations of life here. We will study the molecule, the atom, the electronic whirls and modes even more intensively. All well and good, but we can not expect to find any of the externalities of life in these remote depths of a bird's chemistry. There appears to be nothing to indicate the properties of atomic iron in the electronic energies of iron. Surely the properties of the iron atom do not allow one to predict the properties of any organic molecule into which iron enters as a constituent. At every point new property-levels are built up, one within or upon the other until the resultant of all is the subtle mood of living-expression, which we would all understand if we could.

To my own mind there is no hope of tracing life which is a summation-property, to any internal subordinate level beneath the bones and integuments, so to speak. I would as soon declare that the facies of life existed at one level as another, and hold that the free energy of the electrons should contain its embryo as truly as the morphologically immature embryonic configuration.

With these features in mind, I find great justification for the broader view-points of the genuine field-naturalist. Yet some look askance at him in these days of intensive specialization. The true naturalist is content to see the final resultant of all these interior interacting levels of structure and function, and in truth the final relevancies of life must be sought alone in its external features of form and expression. While the old-time naturalist has become scarce in our midst, it is simply because the newer psychology of organisms has thought to find the key to life in the internal relations of its mechanism. Henry David Thoreau, beholding the sunset with soul attuned to the beauty of it all, is as true a scientist as Leeuwenhoek bringing to light the sperm cells of life. One works on a more external plane than the other—that is all. The man studying chromosomes is content with the details of chromosomes, but if he seeks finality in their relations, he becomes for the moment a naturalist engaged with the external properties of life.

For that reason, a Thoreau studying the relation of his moods to the whip-poor-will's calling, term him poet-naturalist if you will, is a genuine out-and-out naturalist, nevertheless. The electronist, the chemist, the biophysicist, the physiologist, the morphologist, on and on are but subepidermal naturalists in their restricted fields. The true naturalist, the man who must always stand upon their isolated summations, ever transcending all the complexities of their intracellular finds, must be the old-time field-naturalist. Let him now touch his own subtle moods with the poetry and the philosophy of it all; let him stand as a complete entity before the wonders of the gods and he becomes, still more, the calm poet-naturalist in our midst, with sublimities of thought and feeling projected infinitely beyond the levels of his colleagues lost within the organizing integuments which somehow made all this possible as the final vision of life. At last, perchance, moments of mystical experience may lift the soul above mundane relations, and he will, like Wordsworth, feel close to some immanence in the universe.

> When the light of sense
> Goes out, but with a flash that has revealed
> The invisible world.

It is then that we have seen and felt infinitely beyond the confines of our own finite personalities, with a rare vision and mood that glimpses even the gods themselves. It is then that the scientist feels the reality and greatness of an infinite externality of being, it would seem, and the innate religious consciousness of man has asserted itself as the final logical outlook of life.

H. A. ALLARD

U. S. DEPT. OF AGRICULTURE

SPONTANEOUS COMBUSTION IN THE MARSHES OF SOUTHERN LOUISIANA

THE following is abstracted from my notes on observations of marsh fires of apparent spontaneous origin. My complete notes on the subject appeared in *Ecology,* Vol. XII, No. 2, April, 1931.

On August 4, 1924, shortly before noon, while hiking in a dried marsh two miles east of Mandeville, Louisiana, with a party of boy scouts, we observed the start of a fire which apparently ignited spontaneously. The muck-like soil of the marsh, as rich as 90 per cent. in combustible matter near the surface, varies from a few inches to several feet in depth. We were in the midst of an unprecedented drouth, and the water level, which normally would stand a few inches above the grass roots, was several feet below the surface, all but a few deep lagoons and the bottom of alligator holes being without water. The temperature was over 100° F. in the shade, and in the sun the heat was so intense that it was impossible for the boys to walk barefooted in the sand. A strong southwest wind, estimated at 20 to 25 miles per hour was blowing across the lake.

