Points for Young Engineers.

A contributor of the American Machinist gives this advice: Now, young man, first of all, let well enough alone. Never disturb an engine without occasion demands it, and if so, do it systematically. Have the floor swept clean, and spread some old sacking which is clean. When you take a part off clean it with clean waste, being careful to keep your waste from all grit. Run your hand over the part to see if the waste has left anything on it, as the hand will readily detect the smallest particle of grit. After you have cleaned a part, lay it back out of the way just as it came off, and all the small stuff with it, just as it belongs.

When you take off the head or steam chest, take the bolts and lay them in a circle or hollow square, with the small ends in, so that you can put them back just as they came out. You will be surprised to see how much faster the work will progress.

When you come to a thing that sticks, find out what causes it, and remedy it The builders of steam engines do not always do their work well. But whatever you do don't use a hammer; use wood or lead tools to pound with. If you use blocks, cut them about five inches long and eight inches in diameter, of hard wood, keeping them on hand all the time, replacing them as fast as one gives way, never waiting until one is needed.

When you put a wrench on a nut, see that it fits it before you begin to pull, or you will soon spoil both wrench and nut. If a nut goes too hard, take it off and clean the thread.

If your oil can gets stopped up, look out for it, as it does no good to stick the snout of a can into an oil hole unless you leave a drop of oil there.

Empty out both your can and filler, and wash them out clean, then get a piece of thin cotton cloth and strain the oil; it will not take long, and you will be sure of the can's delivering a drop of oil every time it is required. And, lastly, when your engine runs bad, sit down and try and reason out why it does so. And take a good paper to read.

In Earnest.

After Colonel Gordon's death, the English papers were full of anecdotes of the great soldier, of which the following are examples:

Upon his return from China (where he was regarded as the saviour of the Empire), he devoted himself to the service of the vagabond boys of the suburb of London where he lived; gave up his own house to them, spent his salary and his time in teaching them and in trying to "make men of them."

One night, there was brought in a poor little waif, for whom there was not a spot in which he could lie down; the house was filled to overflowing. The boy was lodged in the stable. The next morning early, Colonel Gordon was seen crossing the yard with a bucket of hot water, soap, sponges and towels. He stripped the boy, put him in the trough, and scrubbed him from head to foot. He led the little fellow in to breakfast presently in a clean suit of clothes. None of his servants, he knew, would touch the child.

Another time he gave up a command, because he was ordered to shake hands with and welcome the native princes, whom he believed to be traitors.

"I can resign, but I will not play the polite liar," he said, gruffly.

Passing on a hot summer day through a London hospital, he noticed a wounded man who was tormented by a fly. He hurried out to the shops a mile distant, bought a fan, and carried it to the poor cripple. "This at least I can do for you," he said.

These little traits give us a significant index to the secret of Gordon's irresistible power over other men. Whatever were his faults, he was wholly in earnest in the occupation of the hour. Whether the day's work set before him was to crush the Taeping rebellion, to save a miserable street Arab, or to drive away a fly, he gave himself up to it with a single directness of purpose and forgetfulness of self.

Blessed is the Paying Subscriber.

We clip the following from an exchange:—

Blessed is the man who doth subscribe for a paper and pay therefor. His feet shall not be forsaken by his friends nor prosecuted by his enemies, nor shall his seed go begging.

Blessed is he that walketh into the office of a newspaper, yea, even entereth the sanctum and payeth a year's subscription therefor. Selah.

He shall learn wisdom day by day and be exalted above his fellows.

He shall talk knowingly upon all subjects and his neighbors shall be astonished at the muchness of his learning.

He shall not contract bad debts nor lose good bargains.

He shall not pay additional per cent on taxes, for he shall behold the notice of the collector and he shall take warning thereby.

Verily he shall bring his products to market when the prices are exceedingly good and withhold them when the price descendeth.

He shall not lay hold of red hot pokers, for the knowledge of metallurgy will teach him hot iron burns!

He shall live to a good old age and when his dying hour is at hand his soul shall not be troubled as to his future state.

But it were better for him that doth refuse to subscribe for a newspaper, that he were bound hand and foot, and cast upon a feather bed. He shall not rest by night or by day, for visions of creditors shall dance upon his stomach by night, and their actual presence torment him by day.

If perchance he hath a moment's peace, it is only that he may have a moment's rest ere the memory of an evil life lacerates his mind as the goad pricks the side of a strong ox, so that punishment may be longer drawn out.

India.

