Correspondence.

Mr. Richard A. Proctor and the Million Dollar Telescope.

To the Editor of the Scientific American:

Mr. R. A. Proctor, whose most interesting and instructive course of lectures has just closed in this city, was inclined to doubt the possibility of making a telescope much superior to Lord Rosse's. He also stated, in the lecture of January 19, in regard to Mr. Lick's Rocky Mountain Observatory, that "the proposed magnifying power of 8,000,to bring the moon within 30 miles, was impossible." (240,000÷8,000=30.) Now Lord Rosse, an accurate and conscientious observer, permitted himself to record an observation made with a power of 6,000 diameters, that is, he made out the object nearly as well as if he had used a lower power. In this same way,the power of one hundred diameters for each inch of aperture, instead of fifty diameters, may be applied to a good objective during the 100 hours, or thereabout, of suitable weather which occur during the year. Mr. Proctor, having been informed more fully with regard to the million dollar telescope scheme, and having been requested by us to give his views on certain matters of interest connected with the subject, on the 20th inst., made the following graceful compliment to the world's most skilled optician, and to the magnificent project which bids fair to be realized at no distant date:

"And here let me mention the superiority of the refractor at Cambridge to the Rosse telescope; and let me allude also to the possibilities of great future discoveries by means of a telescope, to be five feet in aperture, which, it is said, your optician Alvan Clark proposes to make, at a cost, I believe, of $1,000,000. That amount will be wanted. It seems a considerable sum. But if any one can do it, it is Clark, for he is unrivaled as an optician. Mr. Cooke, of England, was the only optician comparable with him, but he is dead. I have never had an opportunity of making any comparison between the great telescope of Cooke, 25 inches in diameter, which is used in an inferior atmosphere, and was completed in the hands of his successor, and those of Clark. The telescope at Washington is 26 inches in aperture. But now that Cooke is away, Clark is the greatest of living opticians; and if a telescope is to be made, it is to be hoped he may be spared to make it." Mr. Clark informed me last summer that he did not expect to live long enough to finish such a work, but both he and his son Alvan expressed a willingness to undertake the construction of a million dollar equatorial, if the money were raised for the purpose, the object glass to be 5 feet 6½ inches clear aperture, and focus 75 feet. The flint and crown disks would be made by Messrs. Chance, of Birmingham, England, or specially in the United States. It will not be found difficult to make large glass disks of homogeneous "metal," if the proper materials are used with the requisite care.

The common glass crucible is built up gradually in rings of about two inches in hight, the clay being constantly mixed and trodden by the naked feet of the workman. The fabrication of the melting pot thus requires an entire year. The same care should be devoted to the materials to be placed inside. Optical glass of the very best quality, free from streaks, should be selected and crushed. Fragments of uniform specific gravity should then be sorted out by the hydraulic bucket or an equivalent mining appliance for the separation of ores. These glass fragments, of uniform quality and size, should be charged into the crucible, and melted in the most intense heat attainable in a Siemens' gas furnace, then cooled as slowly as possible, and the central part of the mass sawn out. This mass of perfect glass may be reheated if necessary in the usual disk mold, to soften and flow by its own weight into the requisite shape. Mr. Clark says that the flexure due to the weight of a large object glass does not appear sufficient to disturb its corrections. A reflector, however, such as the 4 foot at Melbourne, can hardly be prevented, by the most elaborate system of counterpoise levers, from bending so much as to distort the image.

Dr. Draper's fine lunar photographs, although taken with a 15½ inches Newtonian silvered glass mirror, supported on an india rubber air cushion, the eyepiece driven by a clepshydra, are hardly as sharp in definition as those of Mr. Rutherford. The latter were taken with an 11 inch refractor with a second flint lens in front of the object glass, corrected by continual trial photographs of stars until the combination converged actinic rays to the same focus. The equatorial is driven by a Bond spring governor clock. At present Dr. Draper's 28 inch silvered glass reflector and Mr. Rutherford's 13 inch triple photographic objective may be regarded as typical specimens of their respective kinds. I infer, therefore, that while the silvered glass reflector is cheap and possesses no chromatic aberration, yet the achromatic is by far the best for accurate work.

