Correspondence.

Pneumatic Propulsion of Vessels.

To the Editor of the Scientific American:

In your issue of January 5 I notice an article on the pneumatic propulsion of vessels, the writer of which appears to hold several erroneous ideas as to the action of the air on the water. His plan is to have two keels with a space between them for the air to rush along to the stern of the vessel, and there escape. Now, the air would have more power to propel the boat with only a simple nozzle at the stern, looking straight backward. In his plan, the air on escaping from the nozzle would pass along between the keels in a solid body, at the same pressure as the surrounding water. On passing along it must necessarily be in contact with a greater surface of the boat than the water, so that the friction on the one would be greater than that on the other, therefore, instead of assisting to propel the boat forward, it would be retarding its progress.

THOMAS HENDERSON.

Nashville, Tenn., January 15, 1884.

Present Steam Engine Practice.

To the Editor of the Scientific American:

Under the heading of "Present Steam Engine Practice" in your issue of Nov. 7, 1883, you open up perhaps *the* most interesting subject to the mechanical mind, and although your remarks seem to me very unsatisfactory, they may call forth from your numerous subscribers more comprehensive ideas.

You rightly assert most of the increase of power is due to increased piston speed, but the other "reasons" quoted, with the exception of the modern engine possessing "generous ports," are entirely fallacious; minimum friction, careful balancing, and exact workmanship, etc., do not affect the power developed, however much they enhance the effective horse power.

You omit altogether the higher boiler pressure of modern practice that plays so important a part in the development of both increased power and economy of fuel: and by not stating the relative speeds of the engines mentioned in the last paragraph, you deprive your readers of the opportunity of studying them comparatively.

We must also bear in mind increased economy by higher grades of expansion is attended with a decrease in the power developed; it is therefore ambiguous to consider improvements in both these directions as due to the same causes, and I am consequently rather skeptical as to the correctness of the examples given.

If your readers will supply examples of such improvements with all the necessary data for a complete comparative examination, we shall have practical information not only interesting but most instructive, and I fear we shall find the improvement is not so great as your article would lead me to suppose.

JAMES H. MAN.

Denver, Colo., Nov. 19, 1883.

[We think the majority of engineers will agree that our article coincided with practical experience and was substantially correct.—ED. S. A.]

The Beet Sugar Industry.

To the Editor of the Scientific American:

An inquirer in SCIENTIFIC AMERICAN Notes and Queries, No. 18, December 29, 1883, asks questions on the beet sugar industry. It is thriving in California. The attempts made in Maine, Massachusetts, and Delaware to establish it were very satisfactory in the sugar richness of the beets worked, but the discouragement was in the lack of the raw material. The proper organization for an abundant production of the root is the only need to insure its establishment in the northern sections of our country.

WM. CARTWRIGHT.

Oswego, N. Y.

How to Annihilate Tornadoes.

To the Editor of the Scientific American:

My scheme to blow up tornadoes with gunpowder, as stated in the issue of December 8, has drawn out a correspondence of Mr. Bert Davis, of Topeka, Kas., in that of January 12. Mr. B. D. holds that a dug-out is after all the safest place to get into, when chased by a tornado.

So no doubt it is for individual personal safety. One man of nerve can, however, with my plan, save a whole village—man, beast, and buildings. Our friend Mr. B. D. will see reasons to change his views regarding cyclones and tornadoes, by reading the elaborately written article by Mr. John D. Parker, U. S. A., in your valuable paper of November 17, 1883. It is now well known that the course of tornadoes in the United States is from S.W. to N.E. In the southwest part of town or village exposed to tornadoes is the place for preparation to meet the tornado. If the keg or barrel of powder could be fired from a large mortar, it would be more effective in the upper air and less destructive below. There is always a certain amount of danger in keeping the commercial powder in the heart of towns, as is necessarily done so far. It would be to the interest of our Western tornado exposed towns, to keep all their surplus powder in extra powder houses in the southwest part of their town.

Such one or more powder houses can be exploded by one man, a town officer, from a safe dug-out northeast of them, to annihilate the tornado threatening to annihilate the town. The premonitory signs of a coming tornado are even now not altogether unknown. An approaching tornado is easily heard and seen, in the form of a dust, electrical, funnel-shaped cloud, etc. The towns in the probable track of a tornado can receive notice of its coming by telegraph or telephone, to prepare to make the tornado at least skip the town with a light charge of powder, or to perhaps annihilate it with a heavy charge, situated and fired as already stated.

