ent of Interesting Performances at the Pumps.

LOG BOOK OF PRENTICE MULFORD

Small Muthy-Night Work-Night Watches Carrying Studding Sails Boau-tiful to Look at, Diabolical to Handle.



NE night the pumps broke down five minutes before 12 o'clock. Our watch was at work on them. was called as usual, and after

the usual bungling and fishing in the well for the broken valves, they were put in order again. It was then nearly 1 a. m. Meanwhile all the able seamen our watch had at eight bells walked below. The watch newly come on deck refused to pump the ship clear, alleging it was the business of the others. The watch below were bidden to come on deck and perform their neglected duty. They refused. This was mutiny. The four mates got their pistols, entered the forecastle and stormed, ordered and threat ened. It was of no avail. The fifteen able seamen who refused constituted the main strength and effectiveness of that watch. They were threatened with beting put in irons. The preferred irons to pumping out of their turn. They were put in irons, fifteen stout men, by four mates, who then returned and reported proceedings to the captain. The men re-mained shackled until the next morning. It was then discovered that it was impossible to work the ship without their aid. Of course they couldn't handle the vessel in irons.

The Wizard rated over 8,000 tons, and

many a frigate of her size would have been deemed poorly off with less than one hundred men for handling the ship alone. We rarely secured the lower sails properly in heavy weather, from the mere lack of physical strength to handle them. So Capt. S—pored sadly at his break fast through his gold bowed spectacles, and when the meal was over issued orders for the release of the fifteen men in frons. In this little affair the boys and ordinary seamen belonging to the mutinous watch took no part. They were strictly neutral and waited to see which side would win. I felt rather unpleasant and alarmed. Though not a full fledged mutiny and a conversion of a peaceful merchantman into a pirate, it did look at one time as if the initiatory steps to such end were being taken.

One of the great aims of existence at sea is that of keeping the decks clean. The scrubbing, swishing and swashing is performed by each watch on alternate mornings, and commences at daylight. It was the one ordeal which I regarded called up at 4 in the morning, when the sleep of a growing youth is soundest. maniacal wretch of the other watch, who does the calling, does it with the glee and screech of a fiend. He will not stop his "All h-a-a-nds!" until he ars some responsive echo from the sleepers. He is noisy and joyous because it is so near the time he can turn in. And these four hours of sleep at sea are such luxuries as may rarely be realized on shore. But the mate's watch is calling us, screeching, howling, thumping on the forecastle door, and making himself extremely pleasant.

We are called and on deck, and stumbling about, maybe with one boot half on, and more asleep than awake and more dead than alive. We are in the warm, enervating latitude of the tropics, with every sinew relaxed from the steaming heat. Perhaps there is a light wind We are carrying studding sails. Studding sails are beautiful to look at from a distance. But when once you have sailed in a ship carrying them from the royals down and know something of the labor of rigging them out all on one side, fore, main and mizzen masts, and then, if the breeze alters a couple of points, taking the starboard sails all down and rigging out the larboard, or perhaps on both sides-and this on a Sunday afternoon, when there are no jobs and you've been expecting plenty of leisure to eat your duff and molasses; or if you have ever helped carry those avy yards about the deck when the ship was rolling violently in a heavy ground swell, and every time she brought sails, blocks and everything movae was bringing up also with a series of pistol like reports; or a judge to pass a laid out on a royal yard trying to pass a laid out on a royal yard trying block," heavy rope through the "jewel block, at the extreme end thereof, while the mast and yard were oscillating to and fro with you through the air in a rapidy recurring series of gigantic arcs caused by the lazy swell, in the trough of which your ship is rolling-and at the end of each roll you find yourself holding on for dear life, lest at the termination of each oscillation you be shot like an arrow into the sea from your insecure perch—why in all these cases the beauty picturesqueness of a ship under studding sails will be tempered by some sober realities.

