BEHIND A TROTTER.

How Noted Reinsmen Got the Best Work Out of Their Flyers.

SOME WIZARDS OF THE SULKY.

Rules for the Guidance of Beginners Laid Down by an Expert.

A GOOD DRIVER MAKES A GOOD HORSE

[WRITTEN FOR THE DISPATCH.]

I had an interesting chat with Mr. E. G. Walker, "Veritas," of the *Horseman*, the other day. Mr. Walker is not only an educated man and a talented writer on equine topics, but he is also one of the best drivers in this country, and so when he began to talk on his favorite topic, I was willing enough to sit back and listen.

Mr. Walker was formerly in the marine insurance business in Boston, but failing health induced him to settle in Southern Michigan, where he bought a few horses and started a stud and training stable on a moderate scale. He had always had a taste for horseflesh, and his new employment proved so congenial to him that he said goodby forever to insurance matters, and has since then devoted himself to training and driving horses and writing about them.

"I had always been fond of road driving," said Mr. Walker, "and had been considered a good driver on the boulevards, but I had never thought of driving on the track. I was first drawn into it by seeing that horses whose training I had supervised and which I knew to be capable of great speed, often come in last in the race, because they were not properly handled. Then I said to myself: 'Well, I have never driven for money, but I can do better than that.' So one day I climbed into the sulky and started in a race. I will admit that I felt considerable trepidation at first, but I determined instantly to concentrate my thoughts on the business in hand. So I dismissed all uneasiness and thought of nothing but the best way to get all the speed possible out of the horse. I succeeded so well that from that time I have driven my own horses or those of my friends whenever occasion offered. You probably heard of my friend J. F. Dingee's fast mare, Miss Alice? Well, I got her last spring, a 5-year-old who had never been in the trainer's hands or on the track. I took hold of her, made a study of her gait, her disposition and other peculiarities and then taught her to race. This summer she has started in nine stake and purse races and won four of them, besides taking a large share of the purse money in most of the others. She made a record of 2:20¼ in the fourth heat of the fourth race she ever trotted.

AN OLD SAYING REVERSED.

"There is an old saying that 'Good horses make good drivers,' but I think it ought to be 'Good drivers make good horses.' Some men are born good drivers; others achieve distinction by persistent efforts, and others literally have distinction thrust upon them by reason of their success with some particular horse. For example, W. W. Blair was never prominent as a driver until he took hold of Maud S. He accustomed himself to her ways, and she to his, and it was he who gave her the unparalleled record of 2:08¾.

"The most notable instance of inherited talent with the reins that I know of is that of the Vanderbilt family. The old Commodore was a fearless and, indeed almost, a reckless driver, and gained a reputation on Harlem lane and the uptown avenues which people talk about to this day. He was a master mind, and impressed his individuality on his horses as well as the men with whom he was brought into contact. His son, William H., inherited that, as he did other paternal qualities, in a conservative way, and was, up to the day of his death, a remarkably good driver. He was particularly fond of driving two horses, which is an art far more difficult than that of driving one. It was he who beat the record of 2:15¾, made by Maxy Cobb and Neta Medium, to a skeleton wagon driven by the expert, John Murphy. Mr. Vanderbilt drove Maud S and Aldine to a top wagon, with his own weight added in 2:15½ at Fleetwood Park. It is, in my judgment, an achievement that will stand unbeaten for many a year. Now, there are plenty of rich men in New York who own fast teams, but there are very few of them who possess the Vanderbilt talent for driving them, and in order to get the best work out of them they have always had to hire drivers such as Mace and Hickok. One of the chief reasons for Mr. Vanderbilt's success was that he always studied the disposition of his horses and let their powers have full play. He allowed them to exercise their natural rivalry to get ahead of one another. In short Wm. H. Vanderbilt was a born horseman, and not merely a man who happened to be rich enough to own fast animals. He would unbend more readily with a man who could talk horse well than he would with anyone else.'

THE COMMODORE'S VIEWS.

"I remember his saying to me once, 'There's very little use in trying to drive a mismated pair of horses. They are like other ill-assorted couples. The sooner they separate, the better. That's the reason I bought Small Hopes, Leander, Lysander, Early Rose, Aldine and others, and tried them all in pairs until I found two who agreed well together. There was Maud S. She did not want to be bothered by her mate in starting off, and I soon found that Aldine was always ready to go off with her, and it was that that made them such a good team.'

"All of the present generation of Vanderbilts are fond of horses, but Fred Vanderbilt is the light-harness man of the family. It was he who inherited Early Rose and Aldine and all the rest of his father's flyers. Maud S, as you will probably remember, was sold to Mr. Robert Bonner for a very much smaller price than had been previously offered for the mare. Mr. Vanderbilt did that because he wished the animal to fall into good hands, and did not want her hippodromed around the country. That shows how Mr. Vanderbilt regarded Mr. Bonner as a lover of the trotting horse, and his judgment was not misplaced. Robert's brother David is a great authority on breeding and all matters relating to horse flesh. Robert has made a life study of horses from the foot up, and Maud S lowered her record twice during his ownership of her. He has not come before the public as a reinsman, but he has driven his horses at his private track in Tarrytown in wonderfully fast time on many occasions. So also have his sons Alley and Fred. The latter drove Lucy Cuyler at Fleetwood to a road wagon half a mile in 1:05. Another illustration of the gift for driving that some men possess, even if they are rich, was given by John Shepard, the well-known Boston merchant, who drove his team, Mill Boy and Blondine, in 2:22, the fastest mile ever traveled by a team in New England. Like Commodore Vanderbilt, he is well known as a fearless and even reckless driver. In fact, men of determination are the only ones who drive well. A timid man should not attempt to drive a pair of horses fast, nor be caught in hot company with a single one.