JOHN F. SCHULTZ.

New York, January 18, 1884.

A Bread Recipe.

To the Editor of the Scientific American:

For the benefit of the numerous readers of your paper I send you an account of the manner of bread making as practiced by my cook for nearly ten years. The bread so made I have eaten ever since 1876, and find it the sweetest and most palatable bread I have ever tasted. It is made as follows:

Take a tin pail or earthen pitcher holding half a gallon; put in one teaspoonful of sugar heaped up, one-quarter teaspoonful fine salt, one-quarter teaspoonful bicarbonate of soda, or sal soda will answer if no other is at hand; on these pour one pint of boiling water; when this has cooled so as not to scald the flour, add flour enough to make a rather stiff batter. This must be beaten up well for at least *five minutes*. Place the pitcher or pail in a larger pail containing hot water, as hot as you can bear your hand in, but not scalding, and put it somewhere on the stove or other convenient place to keep hot; in six to eight hours it will have risen to the top of the pail. Make a sponge with *hot* water, add the yeast made above, keep sponge *hot*, and in one hour it will be ready to knead and mould into loaves, which if kept *hot* will rise quickly and can be baked as ordinary bread.

Keep everything hot if you desire success, but not so hot as to scald. My apparatus is on the glue kettle principle, and kept hot by *jacketing* the outside pail with felt and applying a small "Evening Star" night lamp under it. A tablespoonful of oil lasts all night. Set the yeast at 10 P.M., and it will be ready at 5 or 5:30 A.M. next morning. Brown bread made as above is excellent, and white bread is as white as snow.

S. H.

Dust Causes Brilliant Sunsets.

Professor S. P. Langley, astronomer at Allegheny Observatory, Allegheny, Pa., lately gave to a *Tribune* reporter the following views upon the topic of the transmissibility of light through our atmosphere:

"At first I supposed the sunset matter a local phenomenon, but when the reports showed it to have been visible all over the world, it was obvious that we must look for some equally general cause. We know but two likely ones, and these have been already brought forward. One is the advent of an unusual amount of meteoric dust. While something over ten millions of meteorites are known to enter our atmosphere daily, which are dissipated in dust and vapor in the upper atmosphere, the total mass of these is small as compared with the bulk of the atmosphere itself, although absolutely large. It is difficult to state with precision what this amount is. But several lines of evidence lead us to think it is approximately not greatly less than 100 tons per diem nor greatly more than 1,000 tons per diem. Taking the largest estimate as still below the truth, we must suppose an enormously greater accession than this to supply quantity sufficient to produce the phenomenon in question; and it is hardly possible to imagine such a meteoric inflow unaccompanied with visual phenomena in the form of 'shooting stars' which would make its advent visible to all. Admitting, then, the possibility of meteoric influence, we must consider it to be nevertheless extremely improbable.

"There is another cause, which I understand has been suggested by Mr. Lockyer—though I have not seen his article—which seems to be more acceptable—that of volcanic dust; and in relation to this presence of dust in the entire atmosphere of the planet, I can offer some little personal experience. In 1878 I was on the upper slopes of Mount Etna, in the volcanic wastes, three or four hours' journey above the zone of fertile ground. I passed a portion of the winter at that elevation engaged in studying the transparency of the earth's atmosphere, I was much impressed by the fact that here, on a site where the air is supposed to be as clear as anywhere in the world, at this considerable altitude, and where we were surrounded by snow fields and deserts of black lava, the telescope showed that the air was filled with minute dust particles, which evidently had no relation to the local surroundings, but apparently formed a portion of an envelope common to the whole earth. I was confirmed in this opinion by my recollection that Professor Piazzi Smith, on the Peak of Teneriffe, in mid-ocean, saw these strata of dust rising to the height of over a mile, reaching out to the horizon in every direction, and so dense that they frequently hid a neighboring island mountain, whose peak rose above them, as though out of an upper sea. In 1881 I was on Mount Whitney, in Southern California, the highest peak in the United States, unless some of the Alaska mountains can rival it. I had gone there with an expedition from the Allegheny Observatory, under the official direction of General Hazen, of the Signal Service, and had camped at an altitude of 12,000 feet, with a special object of studying analogous phenomena. On ascending the peak of Whitney, from an altitude of nearly 15,000 feet the eye looks to the east over one of the most barren regions in the world. Immediately at the foot of the mountain is the Inyo Desert, and on the east a range of mountains parallel to the Sierra Nevadas, but only about 10,000 feet in height. From the valley the atmosphere had appeared beautifully clear. But from this aerial height we looked down on what seemed a kind of level dust ocean, invisible from below, but whose depth was six or seven thousand feet, as the upper portion only of the opposite mountain range rose clearly out of it. The color of the light reflected to us from this dust ocean was clearly red, and it stretched as far as the eye could reach in every direction, although there was no special wind or local cause for it. It was evidently like the dust seen in mid-ocean from the Peak of Teneriffe—something present all the time, and a permanent ingredient in the earth's atmosphere.