It is 5:30 or 6 o'clock. The morning light has come. The cry of "Turn to!" is beard. That is, "turn to" to wash wn decks, an operation which will tax the already exhausted resources of an empty stomach until breakfast time at 8 o'clock. The mates have their fragrant "cabin coffee" and biscuit served them on the brass capstan aft; we can smell aroma, but nothing warm can get into our stomachs for over two long bours of work. The basic idea in this regular washing down decks at sea seems to be that of keeping men busy for the cake of keeping them busy. The top of every deck plank must be scrubbed with a care and scrutiny befitting the labors of a diamond polisher on his gems, while the under side may be dripping with fourness, as it sometimes is. I had the post of honor in scrubbing the quarter seck. That was the drawing of water sek. That was the drawing of water a canvas bucket from the mizzen hains to wash over that deck. The smaining five boys would push rearily about with their brooms, and brushes, squabs and squilgees, su-srintended by our extraordinary fourth mate (always to me an object of interest, from the fact of the secret carefully hoarded in my breast that I had pulled him into the New York dock), who, with

a microscopic eye, inspected each crack and seam after the boys' labors, in search of atomic particles of dirt, and called them back with all the dignity of command, and a small amount of commanding personality behind it, whenever he deemed he had discovered any. When this labor was finished I was generally so exhausted as to have no appetite for breakfast. But a sailor's stomach is not presumed to be at all sensitive under any conditions. And above all, a "boy"—a boy belonging to a squad of boys who about once a day were encouraged who about once a day were encouraged and enthused to exertion and maritime ambition by the assurance conveyed them by one of the mates that they weren't "worth their salt" — what business had a boy's stomach to put on airs at sea? Most landsmen, if called up at 4 o'clock on a muggy morning and worked like mules for a couple of hours on a digestive vacuum, would probably at the breakfast hour feel more the need of food than the appetite to par-

take of it.

Though I followed the sea nearly two years, I am no sailor. The net result of my maritime experience is a capacity for tying a bow line or a square knot and a positive knowledge and conviction con-cerning which end of the ship goes first. I also know enough not to throw hot

ashes to windward.

But on a yard I could never do much else but hold on. The foolbardy men about me would lie out flat on their stomachs amid the darkness and storm, and expose themselves to the risk of pitching headlong into the sea in the most reckless manner while trying to "spill the wind" out of a t'gallant sail. But I never emulated them. I never lived up to the maritime maxim of "one hand for yourself and the other for the owners." I kept both hands for myself, and that kept me from going overboard. What would the owners have cared had I gone overboard? Nothing. Such an occurrence twenty-five odd years ago would, weeks afterward, have been reported in the marine news this way: 'Common sailor, very common sailor, fell from t'gallant yard off Cape Horn and lost."

The owner would have secretly rejoiced, as he bought his Christmas toys for his children, that the t'gallant yard had not gone with the sailor. No; on a yard in a storm I believed and lived up to the maxim: "Hold fast to that which is good." The yard was good. Yet I was ambitious when a boy after the mast on the clipper which brought me to California. I was quick to get into the rigging when there was anything to do aloft. But once in the rigging I was of

little utility.

The first time I went up at night to loose one of the royals, I thought I should never stop climbing. The deck soon vanished in the darkness of a very black tropical night, the mastheads were likewise lost in a Cimmerian ob-scurity—whatever that is. At last 1 found the yard. I wasn't quite sure whether it was the right one or not. I didn't know exactly what to do. I knew I had to untie something somewhere. But where? Meantime the savage Scotch second mate was bellowing, as it then seemed, a mile below me. I knew the bellow was for me. I had to do some-thing, and I commenced doing. I did know, or rather guessed, enough to cast off the lee and weather gaskets, or lines off the lee and weather gaskets, or lines which bind the sail when furled to the yard, and then I made them up into a most slovenly knot. But the bunt gasket (the line binding the middle and most bulky portion of the sail) bothered me. I couldn't untie it. I picked away

me. I couldn't unite it. I picked away at it desperately, tore my nails and skinning my knuckles.