One of the boys called my attention to a column of smoke about a foot in diameter, rising from the marsh about one eighth of a mile in from the lake. We immediately ran to the fire to check it if possible and determine its origin, but, because of the nature of the combustible matter and the strength of the wind, it was already beyond control. As the partly dried marsh vegetation was not anywhere over 3 feet in height, no human could have been there without being seen. Although not a single fire had been observed in the marsh or near-by pine woods prior to this date, and the lake shore was uninhabited for about 15 miles to the eastward, we observed quite a number of large fires scattered over that area during that afternoon, which I could not attribute to accident or design by human agency. They were not along the lake shore, highways or byways where one on foot, horseback or automobile would have been apt to set them, nor along the shores of bayous where one traveling by boat would be likely to set them. A single person could not have covered the territory, even upon horseback, in a day, and the nature and depth of the muck, with the occasional bayous, would make travel by horseback impractical if not impossible.

Looking at the physical facts in the case, we find existing at the time some of the same conditions which bring about the spontaneous heating and ignition of agricultural and industrial products, combined with such weather conditions as always accompany the most disastrous forest and grass fires. That summer, similar rather sudden epidemics of fires occurred in muck soils in drained lands near my home in New Orleans. In one case I noticed what appeared to be a very small fire breaking out on the side of a stump in an empty lot, and I secured a bucket of water to extinguish it. It really took several buckets, for the fire had burned a large hole in the muck soil, and the condition of the under side of the cypress stump showed that it had been burning for some time in a partly smothered condition, and was only breaking through to the surface when observed. During a similar interval, a fire started with a match or cigarette would have set all the dried weeds and grass in the lot in flame and would not have burned the ground so deeply under the stump before spreading. Of course, because of the almost continued presence of people on the outskirts of New Orleans, I would have hesitated to attribute any of these fires to spontaneous ignition, had I not been an eye-witness to the fire in the marsh near Mandeville on August 4.

PERCY VIOSCA, JR.

RESEARCH DEPARTMENT,
SOUTHERN BIOLOGICAL SUPPLY CO., INC.,
NEW ORLEANS, LOUISIANA

RHYTHMIC PHENOMENA IN GELS

IN a paper which was presented at the Buffalo meeting of the American Chemical Society (April, 1919), but which was not submitted for publication, the writer demonstrated the musical vibration and rhythmic splitting of silicic acid gels. The former of these two phenomena was also demonstrated at the same meeting[1]; the second phenomenon was recently described in great detail.[2] A third phenomenon, which the writer also reported and which does not appear to have been observed since, is the variation of pitch with time, which precedes the fracture of the gel. After silicic acid gel sets, it produces a low musical note which increases in pitch, with time, at a varying rate. Sometimes the change is too rapid to be followed and again it may be so slow that the change from the lowest to the highest pitch can be followed through all the intervening tones for a period of several days. Sometimes the pitch at the time of fracture is too high to be heard and again the fracture may occur at some lower note.

Another phenomenon which the writer observed was the production of overtones by gels contained in tubes having an irregular shape.

J. M. JOHLIN

SCHOOL OF MEDICINE
VANDERBILT UNIVERSITY,
NASHVILLE, TENNESSEE

BEHAVIORISM IN SCIENCE

PSYCHOLOGY has borrowed much and learned more from the older sciences. It has thus come by method, instrument, procedure and attitude toward the problems of investigating that aspect of nature known as mental life. Mental life is now regarded as part and parcel of nature in general, not as something added or superposed on nature. This has been a great advance, but one which is yet not fully realized by all thinkers.

There has been much ado both within and without psychology over the term "behaviorism." Those to whom the term applies are either extolled as epoch makers in psychology or condemned as destroyers of mental life. Judging from the amount of discussion for and against behaviorism, one would suppose that it was something new on the intellectual and scientific horizon. Perhaps it is not. Behaviorism is an age-old concept or method. Although not specifically called by that name it has been taken for granted in all sorts of inquiries, even in the biological sciences, to which group psychology belongs. Why, then, has its advent caused such a furor in psychology or,

[1] H. N. Holmes, W. E. Kaufmann and H. O. Nicholas, *Jour. Am. Chem. Soc.*, 41, 1329, 1919.
[2] E. C. H. Davies, *Jour. Phys. Chem.*, 35, 3618, 1931.