

Providence, R. I., deduced from the time required to pass across the moon's disk, a speed of about 130 miles per hour for some birds. Our results agree closely with his, although the methods are very different. He had to assume the size of the birds in order to compute their distances and speeds, while with two telescopes the results are independent of any assumption as to size or distance. On the other hand, it is possible to secure many more observations with a single instrument than with two, so there are disadvantages in both methods.

With three telescopes it would be possible to measure both the heights and speeds of birds as they fly across the moon. Two observers about ten feet apart in an east-and-west line could obtain data for the heights, while the speeds could be determined by a third observer situated a hundred yards north or south of the others. In short, given a clear night, the moon about full, plenty of birds in flight, and a battery of telescopes, the conditions are perfect for an easy solution of the problem of the heights and speeds of migrating birds; but it will be seldom that all of these requirements are fulfilled at the same time.

JOEL STEBBINS,  
EDWARD A. FATH.

UNIVERSITY OF ILLINOIS OBSERVATORY,  
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of a twenty-six-inch bed of workable coal, and five thousand for a thirty-six-inch bed, it is only within the past few days that any one has filed with the governor legitimate claims for the bounty. The bed of coal recently exposed, near Peru, Neb., extending some forty-two feet along the sides of a tunnel back from the banks of Honey Creek, seems to be fully thirty-four inches in thickness, as measured by the writer. This is known as the Honey Creek or Peru coal mine. The seam is level and readily accessible; the mine, being ten feet above the creek, is easily drained and transportation is at hand. While the extent of the newly discovered bed is a matter of conjecture, the farms near and adjacent to the Peru coal bed are likewise underlaid probably with the same seam of coal, judging from scattered surface indications. It is reasonably certain that a resource of local interest will be developed, and for a time at least Nebraska may lose its distinction 'the state without a mine.' As to the quality of the coal, whether good or bad, matters little, for any coal is good in a state supposed to be destitute of natural fuel. Analyses of the Honey Creek coal made by Mr. L. J. Pepperberg, a fellow in the department of geology in the University of Nebraska are given in the table.

It must be remembered that the following analyses are made from samples which are

	Moisture.	Volatile Matter.	Fixed Carbon.	Ash.	Total.	B. T. U. per Pound of Coal.	Volatile Matter Per Cent. of Combustible.	Fixed Carbon Per Cent. of Combustible.
Sample No. I., air-dried.....	10	45.25	36.28	8.47	100	12,621	55.50	44.50
Sample No. II., water-soaked as mined..	32.22	28.54	19.38	19.86	100	7,492	54.80	45.20
Sample No. III., lignitic coal, Cumberland, Wyo., for comparison.....	3.65	44.27	46.18	5.90	100	14,100	54.90	45.10

#### A WORKABLE BED OF COAL IN NEBRASKA.

ALTHOUGH for years past the state legislature of Nebraska has offered a bounty amounting to four thousand dollars for the discovery

close to the surface, badly weathered, therefore representing the worst rather than the best of this coal.

By the time the tunnel has been extended one hundred feet the overlying shales will be about fifty feet in thickness and the coal will presumably be of better quality. Across the

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valley of the Missouri in Iowa a bed of coal, similar in all respects to this one, occurs, and is probably a part of the same bed. The evidence from deep wells at Omaha, Nebraska City, Beatrice and Lincoln, the last named well being 2,463 feet deep, points to beds of coal but a few inches in thickness and thinning rapidly to the westward.

For a number of years coal has been mined in various places in the southeastern, or carboniferous portion of this state, as at Nebraska City, Rulo, South Fork and elsewhere, but the thickness of coal in each case scarcely equaled eighteen inches and there was no profit in mining such coal. The best efforts of a Lincoln company headed by Mr. Bullock, a man of ability and experience, failed to make the mine at Rulo profitable, and the undertaking, like that of others, was abandoned at the end of two years as unprofitable.

Although considerable amounts of coal were furnished at one time by the South Fork Mine to the neighboring towns, Table Rock, Humboldt, Salem, Dawson and Seneca, the bulk of coal mined thus far has been used by those mining it. Farmers and others often dig out their own supply of winter fuel. A vigorous effort was made to develop a bed, said to be eighteen inches thick, in northeastern Nebraska, it being a lignitic coal in the Cretaceous and in no way related to the coal recently discovered. Simultaneously with the discovery of coal at Peru come reports not yet verified of a bed equally thick at Falls City. It has certainly been the opinion of geologists at large that commercial coal was not to be expected in Nebraska, and the occurrence of a workable bed in Peru does not materially change this opinion, for at the best it must be local, as shown by surrounding deep wells. Though limited to a square mile or so it is of importance to this commonwealth.

The owner of the land on which the bed of coal was found leased the mine at the rate of fifty cents on every ton of coal sold for three dollars, and one dollar on every ton sold at

four dollars, which may be an item of interest to those regularly engaged in mining.

ERWIN H. BARBOUR.

THE UNIVERSITY OF NEBRASKA, LINCOLN,  
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THE RELATION OF PRESSURE IN THE CORONARY  
VESSELS TO THE ACTIVITY OF THE ISO-  
LATED HEART, AND SOME CLOSELY  
RELATED PROBLEMS.<sup>1</sup>

THE data recorded in this note were obtained in a series of experiments on the excised hearts of turtles, and on the hearts of guinea-pigs, rabbits, cats and dogs, both excised and in situ. The object was to study the effect of various artificial nutrient solutions under different conditions of temperature and pressure with a view of determining their efficiency in restoring cardiac activity. By efficiency is meant the capability of the heart of maintaining an adequate blood pressure.

Defibrinated blood, blood dilutions, Locke's, Ringer's, Howell and Greene's two solutions, 0.9 per cent. sodium chloride, paraffin oil and hydrogen gas were employed.

The animals were etherized and rapidly bled to death, and the blood collected and defibrinated. In isolated preparations, the hearts were rapidly removed and suspended by the base. Cannulae were inserted and the pericardium removed. Ventricular tracings were made by connecting this portion of the heart to a simple lever which recorded the contractions on a drum. Auricular tracings also were made in some experiments. In all cases of isolated preparations, before the injection was begun, the hearts were bathed in the solutions to be employed. With all the solutions except blood, or blood dilutions, oil and hydrogen, a short series of more or less rhythmical contractions, similar to those evoked by simple mechanical stimulation, promptly followed their application to the heart. In the course of the experiments with the hearts in situ, a constant parallelism was observed between the aortic pressure and the rate of the heart. In order to determine whether this result was

<sup>1</sup>All references to literature have been purposely omitted.