A PROUD DISTINCTION.

"Mr. C. J. Hamlin, of Buffalo, is another man of nerve and determination who excels in the gentlemanly sport of driving teams. He makes a specialty of breeding trotting horses of the highest class, at his village farm, and then trotting them in public to prove their merits. He enjoys the distinction of being the only man who has driven a pair of horses of his own breeding and training in 2:18, a feat which he accomplished with Belle Hamlin and Justinia.

"Professional driving is a very different thing from driving on the road for pleasure. The Woodruffs were an old-time family of horsemen, and Hiram Woodruff was the chief exponent of the old school of training and driving. His book 'The Trotting Horse of America,' is an epitome of old-time horse lore, and his road house, near Coney Island, was, in its day, the resort not only of famous horsemen, but of notabilities of every degree as well. His brothers, William and Isaac, also figured prominently as trainers and drivers. Cotemporary with them was William H. Doble, of Philadelphia, a horseman of remarkable ability, whose sons, Budd, Charles and young William, were all noted reinsmen, especially Bud. The Maces, Dan and Ben, inherited their wonderful skill from their father, Daniel Mace, a Boston dealer in and handler of road and race horses. The son familiarly known as Dan Mace, has aptly been termed the 'Wizard of the Sulky.' Brought up as a boy in the old school of training, he graduated from it and became the greatest exponent of the present method of handling the trotting horse in the sulky, to wagon and under saddle. He discarded sweating under blankets, long and repeated severe trials, and adopted the more scientific course of building up the horse's strength, putting him in condition gradually by moderate work and saving his powers for some great race. Driving was with him a fine art. He could inspire the horse with confidence from the start, thread his way through a large field and bring him under the wire a winner, with a tremendous rush at the finish. Another driver of the modern or scientific school is John Splan, who has been a close student of Mace's tactics, and has, in my judgment, more of the natural gifts of a great driver from start to finish, than any man living.

SYMPATHETIC DRIVING.

"My own system in driving is to enter into complete sympathy with the horse, and never call upon him to trot when he is out of condition, or try to make him do more than he is able to do. In training a horse it is best to have him exercise moderately every fine day, but once or twice a week is often enough to drive him at speed. Choose a day that is free from dampness or piercing winds. Let the horse be sent a preliminary spin before sending him along, say a half mile, at his best rate. Speeding against other horses, on road or track commonly called a 'brush,' see that your horse is going level and true, that he has an easy and fair hold of the bit and is on his stride, before asking him to measure paces with your neighbor's horse. A sudden start and over-anxiety on the part of driver and horse has a demoralizing effect on both, particularly if your friend is in a jubilant mood and looks back at you tantalizingly. When you range alongside your competitor do not be in too big a hurry to pass him. Remember that the other man's horse may have nearly as much speed as your own, and the cool head and steady hand is necessary at this juncture. Also when you pass him do not be in haste to draw away or, as the saying is, 'make a showing of him.' Impudent drivers on track and road often beat themselves by exhausting the power of the horse, so that he is not able to finish when tackled by the game horse, driven with judgment and his speed properly rated. Do not overmatch your horse by persistently trying to beat a horse that can play with him, and do not speed him too far. Driving a horse to a standstill or even until he begins to lose heart and interest in the effort, will surely take away his speed. This kind of training and driving makes 2:30 horses improve backward and become 2:40 horses in a little while.

A TROTTER'S LIMIT.

"Every trotter has his ultimate limit. Nature has destined some to reach the 2:20 mark, with others she has drawn the line at 2:30, and with a select few 2:10 to 2:15 are the bounds. Many a horse never reaches his goal of speed because of improper and severe handling. For example, an impetuous driver, known as a 'hustler,' takes in hand a willing young horse. Both are full of go and overdo themselves. A reaction comes and nature calls for rest and recuperation, but more work and faster is demanded. The horse is overmatched in a race, but the driver does not spare him—not he. 'Why, bless you, Mr. Owner,' he says, 'this horse is short of work, and I'll beat the party with him at the next town.' If he does it is a heart-breaking race, and improvement stops for the season, perhaps forever. The 'wait-and-win' driver will put his horse in condition gradually, and bring him along by easy stages until he is ripe and seasoned to live the pace against his peers. This is the time to strike and win; but even then do not force the horse to over-exert himself by more than one whipping finish. Few mares and geldings should be subjected to the cutting lash. Now and then the naturally dull or flagging energies of a stallion must be roused to action by the whip, but its continual application is unwise. A sharp cut now and then with the dread of more will bring forth the best efforts of the dull horse. The voice and rein are greater inspirers of increased efforts than the whip. As a last resort, when all seems to fail, a smart cut and a lifting at the same time, with a letting go of the horse's head, not too sudden, will enable you to win by a neck, a head or an eye lash.

