TESTING BIG GUNS.

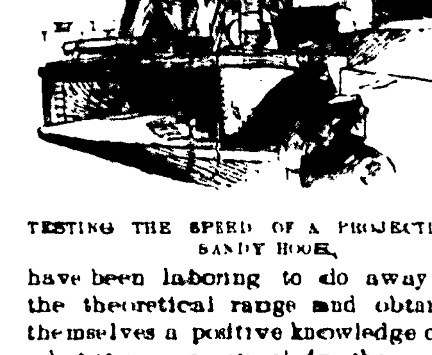
SYSTEM OF PROVING THE SPEED OF A PROJECTILE.

The Projectile Is Fired Through Two Open Frames Placed One Hundred and Fifty Feet Apart—The Velocity Accurately Registered by Electricity.

It is now possible to tell the exact speed at which a projectile moves when it leaves the interior of one of the great guns which help Sandy Hook to frown on the world. This remarkable fact is brought about by new instruments never used before.

The method is as simple as can be. In its very simplicity lie its usefulness and practicality. Compared with the present test, the old ideas of the theoretical measurement of the velocity of a projectile are but child's play. Here for the first time is actually measured, even to the fraction of a second, the exact speed of a projectile as it shoots on its way of destruction. It is to this very end that the brains of the ordnance department of the navy have been working always. An ordnance officer must have accurate knowledge of the velocity of a projectile that he may predict its range and penetration and determine the accuracy of the gun. It is an absolute necessity that the power of destruction of the projectile, as well as the power of penetration at the point of completion of its journey through the air, should be known. Without such knowledge there can be no accurate plan of firing adopted, because to a certain extent it will be guesswork.

The great trouble has been to get some practical method to bring about the desired result which was susceptible of proof without being aboard the ship, for instance, that was fired at. The great guns of the navy are said to have a maximum range of nine miles. The fact of the matter is, however, that an 80 ton gun can never be tested at its maximum range power aboard a ship, for if it were the recoil would result in sinking the ship. The army officers



TESTING THE SPEED OF A PROJECTILE AT SANDY HOOK.

have been laboring to do away with the theoretical range and obtain for themselves a positive knowledge of just what it was practical for the guns to do.

When the test takes place, two open frames are set 150 feet apart in front of the gun. Wires are stretched back and forth across these frames, making a screen through which the shot must pass. The wires in each screen form a complete electric circuit, which includes also an electric battery and an electro magnet. The projectile, after leaving the gun, flies through the wire in the first screen, interrupting the circuit and releasing the armature of the magnet. In a space of time so small as to be hardly conceivable the projectile has covered the distance between the two frames and pierced the wire in the second, interrupting its electrical current and releasing the armature of its magnet as in the first case.

The interval between the drops of these two armatures represents the time spent by the projectile in traveling 150 feet. This time is indicated by the chronograph in the laboratory near by. Wires run from each screen to the laboratory, which is fitted up with batteries and switchboard. The armature of the first electro magnet is an iron rod about three feet long, which is suspended vertically. This rod falls when the first screen is pierced. The armature of the second electro magnet is placed a little below the first, and when it is released it acts as a knife, and, striking the side of the falling rod, makes a slight mark.

The distance from this cut or mark to the end of the rod indicates the distance through which the rod has dropped while the projectile is passing from one screen to another. This forms the unit for the calculation of the projectile's velocity in feet per second. New explosives and high power guns have increased the initial velocity of projectiles wonderfully in the last few years. Projectiles may be expelled now with a force that will make them effective at a range far beyond ordinary eyesight.

Heating Steel Billets by Electricity.

Some interesting experiments are being carried on by the Carnegie Steel company at its Homestead works in heating steel billets by electricity. The advantages said to have been achieved are economy in fuel, a saving in time required to heat the billet and also that billets are heated from the center to the outer surface, insuring equal heat throughout the mass.—Electrical Review.

Testing Paintings by Roentgen Rays.

A valuable painting in Munich was recently tested by means of X rays, as it was doubtful who the artist was. The photograph showed the correct lights and shadows and revealed the initials of the artist, as also his monogram with the date. It is thought that this method might be used to detect fraudulent imitations of valuable paintings.

Gossamer Iron.

"Gossamer" iron, it is stated, is made at Swansea, Wales, only 1-4,800 inch thick. The average leaf of a book is 1-200, or 24 times as thick. We are not told what the iron is used for.—American Machinist.

