

— Prof. J. P. Mahaffy has in press a book on social life in Greece. It includes a review of the life and thought in all the Hellenistic kingdoms from the time of Alexander to the Roman conquest.

— The study of mathematical astronomy seems to attract so few college students in this country, that we have examined with some interest a pamphlet just received, a thesis on 'Cometary perturbations' presented by Prof. W. Hoover for the degree of Ph.D., University of Wooster, O. About half of the pamphlet is devoted to a general discourse on celestial mechanics, and the rest to deducing certain well-known formulae for cometary perturbations. Considerable work has no doubt been done in the study of Watson's 'Astronomy,' but we should have been glad to see the actual application of the formulae to some of our recent comets, following the example of students of astronomy at the German universities.

#### LETTERS TO THE EDITOR.

*\*.\*The attention of scientific men is called to the advantages of the correspondence columns of SCIENCE for placing promptly on record brief preliminary notices of their investigations. Twenty copies of the number containing his communication will be furnished free to any correspondent on request.*

*The editor will be glad to publish any queries consonant with the character of the journal.*

*Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

#### The Sonora earthquake.

In this portion of the world, since the afternoon of the 3d, have been occurring a series of seismic phenomena, such as, so far as records or tradition show, never have happened here. The telegraphic (newspaper) reports possess the usual characteristics, — gross exaggeration with utter inaccuracy of detail. I am securing data to aid in making a more complete record of the phenomena, and make this merely a preliminary note.

The earthquake struck this town at 3.06 p.m. local time, which, reduced to standard, gives 2.48. Probably the best description will be an account of my own sensations. I had just noted the time, when I heard a rumble such as made by heavy ore-teams in passing. This noise increased; and the building, a two-story adobe, began to shake gently, then more violently. By this time it seemed to me to be a severe whirlwind, such as frequently occurs here at this season of the year. The shaking and the noise increasing, I went to the front of the building, some fifty feet, and looked out. Then it began to dawn upon me that something of a serious nature was taking place, judging from the looks of the crowd on the streets. I then ran back to the place whence I had started, picked up a child, and made my way to the street. When the open air was reached, the noise was like a continuous roll of heavy firing, with occasional short peals like a sharp clap of thunder. This ceasing, I looked at my watch, and found that from the time I had noticed the first rumble until the end, had been about 1.75 minutes. Allowing

ten seconds for error, leaves 1.65. Of this time, the duration of the severe shaking could not have been over ten seconds; the moderately severe, about twenty; and the trembling, the balance of the time. Judging by the movement of some glasses and statuettes on my desk, the general direction of the shock was from south-west to north-east.

The amount of damage done, so far as I can learn, is trifling. No building of any stability has been damaged at all; neither has any one been injured or killed. Persons riding or driving were unaware that any thing was happening. In the Sulphur Spring valley, about twenty-five miles east of here, some fissures occurred in the bed of an old stream, and water spouted out to a small but varying height and in considerable quantity. These streams continued flowing for two or three days, but at present all save two are dry. These seem to be permanent, and are running a small amount of water at ordinary temperature. I have not seen them, and my account is derived from the owner. I may mention as an amusing fact, that, in less than an hour after they broke out, they were taken up and located under the water-laws of the United States.

Succeeding the shocks, mountain fires were noticed on many of the ranges. This gave rise to the reports of volcanic action, which may safely be set down as pure imagination. No phenomenon resembling eruptive disturbance, so far as I can now ascertain, has taken place in any part of the section disturbed.

At the time of the first and severe shock, owing to the vibration and the rolling of boulders down the mountain-sides, large clouds of dust arose: this, with the noise, caused many who saw the phenomenon to think that the cause was eruptive. The fires, with only two exceptions that I now know of, were burning before the shock. Of these it is possible that they were not noticed prior to this, or, what in my opinion is not improbable, falling boulders ignited the timber. This point I will try to clear up. The San Pedro River, a small stream nine miles west of here, is reported to have a slight increase of water. This is diminishing rapidly.

The railroad-track of the Atchison, Topeka, and Santa Fé road, at a point where it ran in an east and west direction, was bent  $4\frac{1}{2}$  inches out of line, the convexity looking south. The bend was about three hundred feet in length. Succeeding the severe shock during the following forty-eight hours, marked and noticeable tremors occurred about every half-hour. These were of greater or less severity, but none approached the first. Had instruments been here to record the motion, no doubt they would have demonstrated a continual vibration.

The heaviest shock, since the first, occurred last night about 9.30. One ludicrous incident was that of an acquaintance, who, while driving along a mountain-road, noticed large-sized boulders begin to start down the mountain towards him. He became much excited, took his rifle, and alighted with the intention of seeking vengeance on the perpetrators of the outrage. The falling of some immense boulders weighing hundreds of tons just then, changed his mind: he will not now hunt the author. Men working at a depth of six hundred feet felt the vibrations severely. Some said they became sick, and all said that the bottom of the drifts or shaft seemed to rise. Men working at one hundred and fifty feet did not notice it so much. One crew of

men at that depth did not know of it at all until they came out of the mine. No damage was done to any of the mines. The deepest workings are seven hundred feet.