"There's an old fellow named Kyger who came out of the woods some time ago with a really wonderful mare named Kit Avery, who has a race record of 2:18¼, and could lower it if she were put in decent hands. 'Old Man Kyger,' as he is called, is known on every track in the country. He uses his whip from start to finish, and I've even seen him whipping after the horse has passed under the wire. He's almost spoiled the mare already, and she'll be completely ruined before long. Then he'll go back to the woods from which he came."

J. L. FORD.

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LIFE ON THE AGENCY.

A Big Talk by the New Agent to the Otoe Indians in Council.

PONIES, NOT ADVICE, WANTED.

Double Elopement of Pupils From the Reservation School.

THE ADVENTURES OF A NEWSPAPER MAN

[CORRESPONDENCE OF THE DISPATCH.]

RED ROCK, OTOE AGENCY, I. T., October 20.—The old agent has stepped out gracefully, carrying with him a gold watch as a token of esteem and the good wishes of the majority of employes at these four agencies. He is a good-hearted man, full of generosity and sympathy. He will locate in Arkansas City. The new agent is fully installed, and, like most all new things, comes with a freshness, gush and impulse: new theories, new rules and new regulations, wondering in his heart why more has not been accomplished in the past and the Indian farther on the civilized road. A homely old maxim says: "A new broom sweeps clean, but the old one knows the corners better."

The new agent has excellent plans and rules, which we hope will be enforced and accomplish much good. No profanity, Sabbath breaking or immoral conduct will be permitted on the four reservations. The law has been tacked up in conspicuous places, so all who pass may read and profit thereby. So 2,000 people at least will enjoy a Puritan Sabbath. These Indians like a new agent and new employes. They can impose upon their ignorance of themselves and how affairs are conducted on an Indian reservation, and until their subtlety is known they enjoy more liberty and greater ease. It is amusing to see the policy shown by the old camp Indians. They are natural diplomats. They give the impression to the new agent that they are a much abused people, and are, as they always have been, in perfect harmony with all the rules framed by the Great Father. "Oh, yes, we love work, always have worked and are anxious to work, they say, but our ponies are small. We want good stout horses, etc., etc." Then good stout horses are issued to them and they make other excuses for their laziness. It is hard to make people work when they can get food and raiment without work. The Indians are not to blame.

AN INDIAN COUNCIL.

I attended my first Indian Council yesterday. School was in session, but I gave it in charge of one of my best boys, Joseph DeRoin, the interpreter's son. The children promised that they would be good. When I returned I found that Joseph had made an excellent disciplinarian, being no respecter of persons, but dealing out justice to all. The children told me that he "thumped" John for stretching his neck in trying to see out of the window. John is his brother, a big, black-eyed, roguish boy who loves fun better than he loves anything else.

The Indian Council was a unique affair. It was held just back of the commissary building. The Indians were squatted, Turk fashion, in a semicircle on the ground, while the agent, clerk in charge and interpreter sat in the open barn door of the commissary, which is elevated about four feet from the ground. The agent looked somewhat impressive and commanding as he sat there with two large books on his knees and his eyeglasses adjusted over his keen black eyes. He gave his talk first, in a clear, decisive, kind voice that floated out on the breeze and seemed to mellow before it reached the ears of his listeners. He said:

This is your country, and you must see to it that no white man settles here among you. If white men, passing through, pitch their tents and are inclined to make this a stopping place, your policemen must arrest them and bring them into the agency. You have a school here that the Government has established for the good of your children, and you must put your children into school. When your children are benefited you are benefited. You have good employes, treat them right and they will treat you right. If any of these employes abuse you report it to the clerk in charge, prove your charges and we will settle it. I have but one wife, and it is better for an Indian to have but one wife. The more wives you have the more responsibility you have and the more trouble. Have but one wife, love her above all others. Don't whip your wives. I never whip my wife and never expect to. I saw one of your women bearing on her back a great load of wood, while her husband reclined in the tepee smoking. I heard a young man say once that Indian women were the greatest slaves in the world to-day, and I believe it. Don't make your wives bear the heaviest burdens. "Let me tell you one thing, and this is for the whites as well as for the Indians: There is too much talk floating around. Don't listen to it, don't believe all you hear. Talk less and think more, and act out your thoughts. Remember the eleventh commandment, "Keep your mouth shut."

THEY WANTED MONEY.

Occasionally the Indians would give a significant grunt, move about uneasily, as if growing tired. They were disappointed. They wanted to hear about money and something more interesting. I watched Okahomanie, one of the meanest Indians in the tribe. He had an insolent look on his face, and several times his grunts were almost war whoops. He deliberately arose, while the agent was talking, and sprawled himself down farther away from the sound of his voice. His look and manner spoke more more than his words, had he talked. I noticed one old fellow who seemed to get a great deal of fun out of it all, for he sat with his red blanket wrapped about him, his slouched hat pulled down over his sore eyes, and giggled all the time. Two women in the background said to me: "Heap talk, pis-coon-ie." "Piscoonie" means no good, so to them it was "Heap talk, no good." Mrs. Myucus looked really indignant, and if she had had the privilege of talking might have said some pretty sharp things. But it was good, good homely advice, and what they needed.

