OWER FROM COAL.

ientists Believe the Highest Efficiency Has Been Reached.

IE TRIPLE EXPANSION

Used Upon the Great Grayhounds of the Atlantic Ocean.

ELD OF THE TURBINE ENGINES.

New Utilization of the Exhaust to Generate Electricity.

E HISTORY OF BOILER DEVELOPMENT

[WRITTEN FOR THE DISPATCH.]

For a good many reasons the most efficient am engines built are those we find aboard p. When a factory engine can be so im-oved as to save 100 tons of coal a year its ner increases his profits by the cost of so ch fuel. With a similar improvement in marine engine, the owner saves not only his coal bill, but he can carry 100 tons more paying freight. Should he seek increase passenger traffic rather than of cargo, he use his former quantum of fuel and add, rhaps, as much as a knot an hour to the ed of his vessel.

When we learn that the power needed to ve the Majestic or the Teutonic rises to 000-horse, it becomes plain that the high-prizes in steam engine practice are held t to the inventors who can reduce the st outlay these figures represent. De-te the labors of inventors, stimulated as y have been by great rewards, even the st steam engine is a very wasteful con-vance. Suppose we take one of 60-horse wer, such as may be found in a small rryboat, and set it for an hour at the sole rk of generating heat by rubbing iron ates together, or in any other convenient y, we shall find it yield no more heat an is given out in burning ten pounds of od anthracite coal—about as much fuel as e winter furnace of an ordinary New rk house will consume in an hour.

The Efficiency of the Engine.

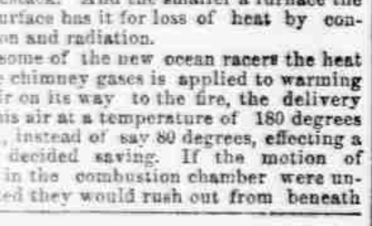
We have a rule here which works both ays, so that, were the heat of our ten unds of coal fully converted into power, should have our 60-horse engine pro-lled by it for an hour. Were the engine e of the very best type, it would give us t one-seventh this duty. That modest action, therefore, shows how much still s before ingenuity in its effort to get work t of coal. Since the days of James Watt e steam engine has been gradually brought an effectiveness four and a half times eater than he was ever able to realize. ow far this march of advance is likely to ntinue will appear as we glance at its incipal steps.

First, and chiefly, this progress is in-bted to a steady improvement in both ill and workmanship. Watt was fully are that economy lay in the use of high essures, but he had not boilers strong ough, cylinders true enough, or pistons ght enough for steam much beyond atmos-heric pressure. As boiler makers and en-ne builders have become more expert, and ought new tools of precision to their aid, eam pressures have constantly increased. f late years movement in this direction s been rapid. Whereas in 1880 marine gines rarely ran with steam exceeding 75 unds pressure, to-day 150 to 200 pounds not uncommon. It is in this increase of essure that the chief gain in the efficiency the steam engine has been realized.

The Heat to Make Steam.

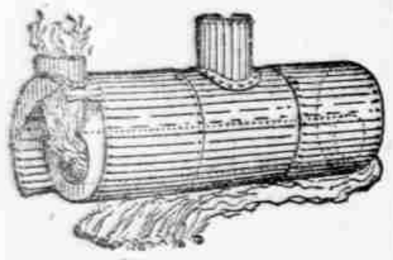
Steam at 200 pounds requires but little ore heat for its production than steam at , yet about double the duty per pound n be gotten out of it. With due regard to her considerations, the smaller a furnace e better. It should admit just air enough r the combustion of the fuel and no more. ny excess beyond this quantity takes heat om the fire to be wastefully carried up the nokestack. And the smaller a furnace the ss surface has it for loss of heat by con-uction and radiation.

In some of the new ocean racers the heat f the chimney gases is applied to warming e air on its way to the fire, the delivery f this air at a temperature of 180 degrees ahr., instead of say 80 degrees, effecting a ery decided saving. If the motion of ases in the combustion chamber were un-hecked they would rush out from beneath



PLAIN BOILER, OLD STYLE.

CORNISH BOILER.



LANCASHIRE BOILER.

he boiler, leaving half the work undone. To prevent this a series of projecting iron lates, or bafflers, is set throughout the ength of the furnace. These bafflers com-el the hot gases to take a roundabout ourse and come into the fullest possible ontact with the boiler surfaces. Another ay in which waste is reduced is by the iberal use of non-conductors in covering urnace, boiler and the working parts of an ngine.

Use of the Automatic Stokers.

Let a furnace be as well designed as it may, its efficiency will nevertheless largely urn on the intelligence and care of its tokers. To supersede manual labor three different patterns of automatic stokers are in the market, and are gradually coming into use. One of them, combined with ma-chinery for handling coal and ashes, sup-plies 300 tons of fuel per day to the furnaces of the Spreckels refinery in Philadelphia. The application of automatic stoking at sea has so far been a failure. A simple machine adapted to restricted space, and to the incal-culable motions of a vessel, would banish from shipboard one of the most exhausting forms of human drudgery. Even with the thriftiest stoking the chimney gases take as toll a full fifth of the fire's total heat.

In getting heat from furnace to boiler in-ventors have made improvement upon im-provement. At first, just as in a common ook stove, the boiler stood quite outside the fire. A long stride ahead was taken when the fire was put inside the boiler, first in one flue in the Cornish type, and then in two, in the Lancashire. If two flues were better than one be-cause they extended the surface at which flame could do work, would it not be better yet to multiply the two into scores? Flues were accordingly reduced to the di-mensions of tubes in boilers of the locomo-tive type with excellent results. With this benefit, however, there came a serious drawback. Soot and ashes are apt to gather inside a fire tube and seriously interfere with its heating power. The remedy for this is ingenious enough; the tubes, in-clined in position, are filled with water in-stead of fire, and put in the hottest part of the furnace. Of course, soot and ashes may collect upon them there, but never to so formidable a degree as within the body of fire tubes, and always so as to be more easily removed. The water tubes are con-nected with a boiler, reduced in size, which serves as a reservoir for both water and steam.