As an interesting coincidence, I will mention, that, while in the Salt River valley two weeks ago, I was informed by Mr. Frank Cushing the ethnologist, who is making extensive excavations in the old ruins abounding there, that one of the principal if not the main cause of the abandonment of so populous and fertile a valley was earthquakes. As there are no records of any occurring since that time, Mr. Cushing may take the blame of suggesting this. I am without trustworthy information concerning the extent of the disturbance; but, as near as I can judge, it is about twelve hundred miles long by six hundred in width. There were no magnetic disturbances whatever.

Since writing the above, additional information has come to hand that modifies my opinion somewhat as to the extent and character of this disturbance. From Señor Campi and Mr. L. A. Richards of Sonora, I am informed that the disturbance in their section of the country was profound. They are living in Sonora, Mexico, about two hundred miles south of here, in the Fronteras valley. The first shock was felt there about three o'clock on May 3. In Fronteras ten houses were thrown down, one child was killed, and one woman fatally injured. In Cumpas, still farther south, four houses were destroyed, no one hurt. Extending the entire length of the valley, over one hundred miles, are fissures varying in width from a few inches to ten feet, having a northerly and southerly direction. From this information it is safe to conclude that the centre or area of worst vibration lies to the south of this and in Mexico. It will take at least a month to secure requisite information to make a report. That country is sparsely settled, with no telegraphic communication or railroads; nothing but wagon-roads, and those very poor. These gentlemen confirm the report of mountain fires immediately succeeding the shock. They think that the entire valley has subsided a little.

Also at the San Bernardino ranch, ninety miles south-east of here, all the buildings on the place were thrown down. They were built of adobe, and were substantial. This place lies within a short distance of some extinct craters, and is in the centre of an ancient volcanic belt.

Later reports make the disturbance in Mexico, about the same region mentioned above, as very destructive. As some lack verification, I defer reporting them until further word is received.

G. E. GOODFELLOW.

Tombstone, A. T., May 7.

#### Defence of a civil academy.

The editorial columns of *Science* (May 13, 1887) are guilty of a manifest inconsistency upon the subject of state aid to the higher education. In your first column you condemn, in strong language, my idea of a civil academy at Washington, proposed in the circular of information, No. 1, 1887, bureau of education. In your fifth column you quote, with evident respect, Professor Jowett's views upon government aid to the university colleges of England. You even give publicity to this statement, without dissent: "No principle of political economy forbids

the application of public money to the education of those who cannot afford to help themselves. Such an expenditure is really one of the best affairs of business in which a nation can engage." You venture to add that there is some prospect of Dr. Jowett's plea being effective. While it is not to be expected, in the present transitional stage of political economy and in the present condition of American politics, that all men should agree upon the necessity of education and science for good government, it is at least fair to demand some degree of consistency in a scientific journal.

Furthermore, I beg to differ from your opinion that this country is dotted with colleges where any young man may obtain all needful political education. If there is one thing needful at the present time in our American civic life, it is instruction in the art of administration. Over against your statement, let me place that of Mr. Dorman B. Eaton, recently expressed before the graduate students of history and politics in the Johns Hopkins university. From his practical connection with the civil-service commission, he may be presumed to know what he was saying. He said there was not a single institution in the United States where a man could learn what reformers wish to know about scientific methods of administration. Mr. Eaton may have ignored one or two oases of political training in this country; but every fair-minded man must admit, upon reflection, that American colleges do not teach this subject. You say it is well enough to train men for the army and navy, but intimate that our prospective civil servants can acquire adequate training "from any village school, and will not ask the government for alms that they may the later live from the public purse." No, our public men sometimes try to carry the entire bag, and distribute public bounty, or 'spoils,' to all their friends and constituents. They even vote in state legislatures for free text-books in common schools, and allow publishers to corrupt school-committees. Who teaches 'the homely proverbs of Poor Richard' to our local politicians nowadays, and who ever heard of the A B C of finance in 'any village school'? Do the spoils system and the history of American legislation, municipal, state, and national, indicate that our public servants have been well grounded in common honesty and good political economy? Before pronouncing judgment upon my suggestion as *poor* economy, you might profitably compare the cost of scientific administration with the present American system. Materials for the comparison may be found in the civil lists of various European countries.

My plea was for a civil-service academy, recruited by congressional appointment from men pronounced fit by our state universities. It was for a civic West Point. It was for the political training of able and mature young men in a political environment, in the capital of the nation. It was a plea for opening the channel of communication between our universities and public life, between political science and political praxis. I proposed that the highest education in the country and the most expert talent now in the service of the government should both be made tributary to the training of picked young men for a term of two years, partly by lectures, and more especially by practical work in government bureaus, after the manner of the seminary connected with the Statistical bureau in Berlin, which is recruited by university graduates of the highest ability.