There is no country in the world the very name of which so dazzles the mind and stimulates the imagination as India, and the more we study the country, its people, and their traditions the more do we find that there is indeed a certain foundation for a large portion, at least, of the exalted popular ideas about it.

At the outset, then, it will be well to point out in general terms a few of the reasons which make it worth while to know something about this country.

India may be looked upon as a sort of epitome of the whole world, but in taking this point of view we must be careful to remember that we are speaking of what has been as well as what is. The records of India refer to a state of thing considerably earlier than any found elsewhere, and the country contains survivals of civilization more ancient than any known to us, Egypt and Chaldea not excepted. We are quite aware that this statement is at variance with received opinions of modern European investigators. In forming our judgment we have been led to rely rather on native then foreign authority, and in a future paper we hope to show that some grounds exist which, if accepted, give at least strong probability of the truth of these assertions.

To the ethnologist, India is a perfect museum. It contains some races in the highest state of culture and others hardly removed from the giant ape. Wave after wave of foreign invasion has swept over the country each leaving its trace in some displacement of the population and the addition of fresh factors thereto.

The languages of India are a life study in themselves; the classical language, Sanskrit, in which most of the sacred books are written, is the finest and most polished extant. Its vocabulary contains many words which it is quite impossible to translate accurately into English, as they stand for philosophical ideas of which the western world hardly has a conception, while structurally the language is, so to speak, a perfect model of architecture. It is to be hoped the time will soon come when this queen of languages, will be generally more studied for its own sake, and not merely, as is too often the case at present, for the beter elucidation of Greek and Latin. There are, moreover, several spoken languages, some of which possess a literature of their own, beside innumerable dialects. No national philosophy can compare with that of India. The Oriental mind revels in metaphysical subtleties and delights to trace out the logical consequences of the boldest speculative theories, and so in India we find every school represented, and anyone who has gone through a complete course of Indian philosophy will not find much that will be new to him elsewhere. Each of the various systems of philosophy finds counterparts in a form of religious belief; all Indian deities are the personifications of some law of nature, some moral idea, and the absurd stories of their mythology were intended originally as vehicles for the diffusion of knowledge, under the form of allegories, or parables.

The students of political philosophy and political economy find in India, in such early institutions as village tribunals and other customs connected with the village communities, a system of local autonomy which contains most of the germs afterward developed into constitutional government, as well as interesting studies of communities, each of which was self-supporting when the struggle for existence was reduced to a minimum.

A Vulnerable British Fort.

Within twelve days' steaming distance of the Russian naval station on the Asiatic coast, and lying within range of the guns of a modern warship manœuvered on the open waters of the Straits of Fuca, the construction of works for the defense of Victoria, B. C., has been entirely neglected by the British and Canadian Governments. The approach to the town wharves of Victoria is by a narrow and intricate channel, which can only be navigated safely by vessels of moderate tonnage; but as the centre of the town is little more than a mile from the outer roads, with good landing places at several points, the intricacies of the harbor channel interpose but a slight barrier to attacks from a hostile force. Three miles from Victoria harbor is the harbor of Esquimault, the only British naval station on the Pacific coast of America. Esquimault is one of the safest and most picturesque harbors in the world, about three miles in length, with a depth of water upon which the largest iron-clad ships-of-war can safely float, surrounded by low, wooded hills, with a narrow but deep entrance from Fuca straits. Esquimault, is, after San Francisco, the best harbor on the west coast of North America. A large naval graving-dock is well advanced toward completion at the upper end of the harbor, and a small dock-yard is near the entrance. Yet, strange to say, this important naval station has never been fortified. In the absence of British war ships from the harbor there is literally nothing to prevent an ordinary steamer, armed with one rifle gun, from steaming in and destroying the dock yard buildings, the graving dock, and the Village of Esquimault. The indifference of the British Government to the defenseless condition of their own naval station on the North Pacific can only be explained on the presumption that the Admiralty intended that one or more efficient cruisers of the British fleet should always be in the harbor. In the summer months the flagship and several of the smaller vessels do go up from the coasts of South and Central America, and refit at Esquimault; but at other times, and particularly during the last three years the harbor has often been deserted by the naval ships and left entirely unprotected.

Australia has an editor 91 years old, and he still works as lively a pair of scissors as any of them. This is another great argument in favor of a spare diet.

THE "BELTED" CRUISERS.

Important Additions to the British Navy now Under Construction.

