the famous Li Hung-chang, for developing the coal and iron districts to the north-west of Tientsin, in the Chihli province. Should the enterprises we have alluded to be successfully carried out, some hopes may be entertained of a gradual development of the hidden resources of the Chinese Empire.

ANGOLA.—We learn that a young and energetic collector, Mr. Alfred Heath, started on board the *Biafra*, which sailed from Liverpool last Saturday, for the purpose of exploring the interior of Angola, and obtaining objects of natural history. Mr. Heath will stay at Ambriz for a short time, and make collections on the River Loge and on the coast, after which he will proceed inland to Bembe, a place recommended by the late Mr. Monteiro as presenting an excellent field for the naturalist.

AN ORGAN-PIANO

WHEN recently in Paris I was shown—I believe at the pianoforte factory of M. Herz—a piano with appliances for producing prolonged sounds like those of an organ, which appeared to me to be based on thoroughly sound scientific principles, and which was so great a success that, although the invention had only been perfected a very few weeks before, the firm were receiving orders for the new instruments much faster than they could execute them. The attempt to combine organ sounds with those of a piano has often before, I believe, been made, but usually, if not always, I am told, by combination with the piano arrangements of real organ appliances, the result being, of course, extreme difficulty in obtaining perfect harmony between notes produced by two such totally distinct methods. In the present instance the organ as well as the piano notes are produced by precisely the same means, the principle consisting in producing the organ or prolonged sound by a succession of extremely rapid blows of a hammer upon the same strings as produce the piano note. It will not be difficult, I think (notwithstanding my want of familiarity with such subjects), to make your readers understand exactly how this is accomplished. They will observe that if the pianist were able, instead of merely holding down a key, to produce upon it an extremely rapid succession of blows, far exceeding in rapidity anything which the finger can possibly effect, a prolonged note would be produced, and especially so if the number of blows given was so great as to be practically inseparable by the ear. Now in the instrument of which I am speaking this object is accomplished by means of a series of additional hammers (one to each string) mounted upon watch-spring levers, all of which are carried by a bar of brass lying across, but above and clear of the strings. To this bar is attached a rocking lever which is set in very rapid motion by means of an apparatus worked easily by a pedal. I was not shown the exact nature of this apparatus, but there are so many forms of small engines worked with immense rapidity by compressed air, any one of which would answer the purpose, that no great importance attaches to this point. The *modus operandi* is simple enough: the pianist works the pedal, and thus sets the transverse bar with its series of hammers into excessively rapid vibration. By holding down any key of the instrument, the string belonging to it is brought within range of its corresponding hammer, and is struck with corresponding rapidity, giving out what sounds at a short distance like one prolonged note, which lasts as long as the pedal is worked and the key is kept down. It is easy to see that by this means it is in the power of the pianist to produce either piano or organ notes at will, and although while standing close to the instrument the mode of production of the note could be detected, at a short distance the effect was precisely that

of combined piano and organ sounds with the immense advantage of absolute concordance and harmony between the two.

E. J. REED

THE COMING TOTAL SOLAR ECLIPSE

WE have received from Admiral Rodgers, the Superintendent of the U.S. Naval Observatory, the official circular which we were enabled to anticipate some little time ago. Owing to the endeavours of the American astronomers, the Pennsylvania Railroad Company have made arrangements for a reduced rate of fare to and from the East to Denver, Colorado, which is near the central line. These arrangements refer only to persons going in a private capacity, and not to members of expeditions sent out by foreign Governments.

Upon the order of the Superintendent of the U.S. Naval Observatory, Washington, the Company will furnish transportation to Denver and return *via* Pittsburg, Indianapolis, St. Louis, and Kansas City, or *via* Pittsburg, Chicago, and Omaha, at the following rates for the round trip:—From New York, 73.00 dols.; from Philadelphia, 71.00 dols.; from Baltimore or Washington, 62.50 dols.

The round trip ticket includes transportation (about 2,000 miles according to route) from New York to Denver and back again to point of starting; or in all, 4,000 miles of travel.

These arrangements allow the journey to Denver to be made by one route, and the return by another. The routes available are—

No. 1, *via* Pittsburg, Chicago, Omaha, Denver.

No. 2, *via* Pittsburg, Chicago, Omaha, Denver.

No. 3, *via* Pittsburg, Chicago, Omaha, Denver. (Different routes from Chicago to Omaha.)

No. 4, *via* Pittsburg, Chicago, Leavenworth, Denver.

No. 5, *via* Pittsburg, Chicago, Atchison, Pueblo, Denver.

No. 6, *via* Pittsburg, Indianapolis, St. Louis, Kansas City, Denver.

No. 7, *via* Pittsburg, Indianapolis, St. Louis, Kansas City, Denver. (Different routes from St. Louis to Kansas City.)

No. 8, *via* Pittsburg, Indianapolis, St. Louis, Kansas City, Pueblo, Denver.

No. 9, *via* Pittsburg, Indianapolis, St. Louis, Kansas City, Pueblo, Denver. (Different routes from Kansas City to Pueblo.)

Those intending to make observations of the eclipse, and desiring to take advantage of the courtesy extended by the Pennsylvania Railroad Company, are requested to notify their intention by letter to the Superintendent of the U. S. Naval Observatory, asking that a letter certifying to their identity be forwarded to their consuls at the port they may select for arrival in the United States. This letter must, upon delivery, be countersigned by the consul of the applicant to prevent mistakes.

The Hon. Secretary of the Treasury has notified the collector of customs of the ports of Boston, Portland, New York, Philadelphia, and Baltimore, of the probable arrival of European observers, who will be identified by exhibiting the above letter, so signed and countersigned, to the collectors named. Orders have been issued to them as follows:—

“Upon the arrival at your port of any of the gentlemen mentioned, you will extend all proper facilities for the speedy delivery to them of the professional instruments in question free of duty and charges.”

On presenting the same letter, so countersigned, to the agent of the Pennsylvania Railroad Company in New York, Philadelphia, Baltimore, or Washington, a round-trip ticket to Denver and return, will be issued to them by the Railroad Company at the rates before named.

From Denver railroad lines extend to points likely to be chosen for observing stations.