European opticians (so Messrs. Merz & Steinheil assured me, in Munich) generally try to get an absolutely homogeneous glass, to work in spherical curves, according to the formula of Gauss. Mr. Clark, choosing simple curves, and the best glass he can get from Messrs. Chance, excels all others in the exquisite delicacy of his local corrections for slight want of homogeneity in the glass,incorrect figuring,etc. You described his method of recorrection, as applied to the Pittsburgh 13 inches telescope, in the SCIENTIFIC AMERICAN of September 20, 1873. Mr. Clark was formerly a portrait painter, and gained, in the practice of his profession, the sensitive touch and correct eye necessary for the work endorsed by such critics as the late Rev. Mr. Dawes and Dr. Huggins. Dawes' double star work was accomplished mainly with a seven inch glass by Clark, and Huggins splendid researches, on the spectral character and composition of stars and nebulæ, were prosecuted with an eight inch by the same maker.

All observers are not aware that, when a perfectly corrected object glass is uncovered to the sky, it must be allowed to radiate heat for about half an hour before the spherical aberration becomes zero.

I read that Mr. Lick has entrusted Colonel Von Schmidt, an eminent engineer, with the location of the Rocky Mountain Observatory. This task I regard as almost equally onerous and important with that of the optician.

The splendid 18 inches, belonging to the Dearborn Observatory at Chicago, is almost utterly useless (or was when I saw it), being perched in a high, ill ventilated tower halfway up the College building, in currents of heated air, and subject to unequal radiation from surrounding objects.

Professor Safford informed me that he intended to have the equatorial removed from its perch and placed on the ground, where it could be used, if possible.

Mr. McCormick ordered a 26 inch equatorial, a duplicate of the one at the Naval Observatory, to be made at the same time with the latter. It is now being completed.

The principle of interchangeable parts, found so advantageous in the construction of smaller machines, has thus been applied on the largest scale to the mounting of great equatorials. This wholesale construction of giant telescopes is of course of great importance in an economical point of view.

The SCIENTIFIC AMERICAN million dollar telescope may therefore be constructed at the same time as Mr. Lick's, to the great advantage of both projects, and the advancement of astronomy, the queen of sciences, whose domain includes all others.

New York city. S. H. MEAD, JR.

Utilizing Coal Dust.

To the Editor of the Scientific American:

Many efforts have been made, directed towards utilizing the coal dust screenings, which are now the waste products of most mines. Some have proposed to saturate them with coal oil; others have invented machines for compressing them into blocks; while a late correspondent has proposed mixing them with corn, that the compound might be burned. I think that, for steam purposes,none of those processes are necessary, at least with the bituminous coal dust such as is produced from the coal mines of Illinois. On examination, it will be found that the dust, or slack, from bituminous coal is better in quality, being less adulterated with sulphur and pyrites than lump coal. When furnaces for steam boilers or other purposes are properly arranged, and the dust is not too wet from rain or snow, it will burn freely by itself, without any preparation or admixture whatever, as the facts below narrated will fully show:

