from northerly points, these finally appearing to flow around to each other, becoming connected at their converging ends at the zenith point. At times when beheld closely waves of light appeared to flow up these celestial streamers with the speed of lightning. It is possible that the factor of perspective may have played much part in the seeming relations of these convergences to each other, but one can only report the conditions of his visual impression from his own infinitesimal point on earth.

This magnificent auroral display lasted well after midnight, the fine, lance-like flashes playing across the northern arc of the horizon for some time after the great display and wide-spread luminosities of red and green had faded away. This auroral disturbance, as indicated by the press next day, appeared to be one of great energy and magnitude, disturbing profoundly the efficiencies of telegraph communications with all parts of the world. How little do we know of these strange celestial storms in the far, thin heavens over our planet, and what their correct interpretations should be. As we have our own little mundane electrical storms, it would seem that the cosmos, too, has its greater electrical storms, perhaps on and on *ad infinitum* with its increasing magnitudes, stirring the souls of men to wonder and admiration now and then with their infinitely far-removed and tenuous cosmic lightnings in the upper spaces. Yet glad am I that something in the universe piques me, and keeps eternally beyond my head and hand, perchance ever to remain a mystery with an eternal mastery of my prosaic, scientific moods and modes. Too often we would term of scientific worth only that which we can commercialize, but above the practical contact and outlook lies an infinite field of marvels which we can merely behold and admire for the beauty and mystery and awe afforded. It is in these experiences that the highest moral values of science reside, for the purest knowledge and inspiration of life may be awakened by such glimpses of these finer, more mysterious relationships which one's being perceives apart from any of the fortuitous, practical good or bad implications of life.

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AUTOMOBILES AND ANIMAL MORTALITY

AN automobile trip of 1,400 miles, beginning at Iowa City, Iowa, and ending at Sanford, Florida, occupied my time from October 1 to 11, 1928. In the course of this journey my wife and I kept as accurate a count as possible of the vertebrate animal casualties, presumably due to passing automobiles, found on the highway, which led through southeastern Iowa, central Illinois, southwestern Indiana, western Kentucky and Tennessee, central Georgia and north central Florida.

In making our count of these dead animals, only the freshly killed carcasses of vertebrate forms that we could identify in passing were included; and only the remains lying in or at the edge of the highway received consideration.

A greater number of bodies were observed on paved roads than on gravel or earth highways where high rates of speed are more difficult to attain. Undoubtedly speed is an important factor in the death-dealing qualities of the motor car so far as wild animals are concerned.

The greatest number of vertebrate remains encountered on any one day was ninety-two, on October 2, between Princeton and Paris, Illinois, a distance of 200 miles, all over fine concrete roads. This was the banner day for domestic fowls and English sparrows, the remains of fourteen of the former and fifteen of the latter being counted. Fourteen mammals, including representatives of at least eight species, also were added to our list on this day.

The preponderance of creeping and crawling things was particularly marked, for they head the list with a total of eighty-one; of these "snakes" make up 67.9 per cent. No doubt the number of casualties among the members of this group was due largely to seasonal change in temperature, for with the coming of cooler weather in early fall these animals crawl on to the paving which has been warmed by the sun and so are often crushed by passing automobiles. It follows, too, that they are most likely to meet with disaster on warm sunny days.

Of the more or less unusual forms met with under the circumstances here outlined may be mentioned the two opossums, one each for Iowa and Kentucky, the pocket gopher, one for Illinois, and the rattlesnake, one for north Georgia.

On comparing the list of species of dead animals observed on this tour with those noted on a 635-mile drive made by us over Iowa roads in June and July, 1924 (SCIENCE, 61, No. 1568, 56–57, 1925) some degree of similarity in the assemblage of forms represented is at once apparent even though the two trips were taken at different seasons of the year as well as through different life zones. This suggests that different types of vertebrates are more likely to meet with disaster than others. Something of seasonal and local faunistic development is also suggested, for, while birds in general and the red-headed woodpecker in particular headed the Iowa list in spring and summer, snakes and turtles made up a goodly bulk of the casualties on our early autumn journey. As might be expected, Florida heads the

list with twenty of these reptiles on about 250 miles of paved roads; Georgia is second with fourteen on 158 miles of various types of highway.

