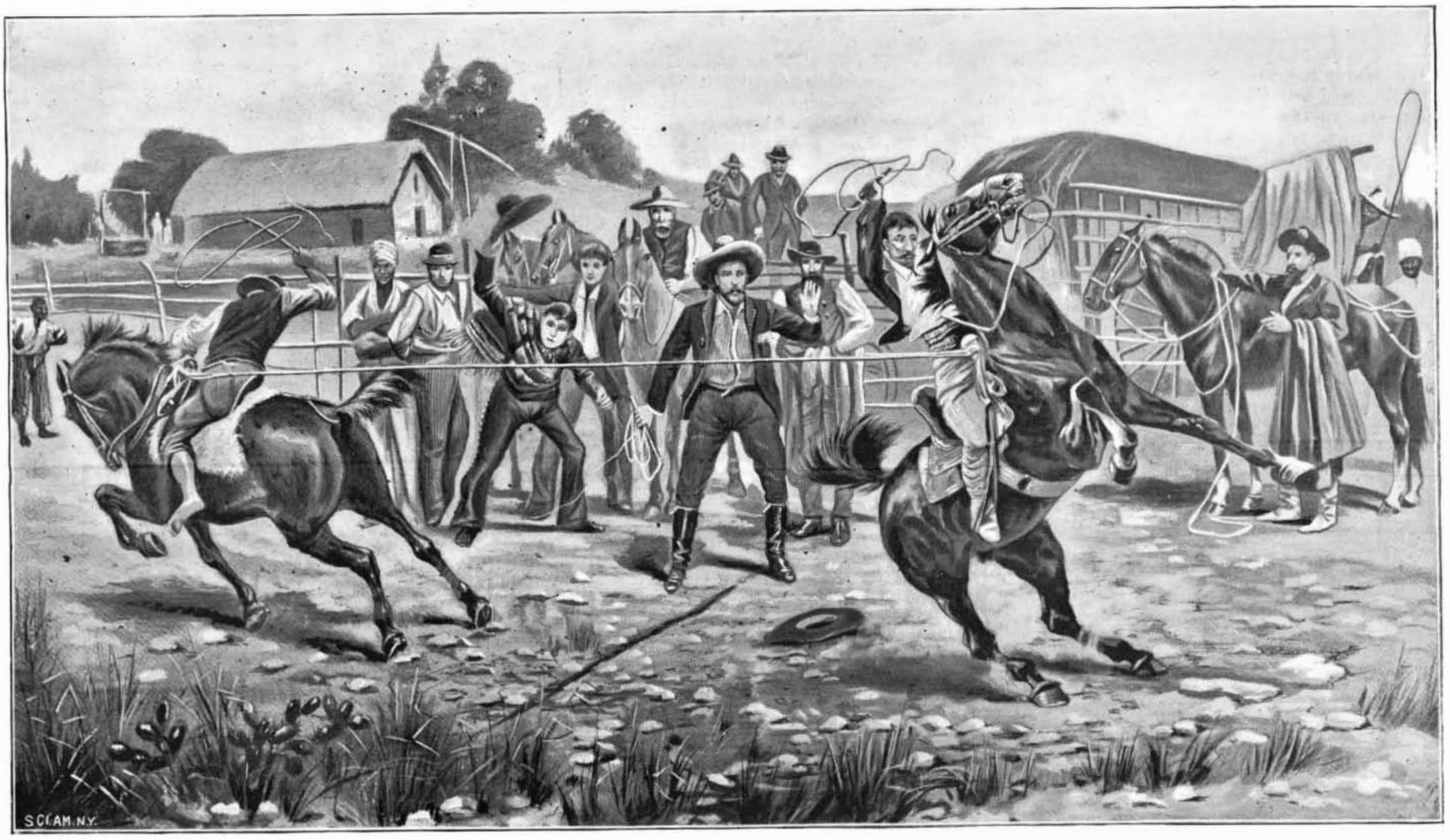
LIFE IN THE PAMPAS—A TUG OF WAR.