In 1868 it became necessary to remove, from the Home Woolen Mills, of Jacksonville, Ill., of which I was the manager, sectional boilers (patent) of one hundred horse power, and replace them with new ones. I resolved to put in ordinary cylinder boilers, having five internal flues and rated at eighty horse power. At all the coal mines of that section could then be found immense heaps of the coal dust, or slack as it is there called, abandoned as worthless, and in almost all cases continually burning from spontaneous combustion. I resolved to set the new boilers and construct the furnace with the view of using this waste product exclusively for fuel. Before starting the fires, I made a contract for all the slack (in case I succeeded in using it) the mill would need, the same to be delivered on board the cars at twenty-five cents per tun. The experiment proved succesful; and from that date, until the burning of the mills in 1873, that fuel was used exclusively, with the exception of a few months one summer (when so little coal was being mined that slack could not be had), and an occasional car load of coal when the other failed to arrive. With this as fuel, an engine of 75 horse power was run, driving the machinery of a four set woolen mill; and direct steam was also supplied to dye house, dresser, wool and cloth drying machines, and in cold weather to the heating pipes necessary to heat the entire building, containing 38,000 square feet of flooring. In use, the slack was found nearly as effective as coal; and from that long experience in its consumption, it was fully established to be only about twenty per cent inferior to the best lump coal, tun for tun, for equal amounts of steam. After this mill commenced burning it, the superintendent of the mines found that the cars could not be loaded at the price originally named, and fifty cents per tun (delivered on board cars) was agreed upon as the price: and that price, and no more, was paid to the mines for the four years of its use. During the same time, lump coal on board cars at the mines ranged from two dollars and a half to three dollars per tun. Under the new boilers, much less of this dust was used for fuel than had been previously used of the best lump coal under the sectional boilers, although the amount of machinery was considerably increased.

After the economical use of this fuel had been established in the Home Mills, the proprietors of other mills examined into the manner of using it, and also adopted it. For the past two years, another woolen mill at Jacksonville, and one at Springfield, Ill., each using seventy horse power engines, and direct steam for other purposes, have been utilizing coal dust in their furnaces. Others in the same section of the State have adopted it, and it is now established beyond all question that it can be successfully burned in the manner above stated. Even in starting fires, no other fuel is necessary, except a few handfuls of kindling wood, such as used with lump coal.

To arrange for burning the coal dust, no considerable change in furnaces from ordinary construction is necessary What is true for the proper burning of lump coal is absolutely indispensable for the dust. The rules are simple and easily understood: A large supply of air in the furnace, regular feeding, open fires, and a good draft. When black smoke is seen coming from the chimney, these requisites are not all present. In fact, no more black smoke should ever be seen coming from a furnace burning either dust or lump coal than from one burning wood, and no coal-burning furnace is properly constructed for its work which emits, for more than a half minute at a time, sufficient smoke to be observed without very close inspection. In the case of the Home Mills, although the chimney was but fifty-four feet high, it was rarely that any smoke whatever could be seen. The engineer in charge understood his business thoroughly, was reliable, and always saw that the furnace was in proper order. That, indeed, was one of the principal causes of continued success, and will always be found to be all important.

The use of slack under steam boilers alone has been adverted to, but it can be used for almost any other like purpose. Those persons using considerable amounts of coal, who can obtain dust at low rates, need have no fear that they will fail if they will follow the above suggestions. No compression into blocks, admixture with coal oil, or adulteration with corn is necessary. A faithful fireman to shovel in small and regular supplies, an open fire, and a good draft, will never fail to make as fierce and effective fire as lump coal, with a very large saving in cost.

Columbus, Ga. JOHN HILL.

Asphalt Pavements.

To the Editor of the Scientific American:

It is suggested that some mixture or mode of laying down asphalt pavements must be found,for obviating the tendency to greasiness. This greasiness is the cause of the slippery character of such pavements when wet or damp. Another great objection to them is the disposition to wash away with rain, to soften in the sun, and to crack on drying. These latter faults are caused by the want of an absorbent element to hold the volatile portions from evaporation and softening in the sun. This absorbent must be of a character that will not crack of itself, if mixed with water to a thin consistency and dried at slow heat. Sand, clay, ground slate, talc, Grafton mineral, lime,etc.,are used at present for admixture in such compositions, but they do not possess the absorbent and non-cracking qualities. The mineral known as fuller's earth is, I believe, the best thing for this purpose. The peculiarities of fuller's earth, among similar minerals, are its powerful affinity for greasy matters, its finely comminuted character (it is an unpalpable powder when crushed, which is evinced by the readiness which a piece takes polish from the friction of the finger nail,) and its peculiarity of drying, rapidly or slowly, without cracking. These render it invaluable for really good and lasting pavement made from asphalt, coal tar, or other bituminous matters.