Secret of the Norwood's Power.

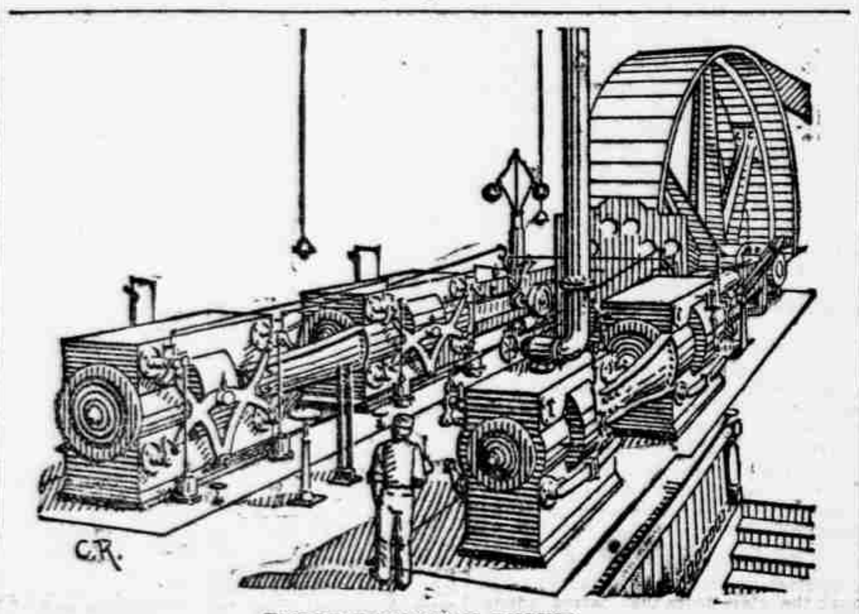
The extraordinary pace of the yacht Nor-wood is to be set down to the account of water tubes so curved as to raise steam with great rapidity.

Their thickness has been lessened with safety by making them of mild steel in-stead of wrought iron. Tubes 4 inches in diameter and but ½ inch in thickness safely bear a pressure of 300 to 400 pounds to the square inch; this while a boiler shell 36 inches in diameter must be thrice as thick to withstand the pressure. Now that armor-plate tests have shown how much steel can be increased in tenacity by alloy-ing it with nickel the way opens for a further thinning of boilers and tubes with a new effectiveness for their fuel.

With very high pressure steam raised in due quantity, the engineer's next thought is its fortune in the cylinder. Here he fully avails himself of the vapor's expansive force: he permits but one-twelfth or one-fifteenth of the cylinder to be filled with steam when communication with the boiler is cut off. During the remainder of the pis-ton's stroke it is urged solely by the steam's elacticity. In this act of expansion some-thing very important happens. We know that the mechanical power of the moving piston could give us a certain quantity of heat were it employed in rubbing two metal plates together. Precisely this much heat disappears from the steam as it expands be-hind the piston. The proportion which this amount bears to the steam's total heat serves to mark the degree of the engine's efficiency.

Figuring on the Efficiency.

Supposing it to be 10 per cent, then 10 per cent of the furnace's effective heat dis-appears from the contents of the cylinder in the brief interval between one stroke of the piston and the next. Cylinder and piston, iron as they are, become quickly chilled by this action, so that every new charge of steam committed to them suffers a grave ab-straction of heat, and consequently of work-ing power. Steam at 392° Fahrenheit has a pressure of 15 atmospheres, or 225 pounds to the square inch; lowered though but 34°



TRIPLE EXPANSION ENGINE.

—but one-thirty-fifth of its total heat—it falls to a pressure of but 10 atmospheres. How can loss so great as this be remedied? First, by jacketing the cylinder either with live steam from the boiler, or, preferably, with steam hotter still from an auxiliary boiler, or by a gas flame. A second plan is to superheat the steam, the furnace being modi-fied for the purpose. The third and best method of all, usually employed with the other two, is to use more than one cylinder for the steam's expansion. In the ordinary compound engine, which has two cylinders, the steam is expanded in part in the first cylinder, and then passes to the second to be expanded to its utmost limit. The triple expansion engine has three cylinders, be-tween which the working force of a single charge of steam is divided in the same way. This seems like an undue multiplication of machinery, but its operation is gainful, nevertheless.

Object of Triple Expansion.

The fall of temperature in each cylinder of a triple expansion engine is kept within one-third the range traversed when full ex-pansion takes place in a single cylinder. Thus limited in its cooling, each of the three cylinders is much more easily kept as hot as the steam which enters it. Quad-ruple expansion engines have followed upon triple, but so far they are in much less demand. Very interesting experiments have been made with pistons and cylinders surfaced with non-conductors such as por-celain, glass and cements, intended to re-duce the cooling effect of expansion. Some practical benefit is very likely to be won in this direction.

In working multiple expansion engines there is a mechanical advantage which has done not a little to recommend them. Their three or four cylinders can be so grouped as perfectly to equalize the strain on the work-ing parts, and uniformity of motion is pro-moted at the same time that repairs are brought to a minimum. With freedom to run at very high speed, these engines enter upon a further source of gain. The in-jurious cooling of a cylinder by its expand-ing contents requires time, though very little; if the piston's journey is extremely rapid, only a fraction of this cooling effect can be exerted. Economy, furthermore, comes with increase in an engine's size—this for the reason that while its capacity augments as the cube of its length or other dimension, its rubbing surfaces, the areas at which steam can be hurtfully cooled or heat wastefully radiated and conducted, in-crease only as the square.