NEW STEEL DISCOVERED.

Said to Contain About Twenty-five or Twenty Per Cent of Nickel.

The manufacture of nickel steel will probably be revolutionized by a new process just invented in Pittsburg. A company has already been formed by well known local capitalists, and the new product will shortly be turned out in large quantities.

The new steel was invented by W. J. Williams, a well known steel worker. No patents have been taken out by the inventor, as he feared his secret would thus be learned by others and endless litigation might result. Careful analyses were made of the finished product by chemists, but they were unable to discover how the steel was made or the proportions of the different materials, as many of the substances had been changed by the furnace's heat.

It is claimed that the new steel contains from 25 to 30 per cent of nickel to the steel. Heretofore not more than from 3 to 4 per cent of nickel to the steel has been obtained by those engaged in the manufacture of it. The tests made showed that the Williams steel increased in strength and hardness to the point where 18 per cent of nickel was used, and from point to 25 and 30 per cent each addition of nickel made the product softer. This variation in the softness or hardness, they claim, is no disadvantage, as the steel will thus become suited to various purposes.

They claim that with the new steel knives may be made just as hard as now, with the additional advantage that they will never rust. The softer steel will be used for the spokes for bicycles, and a large trade is expected to be developed on this class of work.

The advantage gained by the new steel is that much less steel than ordinary can be used and yet have much greater strength.—Pittsburg Dispatch.

A Great Engineering Scheme.

One of the most important electrical engineering schemes on record, by which power is to be conducted from Santa Ana to Los Angeles, a distance of 80 miles, under a pressure of 33,000 volts, is now in process of consummation. It is proposed to deliver electrical energy equivalent to 4,000 horsepower in the car house at Los Angeles. The power station is in Santa Ana canyon, 12 miles from Redlands and 80 miles from the point of development. The current will be generated at 1,000 volts and transformed up to 33,000. The power is derived from the water of the Santa Ana river, which is to be directed from the stream by a canal, flume and tunnel work along the side of the canyon to a point where it suddenly drops through 2,200 feet of pipe, a distance of 750 feet, to the water wheels.—Electrical Review.

Aluminium Coated Sheets.

A middle west galvanized iron manufacturing company is producing steel sheets, coated with aluminium, which, it is claimed, are superior to and more durable than galvanized iron, tin plate or planished iron for many purposes for which those materials are now generally used. The special advantages of the aluminium coated sheets are stated to be that they can be worked and seamed without peeling, the coating adhering absolutely to the sheet, can be easily soldered, will resist the action of sulphurous gases, and can be heated to a red heat without destroying the coating. Moreover, they can, when desired, be polished to a luster equal to burnished silver or nickel.—Popular Science News.

Expensive Metals.

Charcoal thread used as filaments in electric lamps costs about $12,000 a pound, but an authority states that gallium is vastly more expensive than the carbon filament, 1½ grains of it being worth $25, or about $100,000 per pound. He also furnishes a list of the rarer metals, with their approximate prices per pound:

Beryllium and lanthanum	$10,000
Rhodium and thorium	6,000
Didymium and rubidium	4,000
Indium and tantalum	3,500
Erbium, niobium and yttrium	3,000
Ruthenium and vanadium	2,000

—Keystone.

A Contract From Australia.

It is announced that the Pennsylvania Tube works have received the contract for 100 miles of 12 inch lap welded steel pipe and 300 miles of 30 inch riveted steel pipe. The weight will be about 20,000 tons, and the order is said to be the largest ever made at one time. The pipes are to carry water to the Coolgardie mines, Australia.—American Machinist.

Key In the Doorknob.

In a recently designed door lock the key fits into the end of the doorknob, and there is no other keyhole.

Rapid Building.

In Chicago recently the steel skeleton for a nine story building was erected in 29 days.

The Minister Touches the Button.

An electric contribution box is the latest Connecticut invention. The minister touches a button, and small silver cars, lined with velvet, visit each pew simultaneously, running on a slender rail back of each pew. Each car returns to a lock box at the pew entrance and the deacons collect the receipts after the service

The Shot of the Day.

They play at golf along the downs,
And he is tall and she is fair.
Her dress is gay with reds and browns,
And his is trim and debonair.