The bellowing from below continued as fiercely as ever, which, though not intelligible as to words, was certainly exhorting me, and me only, to vigilance. Then the watch got tired waiting for me.
Thinking the sail loosed, they began
hoisting. They hoisted the yard to its
proper place and me with it. I clung on and went up higher. That, by the way, always comes of holding fast to that which is good. Then a man's head came bobbing up out of the darkness. It was that of a good natured Nantucket whose name of course was Coffin. He asked me the trouble. I went into asked me the trouble. I went into a lengthy explanation about the unmanageable knot. "Oh, the knot!" said he. "Cut it!" and he cut it. I would never have cut it. In my then and even present nautical ignorance l should have expected the mast or yard should have expected the mast or yard to have fallen from cutting anything aloft. Only a few days previous I had seen the captain on the quarter deck jumping up and down in his tracks with e because a common seaman bad, by mistake, cut a mizzen brace, and the second mate, as usual, had jumped up and down on the seaman when he reached the deck. I feared to set a similar jumping process in operation. Coming on deck after my lengthy and blundering sojourn loosing a royal, I expected to be mauled to a pulp for my stupidity. But both watch and bellowing mate had gone below and I heard no more of it.

A few days after my unsuccessful ascension the Wizard one morning shot through a bank of fog and San Francisco lay before us.

PRENTICE MULFORD.

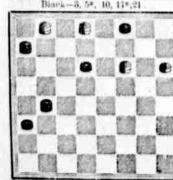
A New Breeding Farm. W. T. Williams, banker and trotting horse owner of Vinton, Ia., has just purchased a 560 acre farm, adjacent to Hastings, Neb. for \$16,000, and will start a breeding estab-

lishment. CHESS AND CHECKERS.

Chess problem No. 46-By W. A. Shink-



White-S pieces. White to play and mate in three moves. Checker problem No. 46-By A. Hannah,



White-1*, 2*, 11*, 12.

white to bray and draw.	
SOLUTION	e.
Chess problem No. 45:	
White.	Black.
1. QxPch	REQ
2. R to K 8 ch	Kt to B
3. B x R ch	K to R
4. R x Kt mate.	
Checker problem No. 45:	
White.	Black.
114 to 18	121 to 2
218 to 14	225 to 3
814 to 17	330 to 2
417 to 21	496 to 3
581 to 27 and wine.	

Trials of Dealing with a Land Lubber Stove.

LOG BOOK OF PRENTICE MULFORD

He Qualifies by Making an Irish Stew, the Only Irish He Could Make-Vessel "In a Stew" for Weeks-Ples-Duff. Plan Dag Plate Dag-Mr Dag.

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as cook was based on the production of an Irish stew which I cooked for the captain and mate while the Henry was "hove down" on the beach at North point. and undergoing the process of cleaning her bottom of barnacles. I can't recollect at this lapse of time where I learned to cook an Irish stew. I will add that it was all I could cook—positively all—and with this astounding capital of culinary ignorance I ventured down upon the great deep to do the maritime housework for twenty great men.

When we were fairly affoat and the Farallones were out of sight, my fearful incapacity for the duties of the position became apparent. Besides, I was dreadfully seasick, and so remained for two weeks. Yet I cooked. It was purgatory, not only for myself, but all hands. There was a general howl of execration forward and aft at my bread, my lobscouse, my tea, my coffee, my beef, my beans, my cake, my pies. Why the captain continued me in the position, why they didn't throw me overboard, why was not beaten to a jelly for my continued culinary failures, is for me to this day one of the great mysteries of my existence. We were away nearly ten months. I was three months learning my trade. The sufferings of the crew during those three months were fearful. They had to eat my failures or starve. Several times it was intimated to me by the under officers that I had better resign and go "for'ard" as one of the crew. I would not. I persevered at the expense of many a pound of good flour. I conquered and returned a second class sea cook.

The Henry was a small vessel-the deck was a clutter of whaling gear. Where my galley or sea kitchen should have been stood the try works for boiling blubber. They shoved me around anywhere. Sometimes I was moved to the starboard side, sometimes to the larwhen cutting whale way astern. I expected eventually to be hoisted into one of the tops and cook aloft. Any well regulated galley is placed amulships, where there is the least motion. This is an important consideration for a sea cook. At best he is often obliged to make his soup like an acrobat, half on his head and half on his heels, and with the roof of his unsteady kitchen trying to become the floor. My stove was not a marine stove. It had no rail around the edges to guard the pots and kettles from falling off during extra lurches.