Two parts of fuller's earth, with one part of a mixture of asphalt and coal tar, or the asphalt alone, make a good compound for the purpose. INVESTIGATOR.

The Preservation of Timber.

To the Editor of the Scientific American:

I came here 30 years since, and began clearing land and building houses with hewn logs and boards split from the tree. After several years' residence I noticed very often that pieces of the same kind of timber decayed more quickly than others; and after much thought and observation, I came to the conclusion that timber felled after the leaf was fully grown lasted the longest. I noticed that timber felled when the leaf first commenced to grow rotted the sap off very quickly,but the heart remained sound; that timber felled after the fall of the leaf rotted in the heart, even when apparently sound on the outside. When fire wood cut in the winter was put on the fire, the sap came out of the heart; but when cut in the summer, the sap came out of the sap wood and next the bark. I noticed also that all our lasting wood had but little sap at any time in the heart: such as cedar, mulberry, sassafras, and cypress.

A cypress post cut in the summer of 1838 is still sound, although exposed to all weathers, while one of the same kind of timber, cut in the winter of 1856 and painted, has rotted in the heart. I saw yesterday a piece of gum plank, which I sawed in the summer of 1859, that has lain exposed ever since, and is perfectly sound; while oak timber that was felled in the winter before is now entirely rotten.

My conclusion then is: Cut timber after full leaf, say in July and August, to get the most last from it. The sap goes into the heart of the tree after leaf fall, and causes decay.

Arkansas. JAMES A. MOORE.

Fish in the Hot Springs of Nevada.

To the Editor of the Scientific American:

About 80 miles north of this place, on the north slope of Bull Run Mountain, which never loses its massive banks of snow, rises a small stream, formed by springs that furnish the purest and coldest water I ever drank. The stream,after running a distance of half a mile, is about 2 feet deep and about 6 feet wide on an average; at this point a succession of hot springs rise on the banks, and flow into the stream, increasing the volume of water about one third. The water of these springs is so intensely hot that less than three seconds are consumed in boiling eggs in it. The creek above and below this point swarms with fine brook trout; and strange as it may appear, to persons standing on the banks where the hot water is discharged into the brook and looking through the rising vapor, you can see hundreds of the fish swimming to and fro in the boiling element with as much indifference as though there were no hot water near.

This letter, if unaccompanied by an explanation, would undoubtedly pass for a Nevada fish story; but to satisfy the incredulous, I will give the result of my investigation, it being July when I visited the place. I took a common thermometer with me, which only registered to 130° Fahrenheit. A test of the water above the hot springs showed a mean temperature of 42°; fastening my thermometer to a pole, I immersed it above the influx of hot water; and keeping it as near the bottom as possible, I moved it gradually down stream. The result was a very low temperature at the bottom, gradually rising to 65° until I reached a point (a fourth of a mile down the stream) where the temperature became uniform throughout. This, it will be seen, shows that the hot water, having a specific gravity much less than the cold, retains its place on the surface, forming an upper intensely hot stratum, and leaving the lower water with its finny tribe undisturbed, and to all appearances swimming to and fro in one of Nature's caldrons.

This stream is one of the many that form the head waters of the Columbia River; and to this point, over eighteen hundred miles from its mouth, in the spring and fall, the salt water salmon come in hundreds to spawn.

Elko. Nev. G. A. F.

The Spider's Web.

To the Editor of the Scientific American:

It is commonly believed that spiders are able to project their webs to distant objects, thus bridging over the intervening space; but how this is done, I have never seen explained. Once I saw a small spider upon some projecting object above a table, before an open window, briskly engaged in trying to do something, without seeming to accomplish his object. I therefore watched him, and saw that, after attaching his thread to the projecting object, he spun down four or five inches, and then commenced climbing his thread, carrying the same with him, or, rather, winding it up into a ball. Having reached his point of support, he descended again, and wound up the thread as before. This he did three or four times, till his ball was nearly as large as the head of a pin. Then taking his position upon the top of his projection, he remained apparently motionless for half a minute, at the end of which time his ball had disappeared, and there was seen a delicate line, a foot or more in length, flying in the wind. He was evidently trying to attach his thread to a lamp standing in the center of the table; but he had miscalculated the direction of the wind. I then carefully broke off the flying thread, when, finding that he had failed to reach the lamp, he repeated the attempt, going through precisely the same movements as before. This he did four or five times, when, doubtless concluding that the fates were against him or that some one was interfering with his operations, he left for parts unknown.