The agent continued by saying: "Don't visit other tribes, especially to get presents of ponies, have a higher aim in life than that, and when other tribes visit you treat them well, but don't give away what you need yourself, and never leave the reservation to visit other tribes without permission. I think you would be better in every way if you had less ponies, so I advise you to sell some of your ponies and buy one or two cows and some pigs. Your corn will yield you more profit if fed to pigs and the pigs sold. I want you to raise a good crop of wheat." Occasionally he referred to the Bible in his conversation to substantiate some of his remarks and to impress the Indians that the words he spoke were the Great Spirit's words also. They were "Wah-cun-dah's" words. "Wah-cun-dah" in Otoe means God or spirit. I noticed in the audience one, James Whitewater, an Otoe Indian, who has been in prison in Nebraska for 17 years, and who has but recently been released. It seems that one evening, years ago, while drunk, he rode up to a field where two white men were mowing and deliberately shot them dead. His sentence was imprisonment for life, but for good conduct he was pardoned by the Governor. While in prison he read the Bible through 30 times, and is now a converted Indian. I noticed while the agent was talking that he seemed to be the most earnest listener, moving his head and lips as if partly sanctioning what he said, and perhaps framing his reply to some things with which

HE DID NOT AGREE.

The agent continued his talk by taking hold of the doctor's case.

"The doctor," he said, "is supposed to be an educated man, understands his business. If I should attempt to give you medicine I might kill everyone of you, because I know nothing about it, therefore don't take medicine from those who do not understand." There was a pause of a few moments, when he lowered his voice, changed his tone somewhat and said. "I am going to speak about something that lies very near your hearts, and which, no doubt, will make you look more sour than you have. I speak of your Indian dances, your feasting and fasting, your cutting yourselves when any of your people die. My heart was made very sad when I heard that one of your number had died from cuts inflicted by your medicine men at a dance, when the news came that a little babe had died. Then I visited one of your tribe who had an arm on him that I wouldn't have had for all these reservations. This is all wrong. You should not do these things. You should not dance on Sundays. You should dance as little as possible."

Many of the Indians had gone before his talk was finished. All of the chiefs stayed and others most interested. They had listened attentively and had conned it all over in their minds and were now ready to give their little speech. Nothing undaunted, they stepped boldly to the front, grasped the agent's hand and then the clerk's in charge, stepped back a few steps and laid it off with all the earnestness and eloquence of studied oratory. They were talking for what they deemed their rights, and were thoroughly in earnest. They most all spoke as if they were disappointed in the agent's talk. They said: "You tell us old things, we know all what you tell us. Our children are hungry. We want to hear about our annuity money. You talk about the treaty, that is old. We know all that. We thought because you are a new man you tell us something new. What you tell us is good, but we not white man, we Indians. Indians have their own laws, their own way, good for us, your way good for white man."

WHITEWATER'S SPEECH.

Missouri Chief looked dignified and commanding in his black velvet beaded surtout, handsome leggings and moccasins. He did not have much to say, but what little he said was well and to the point. The best and most impressive speech was made by James Whitewater, the released prisoner. He was dressed in citizen's clothes, had his hat in his hand while he talked. It was evident he was somewhat excited when he first began. I attributed it to righteous indignation. I think he felt that it was his duty to defend his people; that having been created Indians they were not to blame because they were loth to accept the white man's policy. His style was daring. He stepped up to the agent, shook his hand and then the hand of the clerk, stepped back with dignity and determination, fixed his eyes on the agent and began: "You tell us about the Bible. I know something about that Book, too. On account of bad white men, who made me drunk, I killed two men and was in prison 17 years. While in there I read the Bible through 30 times. It is a good Book. It tells me good things. I would not drink a glass of whisky now for a million of dollars. That Book tells me that God made man. He picked up the red clay and made the red man. You tell me that only one wife is enough, yet that Book tells me that some good men had more than one wife; Abraham had more than one wife. You tell us not to dance. David danced, and white folks dance. You dance for fun; we dance on Sunday because our dances are our religion. "But," he added, "you tell us good things." Many more good arguments he brought forward, and for once among the Indians the preacher found his equal.

James Whitewater is now a Christian, and will preach to the Otoe Indians to-morrow afternoon.

AN INDIAN ELOPEMENT.