The Henry was a most uneasy craft, and always getting up extra lurches or else trying to stand on her head or stern. Therefore, as she flew up high astern when I was located in that quarter, she has in more than one instance flung me bodily, in an unguarded moment, out of that galley door and over that quarter deck, while a host of kettles, covers and other culinary utensils rushed with clang and clatter out after me and with me as their commander at their head. We all eventually terminated in the scuppers. I will not, as usual, say "lee scuppers." Any scupper was a lee scupper on that infernal vessel. I endeavored to remedy the lack of a rail about this stove by system of wires attaching both pots and lids to the galley ceiling. I "guyed" my chief culinary utensils. Still during furious oscillations of the boat the pots would roll off their holes, and, though prevented from falling, some of them as suspended by these wires would swing and fro over the area of that stove.

like so many pendulums, around and to That was the busiest year of my life. I was the first one up in the morning, and the last, save the watch, to turn in at night. In this dry goods box of a kitchen I had daily to prepare a breakfast for seven men in the cabin, and another for eleven in the forecastle; a dinner for the cabin and another for the forecastle; likewise supper for the same. It was my business to set the aristocratic cabin table, clear it off and wash the dishes three times daily. I had to serve out the tea and coffee to the eleven men forward. The cabin expected hot biscuit for breakfast, and frequently pie and pudding for dinner. Above all men must the sea cook not only have a place for everything and everything in its place, but he must have everything choked and wedged in its place. You must wash up your tea things, sometimes holding on to the deck with your toes, and the washtub with one hand, and wedging each plate, so soon as wiped, into a corner, so that it slide not away and smash. And even then the entire dish washing apparatus, yourself included, slides gently across the deck to leeward. You can't leave a fork, or a stove cover, or lid lifter lying about indifferently but what it slides and sneaks away with the roll of the vessel to some secret crevice, and is long lost. When your best dinner is cooked in rough weather, it is a time of trial, terror and tribulation to bestow it safely on the cabin table. You must harbor your kindling and matches as sacredly as the ancients kept their household gods, for if not, on stormy mornings, with the drift flying over the deck and everything wet and clammy with the water surcharged air of the sea, your breakfast will be hours late through inability to kindle a fire, whereat the cook catches it from that potentate of the sea. "the old man," and all the mates raise their voices and cry with empty stomachs, "Let him be accursed." One great trial with me lay in the dif-

ficulty of distinguishing fresh water from sait-I mean by the eye. We sea

cooks use sait water to boil beef and po-tatoes in; or rather to boil beef and pork and steam the potatoes. So I usually had a pail of sait water and one of fresh had a pail of sait water and one of fresh standing by the galley door. Sometimes these got mixed up. I always found this out after making sait water coffee, but then it was too late. They were particular, especially in the cabin, and did not like sait water coffee. On any strictly disciplined vessel the cook, for such an offense, would have been com-pelled to drink a quart or so of his own coffee, but some merciful cherub aloft always interfered and got me out of bad scrapes. Another annoyance was the loss of spoons and forks thrown accidentally overboard as I flung away my soup and grease clouded dishwater. It was in-deed bitter when, as occupied in these daily washings, I allowed my mind to drift to other and brighter scenes, to see drift to other and brighter scenes, to see the glitter of a spoon or fork in the air or sinking in the deep blue sea, and then to reflect that already there were not enough spoons to go around, or forks either. Our storeroom was the cabin. Among other articles there was a keg of molasses One evening after draining a quantity I neglected to close the faucet tightly. Molasses, therefore, oozed over the cabin floor all night. The cabin was a freshet of molasses. Very early in the morning the captain, getting out of his bunk, jumped both stockinged feet into the saccharine deluge. Some men will swear as vigorously in a foot-bath of molasses as they would in one of coal-tar. He did. It was a very black day for me, and life generally seemed joyless and un-inviting; but I cooked on.

The Henry was full of mice. These

little creatures would obtrude themselves in my dough wet up for fresh bread over night, become bemired and die therein Once a mouse thus dead was unconsciously rolled up in a biscuit, baked with it, and served smoking hot for the morning's meal aft. It was, as it were, an involuntary meat pie. Of course the cabin grumbled; but they would grumble at anything. They were as particular about their food as an habitue of Delmonico's. I wish now at times I had saved that biscuit to add to my collection of odds and endibles. Still even the biscuit proved but an episode in my career. I cooked on, and those I served stood aghast, not knowing what would come next.