The pampas are the great plains of South America which extend from Patagonia to the Bolivian frontier. They cover an area of 600,000 square miles. The southern portion forms a great desert, dotted here and there with sand pools and marshes. The northern portion is occupied by the vast unexplored territory of the Gran Chaco. The salient feature of the northern and northwestern parts of this huge territory are plains furnishing magnificent pasture lands. These plains are interspersed with dense timber forests, lagoons and rivers. The growths of clover, thistles and pampas grass are most remarkable. On these huge plains millions of cattle roam which are attended by many thousands of cowboys, who herd them mounted on their sturdy mustangs. This wild, nomadic life is arduous in the extreme, but even the lazy cowboy has his holiday. In our illustration, for which we are indebted to Black and White, one of their diversions is represented—a tug of war between two cowboys, or gauchos, as they are called. Each is mounted on a powerful horse of the country, the high horns of the so-called Mexican saddles are connected by a lasso or rawhide. Both horses are urged in opposite directions by their drivers with whip and spur. The gauchos and Indians applaud and make bets, the lasso tightens, then there is a sound of straining of the saddle girths. If they hold, one of the horses is pulled up on his hind legs, while his fore legs paw the air. An instant more and he is down, while the rider extricates himself as best he can. The gauchos seldom stay for any length of time in one place; they are very lazy and only work when they see fit. Many of them come from the Argentine Republic.



LIFE IN THE PAMPAS—A TUG OF WAR.

Flywheel Accidents.

A curious accident took place in a Swiss electric lighting establishment not long ago. The dynamo machines in this particular station are driven by turbine wheels, of which there are four. The main driving wheels, which are attached directly to the turbines, are large open pulleys, with six spokes, made in two pieces, bolted together. The ordinary speed of these pulleys is about two hundred revolutions per minute. A few days before the accident, to make some test of the turbines, the belts were thrown off, and the turbines and attached pulleys allowed to revolve as they would. In general, as Professor Escher, of Zurich, who writes the account to the Schweizerische Bauzeitung, says, the speed of a turbine without a load is about double what it is with a load suited to its capacity; and, by actual count, the large pulleys revolved, at the maximum, 425 times a minute. Some days later, while no one was in the room, all four of the wheels burst, nearly at the same moment, sending fragments through the floor and ceiling. Professor Escher, thinking that an explanation of this curious accident may be of value, shows that, as the centrifugal force increases with the square of the velocity, the throwing off of the belts brought an outward bending strain on the rim of the wheels nearly five times as great as that to which they were normally exposed, and, as he proves, dangerously near the point of rupture of cast iron; and the fact that all the fractures took place near the spokes proves that they were caused by the outward bending of the unsupported space between the spokes. Curiously enough, the accuracy of these observations was attested later. A spare pulley was mounted, in place of one of those destroyed, and was set at work to drive a portion of the electric light machinery. For some reason, the load for a short time was thrown off this turbine, and then restored. The next morning the pulley was found cracked in two places, just where the others had given way; and, if its use had been continued, there is no doubt the cracks would have spread until the wheel came to pieces like its predecessors.

Transparencies.

A good transparency, sometimes called diapositive, from a good negative, is probably the most technically beautiful of all the products of the camera, and, at least by some of the methods of production, the most permanent, burnt-in enamels perhaps excepted. Why, then, are they not brought more to the front? It is difficult to say.

Photographers, like farmers, are chronic grumblers, and yet here they have something lying at their hands, in their own line, easily produced, always attractive, and waiting only the supply to create the demand. In the reception rooms of most, or, at least, of many, are to be found a variety of articles, all more or less connected with the art, but never, or hardly ever, a transparency; and yet we believe that a proper selection of them would be more attractive and bring more grist to the mill than anything else they handle.

Lantern slides, for example. We cannot remember, in all our wanderings, ever to have seen a lantern slide among the stock of an ordinary photographer, and yet they are now and have long been probably the most popular of photographs. True, the professional slide makers cater remarkably well, but they cannot include everything, and there are few photographers who have not some local surroundings from which interesting slides could be made that would readily find buyers if exposed in showcase or reception room.

Then there are transparencies for decorative purposes, for which there are pretty metallic frames up to 14 by 17 inches, at least in the stockhouses, comparatively cheap. A few of those hanging about the reception room, especially of local scenery and local celebrities, would meet with a ready sale; and if the photographer, whenever he has the luck to make a fine negative of a pretty child or group of pretty girls, would make and frame transparencies from them on "spec," in nine cases out of ten they would be gladly taken and well paid for.

Another excellent piece of bread to cast upon the waters would be a plate of glass about the length of the breadth of an ordinary window, say about 20 by 36, framed in mahogany or white enamel, and on which has been transferred an enlarged landscape, an attractive residence surrounded by groups or single figures of the inhabitants, etc. Such panels would make very attractive lower window shades, and although, especially if of plate glass, they would be somewhat costly, we believe that, to a man of taste and ability, they would afford profitable employment for many a leisure hour. And that is one of the many advantages of such work: it would not interfere with the regular work of the studio, but could be taken up and laid down at any time.