Several days ago four of our pupils, two boys and two girls, ran off. News came to the school that they were married, Indian fashion. The agent sent word from his headquarters at Ponca to have them brought into the agency, to imprison the boys and have the girls work at the school. At first it was thought best to send the boys off to the Haskell Institute at Lawrence, Kan., and keep the girls here in school. And this was the wisest decision, but through the pleading of Chief White Horse, the father of one of the girls, and other prominent Indians, that if these were pardoned and allowed to live together on the reservation, that they would give their bond and forfeit their annuity money in case any more children ran off from school. The agent, who is a Methodist minister, said that they were not married and concluded to marry them legally before he released them. The boys were brought out of jail, and the girls, who had been working in the kitchen, took off their big kitchen aprons which are made out of ticking. This was all the preparation that was made for the marriage. The Indians, who had attended the council flocked into the schoolroom, the school children were present and all the agency people. Just as the sun was sinking behind a rim of golden clouds the two couples walked in, to the music of Grant's march, about the only appropriate march the organist knew.

It was a strange wedding, the ceremony being a little different from any found in prayer book or discipline. He asked the girls these questions: "Do you love this boy? Are you willing to marry him? Do you do this of your own free will? Will you love him above all others, and stay with him while life lasts?" Then he asked the boys the same questions, but added: "Will you open up a farm? Will you buy these girls clothes to wear and food to eat?" All of their answers were a prompt and decided "Yes;" but as lightly as the vows were made, just as lightly will they be broken.

The shadows of the night had deepened ere the ceremony was over. The strange company filed out; the grooms mounted ponies behind some of their friends, and the girls went in an opposite direction. They will have a big feast, and will then be husband and wife, according to Indian law.

A CORRESPONDENT'S ADVENTURE.

A tall, angular, long-haired newspaper man came into the school-room this morning. He had a long rubber coat on, and a blanket thrown on his arm. He had come up from Guthrie the night before, with two Iowa Indians, and had gone direct to White Horse's lodge, where the Otoes were holding a council. The Otoes want to join the Iowas, and live on their reservation, which is about 150 miles south of here. Their roving disposition and love of change have caused them to be dissatisfied here. They claim that this land is not good. The new town of Guthrie is not far from the Iowa reservation, and if the Otoes were to join the Iowas this would throw all their trade into the town of Guthrie, hence the Guthrieites are interested in the dissatisfaction of the Otoes, and are encouraging them in their project. This council at White Horse's Lodge, the arrival of the reporter of Guthrie with the two Iowa Indians had all been slyly arranged, but the clerk in charge heard of it and sent Willie Green, an Indian policeman, out to arrest him and bring him into the agency. When Willie arrived, the long-haired, pale-faced stranger was painting up most gloriously the advantages of the Iowa reservation and the beauties of Guthrie to the eager-eyed Indians. He had just begun to tell them of his business among them when Willie arrived. Willie waited courteously until he paused in his conversation, and then said: "Now I will tell you my business. My business is to arrest you and take you to the agency. The stranger's business seemed to suddenly stop, for he was quite anxious to go to the station and take the train for home. He told the policeman that he meant no harm and begged off.

When Willie returned to the agency without the man, and told all the circumstances, the clerk sent another Indian policeman with him and instructed them to arrest him and bring him into the agency. He arrived at the clerk's office at 9 o'clock at night, had a hearing and was turned loose. He asked if he could get lodging for the night. He was directed to the little stage hotel just across the creek. He wended his way toward the bridge which had parted in the middle months ago, and almost stepped off into the murky stream below. Not knowing of the foot bridge below, and seeing no way to reach the little hotel, which seemed so near and yet so far away, he laid himself down to sweet sleep on the bridge, with some stones for a pillow. It is to be hoped that he saw angels ascending and descending, and that his midnight visions were more glorious than his midday realities. Some Indians passing thought he was an Indian, drunk perhaps, and threw sticks at him from the foot bridge below. He came hurriedly into the school-room this morning, got a few items, and left as hurriedly as he came. He is a New York man, and writes for *Harper's*. He has facts and experience enough now, if he draws on his imagination, to make a thrilling story.

RED BIRD.

EVERY DAY SCIENCE.

Investigating the Constantly Occurring Earthquakes in Japan.

SOME CURIOUS FOUNDRY WORK.

Why Running Machinery Causes Buildings to Vibrate.

SCIENTIFIC AND INDUSTRIAL NOTES

[PREPARED FOR THE DISPATCH.]

Readers of THE DISPATCH who desire information on subjects relating to industrial development and progress in mechanical, civil and electrical engineering and the sciences can have their queries answered through this column.

Among the most interesting matters that were brought before the British Association at its last sessions were the seismological observations which have been organized in Japan, where constant earthquakes of the most innocent as well as the most terrible kind offer a very fruitful field for investigation. Over 700 people sent in their reports, amounting to simple notices or really scientific observations. Prof. J. Milne, who superintended the observations, found the ordinary instruments hardly more than seismographs, and he has designed some material improvements which he has also successfully applied to instruments registering the vibration of railway trains. The typical earthquake is preceded by a faint tremor, which alarms birds and animals a few seconds before the violent concussions set in, and which are followed by some longer waves dying away. The real beginning is very indistinct, a fact which still requires explanation. The rate of the propagation of earthquakes depends on the character of the rock, the distance from the center, the violence of the shock, etc. Thus the Charleston earthquake traveled 1,500 feet per second, the Hell Gate explosion 20,000 feet; up to a certain distance from the center the wave amplitude increases, as has been found by artificial earthquakes or explosions. Prof. Milne proposes to place many instrument in a row, and to watch the developments of the waves; a wave may first appear with a slight, secondary curvature at the top, which gradually increases, and finally the wave splits in two. From the propagation of ocean disturbances calculations have been made as to the average depth of the sea, which always gives results too small by a few hundred fathoms compared to actual soundings.