The Most Efficient Known.

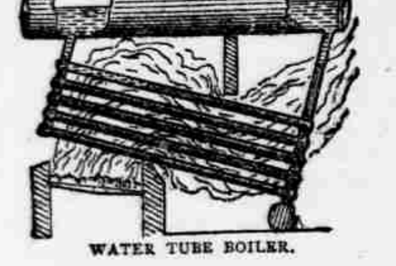
Fully to develop its strong points, this type of engines asks a comparatively steady load, such as that put upon it in a textile mill. Applied to this kind of work a re-cently erected Corliss triple expansion en-gine has shown an efficiency 30 per cent greater than that of the very best engine of the single cylinder class. It uses less than 1½ pounds of fuel per horse power per hour. Developing 1,000 horse power, it consumes but 1,445 pounds of Pocahontas coal per hour. Its third and last expansion is performed in two cylinders instead of one, so as to give perfect balance to the strains on its shaft.

Though marine and stationary engines in their best estate are wasteful of the fuel supplied them, locomotives are more waste-ful still. Wide fluctuations of load, fre-quent stops, exposure of cylinders, all com-bine to make their losses reach a very high figure. Compounding has been applied to locomotives with highly satisfactory re-sults. Owing, however, to the resistance which the steam encounters in passing through two sets of ports, the compound locomotive is better adapted for slow pas-senger and freight service than for fast ex-press trains. On the Western New York and Pennsylvania Railroad last September the work of two Baldwin locomotives was carefully compared. The engines were pre-cisely alike except that one was simple and the other compound. At a speed averaging 18½ miles an hour the latter burned less coal than the former by 36 per cent. On a fast express train between New York and Washington the economy sinks to 15 per cent.

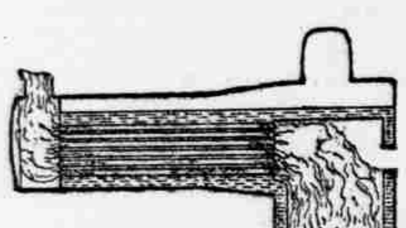
The Work of the Governor.

In other than locomotive engines the work to be done varies from moment to moment in a very trying way. A towering wave strikes a ship and suddenly lifts its propellor out of the water; in rolling mills, at the stations of cable and electric rail-roads, the resistance to be overcome fluc-tuates very sharply. Here arises the need for a governor of the most sensitive kind—a demand fully met in recently devised appli-ances. So immediate is their response to variations of load that they almost seem to anticipate when they must tighten the rein or loosen it.

When by governors and valves of ex-quisite delicacy, and by a well planned series of cylinders, the engineer has econo-mized his steam to the utmost, he comes at last to the point where much the larger part of its heat must be thrown away. If, as in the locomotive, the exhaust steam is ejected into the air this loss is total. If he has a cheap water supply the engineer can effect a saving by condensing this exhaust steam and so harnessing atmospheric pressure to help out the steam at work for him. Con-



WATER TUBE BOILER.



FIRE TUBE (LOCOMOTIVE) BOILER.

densation is usually effected by throwing jets of cold water directly into the steam. A better plan, that of surface condensation, as it is called, requires a much larger out-lay for apparatus. The cold water is sent through tubes outside of which the steam is liquefied.

Using Water Over and Over Again.

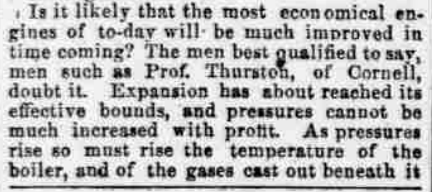
With either method the water carried into the boiler can be heated through a good many degrees. Surface condensation has a special and very important advantage, which makes it imperative at sea and on land wherever a water supply is decidedly impure. In locomotives and other non-condensing engines even the least impure waters deposit a scale. This scale is so poor a conductor of heat that a film of it only one-sixteenth of an inch thick may deduct as much as one-eighth from a boiler's effi-ciency. With surface condensation no such loss need occur, and all necessity for scale solvents ceases, the same clear water being returned to the boiler and used over and over again.

The surface condensers of the Majestic and Teutonic each contain 20 miles of brass tubing seven-eighths of an inch in diameter. Through this labyrinth 4,000 tons of sea water pour every hour to liquefy the engine's exhaust steam. It is in warming streams, great or small, such as this that most of the heat of a condensing engine is wasted; that is, wasted so far as any value as a source of power is concerned. Its utiliza-tion has been attempted more than once.

The Westinghouse Engine.

Of high-speed engines, a very notable model is that invented by Herman Westing-house; it has two cylinders, in each of which the steam acts against but one side of the piston. As the strain of reversal attending double action pistons is thus avoided, as well as the jar which follows upon the ordinary wear of such pistons and their con-nections, an extraordinary pace is reached by these engines.

Is it likely that the most economical en-gines of to-day will be much improved in time coming? The men best qualified to say, men such as Prof. Thurston, of Cornell, doubt it. Expansion has about reached its effective bounds, and pressures cannot be much increased with profit. As pressures rise so must rise the temperature of the boiler, and of the gases cast out beneath it



to pass wastefully up the chimney. To quicken speed means to heighten friction and jar, and to ask valve motions to do more than they can do well. But where the quest is not so much for the utmost fuel duty as for an engine which shall be small, cheap and fairly economical, there has been within the past year or two a very interesting return to the utmost mechanical simplicity.

Era of the Steam Turbine.

In the very first attempt to get rotary motion from steam, tradition has it that Hero of Alexandria sent steam through bent tubes very like those of the twirling jets of a common ornamental fountain. Reverting to this ancient line of attack, and with the curves of the best water wheels before them, inventors have devised steam turbines of remarkable efficiency. In a rigorous test last December at an electric light station in Newcastle-on-Tyne, England, a Parsons steam turbine of 134 horse power, arranged for condensation, consumed but 27.6 pounds of steam, requiring three pounds of the best coal, per horse power per hour. This per-formance compares favorably with that of good engines of the usual kind, although not with engines of multiple expansion. The steam used during the test had 95 pounds pressure; at higher pressures better results are to be had.