In the various methods by which transparencies may be made, the photographer has an ample field for choice. Lantern slide plates would, for most modern men, be most convenient for slides, and commercial transparency plates on ground glass should probably be selected for much of the smaller decorative pictures. Very convenient, too, especially for enlargements for the panels, is Eastman's transferotype paper, which indeed lends itself readily to the making of all kinds of transparencies.

But probably best of all, and as simple as any, is the carbon or pigment printing method, as in technical beauty it is not excelled by any, while, although monochromatic, tissue may be had in all the colors of the rainbow.

In short, we believe that in the hitherto almost neglected field of transparency making, photographers might find opportunity for much profitable work, occupation for leisure hours, and an excellent means of advertising themselves.—Photo-Beacon.

Half-Tone Photo Work.

The firm of Le Page has made improvements in their glue for this process, and now send out a specially clarified brand which leaves nothing to be desired in the manufacture of a printing solution.

The formula, as it now stands with the trial of nearly three years, is as follows:

Clarified glue	2	ounces.
Water	2	ounces.
Merck's bichromate of amm.	120	grains.
Water	2	ounces.
Albumen (dried)	¼	ounce.
Water	4	ounces.
Chromic acid (C. P.)	10	grains.

This prints quickly, develops easily, and gives every detail there is in the negative, and for a high average of work cannot be beaten.

The methods of burning in are now so well known that it is unnecessary to go into details, but no one need be afraid of a lifting in the etching solution.

The whole process is one of the utmost simplicity.—The Photo-Beacon.

The Vanilla Bean.

The so-called vanilla bean is not a bean at all, as is well known, but the fruit of a climbing orchid, Vanilla planifolia, the capsule or pod of which is about three-eighths of an inch in diameter and from six to ten inches long, and has a certain resemblance to the so-called catalpa bean. The plant in its native home, in Mexico and tropical America, climbs over trees and shrubs by means of slender rootlets sent out from the joints of the stem. It is not a true epiphyte, however, but always maintains its connection with the soil. In its wild state it climbs to a height of twenty feet, but in cultivation it is kept within bounds, so that the unripe pods are not injured when the others are gathered. A late number of Popular Science News contains an interesting account of the method of growing the vanilla, in which it is stated that in Mexico the plant is propagated by cuttings and then trained over some rough bark trellis work in partial shade.

When the plants were first introduced into the West and East Indies, they grew vigorously and produced an abundance of flowers, but no pods. It was discovered that the particular moth which fertilized the flowers in Mexico was absent from its new home, and artificial pollination was resorted to, after which the plants produced abundantly. With a long splint of bamboo the lip of the flower is lifted away and the pollen is transferred from the pockets and applied to the stigma. The work is so easily done that one person can fertilize a thousand flowers in a morning. The pods require a month to reach full size and six months more to ripen. The process of curing is long and complicated, and the aroma of vanilla is said to be produced only by fermentation. In the island of Reunion, in the Indian Ocean, where the plant is grown extensively, the pods are placed in a basket and plunged for half a minute in hot water, then placed on a mat to drain and exposed between woolen blankets to the sun for six or eight days, and kept in closed boxes during the night to promote a slight fermentation.

When the pods are perfectly cured, they are a dark chocolate color, pliable and free from moisture. When finally prepared, the pods are tied up in bundles, packed in air tight boxes, and when in prime condition they are covered with a frosting of needle-like crystals of vanillic acid, which, when pressed between the fingers, gives off the characteristic odor. The supply sent to New York is produced in Mexico, and is regarded as of the highest quality. The amount imported amounts to something like 150,000 pounds a year, while on our Pacific coast a portion of the supply is derived from the island of Tahiti, although the quality of this is much inferior. The supply of London comes largely from Mauritius and Seychelles, and the greater part of the vanilla imported into France comes from Reunion. Three years ago more than 500,000 pounds were imported into France from this island, which was twice the amount produced in all the rest of the world.

Nearer to the Stars.

BY PROFESSOR E. E. BARNARD.