Whether he projected his ball of silk, as the sailor does his coil of rope, or whether he merely unwound it, letting the free end fly in the breeze, I could not make out; but it is very certain that when the flying thread appeared, the ball beneath his feet had disappeared. J. H. P.

Franklin, N. Y.

The Curious Ways of Plants.

Who can account for the ways of plants, or explain why a certain species will grow in one place, and will not in another exactly similar, so far as human intelligence can determine?

The American aloe is a hundred years in getting ready to flower, whereas the gourd grows like Jack's bean stalk. Some wild flowers disappear on the advance of civilization; while, on the other hand, the plantain, if the truth is told, goes wherever Europeans go; and in this country was unknown until after the English came, following so closely on their tracks that the Indians gave it the name of "white man's foot."

Some varieties, as above intimated, may be found in a particular locality, and nowhere else within half a dozen miles. There is, for example, in this neighborhood, in central New England, one spot where are a few shrubs of the mountain laurel ("spoon wood") in a little patch by the roadside; and although this would seem the natural country for it, it can be discovered in no other place anywhere about.

Then there is the fringed gentian, which has been seen beside a secluded road some six miles away; but, with that exception, appears wholly unknown in the vicinity; yet the closed gentian is abundant. Another of the perversely disappointing flowers is the dog tooth violet; not, however, more capricious than the yellow violet and the noble liverwort (*hepatica triloba*), which, in certain dry maple woods, in the one case, and in open knoll-covered pastures, in the other, grow in great abundance; still, one might search acres of similar woods and pastures for them, all to no purpose.

Another case, somewhat in point, is the holly—indigenous, or at least one variety, to moist woods along the eastern border of New England; but so partaking of the aforenamed eccentricity, that he may count himself a happy man who can find it, and prove his success by great armfuls of it, wherewith to deck his house at Christmas. One gets glimpses of it while riding through some swampy tract on Cape Ann; the bright berries and evergreen leaves, so suggestive of English good cheer, betraying it. There, too, in summer, by searching diligently, one may find a species of magnolia, that being about its northern limit.

No common New England flower is so little to be depended upon as the trailing arbutus. It is difficult to determine what it wants. It abounds in gravelly knolls by the wayside, and thrives on the very edge of pasture bogs, and in the shade of woods; and yet, with all this versatility, there are many towns where it is never found, and where, though transplanted and tended with care, it cannot be made to live.

Quite opposite, in these respects, is the "cardinal flower," whose home is by the water side, the only place where it grows naturally, although the kind of water is not of imminent consequence, for it will do just as well in a dark nook under the up-heaved root of a willow, on the edge of a mill pond, in the muddiest ooze, as in the cleanest sand along a river's bank, its chief requirement seeming to be that it shall not be crowded; one stalk always standing by itself, independent of its kind, and not in close neighborhood to other plants. It is so adaptive that it will bear removal to a garden, taking kindly to its new conditions; and there it will come up, year after year, flaming out in live scarlet, in "one glorious blood red," as if nothing had happened to it.

There are other facts, more singular, as to the ways of growth and "hows" of blooming. One can understand that a grape vine may hold to its support by means of a tendril, while an ivy or a Virginia creeper secures itself by thrusting its rootlets into a crevice of a wall or in the bark of a tree; but why should a honeysuckle and a bean vine wind in opposite directions, the one going to the left and the other to the right? and either will swing on the wind, or sprawl over the ground, rather than turn the other way.

