about $10^8$ ergs. This latter energy is of course very small; but shocks of this magnitude are registered only at very short distances, and then only by the most sensitive instruments, on whose records they are barely perceptible above the usual ground unrest. Calculation using the physical constants of the instruments indicates that this should be the case for shocks in which an energy of $10^8$ ergs is liberated in a very small time. Since the ratio of the largest to the smallest shocks is determined from the observations, it follows that the estimated energy for neither group can be seriously in error (probably by not more than a factor 10). This tends to remove doubts, such as have frequently been expressed, as to whether energies so large as $10^{25}$ ergs actually are liberated in earthquakes.

In the first paper on the magnitude scale (*loc. cit.*) it was pointed out that the seismic energy liberated in the California region during a given period is almost wholly accounted for by the larger shocks; smaller shocks are not sufficiently frequent to contribute more than a small fraction of this energy. A similar result is indicated, with slightly less definiteness, for the large shocks of the world. During the last 32 years the listed shocks of magnitude approximately 8 or over represent an estimated energy of about $10^{26}$ ergs, or an average of $3 \times 10^{24}$ ergs annually; while in 1926, during which year none of these larger shocks took place, the total liberated energy was of the order of $2 \times 10^{23}$ ergs. Very small shocks do not need to be considered; 100,000 shocks of magnitude 3 would give only $10^{19}$ ergs. Such evidence strongly indicates that the smaller shocks do not appreciably mitigate the strains which are released in the larger earthquakes, but must be regarded as minor incidents in and symptoms of the accumulation of such strains.

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## THE DEATH OF HUNDREDS OF CEDAR-WAXWINGS[1]

THE cedar-waxwings, *Bombycilla cedrorum* (*Ampelis cedrorum*), are chiefly distinguished by the bright red wax-like appendages on the secondary coverts of the wing feathers, although they have many other remarkable characteristics.

These birds feed on insects and small wild berries, scarcely ever touching cultivated fruits.

There is no noisy warning of the coming or going of a flock of "cedar-waxwings." They are very sociable and fly in flocks of very close formation while in search of food. A group of two to five hundred or more keep so closely in contact with each other that they act as if of one mind. Sometimes apparently bent upon going in a definite direction, they suddenly turn about and settle en masse on some tree or bushes, quite noiselessly, having either scented or seen the food as they flew over.

A visitation of a flock of "waxwings" to an apple orchard is welcomed, because it means less worms and better apples the next year. It is very unfortunate to have a flock of these beautiful useful birds destroyed.

On March 19, 1935, a cold morning after the rains, a rather large number of these birds entered Los Angeles, settled on some ornamental Canary Island date palms (*Phoenix canariensis*) and began feeding on the water-soaked dates. The delicious odor and the sweetness of the fruit proved to be a fatal lure; for shortly after they had eaten of the dates the birds began to fall all about dead or dying in one to ten minutes of asphyxia or paralysis-like symptoms. Some recovered after a longer time and flew away. It was noticed that most of the fatalities occurred about one tree. Some of the birds were obtained the next day and autopsies were performed.

In each bird the post-mortem conditions were the same. At the base of the skull of the posterior portion of the cranium, between the supra-occipital and the atlas, in the region of the foramen magnum, there was a large accumulation of blood. The lungs and right side of the heart were full of blood, and the liver and kidneys congested. The blood in general was rather light red in color.

Pieces of the outside of the dates, meat and hull were found in the digestive tract. Pieces as large as half a date were found in the crop, showing the birds had fed very greedily. The birds were in good condition, plump and fat. No parasites were discovered, and no evidence of infection with microorganisms was found, also no indications of metallic poisoning. No pathology was noted.

The dates were bruised and water-soaked. The outer covering remained mostly intact, while the inside consisted of a watery mushy pulp.

The syndrome, or picture, obtained from the symptoms and post-mortem findings gave evidence of hydrocyanic poisoning.

Conclusions were that the prolonged cold rains and bruising of the fruit by the whipping of the winds, had destroyed the protoplasmic structure of the date

[1] Presented at the meeting of the Pacific Coast Division of the American Association for the Advancement of Science, June 27, 1935.

tissue, permitting the enzymes to hydrolize a glucosoid in the fruits, liberating the hydrocyanic acid.