They play an hour or may be more,
And neither seems to try to win,
And then they wander to the shore
To watch the tireless tide come in.

While on the links, with jaunty airs,
Dan Cupid now the golf club swings.
His dress is chic. He lightly wears
A very modest pair of wings.

He sets the ball upon the tee,
Then toward the couple far away
A fleeting glance—a stroke—and he
Has made the triumph of the day.
—New York Truth.

VISITED BY THE VIRGIN.

A Miracle Performed by Which a Dying Girl Was Restored to Health.

The recent miraculous cure of Sister Alfred at Loretto convent, near Lebanon, Ky., is vouched for by several of the sisters of the convent and is the subject of widespread comment. Sister Alfred, a novice at the Loretto academy, was taken sick with appendicitis several weeks ago. Peritonitis followed, and during her illness she suffered much. Finally a telegram was sent to her parents in Kansas that all preparations had been made for her funeral, as it seemed she had only a few more hours to live. She had had the last sacraments, and all were waiting for the end.

At night, however, between the hours of 11 and 12, Sister Alfred suddenly was freed from pain. She had had only liquid food for several weeks and had no appetite, but her appetite was craving, and she said that she was as well as ever in her life and wished to get up and go about. It is said by the sisters of Loretto that at 11 o'clock on the night of the cure two sisters attended Sister Alfred. They went into an adjoining room for a lunch, and while out they heard Sister Alfred talking. On returning they found her very much excited and frightened. She said the Blessed Virgin had appeared to her. The two sisters thought she was talking at random, and after quieting her left the room again.

They were out only a few moments when they heard Sister Alfred talking again. In a short time they returned, when the sick sister, in a high state of excitement, told them she had been talking to the Blessed Virgin again. She also said the Blessed Virgin told her she was cured, and that she should offer up the communion in the morning for the conversion of England.

From this moment she was cured. The high fever had left the patient. The sisters of the convent are convinced that it was a divine interposition. Water of Lourdes had been applied.—Exchange.

Its New Chimes.

St. Patrick's cathedral in New York has a set of chimes. The new bells were made in Savoy, France, by the Paccards, a famous firm of bell founders. There are 19 bells. The largest weighs 7,000 pounds, and the smallest weighs only 800 pounds. On every bell is an inscription giving the name of the saint and the name of the donor. The bells have all been presented to the cathedral by parishioners.

It is probable that the bells, in conformity with the present practice, will be rung by electricity. The cathedral is the only Roman Catholic church in New York with such a set of chimes—in fact, with any chimes. Other Roman Catholic churches in this country with chimes are the cathedral in Buffalo and the convent of Notre Dame in Indianapolis.

Origin of the Rosary.

The form of prayer called the rosary was introduced into the church by St. Dominic. Consisting of a union of supplication with meditation on the mysteries accomplished by the Saviour in the work of salvation and in which his blessed mother took part, it is a short and instructive history of the life, sufferings, death and triumph of the Redeemer, divided into three sets of mysteries, the joyful, the sorrowful and the glorious.

A Glorious Mystery.

The Roman Catholic church religious world has always believed and taught what it believes and teaches today—that it is a mystery, and that it must be believed while it cannot be understood. If you ask any young Catholic who has studied, he will tell you that it is the mystery of God in three distinct persons.—Exchange.

THIRD RAIL IN ENGLAND.

Americans Will Build and Equip London's New Underground Railway.

The latest addition to the system of underground railways in London will probably rank as the most important of all these lines before it has been very long in operation. It will run a distance of 6½ miles through the busiest part of London. The road will be about 65 feet below street level and will be carried in two separate and parallel tunnels. Each station will be served by two elevators and two stairways.

The new undertaking will have especial interest for this country from the fact that the electrical equipment of the road itself and of the extensive system of elevators by which it will be served will be furnished by American firms.

The third rail equipment will be put in by the representatives in England of the General Electric company—the British Thomson-Houston company. The conductor will consist of an insulated third rail, placed on the ties between the main rails. The service will differ from that on the New Haven line in that the trains will be hauled by separate electric locomotives, whose general appearance will conform to the well known heavy locomotives which are being used in the belt line tunnel at Baltimore.

Equally interesting will be the extensive elevator equipment. There will be 49 in all, and they will be of the well known double drum Sprague type. Their capacity will be 100 passengers per trip, or a load of about 15,000 pounds.