After five months of self training I graduated on pies. I studied and wrought out the making of pies unassisted and untaught. Mine were sea mince pies; material, salt beef soaked to freshness and boiled tender, dried apples and molasses. The cabin pronounced them good. This was one of the few feathers in my culinary cap. Of course, their goodness was relative. On shore such a pie would be scorned. But on a long sea voyage almost any combination of flour, dried fruit and sugar will pass. Indeed, the appetite, rendered more vigorous and perhaps appreciative by long deprivation from luxuries, will take not kindly to dried apples alone. The changes in the weekly bill of fare at sea run something thus: Sundays and Thursdays are "duff days;" Tuesday, bean day; Friday, codfish and potato day; some vessels have one or two special days for pork; salt beef, hardtack, tea and coffee are fluids and solids to fall back on every day. I dreaded the making of duffs, or flour puddings, to the end of the voyage. Rarely did 1 attain success with them.

A duff is a quantity of flour and yeast, or yeast powder, mixed, tied up in a bag and boiled until it is light. Plum duff argues the insertion of a quantity of raisins. Plain duff is duff without raisins. But the proper cooking of a duff is rather a delicate matter. If it boils too long the flour settles into a hard, putty like mass, whereunto there is neither sponginess, lightness, nor that porous ness which delights the heart of a cook when he takes his duff from the seething enough, the interior is still a paste. If a duff stops boiling for ever so few minutes, great damage results. And some times duff won't do properly, anyway. Mine were generally of the hardened species, and the plums evinced a tendency to hold mass meetings at the bottom. Twice the hands forward rebelled at my duffs, and their committee on culinary grievances bore them aft to the door of the cabin and deposited them there unbroken and uneaten for the "Old Man's" inspection. Which public demonstration I witnessed from my galley door, and when the duff deputation had retired, I emerged, and swiftly and silenty bore that duff away before the Old Man had finished his dinner below. It is a hard ordeal thus to feel one's self the subject of such an outbreak of popular indignation. But my sympathies now are all with the sailors. A spoiled duff is a great misfortune in the forecastle of a whaler, where neither pie nor cake nor any other delicacy, save boiled flour and molasses sauce, come from month's end to month's end.

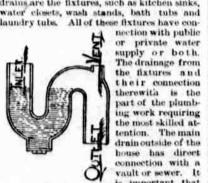
PRENTICE MULFORD.

CONCERNING PLUMBING.

mething That Is by Many Regarded as a Necessary Evil. By a great many people plumbing work to

regarded as a necessary evil. As to its being cessary for comfortable and economica living there can be no doubt. As to its being an evil, that depends. There is no reason why all plumbing work should not be safe from a sanitary standpoint. There is no reason why there should be vexatious plumbing bills to disturbitone's peace of mind and de-plete his pocketteck. Plumbing work may be laid out and executed in a way to be entirely safe and economical of maintenance.

There are a few principles which one needs to consider in order to bring about the re sults above outlined. All plumbing work is essentially a system of water supply drainage from the house, and the attachments to the drains are the fixtures, such as kitchen sinks. laundry tubs. All of these fixtures have con



their connection therewith part of the plumbing work requiring the most skilled attention. The main drain outside of the house has direct connection with a vault or sewer. is important that

"B" TRAP. tion with this drain be such as will prevent the passage of the contaminated air of the sower or vault into the house. This is done in two ways. First, the fixtures have a trapped or water sealed connection with the drain. Second, the air in the drain has an exit above the top of the house. This is done by continuing the drain above the roof. This is what is known as drain ventilation. drains with all fixtures should be ventilated

in this way.