Due to the low temperature of that morning, sufficient amounts of this extremely toxic compound had accumulated in the fruits to cause the death of the cedar-waxwings.

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## A NEW LOCALITY FOR THE BLACK WIDOW SPIDER

AN adult female of *Latrodectus mactans* (Fabr.) was found early in July, 1935, at Parfrey's Glen, near Prairie du Sac, at the edge of the Driftless Area of Wisconsin. This is the first case of finding this spider within the boundaries of this state.[1] The web, found in tall marsh grass about two and a half feet from the ground close to a marshy plot near a small stream, was of characteristic construction. The spider was brought back to the laboratory, where she laid two eggs sacs within five days of each other. The young hatched in about twenty days.

It is of particular interest to note that two males and two females of *Gea heptagon* (Hentz), an orb-weaver previously reported only from the southern United States and as far north as the District of Columbia,[2] were also found in the same locality. A collection of spiders made during the past four years, including about four thousand specimens and over two hundred species from many different localities throughout Wisconsin, has failed to reveal the presence of these two species elsewhere in the state.

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## FRESH-WATER MEDUSAE IN IOWA

ON August 20, a strange animal was reported in Avon Lake, a gravel pit 10 miles southeast of Des Moines. On investigation many specimens of the fresh-water medusae, *Craspedacusta sowerbyi,* were found moving about near the surface of 15-foot water.

At different times, these animals were collected and kept alive in jars for ten-day periods. The character of 4 tentacles erect while swimming could not be definitely ascribed to this species. Some individuals did show a tendency to hold the long tentacles upward, however the majority of medusae observed held the tentacles in a pendulous position.

Observations were kept on these coelenterates in their natural medium for 30 days. At the end of this period they had moved out of the deeper water into shallower reaches. Specimens on the 18th of September swam, either with all tentacles upward or all held downward.

This is the first time apparently that *C. sowerbyi* has been recognized in Iowa.

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# SCIENTIFIC BOOKS

## VAGARIES OF BELIEF

*Wish and Wisdom: Episodes in the Vagaries of Belief.* By JOSEPH JASTROW. D. Appleton-Century Company, Inc., New York, 1935, 394 pp., $3.50.

MORE than three hundred years ago Francis Bacon, having discerned that knowledge can be power, set himself the task of describing and classifying the knowledge which is not power. He divided it into three groups: the delicate, the contentious and the fantastic. Like the knowledge which is power, fantastic knowledge is an effort to discriminate and to manipulate natural causes in such a way as to control the march of natural events. Like true knowledge, this effort takes on a certain pattern of procedure and operation. But unlike true knowledge of causes this effort neglects the conditions and ignores the methods of control. In effect, it deliberately leads human beings astray.

In this forthright and epigrammatic book Joseph Jastrow resumes Bacon's epic theme. He brings together samples of fantastic knowledge from all the ages, beginning with Lucian's classic Alexander and stopping with Richet and von Reichenbach and their contemporaries. He stops, he does not finish, because the material goes on, not only reproducing old fantasies but generating new ones. It can be exhibited by the method of sampling alone. That the analysis and judgment of the samples should carry conviction to believers in the fantastic is not, of course, to be expected. The study can only confirm those who already agree with Mr. Jastrow in their infidelity: they can not convert the true believers. But to his fellows in infidelity Mr. Jastrow's book should bring merriment and illumination. Between a "Foreword" and an "Afterword" of psychological comment, he sets, decently and in order, a chain of instances which he classifies as "Credulity," "Magic and Marvel," "Transcendence," "Prepossession," "Congenial Conclusions," "Cults and Vagaries" and "Rationalization." Under "Credulity" he links the picaresque career of

[1] C. E. Burt, *Jour. Kans. Ent. Soc.,* 8 (4): 117–130, 1935.

[2] A. Petrunkevitch, *Bull. Am. Mus. Nat. Hist.,* 29: 345, 1911.