It is very gratifying to note that the whole of the electrical equipment of such an important work in the capital city of the world has been secured by two American firms, and the fact is a direct tribute to the high character of electrical work in this country.—Scientific American.

The 350,000 immigrants landed in the United States during 1896, added to the number landed since 1820, foot up a grand total of something over 18,000,000.

A BURGLAR STORY.

BY E. L. WEDERKIND.

It was evening in a quiet village not a hundred miles from Boston. Six frolicsome children, aged from three to thirteen years, might be seen clustering around a pleasant looking young man whom we should imagine had seen about twenty-two summers.

Cousin Harry was a general favorite with the children. His home being so far away that he could not make it convenient to leave the city for a long time, he could whenever he had a short vacation like the present manage to spend it at the pleasant home of his aunt, where he was always warmly greeted, particularly by the young folks.

"Pleathe tell uth a thstory," lisped little Elsie, a flaxen curled, bright eyed fairy, the youngest of the group.

"Did I ever tell you of my adventure with burglars?"

"Your adventure with burglars! Why, no, indeed, Cousin Harry! Did you ever have an adventure with burglars?"

"You shall hear and then judge for yourselves if I didn't have a narrow escape though."

"I hope they didn't try to kill you, Cousin Harry. Wouldn't it have been dreadful?"

"Hattie, you and Willie can remember the village of Lebanon, where my home is. You were there with your father about three years ago, just before I went to the city to live. There was a large brown store on the corner where the three roads met"—

"Where you stopped and bought the raisins and crackers the day we went up the mountain, do you mean?"

"Yes, and it was there, while serving my apprenticeship as a clerk, that the adventure occurred of which I am going to tell you.

"It was a pleasant evening the latter part of summer. I had been sitting for some time in a comfortable position on the 'stoop,' or portico, in front of the store, in an armchair, with my feet on a dry goods box, watching the farmers' teams which drove lazily past, or perhaps an occasional carriage, containing some wealthy and gayly attired ladies and gentlemen, rolling by on its way back to The Springs, whither the fashionable nabobs were returning after their afternoon ride.

"When it grew dark, I lighted the large kerosene lamps, and again sat

"WHO'S THERE, I SAY? SPEAK, OR I'LL FIRE!"

down. Finally Mr. G., one of the gentlemen who owned the store, suggested that it be closed for the evening at an earlier hour than usual, as business was so very dull.

"So I closed and barred the solid wooden blinds which secured the windows and put up the heavy shutters that barricaded the door, and when the two or three stragglers had taken the hint and gone home I locked myself in, as I had my hammock in the store, and usually slept there to guard it.

"It was not long before I was sound asleep. How long I had slept I did not know, but I was awakened by a noise which sounded like a man boring with a large auger in the heavy shutters in front of the door. I listened—bore, bore, bore, with an occasional heavy thump, was all I could hear, except the quickened throbbing of my heart as I thought of my perilous position. Making as little noise as possible, I hastily drew on a part of my clothing, and then sat down a moment for consideration. Bore, bore, thump; bore, bore, thump—still it kept going. 'It cannot take them long to bore out the lock,' I thought, 'and then they will be upon me.'

"The recollections of a robbery which had recently been committed in the neighborhood flashed vividly through my mind. An old miser by the name of Adams, who lived with his wife in an old house in a lonely situation, had recently been attacked in the dead of night (just my situation, I thought,) by robbers, who entered stealthily by the kitchen windows and bursting suddenly into his bedroom seized and bound himself and his wife before he could get hold of a loaded revolver which he kept under his pillow to defend himself. The house was then ransacked, and the robbers carried off about six hundred dollars in money, besides other valuables. Of course the remembrance of this did not serve at all to alleviate my own fears in my situation, but I knew it to be my duty to defend the store, and I resolved to do my best. So seizing an old saber, the only weapon that I could command, I marched boldly toward the door, and in a voice gruff and hoarse with excitement I demanded, 'Who's there?' It was silent for a moment and then bore, bore, thump, bore, bore, went on again, louder than ever. I cautiously stepped to one side, lest an unwished for pistol ball might come through the door in uncomfortable proximity to me, and again I demanded, still louder and hoarser: 'Who's there, I say? Speak, or I'll fire!' I hadn't anything to fire but the old saber, but the boring and thumping continued, when suddenly a ray of light flashed into my mind, and, seizing the key, I quickly unlocked the door, and then, hastily unbolting the ponderous shutters, I slammed them down upon the 'stoop' with a crash that echoed far among the hills in the dead silence of the early morning, and in the slight dawn—for it was yet quite dark—I could distinguish the hastily retreating forms of three—cows, who proved to have been my disturbers. Seizing a cudgel which happened to lay close by, I immediately gave chase, resolving to repay the unconscious intruders for thus unceremoniously disturbing my repose and causing me so much unnecessary fear."