The machine is as yet only in process of experimental development. Even if, when perfected, it should demand more fuel than its familiar rivals, its small first cost, its simplicity and lightness, its freedom from vibration, and small friction may make it the cheapest steam motor in the end. For the engineer's aim is not so much to reduce the consumption of his fuel as to bring down the total cost of power, of which fuel is but one item, to the lowest possible point.

GEORGE ILES.

THE FACE OF BUDDHA.

Lafcadio Hearn Searches for the Idol in Japanese Temples.

NOT VERY DIGNIFIED AFTER ALL.

Telling Fortunes With a Mysterious Box and Dai-Kitsu Paper.

AN ANCIENT BUDDHIST CEMETERY

[WRITTEN FOR THE DISPATCH.]

I am still unsatisfied in my search for that which is always hidden away. I have pas-sed another day in Japan, wandering from one shrine to another; but I have not yet seen the face of Buddha. Sometimes it happens that after unspeakably wearisome climbing of stone steps, and passing under miraculously carven gates, whose gargoyles are tusked heads of elephants, and heads of angry lions—and entering shoeless into scented twilight, into magical gardens of golden lotos blossoms made of paper—and thence behind screens, into deeper dim-nesses still more richly scented, and wait-ing for the eyes to become habituated to the soft gloom, I look in vain for the god.

Only an opulent glimmering confusion of things half seen—vague altar-splendors created by gilded bronzes twisted into enig-mas, by indescribable vessels, by beautiful texts of gold, which are riddles to all but the learned—and these framing in nothing but the darkness of the void behind the altar.

These Japanese take their religion lightly, cheerfully. They throw their cash into the temple box, make their reverence, clap their hands together thrice, murmur a prayer—then turn to laugh or to smoke their little pipes before the open gate of the shrine. Their faith seems to have a joyousness un-known in the Western world. There is nothing grim, austere or self-repressive about it.

Joyousness of Japanese Faith.

Returning to my hotel, Akira, my at-tendant, is bowing and smiling at the door. He slips off his sandals, enters in his white digitated stockings, and with another charm-ing smile and bow, sinks gently into the proffered chair. Akira is a handsome boy. With his smooth beardless face and clear bronze skin, and fine white teeth, and thick blue-black hair trimmed into a shock that shadows his forehead to the eyes—he has al-most the air, in his long-sleeved, satin-belted robe and snowy stockings, of a young Japanese girl. I clap my hands for tea—hotel tea—which he calls "Chinese tea." I offer him a cigar, which he declines; but with my permission he will smoke his pipe. Thereupon he draws from his girdle a Jap-anese pipe-case and tobacco-pouch com-bined—pulls out of the pipe-case a little brass pipe with a bowl scarcely large enough to hold a pea—pulls out of the pouch some tobacco so finely cut that it looks like hair—stuffs a tiny pellet of this preparation in the pipe—and begins to smoke. He draws the smoke into his lungs, and blows it out again through his nostrils. Three little whiffs, at intervals of about a half minute; and the pipe, emptied, is replaced in its case.

Going to See Buddha.

Meanwhile I have related to Akira the story of my disappointments.

"Oh, you can see him to-day," responds Akira, "if you will take a walk with me to the Temple of Zoto-Kuin. For this is the Busshoe—the festival of the birthday of Buddha. But he is very small, only a few inches high. If you want to see a great Buddha you must go to Kamakura. There is a Buddha in that place sitting upon a lotos, and he is 50 feet high."

So I go forth under the guidance of Akira. There is a sound of happy voices from the temple, and the steps are crowded with smiling mothers and laughing children. Entering, I find women and babies pressing about a lacquered table in front of the door-way. Upon it is a little tub-shaped vessel of sweet tea—amacha; and standing in the center of it is a tiny figure of Buddha—one hand pointing upward and one downward. The women, having made the customary of-fering, take up some of the tea with a wooden ladle of curious shape—like an im-mense pipe—and pour it over the statue, and then, filling the ladle a second time, drink a little, and give a sip to their babies. This is the ceremony of washing the statue of Buddha.

A Baby in a Bell.

Near the lacquered stand on which the vessel of sweet tea rests, is another and lower stand supporting a temple bell, shaped like a great bowl. A priest ap-proaches with a padded mallet in his hand, and strikes the bell—keeping his eyes the while fixed on me, with a look of kindly curiosity. But the bell does not sound properly; he starts, looks into it, laughs and stoops to lift out of it a pretty, smiling Japanese baby. The mother, also laugh-ing, runs to relieve him of his burden; and priest, mother and baby all look at us with

WASHING BUDDHA.

a frankness of mirth in which we cannot join.

Akira leaves me a moment to speak with one of the temple attendants, and presently returns with a curious lacquered box, about a foot in length, and four inches wide on each of its four sides. There is only a small hole in one end of it—no appearance of a lid of any sort.

"Now," says Akira, "if you wish to pay two sen, we shall learn our future lot ac-cording to the will of the gods."

Gladly I pay the two sen, and Akira shakes the box. Out comes a narrow slip of bamboo, with Chinese characters written thereon.

"Kitsu!" cries Akira—"Good fortune. The number is fifty-and-one."

Again he shakes the box, and a second bamboo slip issues from the slit.

"Dai Kitsu!—Great good fortune. The number is ninety-and-nine."

Once more the box is shaken; once more the oracular bamboo protrudes.

"Kyo!" laughs Akira. "Evil will befall us. The number is sixty-and-four."

Fortune Telling in Japan.