The "S" trap referred to gets its name from its form, which is illustrated by the ketch. The drain water comes down through the trap from above into the lower part of the bend and then upwards and again down wards and into the drain. Thus there is a sertain amount of water always in this trap This water is called the seal. The depth of the seal is dependent upon the depth of the bend in the trap. It will be seen that the air would have to pass through the water to get

into the house. There are many conditions under which the trap would fail to act. The water may be siphoned out, may evaporate, or it may be-come contaminated from long connection with the air in the drain. The ventilation of the drain and the ventilation of the trap resloce this risk to a minimum. There are hundreds of different kinds of traps, but they are all constructed on the same principle. They are all largely dependent upon the water sail for protection to the inside of the house. Acundant flushing is highly important as a precautionary measure. Flushing means a discharge of large quantities of water through the traps and drains. The frequent use of plumbing apparatus contributes to its safety from a sanitary standpoint.

Sketch No. 2 is of a water closet of a washout pattern. There

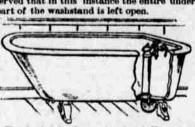


posed to view.

Sketch No. 3 shows a modern washstand. It is carried on brackets made of marble or iron, the top and back are marble, and the bowl of porcelain ware. It has a standing over-flow at the back and inside of the bowl, this bowl having a straight back rather than a true semi-spherical form, as is common. The

MODERN WASHSTAND.

ordinary waste, which is in the back of the bowl, becomes foul from rancid soap which accumulates therein from time to time. The standing overflow mentioned here can be lifted out at any time and washed. It also acts as a waste when one desires to drain the water from the bowl. By merely turning the little knob at the top an opening is formed. An objection to the plug and chain waste is that the chain gets foul and is never perfectly clean. After it has been used once it is foul for use next time. It will be observed that in this instance the entire under part of the washstand is left open.



The bath tub shown in sketch No. 4 is of ron, porcelain lined. They are made of planished copper, solid porcelain and cast tron unpainted. The copper tub is the cheapest; the porcelain the best. The iron, porcelain lined, is a very agreeable compromise. It has the standing overflow, same as that described for washstands, and this tub is not cased at sides or ends any more than is the vashstand and water closet described.

The kitchen sinks have been described be-fore. The laundry-fittings will be considered at some-other time. Louis H. Girson.

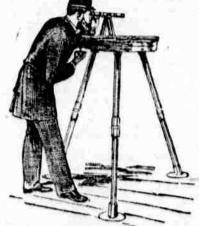
THE FISK RANGE FINDER.

AN INVENTION OF VALUE TO THE

UNITED STATES NAVY. Due Solely to Superior Handling of the Guns, and This Was Due to Close Esti-

mates of Rauge-British Improvements Authorities are quite generally agreed that in the war of 1812 the great source of our success was undoubtedly the superior management and direction of our guns, and that the English and other governments were satis fied of this is sufficiently proved by the careful attention they have since continued to bestow upon this branch of the naval service. Not only must we have well trained guns' crews with good shots as gun captains, but the officers must perform their parts as well. The guns must be completely under the control of the officers and through them of the captain; which means that to the speedy service of the guns must be added the correct placing of the sight bars, so that no shot may be wasted.

The fire of guns at sea is a much more difficult matter to deal with than their fire on shore, the speed of the swiftest target on shore, a squadron of cavalry, being nearly always exceeded affoat In finding the distance of a target, or the range as it is called, it is customary to feel the way to a first approximation to the correct range by firing as rapidly as may be convenient a succession of single shots, using the rapid fire guns for this purpose, as their range is generally sufficient, and the waste of ammunition is



THE BANGE FINDER. not as appreciable. Existing guns, ir the hands of gun captains of fair skill. will put about one-fourth the shots fired from them when affoat into a target twelve feet high and of most any length -the vertical rather than the horizontal being the chief consideration-when at 2,000 yards range, the distance being accurately known. This will probably be the effective range for opening future

engagements. Such is at least the opinion held by most gunnery experts both in this country and in foreign services. It is to overcome this element of uncertainty in the calculation of the distance the enemy is off, and to thereby increase the range at which the gun reigns supreme, that Lieut. Fiske, United States navy, has brought his knowledge and ingenuity to bear. His range finder, which is illustrated by the accompanying cut, introduces electricity and depends almost entirely upon the principles of the Wheatstone bridge or the electrical balance. The instrument consists of an iron tripod support ing a flat iron table, carrying a telescope which has a vertical and a horizontal mo tion, and which is also in the circuit of an electric current. In order to secure having a base line, no matter whether the vessel presents bow, stern or broadside

to the target, there are four of these tri-

pods on each snip, one at either end of the bridge forming the shorter base line; a third forward and a fourth aft, forming a longer base line, which is about the length of the ship.