Vibration in Buildings.

One of the most perplexing problems that confronts the engineer is the vibration in buildings, caused by running machinery. The character of the building, the ground on which it rests, the weight, power and speed of engines are all factors which must be considered, some of which are very indefinite, or at least, their effect is hard to pre-determine, combined with which is the very important influence which is involved in the relation which the speed of the engine bears to the natural time of vibration of the floor beams. It is evident that if the slight motion that every engine has is exactly in time with the natural vibration of the floor beam, each pulsation of the engine will increase the scope of the vibration of the floor, resulting in a most disastrous shaking, while if the pulsation of the engines are in discord with the floor, comparative quiet will obtain. As floor beams are usually long, and their time of vibration correspondingly long, it is usually found that a fast-running engine will give less of its vibration to the floor beams than a slow running one. It is also worthy of note that the vibrations of a fast-running engine are more numerous and less forcible, hence more easily resisted by the mass of the floor. An interesting example of preventing vibrations by discord has just been shown in the case of a 10-horse-power engine, which, on the upper story of a silverware manufactory created such a commotion as to rattle the silverware on the shelves a hundred feet distant. A change of 25 revolutions in the speed, which change was in the direction of increasing the speed, entirely stopped the vibrations.

Baku Not Drying Up.

The report of the exhaustion of the Baku oil supply, which has lately been extensively circulated, appears to have arisen from the fact that a "shut-down" of a large number of wells was ordered, for the purpose of checking the wasteful over-production which has been going on. It is no uncommon thing for a native of Baku to tap a supply of 20,000,000 gallons of oil, and waste 19,000,000 out of it, simply for want of foresight in providing a cap for the well, or by the omission to arrange for surface storage. The authorities have now taken the matter in hand, and passed laws which regulate the supply. In view of the rapid increase in the demand for petroleum, it is satisfactory to know that Baku is as prolific of oil as ever. The oil trade is rapidly assuming such gigantic proportions that for many years there will probably be ample room for America, Russia and Burmah, as well as for the minor fields that will in time furnish a supply for the world's market. But, in any case, it will be a good thing for Russia when the more careful and economical methods of America are adopted in the Caspian region.

Pea Soup as a Substitute for Beef Tea.

Pea soup is now recommended on excellent authority as a substitute for beef tea for invalids, convalescents, and more especially for patients suffering from cancer of the stomach, or diabetes mellitus. The mode of preparation is to take peas, water and a sufficient amount of some vegetable suitable for soup, and ½ per cent of carbonate of soda, and boil the whole until the peas are completely disintegrated; then let the soup stand until sedimentation is complete and decant the fairly clear, thin fluid above the deposit. The product resembles a good meat soup in its tastes; it is equally digestible, and at the same time surpasses the very best meat soup in nutritive value. The latter statement may appear surprising, but it must be remembered that peas contain a considerable portion of legumen; that is, a vegetable albumen which is easily soluble in a faintly alkaline water, is not coagulated by heat, is easily absorbed, and is equal to the albumen of eggs in its nutritiousness.

Substitute for Ivory.

An extensive industry has arisen in France to supply an artificial substitute for natural ivory in view of the growing insufficiency of the latter to meet the demands of art and industry. The majority of the products formerly employed were obtained by injecting whitewood with chloride of lime under strong pressure. At the Amsterdam Exhibition, however, almost all the products had been prepared with the bones of sheep and waste pieces of kid skins. The bones are for this purpose macerated and bleached for two weeks in chloride of lime, then heated by steam along with the skin, so as to form a fluid mass, to which are added a few hundredths of alum; the mass is then filtered, dried in the air, and allowed to harden in a bath of alum, the result being white tough plates, which are more easily worked than natural ivory.

New Treatment of Heart Disease.

It is well known that at certain stages of heart disease dropsy inevitably sets in. Prof. Germau See, of Paris, has long been experimenting with a view to discover what element in milk rendered it such an admirable agent to stimulate the kidneys, increase the flow therefrom, and hence prove of such great service in dropsies. The conviction which he arrived at was that the one important element is sugar of milk. Acting on that theory he selected 25 patients with heart disease, in all of which there was more or less dropsy. To each he gave 100 grammes of the sugar of milk a day, dissolved in two quarts of water. In all these cases a marked effect on the kidneys was felt within 24 to 45 hours, and the dropsies diminished rapidly, and after a series of treatment lasting from six to eight days, almost all such swellings disappeared. This discovery is regarded as one of the most important which has been made in the medical world for years.

Activity in the Rubber World.

Inventive activity is to be noticed in the rubber world as well as elsewhere. At the present time there are in process of development and already before the heads of three large rubber shoe factories three different machines for cutting soles at the rate of 10,000 pairs a day. It is noticeable that one of these mechanisms is the invention of a woman, who, to use an expression of her own, "has made the building of heavy machinery a special business for many years." This might sound as an a idle boast, but for the fact that a very complicated machine in paper manufacture, the invention of this same feminine genius, is in wide use, and has already netted her many thousand dollars.