He returns the box to a priest, and re-ceives three mysterious papers numbered with numbers corresponding to the numbers of the bamboo slips. These little bamboo slips, or divining-sticks, are called mikuji. Now this, as translated by Akira, is the sub-stance of the text of the paper numbered fifty-and-one.

He who draweth forth his mikuji, let him live according to the heavenly law and wor-ship Kwannon. If his trouble be a sickness, it shall pass from him. If he have lost aught, it shall be found. If he have a suit at law he shall gain. If he love a woman he shall surely win her, though he should have to wait. And many happinesses will come to him.

The Dai-Kitsu paper reads almost simi-liarly—with the sole differences that instead of Kivannon, the deities of wealth and pros-perity—Daikoku, Bishamon and Benlin—are to be worshiped, and that the for-tunate man will not have to wait at all for the woman loved. But the Kyo paper reads thus:

He who draweth forth this mikuji it will be well for him to obey the heavenly law and to worship Kivannon the Merciful. If he have any sickness, even much more sick he shall become. If he have lost aught it shall never be found again. If he have a suit-at-law, he shall never gain it. If he love a woman, let him have no more ex-pectation of winning her. Only by the most diligent piety can he hope to escape the most frightful calamities. And there shall be no felicity in his portion.

"All the same we are fortunate," laughs Akira. "Twice out of three times we have found luck. Now we will go to see an-other statue of Buddha."

And he guides me, through many laby-rinthine curious streets, to the southern verge of the city.

Before us towers a hill, which a broad flight of stone steps sloping to its summit—between foliage of cedars and maples. We climb; and I see above me the lions of Buddha waiting—the male yawning menace; the female with mouth closed. Passing be-tween them, we enter a huge court, at whose further end rises another wooded eminence.

This One of Respectable Size.

I peer in through the blue smoke that curls up from half a dozen tiny rods planted in a small brazier full of ashes; and far back in the shadow I see standing a swarthy Buddha, tiara-coiffed, with head bowed and hands joined—just as I see the Japanese praying erect in the sun before the thresh-olds of temples. The figure is of wood, rudely wrought and rudely colored; still the placid face has beauty—beauty of sug-gestion.

Crossing the court to the left of the build-ing I find another flight of steps before me leading up a slope to something mysterious still higher—among enormous trees. I ascend these steps also, reach the top, guarded by two small symbolic lions, and suddenly find myself in cool shadow, and started into immobility by a spectacle to-tally unexpected and unfamiliar.

Dark—almost black—soil; and the shad-owing trees immemorially old, through whose vaulted foliage the sunlight leaks thinly down in rare flecks; a corpuscular light, tender and solemn, revealing the weirdest host of unfamiliar shapes—a vast congregation of grey columnar, mossy things, stony, monumental, strangely sculp-tured with Chinese ideographs. And about them, behind them, rising high above them—thickly set as rushes in a marsh verge—tall, slender wooden tablets, like laths, black-written with similar fantastic lettering, pierce the green gloom by thou-sands, by tens of thousands.

An Ancient Buddhist Cemetery.

And before I can note other details I know that I am in a hakaba—a cemetery—a very ancient Buddhist cemetery. These laths are called in the Japanese tongue sotobas. All have notches cut upon their edges on both sides near the top—five notches; and all are painted with Chinese characters on both faces. One inscription is always the phrase, "To Promote Buddha-hood," painted immediately below the dead man's name; the inscription upon the other surface is always a sentence in Sanscrit, whose meaning has been forgotten even by those priests who perform the funeral rites. One such lath is planted behind the tomb as soon as the monument (haka) is set up, then another every seven days for 49 days, then one after the lapse of 100 days, then one after the passing of three years, then at successively longer periods others are erected during 100 years.

And in almost every group I notice one quite new, of freshly planed, unpainted white wood, standing beside others gray or even black with age, and there are many still older, from whose surface all the char-acters have disappeared, lying on the somber clay. Hundreds stand so loose in the soil that the least breeze jostles and clatters them together with a bony sound. Not less unfamiliar in their forms, but far more interesting, are the monuments of stone. One shape I know represents five of the Buddhist elements: A cube support-ing a sphere which upholds a pyramid, on which rests a shallow square cup with four crescent edges and tiled corners—and in the cup a pyriform body poised with the point upward. These successfully typify Earth, Water, Fire, Wind, Ether—the five sub-stances wherefrom the body is shapen, and into which it is resolved by death; the ab-sence of any emblem for the sixth element, Knowledge, touches more than any imagery conceivable can do.

For the Little Children.

Roku Jizo—"The Six Jizo"—these images are called in the speech of the people, and such groups may be seen in many a Japan-ese cemetery. They are representations of the most beautiful and tender figure in Jap-anese popular faith—that charming divinity who cares for the souls of little children, and consoles them in places of unrest, and saves them from demons.

"But why all those little stones piled about the statues?" I ask.

Well, it is because some say that the child-ghosts must build little towers of stones for penance in the Saina-Kawara, which is the place to which all children after death must go. And the Oni, who are demons, come to throw down the little stone-piles as fast as the children build, and these demons fright-en the children, and beat them and torment them. But the little souls run to Jizo, who hides them in his great sleeves, and com-forts them, and makes the demons go away. And every stone one lays upon the knees or at the feet of Jizo, with a prayer from the heart, helps some child-soul in the Saina-Kawara to perform its long penance.

"All the children," says the young Budd-hist student who tells me all this with a smile as gentle as Jizo's own, "must go to the Saina-Kawara when they die. And there they play with Jizo. The Saina-Ka-wara is beneath us, below the ground. And Jizo has long sleeves to his robe; and they pull him by the sleeves in their play; and they pile up little stones before him to amuse themselves. And those stones you see heaped about the statues are put there by good people for the sake of the little ones—most often by mothers of dead children, who pray to Jizo."