In speaking with Alvan G. Clark (the sole survivor of the firm of Alvan Clark & Sons, and the discoverer of the companion of Sirius) in April of 1893 he expressed himself as ready, just as soon as the forty inch was finished, to begin a five-foot object glass, and I rather inferred from his conversation that such was only waiting the completion of the forty-inch. He was then at work on the forty-inch disks, one of which lay on a bench covered with an old piece of sacking near a low window, which on the outside was level with the ground. A careless stone from a still more careless boy's hand could easily have dashed through the window and smashed the lens, but Clark didn't seem at all put out when this was mentioned as possible, and simply remarked that the object glass was insured for $60,000. Perhaps he had more confidence in the Cambridge small boy than I had. An accident to the glass now would doubtless delay the great telescope from three to four years.

What Americans cannot do in the way of great glasses by the Clarks and by Brashear, and what mechanical difficulties they cannot overcome in mounting these great glasses through the genius of Warner & Swasey, is certainly not worth while undertaking elsewhere.

It is possible, however, that our great telescopes of the future—I speak now in point of actual size—will be some form of the reflector, such for instance as the one projected by the French for their exposition of 1900, and that which Sir Howard Grubb has but recently proposed.

The question now arises: Is there any limit to telescopic power, or can we continue to make and use bigger and bigger telescopes yet? To most intelligent people this question will at once resolve itself into two parts. First, Will it be possible to make much greater lenses? This question our native opticians will answer for up to six or seven feet. Second, Can the mechanical difficulties encountered in mounting these great telescopes of the future be overcome? When we have made a perfect object glass six or eight feet in diameter, can we mount it in a slender steel tube 100 feet or more in length so rigidly that when it is turned to any point of the heavens there shall be no strain upon it sufficiently great to destroy the perfection of the image, and which shall move by the most delicate mechanism and follow uniformly the motion of a star?

This question was even a consideration in building the Lick thirty-six inch, but Warner & Swasey satisfactorily answered it. That they have done the same for the forty-inch no one will question. But there must be a limit even to their skill. Just where that limit may be I shall not attempt to say, for there is something else still more potent to deal with in out future great telescopes, and over which man has absolutely no control.

The atmosphere itself, which is so necessary for our very existence, is the greatest foe to the future great telescopes, just as it is already to those of to-day.

The ideal place for a great telescope would be that one which had no atmosphere at all. But such cannot be found on our planet, and if it could a new kind of observer would have to be invented to run the telescope. Therefore we must be content to work with our atmosphere just as it is.

It is not the clouds that float in our atmosphere and which intercept our view that we have most to dread, though of course if continuous these alone would be sufficient cause for complaint. The real trouble often-est occurs when the air is very clear. (The clear, crisp wintry night, when the stars are bright and sparkling, is the worst possible time for a telescope, for on such a night the images are a mass of boiling and quivering light.) We are at the bottom of a great ocean of atmosphere that covers the entire globe. To see the stars and the other heavenly bodies we must look at them through this vast ocean of air. If this aerial ocean would keep perfectly quiet while we looked, it would be all right. But unfortunately that is its last intention. Sometimes it is fairly quiet, but in general it is very unsteady. Often it is in a fearful commotion. The result of this disturbed condition of the air is to more or less totally destroy the image of a celestial body when looked at in a great telescope.

As I have said, there are nights when the air is almost perfectly quiet. If under this condition we look at a star through a powerful telescope, it glows with a steady and beautiful radiance. On such a night everything that is at all within the reach of that telescope can be seen with it. The finest and most delicate details upon the surface of a planet, the faintest star or satellite, all come out with a distinctness that permits the most delicate and accurate observations to be made. If this condition always existed, the work of an observer would be exceedingly pleasant and profitable, but such seldom occurs, and its occurrence is rarer the bigger the telescope, and when it does occur it does not last for any great length of time; a couple of hours of such perfect seeing and then the air becomes disturbed and the image more or less tremulous and blurred. The delicate details are lost and the faint satellite is blotted from view. If the observer has the run of several different sized telescopes, he will appreciate this peculiarity of the atmosphere.

There will be nights on which he can successfully use a 6-inch glass that will not permit a satisfactory use of a 12-inch, and which would wholly for bid the use of a 36-inch. In this case the tremors present in the air would not be sufficiently magnified by the 6-inch to affect the clearness of the image. But with the 12-inch (four times as powerful) these tremors would be so magnified by the greater power of that glass as to spoil the clearness and definition of the image. The yet greater power of the 36-inch (thirty-six times as powerful as the 6-inch) under these conditions will so increase the effect of this disturbance as to totally destroy the image. Such nights have occurred where features could be seen in the 12-inch that were entirely blotted out in the 36-inch. But let the conditions be the best for observing with the air steady, and the 36-inch is far ahead of the 12-inch. It is very seldom, however, that the tremulousness of the air is not more or less apparent in the 36-inch, and under such conditions it is difficult or impossible to use the highest powers of the telescope. One has to wait and watch patiently and snatch a moment here and there of steadiness to do his best work.

