Correspondence.

How to Cure Stammering.

To the Editor of the Scientific American:

Referring to No. 18 of Notes and Queries, of your issue of December 19, would say that if O. C. P. will always fill his lungs with air by a strong inhalation before he begins to speak, he may very readily cure the most obstinate case of stammering. At least that is the personal experience of the writer.

CHAS. F. PENNMAN.

Asheville, N. C., December 20, 1885.

Bell not the Inventor of the Speaking Telephone.

To the Editor of the Scientific American:

There is a phase of the telephone controversy which I do not remember to have seen referred to, namely, that Prof. Bell's title to his telephone patent of 1876 is at best *only legal*, which so interpreted has been sufficient so far for his purpose. It is not true *historically* that he was the inventor of the first speaking telephone. Leaving out all that Reis did and said about his telephone, it is nowhere denied, and is everywhere believed, that Yates, of Dublin, did make and use a telephone, which for substance was identical with the caveat of Gray, and which Bell himself used for his first success in speech transmission. Yates' experiments did not happen to be published, though there were, and still are, several witnesses to their success, and the instruments have been produced in a London court. Therefore, if it be allowed for the argument's sake that Reis did not transmit speech, it cannot be allowed that Yates did not; and hence, if Reis was not the inventor of the first speaking telephone, Yates was. This is simple history, and is not subject to legal quibbles. Happily, there are no legal priorities in matters of history.

Admitting the necessity for a law as to priorities in invention, and even admitting its applicability in this special case on account of the lack of publications of Yates' work at the time, it still does not in truth follow that Prof. Bell was the inventor of the first speaking telephone; and though he holds a legal patent, it is only upon *technical grounds*, and ethically it is neither just nor honorable that he should be considered the inventor of the first speaking telephone.

Courts construe law and courts *make* law when they see fit, and whether they do the one or the other, depends in a good measure upon their environment.

A. E. DOLBEAR.

College Hill, Mass., Dec. 21, 1885.

Starting the Ship Railway Trains.

To the Editor of the Scientific American:

In reading the very interesting letter of Mr. C. H. Needham in your issue of December 19, about the power required for the ship railway, considerable unnecessary stress was laid on the extra power required to start such a large mass as a ship and cargo. If it requires 25 per cent more to start a train than to keep it in motion afterward, would not the car be started by having either end of the road depressed sufficiently, so the car would start by merely loosening the brakes? This would seem to me desirable, even if the slight depression at the immediate end of the line had to be recovered after the car got in motion. It would also tend to stop the car at the end of its journey, which with such a mass is no small consideration. I hope that this small and original (as it would seem from the above mentioned letter) suggestion may be used to advantage.

E. STANLEY GARY.

Baltimore, Dec. 17, 1885.

[Mr. Gary's suggestion would possess greater merit if he had told us how he proposes to start the car on any intermediate part of the line. It will doubtless be necessary sometimes to stop the engines temporarily at points between its terminals, to readjust some of its moving parts, tighten up nuts, or relieve a heated axle, as in ordinary railway practice; and as a moderate increase of diameter of cylinder over the ordinary requirements of the present railways will, as was shown in our issue of December 19, furnish all the extra power required to start the ship railway train, and do it both economically and with certainty, we fail to see the advantage of Mr. Gary's suggestion.—ED.]

The Kansas Grasshopper.

It is reported that the citizens of Helena, Ark., were recently aroused early in the morning by what seemed to be a heavy rainstorm, but they found the sky perfectly clear, and the air full of dark flakes which afterward proved to be a cloud of grasshoppers. They pattered against the roofs and windows of the houses with so much force and in such large numbers that they simulated rain. People who had seen the dreaded pests before, when they descended upon the grain fields of Kansas and consumed every blade in a few hours, say that the numbers exceeded even that visitation. They were passing westward. Many of them were disabled by hitting against buildings and other obstructions, as they flew very low, and had to be shoveled off the sidewalk in the street. They were apparently genuine Kansas grasshoppers.

The Equatorial Telescope and its Operation.

ISAAC SHARPLESS.

