have also been very recently published on Norway, Sweden, Czechoslovakia, Hungary, Morocco, Caucasus and Belgium.

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## SCIENCE SERVICE AND THE LOCATION OF EARTHQUAKE EPICENTERS

RECOGNIZING the great popular and scientific interest in the subject of earthquakes and the desirability of providing a means by which the exact epicenter of at least moderately severe earthquakes could be reported promptly to the press and to seismologists, Science Service has provided and had in operation for about a year a system of cooperative earthquake reporting. In March, 1925, a scheme of cooperation with the Division of Terrestrial Magnetism and Seismology of the U. S. Coast and Geodetic Survey was effected, and in January, 1926, this was extended to include the Jesuit Seismological Association, which numbers in its membership the numerous seismograph stations of the Jesuit colleges.

The first regular reports of earthquakes were made by the Rev. Francis A. Tondorf, S.J., in charge of the Georgetown University Seismograph Station, in 1913, through the Associated Press. Father Tondorf has continued this service to the present, and in recent years other individual stations have also announced their results. Such reports include the time, an estimate of the distance and of the directions, but do not give the position of the epicenter, for this can not be determined with accuracy from the reports of a single observatory.

The new work of Science Service is not intended to supersede this valuable work, but to supplement it. The method is as follows:

As soon as a quake of at least moderate severity is recorded at any of the eighteen stations cooperating, the seismologist in charge read their records and telegraph the data to Science Service in Washington. To facilitate this transmission a special code has been devised, a modification of the Gerrish Astronomical Code used by the Harvard College Observatory in reporting new discoveries. The earthquake code permits all the necessary data to be transmitted in eight code words, of five two-letter syllables each, each syllable representing a digit. These telegrams are decoded and the data transmitted to the Coast and Geodetic Survey, where the work is in charge of Commander N. H. Heck, chief of the division. The same data are also telegraphed to the Rev. James B. Macelwane, S.J., in charge of the Jesuit Seismological Association's central station at St. Louis.

Determinations of the epicenter are made by both the Coast and Geodetic Survey and the Jesuit Seismological Association and transmitted immediately to Science Service. Announcement of the epicenter is then made by Science Service through its subscribing newspapers by telegraph and mail, reaching a total of about one hundred papers in all parts of the country.

The stations now cooperating in this project are as follows: Those of the Coast and Geodetic Survey of Tucson, Arizona; Cheltenham, Md.; Sitka, Alaska; Honolulu, T. H., and San Juan, P. R.; stations affiliated with the Jesuit Seismological Association at Georgetown University, Washington; Fordham University, New York; Spring Hill College, Mobile, Ala.; Loyola University, New Orleans; St. Louis University, St. Louis, Mo.; Regis College, Denver, Col.; University of Santa Clara, Santa Clara, Calif.; and Gonzaga University, Spokane, Wash.; and the stations at Harvard University, Cambridge, Mass.; Yale University, New Haven, Conn.; the U. S. Weather Bureau, Chicago, Ill.; the Dominion Observatory, Ottawa, Canada, and the private station of Mr. J. J. Shaw, at West Bromwich, England.

This scheme first functioned with the Montana earthquake of June 27, 1925, and since then twenty-two epicenters have been located, all within a few hours after the records were obtained, and in good agreement with later determinations made by detailed study of the seismograms. The details of the operation of the service are under the supervision of Mr. James Stokley, of the Science Service staff.

Arrangements for a further extension of the service are now being completed, in order to provide data from a group of stations in southern latitudes.

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## THE AUTOMOBILE AND WILD LIFE

DURING the past spring and summer some observations of dead animals which had obviously been killed by automobiles were made along highways in Illinois. These observations were all made in the central part of Illinois and on concrete highways where auto traffic was very heavy.