LAFCADIO HEARN.

Where the Microbes Thrive.

Snooper—It's no wonder they are always finding microbes, bacteria and such things in France."

Simeral—Why?

Snooper—Because France is just the place for Parisites."

OUR BOYS AND GIRLS.

WHITE MICE OF AFRICA.

How the Mother of Five Little Ones Gave Them an Airing—Forming a Chain for Protection—Hiding Under a Heap of Leaves.

[WRITTEN FOR THE DISPATCH.]

The following drama in a thicket took place in Africa, near Biskra: I was return-ing from the hunt with my orderly, weary with hours of walking under a burning sun, which dried my throat. In these regions of sand nothing can be found to quench thirst but a brackish and putrid water. My gourd had long been empty when at last we caught sight of the first trees of the oasis, and further in the distance the tents of a no-madic tribe.

I sent in all haste in search of milk, and stretched myself out in the shade of a cork tree to wait. I had before me a superb African landscape, but I confess I had little thought of admiring it. My eyes rested, with the vague look of a wearied man, on a thicket of aloes whose branches seemed to caress the foot of a gigantic palm, when suddenly, in the midst of the thicket, ap-peared a fine, tiny head and two brilliant eyes. My instinct for observing awoke. I forgot my thirst and fatique; I foresaw something curious, and concentrated my attention on the foot of the palm tree.

Exploring the Surroundings.

After minutely examining everything about her, the little animal slowly emerged from her hole and stopped. It was a white mouse with an eye as quick and cunning as that of a Parisian grisette. The little ani-mal looked, seemed to listen and then she began to move slowly around the tree to

The Procession of Mice.

make sure that she was alone. At first she kept quite close to the trunk, but gradually enlarged her circle, and when she had ex-plored a certain radius of space she stopped again.

"Very good," she seemed to say to her-self; "all is quiet. We shall run no risk."

I could read this plainly in the expres-sion of her eyes. Suddenly, after a last look about, she started, trotting in a direct line to her hole, in which she disappeared with marvelous agility. Scarcely one minute had elapsed when the head of my little ani-mal reappeared. The same performance was then executed as when she first came out. She looked to the right and to the left, but this time she was not alone! She was the good mother of a family bringing her chil-dren out for an airing. There were five of these children—tiny, pretty, white things, the picture of their mother. And so well-behaved! They moved in line like soldiers in single file, one after another.

It Was a Chain of Mice.

But it was only as I looked more closely at them that I understood the cause of their irreproachable alignment, and perceived at the same time a proof of their mother's prudence and ingenuity. The foremost of the little ones held his mother's tail in his mouth, the second held his brother's tail in the same manner, and so on down to the last in the line. In this way, in case of alarm, there was no danger of losing any member of the family.

The mother, after casting a rapid glance about her, uttered a little cry, and the babies, like schoolboys at the master's signal, broke the line; and then, under the watchful surveillance maternal, began to play and to run to and fro. Gravely sitting on her haunches, with her tail straight out behind her—which is a sign of vigilance—the mouse looked on at their play, her eyes gleaming with pleasure. When the little band had had plenty of sport, at a signal they gathered closely together, rolling

Covering the Young.

themselves into a sort of ball, as if they were chilly. This maneuver must doubt-less have been practiced and agreed upon beforehand. Then the mother, bringing dried leaves in her mouth, gradually covered them entirely from view.

Leaving the Little Ones Alone.

This operation ended, she withdrew a few steps to examine the result of her labor. She was probably satisfied, for after having gone close to her children and given them some final injunction, she disappeared in a glade of the neighboring forest. The little ones were motionless under their covering of leaves; nobody could have suspected that a whole family of mice was hidden away there.

About ten minutes later the mother re-turned, and I then understood her absence, which had puzzled me. She carried in her mouth a nut from which the shell had already been gnawed off. Probably this preparation had been made by the male as a good father of a family.

Again I heard the cry which I had noticed before. Immediately the covering of leaves fell into ruin, and the little fellows ran about their mother. They seemed to know that dinner time had come.

After a few busy instants, while both teeth and paws were doing their part, the nut was brought from its shell and divided into five equal parts, which the children nibbled at with the appetite peculiar to their age. When the last fragment of the nut had disappeared, they returned to their play. The mother made no objection to this. All was tranquil.

Scampering Away to Shelter.

But there is no perfect happiness in this world. Up to this point I had watched the various doings of the little family with in-terest. Now impelled by curiosity, I re-solved to trouble their serenity for the sake of seeing what would happen, and I made a sudden noisy movement where I lay.

I had scarcely time to observe what took place. One of the little ones had instantly seized his mother's tail in his mouth, an-other his brother's tail, and so on; and in the twinkling of an eye this cluster of mice had formed into line and disappeared within its hole.

I felt something like compunction at having disturbed the peace of these little creatures, but I had found a new argument to prove that animals have intelligence; and, believe me, intelligence is becoming so rare among men that I was glad to find evi-dence that it was not entirely disappearing from the face of the earth.

M. DE BAJON.

EAT FIVE TIMES A DAY.

Doctors Agree Now That That Is the Best Thing for the Health.

[WRITTEN FOR THE DISPATCH.]

The wise doctors grow wiser with each year. Time was when they were wise enough to tell us that the chief of sins against one's stomach was to give it work to do before putting it to bed. This was de-clared to be the fruitful source of dyspepsia and nightmare and other unholy afflictions. They are wiser now and tell us that so far from being wrong to ourselves to eat before going to bed, it is a wise and desirable thing to do, especially in case of delicate persons and growing children, or when the food of the previous meal has had time thoroughly to digest before the sleeping hour.