Circulation of Water in Boilers.

The circulation of water in boilers is attracting more attention from engineers and the importance of it is being more generally recognized. The best circulation is, of course, found in the plain cylindrical boiler, where there is nothing to interfere, and decreases with the number of flues added. Other considerations must enter in the matter of the economical generation of steam, but the circulation should not be forgotten. In tubular boilers, the best practice places the tubes in vertical rows, leaving out what would be center row. The circulation is up the sides of the boiler and down the center. Tubes placed zigzag in boilers never give good results.

New Safety Switch.

A new safety switch for railway work has been brought out in Minneapolis, which for ingenuity and efficiency is very highly recommended. The great value of the device is in the protection of trains when the switch has been left partly open either by carelessness or design. In that case when a train leaves the rail at the end of the main line the flanges of the wheels rest on the wrecking shoes and the guard rails guide them on to the track. From many experiments it has been found impossible to derail a train while this switch is in use.

Curious Foundry Work.

A curious and noteworthy instance of expert foundry work is reported. It consisted of three plates of cast iron about one-fourth of an inch, and 7 by 5 inches in surface, covered with writing indented in the iron. The impression on the iron is made by writing on thin paper, pinning the paper in a mold and then pouring on the iron. The writing thus transferred to the plates when the iron is cooled is wonderfully clear and distinct, and is so deeply imprinted as to defy any attempt at erasure.

The 180th Degree.

Editor Every Day Science:

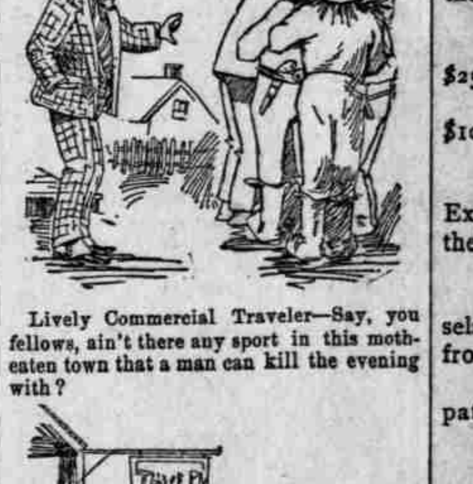
There is a meridian of longitude somewhere east of Greenwich, England, observatory, presumably 180°, that is the meridian, after passing which, navigators, by some sort of maritime arrangement, agree to redate their logs for nautical, legal and general purposes. Where is the meridian, the number east of Greenwich, and what is the scientific, nautical, astronomical or other name by which it is known or understood?

SUBSCRIBERS.

New Use for Graphite.

Graphite is suggested by the Los Angeles municipal authorities as a proper ingredient to mix with the cement now being used for laying miles of sidewalks in that city. These walks are objectionable only for the blinding glare of the white material used, and the plumbago, which exists in considerable quantity in that neighborhood, is recommended as a means of producing a color safer and more grateful to the eye.

He Was Just in Time.



Lively Commercial Traveler—Say, you fellows, ain't there any sport in this moth-eaten town that a man can kill the evening with?

Spokesman—Wal, stranger, they's goin' ter be a surprise party up ter Hen Billins' in a few minutes—ye mought come along, if ye wanter!—*Puck*.

The Sponge is Mightier than the Brush.

THROW AWAY THE SHOE BRUSH

and use a Sponge and water, which will keep your SHOES BRIGHT and CLEAN if you use

Wolff's ACME Blacking

The women know a good thing and will have it, and the men ought to.

It preserves the leather and gives a brilliant polish. Water and snow slip off it as surely as off a duck's back. Men's shoes require dressing ONCE A WEEK—women's once a month, that's all. Worth trying, isn't it? It is also the best dressing for harness, on which it lasts THREE MONTHS.

WOLFF & RANDOLPH, Philadelphia.
RWSSU

NEW ADVERTISEMENTS

FIGURES THAT TALK.

THE FOLLOWING MATCHLESS PRICES ARE NAMED BY

KEECH'S

In Substantiation of their claim to undersell every competing house in the city:

Substantial Antique Chamber Suites, everyone guaranteed to give satisfaction, at only $18.

Fine Chamber Suites, 8 pieces, light or dark finish, at only $30.

Magnificent Solid Mahogany Chamber Suites, cheval glass in dresser, English Washstand, square French plate mirror in the toilet, beautifully carved in heavy relief, at $100.

Sixteenth Century Finished Chamber Suites, in any line and at most any price.

The popular Terry Covered Parlor Suites at only $28.

Handsome Pettepoint Plush Parlor Suites at $35.

Hair Cloth, ruffled front and piped back Parlor Suites at $37 50.

Magnificent Overstuffed Plush Parlor Suites, $40 up.

Georgeous Tapestry Parlor Suites from $75 to $300.

Antique Rockers, upholstered, marbleized silk plush, in natural cherry, antique oak and imitation mahogany, at only $5 50.