The two tripods forming the base lines are connected with the electric battery, carrying a weak current, two accumulator cells being sufficient, and also with a galvanometer. The principle involved in finding the range and position of an object depends upon the determination of a fractional portion of a conducting body bearing in length a ratio to an angle between two lines of sight directed upon the distant object, and the measurement the distant object, and the measurement of the electrical resistance of that length. The practical working of the apparatus includes three observers, one at each telescope, and a third at the galvanom-eter. On top of one of the tripods, and underneath the telescope, is a slider which is adjustable and has its middle portion insulated so that the current cannot pass across, but goes by wire to the galvanometer. Moving this slider one way or another increases or lessens the resistance and causes a deflection in the needle of the galvanometer.

One of the observers sights his tele-

scope at the target, and a certain deflection of the needle is observed. The other observer also sights on the object, and the needle shows a change in deflection. The slider is then moved until the needle of the galvanometer reads zero, and the position of the slider in reference to a fixed scale of yards shows at once the distance the target is away from the ob-ject. Well known principles of the re-lation of arcs and the sides and angles of triangles bear to each other render it possible, from the data of lengths, angles, etc., of the apparatus itself to extend etc., of the apparatus itself to extend their proportions to any distance, and it is by these methods of proportion and the electric balance that the required distance is obtained. Its application is not confined to vessels alone, as it can be applied anywhere where a base line of known length can be obtained.

For instance, the telescopes, suitably mounted, could be sent out on the skirmish line or to any other advanced position and the distance of an enemy's works or troops accurately determined.

works or troops accurately determin so that the gunners would know at what range to elevate their guns. The trouble on shipboard has been that the base line on supposing has been that the base line has heretofore proved too short for prac-tical use, and the delay has been caused by time required for communication be-tween the two observers.

Second Baseman Charles Crooks Charles Crooks, the expert second baseman of the Columbus club, has been a professional ball player for the past three years. He was born Nov. 9, 1866, in St. Paul, Minn. His first baseball experience

was gained while a student at college Racine, Wis. His first profesoils tearn. At the end of the season he ranked first in the official averuges as third basevan. In 1887 he vered second base the St. Paul and ranked of st.

club and ranked sixth in the batting averages of the Northwestern league. During the latter part of the senson of 1888 he played second base for the Omaha club of the West-ern association. He staid with the Omahas during the senson of 1889, playing in ninetyseven games, and being credited with sixteen home runs, twelve three base hits and fifteen doubles. Towards the end of the season he signed with Columbus for the remaining months. His work with that club was of a very high order. In thirteen games that he played at second base for the Columbus club he had seventy-one chances, and accepted all except one. While playing with the Omaha team in a champiouship game against the St. Paul club, June 8, 1889, Crooks made five successive safe hits, including four home runs and a single, or a total of seventeen bases. Crooks covers a great deal of ground in a short time, and his celerity in stop ground hits and throwing to bases is mar-

Nature in Convulsion

Is terrific, Volcanie cruptions, cyclones, earthquakesare awfullyandtremendouslypicturesque
but scarcely destrable to emulate in action and effect by the administration of remedies which produce convulsion and agony in the abnormal portion of the human frame. Such is the effect of the old-fashioned violent purgatives happily of the oid-fushioned violent purgatives happily failing more and more into disuse, and of which Hostetter's Stomach Bitters is the wholesome, pleasant and far more effective succedaneum. They weakened the Intestines—the Bitters in vigorates them. They left the bowels inactive, because incapacitated by ensuing feebleness. The Bitters, on the contrary, and because it enables, but forces, them to act—a vast and fortunate difference—perpetuates their activity and regularity. The liver is beneficially stimulated, as the kidneys also are, by this medicine, which cassily conquers, also, malaria, nervousness and rheumatism.

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