Many a person has found this out for him-self or herself by personal experiment. There are a few persons so unfortunate as to be unable to eat even lightly before sleeping without having a stupid headache the next day. But the majority of people are only the better for a little food at bed-time. It should not be rich or of great va-riety. A few biscuits and cup of hot buil-lon is excellent; so is a glass of beer or of hot milk, sipped slowly, and both induce sleep. Cheese, meats, fruits and pastries are not good guides through dreamland. They know where the ogres dwell.

More women sin through under-eating than through over-eating. And all women sin in not distributing rightly the amount of food taken through the 24 hours. An empty stomach is as bad as an empty head. Digestion is the proper function of the stomach, and it can be made more nearly continuous than people think. The com-mon practices of putting into the stomach three times in 24 hours, just as much food as it can hold, and then of giving it nothing whatever for 12 hours more, is about as illogical an arrangement as anybody ever devised. To the credit of the human race be it said that this is a habit that is not now universal. The French eat four times a day, the English four and sometimes five, the Germans four also. A woman who breakfasts at 8 should eat again between 11 and 12. Luncheon at 1 again, and tea and a biscuit at 5, when dinner is at 6:30 or 7. Before going to bed at 11 she should eat a little more—a biscuit again and something hot. This will insure quick and resting sleep, because it takes the blood from the head, where it doesn't belong, down to the stomach, where it does belong.

HELEN WATTERSON.

ST. LOUIS' WATER SUPPLY.

A Doctor Stands Up for Adam's Ale in the City of Lager Beer.

A New York gentleman, recently in St. Louis, got himself interviewed on his re-turn home, and stated that St. Louis drink-ing water was so filthy that everybody was compelled to drink intoxicating liquor, while most people drank to excess from pure necessity, says Dr. Milton N. Berry, of St. Louis, in the *Globe-Democrat* of that city. This gentleman must have contented himself with looking at a muddy glass of water without tasting it, or he would have found out that St. Louis water is really more palatable before filtration than after, and if he had taken the trouble to make in-quiry among the physicians he would have found that there is nothing in our unfiltered water objectionable or hurtful.

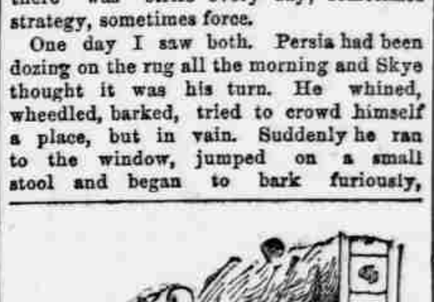
It is not every filter that will do its work with our water, but there are several that will purify it thoroughly, yet the sale of filterers in the city is not so large as in many other places where the drinking water looks much clearer and more pleasant, for the simple reason that most people prefer it as it comes through the pipes. The New York gentleman, if he ever said what was attributed to him, stands convicted of either ignornace or mendacity, or perhaps a little of both.

TWO FOUR-FOOTED JOKERS.

Various Means Adopted by a Cat and a Dog to Get a Fur Rug.

Not very long ago I was witness to a curi-ous instance of practical joking between two animals. Persia was a Persian cat, and Skye was a terrier. They lived together on good terms, there being but a single point of controversy—who should occupy the fur rug in front of the grate. But about this there was strife every day; sometimes strategy, sometimes force.

One day I saw both. Persia had been dozing on the rug all the morning and Skye thought it was his turn. He whined, wheedled, barked, tried to crowd himself a place, but in vain. Suddenly he ran to the window, jumped on a small stool and began to bark furiously,

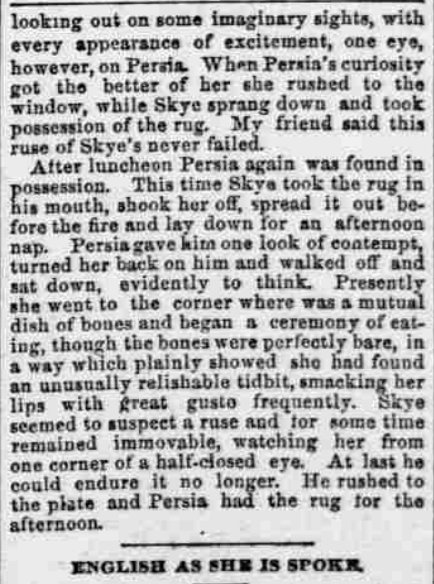


Skye Thought It Was His Turn.

looking out on some imaginary sights, with every appearance of excitement, one eye, however, on Persia. When Persia's curiosity got the better of her she rushed to the window, while Skye sprang down and took possession of the rug. My friend said this ruse of Skye's never failed.

After luncheon Persia again was found in possession. This time Skye took the rug in his mouth, shook her off, spread it out be-fore the fire and lay down for an afternoon nap. Persia gave him one look of contempt, turned her back on him and walked off and sat down, evidently to think. Presently she went to the corner where was a mutual dish of bones and began a ceremony of eat-ing, though the bones were perfectly bare, in a way which plainly showed she had found an unusually relishable tidbit, smacking her lips with great gusto frequently. Skye seemed to suspect a ruse and for some time remained immovable, watching her from one corner of a half-closed eye. At last he could endure it no longer. He rushed to the plate and Persia had the rug for the afternoon.

ENGLISH AS SHE IS SPOKE.



TRICKS WITH A BIRD.

Any Boy Can Train One in Five Minutes if He Knows the Secret.

THE BLONDIN TRICK IS EASY.

All There Is in It Is to Utilize the Shape of the Little Body.