"Oh, I'm so glad, Cousin Harry, that there were no robbers after all! But how could the cows bore into the shutters or make the noise you describe?"

"I will tell you. Just outside of the door stood two or three old barrels which had contained salt mackerel, and in the bottom of them was a little salt, which the cows were trying to get, and the noise which they made by licking the rough insides of the barrels sounded exactly like boring, and moving the barrels about and thumping them against the side of the store caused the pounding noise which I imagined the robbers were making. So now, children, you must profit by my experience and never be frightened unless you are sure there is some cause of danger."

A Hint For Campers.

One season when I was camping on Lake Winnepesaukee, New Hampshire, night found us in a wild cove, surrounded by dank swamps and morasses and consequently infested with mosquitoes. We disliked the place, but the night was dark, we were on a strange shore, and reluctantly we pitched our tent. It proved just as we expected. The little pests swarmed upon us in clouds. Sleep was impossible, and we devoted the first hours of the evening to fighting our small enemies. We smoked cigars and pipes until we could scarcely breathe in the stifling air. This they seemed to like and buzzed all the more merrily for it. We scented ourselves and the bedding with essence of peppermint, with spearmint and carbolic acid, which pleased them so well that the myriads inside the tent called upon other myriads outside to come in and enjoy it. The situation was getting desperate, but at last I thought of one more expedient, which had been recommended, but which I had forgotten. I searched through my stores and brought out a piece of gum camphor. Taking a piece about the size of a walnut I placed it on a tin plate and set fire to it. It burned as readily as pitch, with a bright, clear flame and apparently no smoke, and it acted like a charm. In two minutes the noisy hum of the mosquitoes had ceased. In five minutes not one of our winged persecutors remained within the walls of our tent. Then, making everything comfortable and carefully covering our one window with mosquito netting, we went to sleep and slept the sleep of the just, with never a bite or a hum from our odious foes for the rest of the night.

A Little Girl's Victory.

A coal cart was delivering an order in Clinton place the other day, and the horse made two or three great efforts to back the heavily loaded cart to the spot desired, and then became obstinate. The driver began to beat the animal, and this quickly collected a crowd. He was a big fellow, with a fierce look in his eye, and the onlookers were chary about interfering, knowing what would follow. "I pity the horse, but I don't want to get into a row," remarked one.

"I am satisfied that I could do him up with the gloves on, but he wouldn't fight that way," added a second.

"I'm not in the least afraid to tackle him," put in a young man with a long neck, "but about the time I got him down along would come a policeman and arrest us both."

The driver was beating the horse, and nothing was being done about it when a little girl about 8 years old approached and said:

"Please, mister."

"Well, what yer want?"

"If you'll only stop, I'll get all the children around here and we'll carry every bit of the coal to the manhole and let you rest while we're doing it."

The man stood up and looked around in a defiant way, but, meeting with only pleasant looks, he began to give in, and after a moment he smiled and said:

"Mebbe he didn't deserve it, but I'm out of sorts today. There goes the whip, and perhaps a lift on the wheels will help him."

The crowd swarmed around the cart, a hundred hands helped to push, and the old horse had the cart to the spot with one effort.

TUDIE AND [illegible]

Tudie dear and Flossie [illegible]
Came from city [illegible]
Country [illegible]
Grandma, with [illegible]
All the farm is [illegible]
Tudie dear and Flossie [illegible]