Counts of dead animals were made along a total of 299 miles of highway during April, May, June, July and August. The total number of animals noted on the highways were as follows:

| | |
|---|---|
| Birds[1] | 24 |
| Brown Thrasher | 1 |
| Cats | 4 |
| Chickens | 17 |
| Flickers | 2 |
| Gophers | 29 |
| Mourning Dove | 1 |
| Owl | 1 |
| Rabbits | 22 |

[1] Birds include those so badly mutilated that they could not be positively identified.

| | |
|---|---|
| Rats | 2 |
| Red-headed Woodpecker | 20 |
| Robin | 1 |
| Skunk | 1 |
| Snakes | 10 |
| English Sparrows | 84 |
| Squirrels (Gray) | 2 |
| Toads | 3 |
| Animals[2] | 3 |
| Total | 230 |

The observations on the number of animals killed were all made on trips of from eight to fifty-four miles, in most cases, starting from Champaign, Illinois. The total number of 230 dead animals probably represents the animals killed within three days of the time the examinations were made. In one case, a gopher was killed by an automobile immediately in front of the one in which the observer was riding, and on returning over the same route about eight hours later, the body of the gopher was found flattened out and nearly dry, having been run over by a large number of automobiles in the interval since it was killed. It is doubtful if the body of the animal would have remained on the highway another day. In another case, the body of a sparrow disappeared from the highway on the third day after it was killed.

On the cement highways of Illinois, the automobile traffic is usually very heavy, and through the country an average speed of from twenty-five to thirty-five miles an hour is maintained by nearly all cars. Animals killed on such highways are repeatedly run over, and all moisture is rapidly crushed out of the bodies, and in a short time they are blown off by the wind, or by the air from passing automobiles.

There are several things of special significance in connection with the dead animals noted in these observations. If the observations are taken by months, and considering only those animals which occurred in largest numbers, we find that during April observations on fifty-four miles of highway showed:

| | |
|---|---|
| Sparrows | 3 |
| Rabbits | 4 |
| Snakes | 5 |
| Gophers | 10 |
| Red-headed Woodpeckers | 0 |

On the sixty-eight miles of highway observed in May were found:

| | |
|---|---|
| Sparrows | 7 |
| Rabbits | 5 |
| Snake | 1 |
| Gophers | 8 |
| Red-headed Woodpeckers | 0 |

[2] Animals in the same condition as birds.

On the seventy-four miles of highway observed in June were found:

| | |
|---|---|
| Sparrows | 10 |
| Rabbits | 6 |
| Snakes | 3 |
| Gophers | 6 |
| Red-headed Woodpeckers | 5 |

On the sixty-four miles of highway observed in July were found:

| | |
|---|---|
| Sparrows | 30 |
| Rabbits | 7 |
| Snake | 1 |
| Gophers | 4 |
| Red-headed Woodpeckers | 14 |

On the thirty-nine miles of highway observed in August were found:

| | |
|---|---|
| Sparrows | 34 |
| Rabbits | 0 |
| Gopher | 1 |
| Red-headed Woodpeckers | 3 |

Apparently the sparrows are killed in the greatest numbers during the time that the young are most abundant. It is also possible that the larger kill of sparrows during July and August was due, at least in part, to the fact that during this period small grain was being threshed generally throughout the farming districts and hauled in wagons over the concrete highway to elevators. Small amounts of grain were scattered from the wagons over the highways, and it is probable that many of the sparrows killed were surprised while feeding upon this grain. It would seem that the greatest number of snakes are killed during the spring months, when they are just coming out of hibernation and are more or less sluggish. The number of rabbits remain fairly constant throughout the summer, but the number of gophers decreased slightly after the spring months. It is also apparent that the red-headed woodpeckers were killed in greatest numbers during midsummer, and as many of the birds observed were young it seems likely that these are killed in greatest numbers shortly after the time when they leave the nest. The small numbers of chickens killed was rather surprising and it is probable that a greater effort is being made to keep them off the highways.

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## ON EINSTEIN'S THEORY OF RELATIVITY

PROFESSOR ALBERT EINSTEIN and other experts have repeatedly stated that, although the theory of rela-