It is a mistaken idea that to study astronomy successfully a great telescope and the resources of a fixed observatory are essential. The observers of the East in ancient times, with nothing to use but their trained eyes and quickened intellects, saw a multitude of sights in the heavens of which those of us who are not astronomers, but who have plenty of facilities, never think. The sun, the moon, and the stars roll around us with a regularity and precision which have no counterpart in nature or in human handicraft, and to observe and test this regularity requires instruments and appliances of the most delicate sort. It is for this mathematical part of astronomy, *practical* astronomy, in the common sense of the word practical, and not for the purposes of the unprofessional observer, that the extreme delicacy of construction and mounting of astronomical instruments is needed.

If the earth, our station for observing, stood still, it would greatly simplify the problems to be dealt with. But when it is traveling through space at the rate of something like one and a half millions of miles a day, and also whirling daily about its own axis, an element of difficulty is introduced. If our telescope is pointed at an outside object, in a minute it will point in another direction. To study attentively anything which requires time, this motion of our earth must be counterbalanced by a motion of the telescope in a contrary direction. It is as if we were intently examining a point of the landscape, with a spy glass, from the window of a rapidly moving train. Evidently the spy glass cannot be rigidly attached to the framework of the car, but must be in continual motion. It is for securing a result similar to this that the common form of mounting for telescopes, the "equatorial," is devised.

But let us begin at the base. The pier of solid masonry on which the telescope is to rest is set on a firm foundation, several feet under ground. The surface ground should not come in contact with this pier, for the tremors of the earth are communicated by some kinds of strata to a long distance. A railroad train shakes the earth, sometimes for a half a mile on each side. At Columbia College Observatory, close to the N. Y. Central R.R., all observations have to cease when a train passes. City observatories are nearly always defective for this reason.

The pier is extended upward to a height necessary to give a good horizon. If too tall, the element of instability enters. Modern telescopes are mounted lower than what was thought necessary a few decades ago—astronomers preferring to have part of their horizon obscured rather than take any risks of tremors.

The house which surrounds the pier is built entirely separate from it, being framed around it without contact. Otherwise the motion of a person about the rooms, or the wind striking the outside, will produce a very decided quivering of the instrument. We have known a large telescope to become almost useless because a piece of mortar, dropped by a workman, had hardened between the pier and the framework of the building, though the pier was in this case solid brickwork, six feet square.

The telescope room is surmounted by a hemispherical dome which runs on a horizontal track around the base. Sometimes this is merely an iron track, sometimes the dome rests on iron balls, and a great many devices for equalizing pressure and destroying friction are often used. The new dome, forty feet in diameter, just completed for the great telescope of the University of Virginia, can be turned by the force of about ten pounds applied at its base in the direction of its motion.

The great observatory at Nice in France, created by the liberality of M. Bischoffsheim, has its large dome floating in a circular tank, the liquid in which takes nearly all the weight off the supports. Of course this is not available in climates where such great cold is felt as in ours, as the liquid would freeze.

In the dome is a shutter, to open when the telescope is to be used. By revolving the dome, this shutter, which extends all the way to the apex, can be brought so that any point of the heavens can be viewed by the telescope.

On the pier within the dome is the telescope. To readily counteract the rotation of the earth, one of the axes of the telescope is made parallel to the axis of the earth, or pointing nearly to the North Star. A series of wheels run by a weight will move the telescope slowly around this axis, and a governor regulates the speed. When the telescope is pointed at a star, it is clamped to the axis, the clockwork is set in action, and if properly regulated, as fast as the rotation of the earth would carry the telescope eastward, the weight would carry it westward. Thus, as the star rises, crosses the meridian, and sets, the telescope follows it. By occasionally winding up his clock, the astronomer has no concern after once finding his star. He may leave the room, sure that on his return the image of the star will still be there in his tube. If his telescope axis were not parallel to that of the earth, this could not be so readily arranged. But the stars seem in their diurnal rotation to move about an axis running north and south, with the north end tilted up at an angle equal to the latitude of the place. If the telescope also moves about such an axis, all that has to be done is to regulate its motion to the right velocity, and we have a perfect counteraction to the earth's rotation.

