

clam (*Mya*) from the shell heaps of Goose Island, Maine; Ipswich, Mass., and Marblehead, Mass., in comparison with recent forms of the same species collected in the immediate vicinity of these ancient deposits, showed that the ancient specimens were higher in comparison with their length than the recent specimens.

A comparison of the common beach cockle (*Lunatia*) from the shell heaps of Marblehead, Mass., showed that the present form had a more depressed spire than the recent forms living on the shore to-day, and this variation was in accordance with observations he had made on similar species in Japan.

AMERICAN COAL FIELDS.

The areas of the anthracite coal fields, confined to a few counties of our State, are so well defined that we need be in no doubt as to their extent; and this limited area admonishes us that we should carefully husband our inheritance, and not waste it. The fact is well established, that for every ton shipped to market, two are wasted. The loss in the operations of mining, the pillars left to support the roofs of the mines, the loss in preparation, each contributes to this great aggregate. How to prevent these losses, by use of improved machinery, and by more thorough methods of working the mines, should be the study of our mining superintendents and engineers. Several suggestions with a view to a partial remedy, present themselves.

First.—The owning of the land by the operators would make them careful to mine all the coals. As tenants for a limited term of years, their object is merely to take out that coal, and in such a manner as will cost them little, and bring them much.

Second.—If the lands are to be leased, the term should be long enough to enable them to mine all the coal beds covered by the lease.

Third.—The lease should contain clauses subjecting the methods of mining, ventilation and drainage to the supervision of the owner's mining engineers; limiting the lengths of "breasts" to seventy yards or less; forbidding the use of monkey rolls, or the rebreaking of the coal; providing for the dumping in separate heaps of the coal dirt and the slate and rock.

Fourth.—We need larger collieries, and fewer of them, with perfected machinery, for hoisting, pumping and breaking.

Fifth.—More capital is required to open the mines for extensive and exhaustive working, by driving the gangways to the extreme ends of the territory, and then mining towards the outlet, so as to obviate the necessity of retracing our steps and robbing the pillars.

In Schuylkill county we are specialists. We are dependent upon one substance: coal is king. There is no gold, silver, lead, copper, or other valuable metals. Though we have good iron ores, they are so disseminated as not to furnish us one workable bed. Yet we largely help Pennsylvania to furnish nearly half the iron manufactured in the United States. We have a large farming area well cultivated by our industrious and frugal German farmers. Our convenient location to the great markets of the Atlantic seaboard, our canals and abundant railroad facilities, our great commodity, always give a promise and an attitude among the great countries of our grand old commonwealth, which we are ever proud to realize.—*Geology of Schuylkill County*, by P. W. Scharfer. Pottsville, Pa.

The latest addition to microscope stands is the swinging sub-stage. This American invention has been adopted by most of the English manufacturers. In the last number of the *Journal of the R. M. S.* we find the value of the swinging sub-stages disputed by Mr. Crouch, and that Mr. Stevenson concurred in this view, and described them as useless incumbrances and unsuitable for use with certain apparatus, which is essential to the display of some objects.

ASTRONOMY.

COMET C (SCHÄBERLE), 1881.

This comet has been observed here since the 16th of July. When first seen it was large, round and bright, and slightly condensed at the centre, being very plainly visible in a $1\frac{1}{4}$ -inch telescope. On the morning of the 19th it had increased sensibly in brightness; a faint tail could be traced for a distance of fully 15', pointing in a northwesterly direction; on the above date its position was obtained from θ (*Theta*) *Aurigæ* in the following manner: The comet and star were separated too far to be both seen in the field of the telescope together, the comet was also too far north of the star for both objects to be seen at once in the finder. One of the wires in the finder eye-piece was made parallel with the meridian, and then the star, which preceded the comet, was brought into the field and its passage of the wire obtained; the telescope was then carefully moved northward in declination until the comet, entered the field when its passage of the wire was observed; in this manner the difference of R. A. was obtained; the difference of declination was then estimated. From a mean of several passages of the star and comet its position on July 18th at 15h. 40m., Nashville mean time, was found to be R. A. 5h. 52m. 52sec., and Decl. $40^{\circ} 15'$. The R. A. will be very little out, but the declination may be over a minute in error.

Its position was obtained in the same manner on the 20th (A. M.), using the same star at 3h. 35m., R. A. 5h. 53m. 54sec., Decl. $+40^{\circ} 42'$, with probably several minutes of error in the declination. On July 24, at 15 hours, the comet was visible to the naked eye, appearing about as bright as a sixth magnitude star (Prof. Swift, of the Warner Observatory, saw it with the unaided eye as early as the morning of the 23d).

On the 28th a small star-like nucleus was visible with the telescope.

Aug. 3 (A. M.), it was very easily visible with the naked eye, traces of the tail being seen without a telescope. A naked eye comparison with comet B showed C to be the brighter. Comparing it with a six magnitude star it was of the same brightness, but, covering a larger area, it was more noticeable than the star. The tail, in the telescope, was long and slender and straight as a shaft.

Aug. 4 (A. M.), the comet was quite conspicuous with the unaided eye, the tail stretching out for some distance. In the telescope the nucleus was small, round and pale, and star-like in form. Turning the telescope from comet C to comet B, the two were identical in brightness, but B was slightly broader about the head and tail, and the nucleus was not so distinct; but considering the low altitude of C it must have been really much brighter than B.

On August 14 it was visible in the evening after sunset, being quite plainly visible to the naked eye, with its tail streaming upwards for several degrees. In the telescope it was many times brighter than comet B.

21 inst., in the evening, the comet was as bright to the eye as a $3\frac{1}{2}$ mag. star. It appeared very graceful, straight and slender in the telescope. On this occasion I obtained its position with the aid of a ring micrometer, referring the comet to *Psi ursæ minoris*.

1881, August 21 ds., 14.1m. Washington, m. t. $\{ a = 11h. 08m. 08.5s.$
This was the *apparent position*. $\} \delta = +45^{\circ} 13' 42''$

22 inst., evening, its tail could be traced with the telescope for a distance of about 6° , and was visible to the naked eye for about the same distance. A faint lightish stripe was visible on this date, extending from near the head to a degree or so along the middle of the tail. The following side of the comet's head and tail were distinctly defined, the sky appearing quite dark up to the very body of the comet, but the preceding side was ill-defined and blended, the sky being whitish for some distance from the comet; there also appeared to be a diffused sort of short tail running out some $10'$ or so from the n. p. side