Armchairs and Rockers of every kind and description, at prices that will leave nothing to be desired.

Center Tables! A truly gigantic and very handsome variety. Pretty conceits at $1 25. Full size Center Tables from $2 50 up to $50.

Antique Oak Sideboards, four French Beveled Mirrors, artistically carved, only $22 50.

Very large, solid Cherry, imitation Mahogany finished, Sideboards, 7 feet 6 inches high by 4 feet long; beautiful carved work, only $37 50.

Walnut Sideboards, size 7 feet high by 4 feet 6 inches long, cabinet top, beveled mirror, marble top, at only $50.

Solid Cherry Sideboards, 8 feet high, marble top, fancy carvings, at $35; finest Sideboards up to $200.

Drop Leaf Breakfast Tables, Antique and imitation walnut, only $2 50.

Extension Tables, with carved pillars, Antique Oak, at the following prices: $12 for the 8-foot, $14 for the 10-foot, $16 for the 12-foot.

Solid Oak Dining Chairs, genuine leather spring seat, at $5. The same style, in a cheaper quality, at $3.

Extra fine Antique Dining Chairs, loose cushions, embossed leather-covered high back, oxidized trimmings, at $10.

Antique Chiffoniers, six drawers, two mirrors on top, only $12 50.

Cherry-finished, Mahogany Hat Racks, large mirror and handsome carvings, antique trimmings, embossed leather seat, 6 different styles to select from, at only $35.

Beautiful Hanging Hat Racks, 3 French-plate mirrors, at $6 50.

A complete assortment of Wardrobes. Here are two specialties: Antique-finished Wardrobes at $12 50; Solid Walnut Wardrobes at $20.

Light-finished Beds, single or full size, well made, only $2 25.

Child's Beds, light or dark finish, in Antique, Mahogany and Walnut, at only $2.

Nice Antique Oak Combination Washstands at $4 50.

Antique Ash Washstands, with beveled plate mirror, complete at $9.

All grades and makes of Mattresses, from the substantial $3 article to the finest Hair at $50.

Pillows, Bolsters and Bed Spreads, more of them than can be seen at any two houses in this city combined, and at prices no dealer can meet.

Folding Beds, from the good, plain makes to the richest and most elaborate. Prices range, in rises of $5, from $21 to $125.

Lounges, all kinds manufactured. Good Lounges as low as $6, and the finest hand worked leather or Pullman Plush Covered goods at $60.

Lace Curtains, finest imported and domestic makes, from 75c to $25.

Chenille Curtains, beautiful effects, with long Chenille Fringe, at $10 per pair. Others less gorgeous, at proportionately lower prices.

A lot of very finest quality Chenille and Lace Curtains from late Exposition display. They are slightly soiled and will be sold at half their intrinsic value. They can be had in half to two pairs only.

Beautiful Tapestry Brussels from 50c up. Magnificent Body Brussels from $1 up. Excellent Moquettes from $1 25 up. Durable Ingrains from 25c up.

100 rolls of Matting, just received and consisting of entirely new patterns, at $4 per roll.

Oil Cloths, in scores of new and pretty patterns, from 25c up.

Linoleums, every kind in the market, from 75c to $1.

Jointless Mattings, plain and colored, from 50c to 75c per yard.

Rugs! A variety as large as it is beautiful. Prices range from the Smyrna Rugs at only $3 up to the celebrated Royal and Dacheston products at $9.

More Rugs! Magnificent animal designs, at indescribably low prices. Mountain Fox Rugs, beautifully mounted, at $6. Rocky Mountain Wolf Rugs, elegant specimens and faultlessly mounted, at $10. White, gray and black large size Mountain Goat Rugs from $3 to $4 50.

Silverware and Cutlery—reliable grades that will not tarnish—at strikingly low prices.

Clocks, Pictures, Paintings, Figures, Statues, Screens and other ornamental designs at prices that even the poorest can afford to pay.

The celebrated Chase Bros.' Pianos, finest rosewood, pronounced by the best musicians to be equal to the costly Steinway, Knabe and Chickering, and warranted for 5 years, at only $350, which price includes stool and cover.

Men's Clothing of every desirable quality and style. Fall and Winter Overcoats, all sizes, from $5 to $35; Suits from $8 to $25.

Ladies' Cloaks and Wraps. Enough new styles to suit the most particular shopper. Handsome Newmarkets at $7. Real Seal Plush Coats at $20.

A lot of Ladies' Boucle Jackets, warm and durable, will be closed out at $1. All sizes among them.

Children's Cloaks—none but such styles and qualities as we can honestly recommend to our patrons—from $3 up.

A full assortment of Dress Goods, Drygoods, Flannels, Heavy Skirts, etc., at figures that will delight the most economical purchasers.

A complete assortment of Comforts from 75c to $5; an excellent stock of Blankets from $1 50 to $7. A saving guaranteed in every instance.

Any of the above goods can be bought for CASH or on CREDIT, at

KEECH'S

Cash and Credit House,

923 and 925 Penn avenue,

Near Ninth Street.

☞ Open Saturday Nights till 10 o'clock.

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