GETTING DOVES TO ALIGHT ON YOU

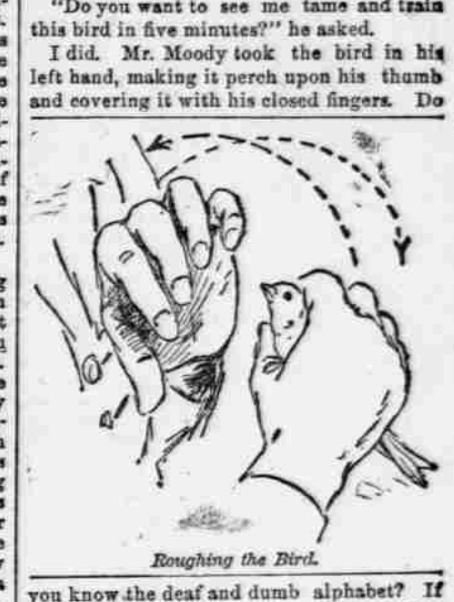
[WRITTEN FOR THE DISPATCH.]

The bird that is born in captivity is al-ways harder to train than another of the same species which is hatched in freedom. It is the same way with wild animals. It is explained that the captive has been accus-tomed from infancy to the sight of man and to restraint; therefore, when the trainer begins to exercise his authority he finds that his pupil has an unbroken will, and that fear of man does not enter into his mind.

I recently called on Mr. Moody, the old-est and best bird trainer in this country. He took from one of the cages a wild bul-finch.

"Do you want to see me tame and train this bird in five minutes?" he asked.

I did. Mr. Moody took the bird in his left hand, making it perch upon his thumb and covering it with his closed fingers. Do



Roughing the Bird.

you know the deaf and dumb alphabet? If you do, make the sign for the letter "O," and you will have your hand ready to re-ceive the bird. Through the "O" the bird will flutter. The moment its head appears gently catch it in your right hand and keep on rubbing it, first in one hand and then in the other hand until its fear has left it.

Roughing Its Fear Away.

"I do this for a minute to get the fear out of the bird," explained Mr. Moody. "Now see!" Then the bulfinch perched for a mo-ment on the trainer's forefinger. When it took wing and fluttered away to a bookcase in the corner Mr. Moody followed it.

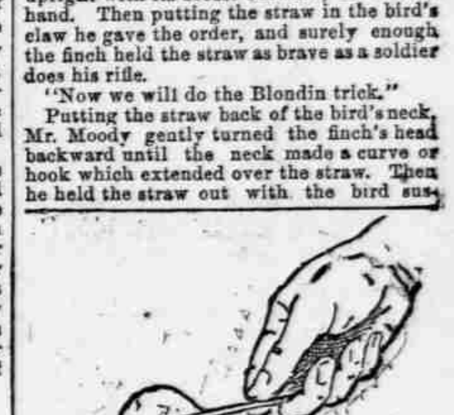
This rubbing, or "roughing," as it is called, was repeated for two minutes. At the end of that time the little finch perched on the trainer's finger and hopped from one finger to the other as if it had known no other perch since it left its nest of twigs in old England. When the bird was tired of flying its fear had been roughed away, so Mr. Moody said, and he seemed to be right.

"I will now make it shoulder arms."

Taking a straw, the trainer held the finch upright with its breast outward, in his left hand. Then putting the straw in the bird's claw he gave the order, and surely enough the finch held the straw as brave as a soldier does his rifle.

"Now we will do the Blondin trick."

Putting the straw back of the bird's neck, Mr. Moody gently turned the finch's head backward until the neck made a curve or hook which extended over the straw. Then he held the straw out with the bird sus-



The Blondin Trick.

pended from it, and one of the simplest but apparently most difficult feats in balancing was illustrated.

Making the Finch Die.

"You are going to die now," said the trainer, and he laid the finch on its back upon the carpet, gently smoothing down its wings close to its body and straightening out its legs so that the claws rested between the long tail feathers.

"Now, sir, you are dead." And the bird looked it.

"The policeman is coming; look out for yourself!" and Mr. Moody slapped the car-pet on each side of the dead bird with the palms of his hands, and in the twinkling of an eye the dead bird had come to life, and was perched trembling upon a toy tree in the farther corner of the room. All of this was done in less than five minutes.

These tricks, as you see, are exceedingly simple. The bird could not help doing them. The trainer had simply taken ad-vantage of the peculiar conformation of the bird's body. Any bird handled as the finch was handled could not have helped doing the same things, although it might have taken longer to have roughed the fear out of an excessively shy bird. It is equally easy to train birds to fly to their trainer and eat hemp seed between his lips.

The Regular Tricks Are Harder.

There are many amusing tricks which re-quire apparatus; such as teaching a bird to fire off cannons, pull wagons, haul down flags, draw wagons filled with seed up an inclined plane to the cage, and draw water from a miniature well in a little thimble bucket. But those should not be attempted until the simpler tricks are learned and the would-be trainer has thoroughly acquired the knack of training a bird.

The macaw, paroquet, cockatoo—all vari-eties of the parrot in fact—are wild and dangerous birds to handle before they are trained. The parrot must be taken from its cage with a heavily-gloved hand, for its hooked bill is terribly powerful and it is a cruel biter. This is the way it is tamed: Take it into a small and entirely empty room. Put heavy gloves on your hands and take a stick with you. Then let the bird go. Don't let it perch for an instant anywhere. Keep it constantly on the wing. When the bird tires offer it your finger to perch upon. At first, and indeed after many trials, it will bite at your finger. When it does that smooth it down until it leaves you to fly away once more. Keep on doing this and in less than two hours you will tame the wildest Polly that ever asked for a cracker.

Much in the same way are doves taught to fly to their trainer as you have seen them do in shows. Begin with not more than three doves, and keep them flying until they learn that they can alight only upon you. The fortune-telling trick, where a bird picks out a card from a pack, is simple in the extreme. First begin with a card between the edges of which is a hemp seed half concealed.

Among the easiest songsters to train are the goldfinch, chaffinch, bulfinch, siskin, redpole and starling.

BENJAMIN NORTHROP.

—Women of every rank go bareheaded in Mexico.