The ketmia opens at nine o'clock in the morning, and shuts at ten, as if it had a visual weakness; while a bed of portulaccas never expands unless the sun is out; and the hotter he shines, the wider they spread themselves; and the evening primrose waits until he has gone down, and then comes open with a snap, like a subdued kind of fire cracker.

But most unaccountable of all, perhaps, is the night-blooming jasmin. You see a simple tree-like plant, with a plain style of leaf, at the base of which grows a spray of yellowish green tubes, like lilac buds, suggesting, more than anything else, a string of small candles. You look at them in the middle of the day, and they are "only that and nothing more;" and you might, if you did not know their ways, forget all about them; but when evening comes, forgetting is impossible. The room is full of fragrance, rich as orange flowers, and almost as subtle as violets; and lo, your little candles are all lighted; and from somewhere about them comes that perfume which is so delicious and so mysterious as to its source. The next morning, they begin to contract; by noon, the five points are all close packed, and there is no scent to them or about them at all till night comes on again; and so they continue, scentless through daylight, but of exquisite sweetness when darkness appears.—*A. B. Harris, in the Christian Weekly.*

Machinery as applied to the Manufacture of Watches.

That our American cousins have gone far ahead of us in the application of labor saving machinery is a truism which has become almost stale by repetition, and is capable of proof by reference to their very complete "Patent Office Reports," or to the pages of their scientific and technical journals. Scarcely can we find a department of trade in which some automatic machine does not supply the place of dear skilled labor. But in no branch of manufacture has automatic machinery proved such a thorough success as in the production of watches. In the manufacture of small arms the application of machinery to the making of interchangeable locks and stocks revolutionised the trade, and to this manufacture are the Americans indebted for a system which has supplied them with a home-made watch, for a system, which is ultimately to become the leading one alike in England, France, and Switzerland. It is useless for English watch manufacturers to say "the thing cannot be done; the machine-made watch cannot beat the hand-made English lever in the home market." To their own cost the record of the past proves the fallacy of such argument. Twenty years ago America was supplied with her better class of lever watches almost wholly by Coventry and Liverpool, the demand for a common article being met by a large importation of movements of Swiss and French make. To-day these latter countries supply still the enormous demand of the States for cheap work, but more than 90 per cent of the good lever watches are now of American make. The machine made watch has supplanted not only the product of the skilled French operative, but that of his more highly skilled English brother.

The reasons which have led to this result are diverse. National pride may have had something to do with this, but the protective tariff, so often put forward by the watch trade as the leading reason, has had positively nothing to do with the defeat of the hand workers, who gave up the contest ingloriously. The truth is that the American watch companies have never yet known anything of trade competition, have never yet been able to keep pace with the demand for their products, and the main portion of their success must be attributed to their machinery—to the fact which is becoming more and more evident daily, that machines planned by brains at once scientific and practical must beat the simply practical rule-of-thumb workman, and the arms and muscles of iron will outwork and outlast mere flesh and bone. At the present moment the watchmakers of England are unable to supply the home demand for their products, and it may therefore be *apropos* to draw attention for a few minutes to the machine system as applied in the United States. As is generally known, the English system divides the manufacture into a vast number of branches, in each of which the work is performed by hand, or by the use of very simple lathes, driven by manual or foot power. In only three instances in England are we aware of the employment of steam power in the production of watches, and in one instance only is duplicating machinery used, and then only in the production of the plated or the rough movements. The American system subdivided the manufacture into a much larger number of details, and apportions a machine to the perfection of almost each operation leaving not more than 10 per cent of work to the skilled workmen.