When the astronomer desires to bring his telescope into action, he first opens the shutter and revolves the dome, so as to bring the opening in the direction of the desired object. Then by his finder, a little telescope set by the side of his large one and embracing a large field of view in the sky, he points the telescope aright; having now the object in his large tube, he fastens the clamping screws and releases the clock, so as to keep the telescope on the object. If these operations have slightly disarranged his tube, by a system of cords and levers reaching to the eye end of the telescope, and which he handles while looking into it, he makes the necessary adjustment. The observing chair, a sliding seat mounted on a step ladder, adjustable to all different heights, he places in position. His dark lantern to read the graduated circles of the instrument is at his side. With pencil and note-book in easy reach he is ready for work, only to be interrupted by the necessity of occasionally winding the clock and shifting the dome. Many of the larger telescopes have little telescopes leading from the circles to the eye end, so that all may be read without leaving the chair. A little lamp lights up the figures and divisions, so they may readily be seen. Save that the temperature must be that of the outside air, the observer may do his work in entire comfort. Some of them are too Spartan in their zeal to take advantage of these luxuries; but discard the chair for a platform, on which they stand twisting their necks into most abnormal positions.

The work of an astronomer is not all poetry. Sitting before a telescope with the thermometer close to zero, and a wind raging without, with benumbed fingers and cold feet, when the clock won't work for the stiffening of the oil, and the shutter becomes frozen on its track, working alone in the stillness of the midnight or morning hours, requires as much the spur of strong incentive as any other unpleasant employment.

Haverford College, Pa.

Our Mining Industries.

The report of the United States Geological Survey shows that the mining industries of the United States are assuming giant proportions. Not less than $800,000,000 is invested in mining enterprises as productive capital, and over 400,000 people are furnished employment, and the mineral product of the United States for the year 1884 had a value of $413,104,620. The following is a detailed statement of these mineral products as shown by the statistics collected by the United States Geological Survey:

	Quantity.	Value.
Pig iron, long tons	4,097,868	$73,761,624
Silver, troy ounces	37,744,605	48,800,000
Gold, troy ounces	1,489,949	30,800,000
Copper, pounds	145,221,934	17,789,687
Lead, short tons	139.807	10,567,042
Zinc, short tons	38,544	3,422,707
Quicksilver, flasks	31,913	936,327
Nickel, pounds	64,550	48,412
Platinum, troy ounces	150	450
Aluminum, troy ounces	1,800	1,350
Bituminous coal, long tons	73,730,539	77,417,066
Pennsylvania anthracite, long tons	33,175,756	66,331,512
Petroleum, barrels	24,089.758	20,476,294
Lime, barrels	37,000,000	18,500,000
Building stone	....	19,000,000
Salt, barrels	6,514,937	4,197,734
Cement, barrels	4,000,000	3,720,000
Limestone for iron flux, long tons	3,401,930	1,700,965
S. Carolina phosphate rock, long tons	431,779	2,374,784
New Jersey marls, short tons	875,000	437,500
Borax, pounds	7,000,000	490,000
Mica, pounds	147,410	308,525
Zinc white, short tons	13.000	910,000
Natural gas	....	1,460,000
Other mineral products	....	11,062,631
Grand total of mineral products	....	$413,104,620

Requirements of the Canadian Patent Law in Respect to Manufacture of Patented Articles.

The Bell telephone patents having been declared invalid in Canada for the reason that they had not been manufactured in accordance with law, a suit was lately brought to upset the Edison telephone patents on the same ground. The Minister of Agriculture has, however, decided that in the case of the Edison patents the law has been complied with, and the patents stand. He says:

"A patentee is within the meaning of the law, in regard of his obligation to manufacture, when he has kept himself ready either to furnish the patented article or to sell the right of using, though, may be, not one single specimen of the article has been produced, and he may have voided his patent by refusal to sell, although his patents were in general use.

"In this case there is absence of the proof, without which no patent should be considered forfeited.

"Therefore, Thomas Alva Edison's Patents No. 8,026, for telephonic communication, No. 9,922, for improvements in telephone, and No. 9,923, for improvements in telephones and circuits, have not become null and void under the provisions of Section 28 of the Patent Act of 1872."