DISCUSSION AND CORRESPONDENCE.

THE LUNAR THEORY.

In a recent number of the *Monthly Notices* of the Royal Astronomical Society, Mr. P. H. Cowell gives an account of his investigations on the motion of the moon. He finds considerable errors in Airy's theory, but gives no explanation of the small defect in the tables of Hansen. A curious result of several investigations is to show the accuracy of the tables of Damoiseau, made four score years ago, and after a theory which has gone out of use.

The interest now shown in the lunar theory by several astronomers promises to give us better tables of the moon. Two methods can be followed. The attractive one is to make a new theory, since in this case one has the entire question in hand. But this requires a great expenditure of labor. The other method would be to correct the tables of Hansen. The accuracy of the coefficients in these tables is very great, and it is a pity so much good work should be lost. In determining the orbit of the moon for the formation of his tables Hansen introduced twelve unknown quantities into his equations of condition, or fourteen, if we include the two depending on the distance from the center of figure to the center of gravity of the moon. It is not much wonder that a small error should have been committed in such a complicated theory. The manuscript of Hansen must be preserved, probably in the observatory of Gotha, where he spent most of his life. There are several astronomers in Germany who studied with Hansen, and who understand his methods. It is to be hoped that a careful revision of Hansen's calculations on this theory will be made and that his error may be discovered.

After looking at some of the works on this theory I venture to make this suggestion: that astronomers should unite on a system of notation for the lunar theory. So many changes have been made that it is almost necessary to have a dictionary of symbols in order to read the various memoirs.

A. Hall.

Norfolk, Conn.,
January 5, 1904.

THE SCAURS ON THE RIVER ROUGE.

To the Editor of Science: The earth's rotation causes in the winds of our hemisphere a tendency to deviate to the right of straight ahead in whatever direction they are flowing (Davis' 'Meteorology,' p. 101). It ought to produce the same effect on rivers (Russell, 'Rivers of North America,' p. 41). Instances have been supposed to be found in the streams on the south coast of Long Island (*American Journal of Science,* 1884, p. 427), in the great detrital cone of Lannemezan, on the Rhine, Danube, Ob, Irtish, Nile, New Zealand streams, Parana and Paraguay by authors cited in Penck, 'Morphologie der Erdoberfläche,' pp. 351–360. From objections that have been made to most of these illustrations it appears that there is more of unanimity as to the theory than in the conviction aroused by the evidence offered.

The Michigan rivers have long seemed to me suitable to examine for evidence of this sort. They are young, meandering streams, not usually encountering ledges, but flowing either in lake clays or in a till that has few large boulders and is fairly homogeneous.

The Rouge is a stream some twenty-five miles long that flows into the Detroit River a few miles west of Detroit. At Dearborn two forks of the river unite into one. Early in November I visited the west branch in company with Mr. Isaiah Bowman to look over the availability of the valley for work with my class in field geography. The river is ten or fifteen feet wide, meandering on a flood plain two or three hundred feet wide, which is incised in the level clays that once formed the floor of Lake Maumee. Every now and then the stream in its meandering undercuts the bank, causing a naked bluff of clay in a landscape that is elsewhere well grassed. Such a bluff is what the Scotch call a scaur. As the scaurs indicated the points where the river is actually at work widening its valley, it was proposed to measure the proportion of bank occupied by them. To this end we paced the distance along the river bank under each scaur and by the flood plain to the next one, noting whether the scaur was on the right bank or

the left. The results are given in the following table.

FIRST DAY.

Scaur. Right.	Left.	Flood Plain.
222		245
	55	187
	73	350
96		271
	90	442
73		303
	21	518
	34	273
41		287
76		236
50		280
	31	100
	53	466
95		168
653	357	4,126
In all		5,136
Total both banks		10,272
Total scaur		1,010
Per cent. of scaur		10
Per cent. of scaur on right		64

SECOND DAY.

Scaur. Right.	Left.	Flood Plain.
	66	295
56		300
	130	273
120		153
173		225
	195	1,160
	39	144
30		350
	60	245
16		341
178		256
	47	196
	37	100
200		343
48		260
100		1,218
27		78
30		30
	17	259
		180
978	591	6,406
Total		7,975
Total both banks		15,950
Total scaur		1,569
Per cent. of scaur		10
Per cent. of scaur on right		62

Mr. Bowman's pacing gave practically the same results.

As my pace is 2.75 feet, we walked the first day 2.6 miles and the second 4.1, and found each time that along one tenth of its course the Rouge is widening its valley, while two thirds of this work is being done on the right bank. This called Mr. Bowman's attention at once and he will prosecute further studies on this and other streams. Of course, the interest here is in a possible criterion for detecting deflection of rivers by the effect of the earth's rotation. The distance is short, yet the results are singularly uniform, as appears from the following analysis in detail.

Grouping the scaurs by successive amounts of about 500 paces, we have:

Total Scaur.	Right.	Left.	Percentage on Right.
536	318	218	59
474	335	139	71
545	349	196	64
518	224	294	43
506	405	101	80
2,579	1,631	948	64

Rivers ought to show the effect of the earth's rotation and no criterion could be simpler in theory or application than this. As the Rouge flows fairly to the east prevalent westerly winds urge the river neither to right nor left.

MARK S. W. JEFFERSON.
MICHIGAN STATE NORMAL COLLEGE,
December 7, 1903.

SHORTER ARTICLES.

WONDER HORSES AND MENDELISM.

DR. CASTLE'S reference to the Oregon Wonder horse in SCIENCE for December 11 reminds me that in the autumn of 1899 I corresponded with Mr. James K. Rutherford, of Waddington, N. Y., who then owned a horse called Linus II. Mr. Rutherford sent a photograph of the horse, taken in 1898. The photograph shows a Morgan horse probably about five years old with a double mane which trails on the ground on either side for a distance of two feet. The tail trails on the ground for a distance of about six to eight feet. Correspondence with Mr. Rutherford yielded the following additional statements: Linus II. is the son of Linus I., which had a mane that was single, but at fourteen years old eighteen feet long, while the tail was twenty-one feet long. "The mother also had a remarkable growth of hair." The paternal grandmother was known as the 'Oregon Beauty' and was noted for the mass and length of her hair. My correspondence with the owner of Linus I. led to few additional facts. He stated that the long