Not only do we find an advantage in respect of the watch-making tools proper; we find also very great superiority in the appliances for making these tools. The use of labor-saving contrivances in America in all the avenues of trade has giving rise to especial machinery for their production, and this is very noticeable in the watch factory machine shop. The screwing and sliding lathes are made to meet more varied requirements than are the English articles. Planers, tool are capable of adjustments which are not attainable, except in very expensive machines, in England; and in small form, with a 4 inch or 6 inch stroke, we have as yet failed to find the machine. Another most useful tool, which is an absolute necessity to the watch machine shop, is the universal milling tool; and indeed no machinist can afford to be without it, if he has once used it. Yet we can find in England no tool which can take its place, or which combines such a multiplicity of operations. It is adaptable not only for ordinary milling, but it can be used to cut straight or spiral reamers, drills, and mills. It can be arranged to cut spur or beveled gears, and it can also be used to cut straight or spiral cones. The movement and feed of the tool carriage is automatic, and it is provided with adjustments for any desired angle. Such a machine cannot but be a favorite with close workmen on fine work. A machine wholly unknown outside the watch factory is the parallel and cone grinder, a modification of course of the grinding tools now replacing the file in so many shops. This machine reduces to absolute truth and fit the hardened steel spindles and bearings which are the specialty of watch-making machines. By it any taper given to the spindle may be reproduced in the bearing, sleeve, or collar, and the fit is at once removed from the region of doubt. Any desired degree of finish, too, may be attained, that usually preferred being by the use of diamond laps. So it will be seen that, while the tools for the manufacture of watch machinery are very fine, here is no lack or means for the production of highly finished and perfect work.

The picture of this American machinery teems with lessons to the Englishman. To the machine manufacturer it speaks very loudly. We must all bear witness to the marvelous beauty and finish of some of our English lathes, with their ingenious compound rests, for the turning, etc., of shaped surfaces. But nowhere in England can we see such lathes as we find mounted on the benches of the watch factory; nowhere on this side of the Atlantic can we see tools so well made and closely fitted or provided with such multiplicity of adjustments for the close correction of errors resulting from wear or otherwise. This state of things is due alike to the lathes and men of the machine shop, for the system has most certainly produced a set of workmen who are second to none as practical machinists, and, in all probability, cannot be equaled.—*The Engineer.*

Railroading at a High Elevation.

The Buenos Ayres *Standard* lately contained the following account of a trip made in a construction train from Arequipa, over the Andes. Among other places reached was Vilcomayo, 14,533 feet above the level of the sea. The newspaper man has reached these high altitudes. "As I write," says the tourist, "there lie before me copies of *El Ciudadano*, a newspaper published at Puno, and of *El Heraldo*, a newspaper published at Cusco, both of them being well printed and well written sheets, and both of them being published more than 12,000 feet above the level of the sea. Nor is either of these the champion climbist of the newspaper world. At Cerro de Pasco they issue a very clever gazette devoted to mining and the muses; and Cerro de Pasco is fourteen thousand feet above tide water. Of Vilcomayo, the writer says: "Here, amid the supreme desolation of the Andes, at a hight at which man in Europe does not dream of living, was a genuine railway village. There was an 'American hotel' two stories high, with a piazza, and some forty or fifty rooms for the accommodation of the railway people. There were all the buildings, station houses, machine shop, engine houses, coal yards, required for a large road. There were the cabins of the laborers employed on the work, many hundreds of men, Chilians (the Yankees of South America), Bolivians, Peruvians, whites, ladinos, Indians,—a motley multitude, but superior, both in respect to capacity and conduct, to the average navvies of Europe and the United States. With the early morning a further run of an hour at good speed brought us to the actual summit of the road, at 14,586 feet above the sea level, and we then began to descend the Atlantic slope."

Improvement in Tanning.

M. B. Picard reports a new system of tanning skins which is carried through without acid and in a much shorter time than is required by ordinary processes. He first boils the tan down in water, making a complete extract, and then frees the decoction by decantation from all residue and foreign substances. The strength of the essence thus obtained is regulated according to the quality, thickness, etc., of the hides to be treated, weakening it when necessary with pure water. It is placed in the pits in a cold state, and the skins are immediately thrown in. The latter are lifted and their positions changed three times during both the first and second days, twice during the third, and once a day afterwards. Ordinarily, eight days suffices to complete the operation, and the inventor states that the proportion of about 77 pounds of extract to 220 pounds of skins gives excellent results.