"At our own great elevation the sky was of a remarkably deep violet, and it seemed at first as if no dust was present in this upper air, but in getting, just at noon, in the edge of the shadow of a range of cliffs which rose 1,200 feet above us, the sky immediately about the sun took on a whitish hue. On scrutinizing this through the telescope it was found to be due to myriads of the minutest dust particles. I was here at a far greater height than the summit of Etna, with nothing around me except granite and snow fields, and the presence of this dust in a comparatively calm air much impressed me. I mentioned it to Mr. Clarence King, then director of the United States Geological Surveys, who was one of the first to ascend Mount Whitney, and he informed me that this upper dust was probably due to the 'loess' of China, having been borne across the Pacific and a quarter of the way around the world. We were at the summit of the continent, and the air which swept by us was unmingled with that of the lower regions of the earth's surface. Even at this great altitude the dust was perpetually present in the air, and I became confirmed in the opinion that there is a permanent dust shell inclosing the whole planet to a height certainly of about three miles (where direct observation has followed it), and not improbably to a height even greater; for we have no reason to suppose that the dust carried up from the earth's surface stops at the height to which we have ascended. The meteorites, which are consumed at an average height of twenty to forty miles, must add somewhat to this. Our observations with special apparatus on Mount Whitney went to show that the red rays are transmitted with greatest facility through our air, and rendered it extremely probable that this has a very large share in the colors of a cloudless sky at sunset and sunrise, these colors depending largely upon the average size of the dust particles.

"It is especially worth notice that, as far as such observations go, we have no reason to doubt that the finer dust from the earth's surface is carried up to a surprising altitude. I speak here, not of the grosser dust particles, but of those which are so fine as to be individually invisible, except under favoring circumstances, and which are so minute that they might be an almost unlimited time in settling to the ground, even if the atmosphere were to become perfectly quiet. I have not at hand any data for estimating the amount of dust thrown into the air by such eruptions as those which recently occurred in Java and Alaska. But it is quite certain, if the accounts we have are not exaggerated, that the former alone must have been counted by millions of tons, and must in all probability have exceeded in amount that contributed by meteorites during an entire year. Neither must it be supposed that this will at once sink to the surface again. Even the smoke of a conflagration so utterly insignificant, compared with nature's scale, as the burning of Chicago was, according to Mr. Clarence King, perceived on the Pacific Coast; nor is there any improbability that I can see in supposing that the eruption at Krakatoa may have charged the atmosphere of the whole planet (or at least of a belt incircling it) for months with particles sufficiently large to scatter the rays of red light and partially absorb the others, and to produce the phenomenon that is now exciting so much public interest. We must not conclude that the cause of the phenomenon is certainly known. It is not. But I am inclined to think that there is not only no antecedent improbability that these volcanic eruptions on such an unprecedented scale are the cause, but that they are the most likely cause which we can assign."

Delicate Mechanical Work.

The extreme nicety of workmanship possible with the delicate machinery of the present day is well represented by the following incident. A city contemporary published, from the London *Times*, an account of a visit of the German Emperor to a great needle manufactory at Kreuznach. There "a bundle of superfine needles was placed before him, 1,000 of which weighed less than half an ounce, and he expressed his astonishment that eyes could be bored in such minute objects. Thereupon the foreman of the boring department asked his Majesty to give him a hair from his beard, and receiving it, he bored an eye in it, threaded it, and handed back to the astonished Emperor this improvised and most peculiar needle."

This statement coming under the eye of a Newark mechanic, he resolved to try the experiment. He took a hair of his own beard, and, on the first attempt, bored it, reamed the eye, threaded it with silk, and mailed the needle to the editor of the New York *Sun*, in which he had seen the original statement.