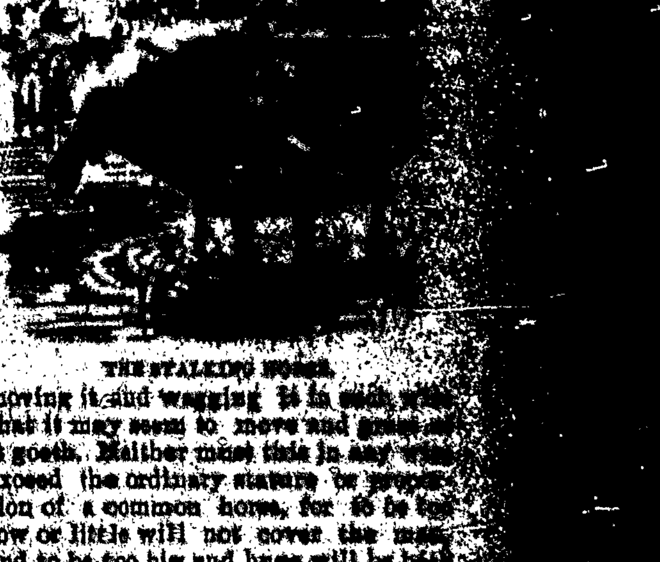
Tudie dear and Flossie sweet,
With their [illegible]
Romping over hill and [illegible]
After berries with a pail,
Summer dress and [illegible]
Tudie dear and Flossie sweet.

Tudie dear and Flossie sweet,
Playing on the wagon seat,
Sit contented all alone
Like two queens upon a throne,
In a little world complete,
Tudie dear and Flossie sweet.
WILL M. [illegible]

THE STALKING HORSE.

An [illegible] Way of Shooting Wild [illegible] In Olden Times.

One of the oldest methods of shooting woodcock and wild fowl was under cover of the stalking horse. In very early times the stalking horse was a horse broken in for the purpose of stalking. In the red letter days of poaching in Great Britain the poachers made use of an artificial horse for the purposes of sport. Poachers had not much money, and hence the expense of keeping a real horse was in most cases beyond them. The sham animal, such as is shown in the illustration, was long in use among sportsmen, including poachers, of former days, who, concealed behind it, could thus stealthily stalk on wild fowl in the water and land fowl crouched on shore. To make the artificial stalking horse an old writer directs that the sportsman should take "any piece of old canvas, and having cut it to the shape of a horse, with the head bending downward, as if he grazed, 'stope' it with clean straw, moss, flocks, or any light matter, and paint it as near the color of a horse as possible, and in the midst let it be fixed to a staff with a pick of iron in it to strike down in the ground at your pleasure, and stand fast while you choose your mark, and also to turn and wind any way you please, either for your advantage of the wind or for taking better aim, and it must be made so light that you may bear it easily with one hand,



THE STALKING HORSE.

moving it and wagging it in such wise that it may seem to move and graze as it goeth. Neither must this in any wise exceed the ordinary stature or proportion of a common horse, for to be too low or little will not cover the man, and to be too big and huge will be both monstrous and troublesome and give a fright to the fowl." The sportsmen, taught by experience, found that early morning or late evening was the best time for going out with the stalking horse.

The stalking horse is more [illegible] ly used against wild fowl [illegible] marshes than against [illegible] being mostly taken by [illegible]

Watch that sportsman. [illegible] back is along the stalking [illegible] now unslings it and, [illegible] left arm, he presents it [illegible] birds. He then begins [illegible] ly as the nature of the [illegible] mit, in a circle. [illegible] but contracts the [illegible] birds watch his [illegible] that they are [illegible] direction is blocked [illegible] that formidable and [illegible] "I will creep near him," [illegible] "Perhaps I shall escape his [illegible] cannot mean to harm me. I have [illegible] made him angry." The [illegible] behind the horse sees the [illegible] nearer and nearer and, [illegible] gun through a hole [illegible] lays him dead in a [illegible] comes the sportsman's [illegible] valuable helper [illegible] bears the game [illegible] he knows that it is his [illegible] So well trained is [illegible] that, if needful, he will [illegible] streams or search among [illegible] he finds the bird, when [illegible] will take it to his [illegible]

[illegible]

Arthur Graham, [illegible] Wy., [illegible] a bicycle [illegible] sheep because he [illegible] fast and serviceable. [illegible] the horse because it never [illegible] goes wind broken, [illegible] when left alone [illegible] In many other [illegible] able than a pony. [illegible] may stampede [illegible] them scurrying [illegible] set disorder. The [illegible] sometimes [illegible] ance of the [illegible] cient to cause [illegible] ward [illegible] all directions.

Herder Graham [illegible] experiences, [illegible] in the saddle [illegible] from a [illegible] [illegible]