Now let us increase our aperture to, say, four inches. The atmospheric conditions being the same, then this quivering of the air, which has been objectionable in the 36-inch, will, through the greater power of the 40-inch, have become far more objectionable. Now let the two instruments remain under the same conditions, but let the air grow more tremulous. We shall notice the effect soonest on the 40-inch, and after it has become unbearable in that telescope it will still be tolerable in the 36-inch, and, much later, in the 12-inch. Now, let us imagine another telescope still more powerful, say several times as powerful as the 40-inch. The effect of a slight disturbance in the air is multiplied just so many times more, and we should have to look long and often during a year to find a night that would permit only a few hours of good observing with that great telescope. In general it would be so crippled by the unsteadiness of the air that its effective power would much of the time dwindle down to that of the 40-inch, or even below it. But when a few hours of the best seeing come, what marvels that glass would show!

Let us now go still a little further and make our telescope still more powerful. We rapidly diminish the number of hours in the year that the atmosphere would permit its use at all. Still, let us increase the size and power of our telescope—for we may suppose our American ingenuity unlimited—and we shall never find an hour during which our instrument can be used to perfection, because the slight tremors ever present in our air would forever baffle the use of such a telescope.

So, looking at the matter in this light, we can see how, though the optical and mechanical difficulties may be overcome, the atmosphere itself is going to limit the practical use of great telescopes in the future, and in the end, if successfully made large enough, will prohibit their use at all, or at least make them inferior to smaller telescopes.

However, though I am confident the working hours of the future great telescope will be much diminished, yet I believe much bigger telescopes will be made and successfully used, but in the end the atmosphere will limit the effective work before the optician and the mechanician give up.

Of course, it is unnecessary to say that a favorable site upon the earth's surface for a great telescope will aid much in making its powers effective.

As for the telescope proposed by a Chicago man—a large lens made up of many smaller ones, like the eye of a fly—it is safe to say that no great telescope will ever be built on that plan, and if it should be (and we don't know what people may do nowadays), it will be absolutely safe to say that it will never be successfully used.—Examiner, San Francisco.

The Trolley Postal Service.

The plan of employing trolley cars to assist in distributing the mails has been tested recently in Brooklyn with very satisfactory results, and it is thought that this success will lead to the introduction of the practice in other cities. The trolley cars were first used to transport mail bags between the several post offices. The bags were intrusted to the motorman or the conductor and were carried on the platforms of the ordinary passenger cars. The postal trolley cars were then introduced to make it possible to sort and arrange the mail on the way from the central to the rural post offices. The ordinary trolley car was partitioned off into two compartments for this purpose, one section being used as a post office and the other as a smoking car. The part of the car reserved for the post office is especially fitted up for this purpose. The equipments of this novel traveling post office are similar to those ordinarily used. Several postal clerks accompany the cars, and they open the mail bags and sort and arrange the mail on the route. This saves time, it will be seen, and relieves the pressure of work at the regular post offices. Along the entire route these cars stop to take on and let off passengers in the usual way. The cars are run directly into the post office yards to load or unload the mails. In this work the trolley lines are looked upon as regular mail routes and are regularly engaged and paid by the government. It is said that the postal authorities look with considerable favor on this adjunct to our mail service and that it is probable very general use will be made of this novel plan throughout the country.

Celebration in Honor of Helmholtz.

A memorial celebration in honor of the late Prof. Hermann von Hemholtz was held in the hall of the Sing-Akademie at Berlin on Dec. 14. An immense bust of Helmholtz, almost buried in flowers, stood in the center of the stage. The exercises began at noon. Joseph Joachim, the celebrated violinist, took part in them. The eulogy was delivered by Prof. Bezold. The audience was composed of the most celebrated men of Germany and included a large number of the members of the Reichstag and the municipality as well as the Faculty of the University of Berlin. Prof. Helmholtz was specially honored by the presence of the Emperor and Empress.

Porous Glass for Windows.

The latest hygienic craze in Paris is the use of porous glass for windows. This is declared to possess all the advantages of the ordinary window framing, and, while light is as freely admitted as through the medium of common glass, the "porous" further admits air too, the minute holes with which this is intersected being too fine to permit of any draught, while they provide a healthy, continuous ventilation through the apartment.—The Hospital.