While the number of individuals as well as species of vertebrate animals here catalogued as having met their fate from speeding motor cars on well-surfaced roads is not extraordinary in consideration of the distance over which the records were made and the diversity of the topography encountered, it can not be denied that the combination of automobiles and good roads go hand in hand and constitute important regulatory factors in the abundance and distribution of at least certain types of animal life throughout the country.

The complete list of twenty-three identifiable species of vertebrate casualties encountered on this trip follows, together with other individuals which, in passing, it was not possible to determine further than the larger taxonomic groups.

	AMPHIBIANS	
1.	Frogs and toads	6
	REPTILES	
2.	Painted terrapin	5
3.	Tortoise	1
4.	Miscellaneous turtles	19
5.	Garter snake	2
6.	Blue racer	1
7.	Black snake	1
8.	Bull snake	8
9.	Rattlesnake	1
10.	Miscellaneous snakes (may include some of above)	43
	BIRDS	
11.	Sparrow hawk	1
12.	Other hawks	1
13.	Domestic fowl	23
14.	Mourning dove	1
15.	Crow	2
16.	English sparrow	21
17.	Mockingbird	1
18.	Miscellaneous birds (may include some of above)	17
	MAMMALS	
19.	Opossum	2
20.	Fox squirrel	1
21.	Thirteen-lined spermophile	2
22.	Norway rat	2
23.	Pocket gopher	1
24.	Cottontail rabbit	7
25.	Domestic pig	1
26.	Striped skunk	1
27.	Domestic dog	2
28.	Domestic cat	6
29.	Miscellaneous mammals (may include some of above)	20
	MISCELLANEOUS VERTEBRATES	
30.	Probably includes amphibians, reptiles, birds and mammals	35
	Total	234

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INTERPRETING THE GRAND CANYON

THE informal expositions by specialists of the natural phenomena of geology and life impressively illustrated at the Grand Canyon, which were instituted last summer by the National Park Service, with the cooperation of the Grand Canyon committee of the National Academy of Sciences, are being continued during the current season. Dr. Douglas Johnson, professor of physiography at Columbia University, now at Grand Canyon, will, by invitation of the director of the National Park Service, be followed in June by Professor John P. Buwalda, head of the department of geology at the California Institute of Technology, and by Dr. Harold Bryant, director of the educational and research division of the Fish and Game Commission of California. Dr. Herbert E. Gregory, director of the Bishop Museum in Hawaii, one of the leading students of Grand Canyon geology and geography, may continue the program later in the summer.

With the object of aiding the tourist to a better understanding of the origin of the Grand Canyon, the geologic history of the region and the zonal distribution and environmental adaptations of the life, the methods that are being worked out by the National Academy Committee, under the chairmanship of Dr. John C. Merriam, consist primarily in the preparation of exhibits *in situ*, such, for example, as footprints, plant impressions, marine shells, fault contacts, contact conglomerates, etc., so exposed or arranged with reference to one another as to stimulate observation and correct deduction on the part of the visitor as to the conditions under which the fossil organisms lived, their burial in place of growth, the former continuity of the strata from side to side of the Canyon, changes in the sequence of life from the bottom upward in the series of sedimentary deposits, the contrasts in the life that at different times occupied the region, the relative antiquity of the formations crossed in descending the Canyon walls and the agencies of erosion still acting with stupendous power, as seen in the sand-laden river and the rolling boulders in or along its channel.

Geological and paleontological specimens taken from or connected with the different field exhibits form part of a small collection in the observation station built under the auspices of the committee on outdoor education of the American Museums Association, with the cooperation of the academy committee and the support of the Laura Spelman Rockefeller Memorial. The station, designed by Herbert Maier