The two new belted cruisers secured from the Government by Messrs Robert Napier & Sons, Govan, are to be named the Australia and Galatea—the former, it is affirmed, out of respect to the spontaneous action of the Australians in sending volunteers to assist the mother country in the Soudan. Ever since it became known that two of the vessels had been booked on the Clyde many questions have naturally been asked about what constitutes a belted cruiser, and also as to the part it is to play in the naval service of the future. The matter of speed is said to have seriously engaged the attention of Admiralty experts several days before the contracts were given out, and 18 knots were finally adopted. Many builders on the Clyde, however, think that this should have been increased by at least half or even three-quarters a knot. This difficulty will, perhaps, be overcome much more easily than many imagine, for it may be recollected that in the case of the Phaeton, Leander, and Arethusa, the last war vessels built at Messrs Napier's yard for the Government, the contract speed was 16 knots, but this was actually exceeded by one of them to the extent of $2\frac{3}{4}$ knots on an exhaustive trial by the Admiralty. If the celebrated Clyde firm could do this with their last Government job it is, of course, within the range of possibility that on their trial trips both the Australia and Galatea many astonish "my lords" by steaming at

19 KNOTS PER HOUR.

Should such eventually prove correct in the case of a heavy belted cruiser armed with formidable guns, going at 19 knots per hour, an important problem in marine engineering will have been solved which cannot fail to influence the future condition of the British navy. For the present at least, these vessels will be the only ones on her Majesty's navy list with triple expansion engines. The triple expansion process is simply an improvement on the surface-condensing engine invented and successfully brought out by the late Mr. John Elder fully a quarter of a century ago. At that comparatively early period in Clyde engineering the great naval architect's idea was not regarded with the same importance as it was ultimately destined to assume when applied to fast ocean-going steamers consuming from 100 to 260 tons of coal in the 24 hours. But without it fast vessels could never be built to pay. The condensing of steam is so successfully treated by the original process of Mr. Elder that it can be used twice before it passes through the exhaust pipes. The same, or a like arrangement, wrought out by Mr. A. C. Kirk, enables the engineer to

USE THE STEAM THREE TIMES

before it becomes useless, and the fuel saving is thus very considerable on board a large ship. No doubt the Admiralty will soon find out for themselves the value of the invention. The dimensions of the Australia and Galatea are:—Length between perpendiculars, 300ft.; breadth, 56ft.; with a gross tonnage of 5000 tons. The main belt, from which the vessels take their names, and which forms the most effective part of their protective arrangements, is 240ft. long, 5ft. broad, and 10 inches thick, faced with three inches of steel before the seven inches of iron. The ends are protected by an underwater belt similar to that fitted into the Mersey; but as they are very fine the part of the water line not actually protected by armour is comparitively small. The engines are to be of the usual horizontal type for driving twin screws, and differ only from those of the Arethusa class by the cylinders being a shade larger and the adoption, as we have already said, of Mr. Kirk's triple-expansion appliances. The cylinders are 42in. and 72in., with a 43-inch stroke of piston. Double-ended boilers, four in number, with a total grade surface of fully 500 square feet, and working up to a pressure of 120lbs, are also to be introduced. They are to be able to develop at least 7500 horsepower on an exhaustive trial, and a speed of 18 knots must be attained to satisfy the Admiralty. In the construction of the machinery everything tending to lightness, such as brass and steel, is to be put in use, and the weight of the engines is not to exceed 720 tons. So much for the engines and hull, and now for the maning and armament. The Australia will have a crew of fully 340 all told, for whom excellent provision will be made on the second deck above the water line, the officers' quarters, in particular, having

ALL THE LATEST IMPROVEMENTS

for comfort and convenience. Two 18-ton guns, arranged forward and aft to fire round a complete sweep both at bow and stern, and twelve 4-ton and six machine guns, mounted on patent pivots, will form the chief armament; and the vessels, for greater protection in cruising near a hostile shore, will be provided with a patent torpedo net defence, and also appliances for discharging torpedos from small tenders, constructed for the purpose. The protective decks of the vessels will also form an important feature, and enable the belted cruisers to hold their own for a time with armour-clad vessels should necessity arise—their great speed and lightness enabling them to get out of the way after firing off their guns towards a slower but more powerful adversary. It is scarcely necessary to say that the new cruisers, as is the case with all her Majesty's ships of modern construction, will be sub-divided into water-tight compartments, and have all the most recently invented equipments, such as duplicate steering gear, mechanical ventilation, elaborate and powerful pumping arrangements, rapid and effective means of handling ammunition, indicators, steam steering gear, &c., and, in fact, every conceivable appliances which can be devised for efficiency, comfort, and safety. Two years and three months are allowed for building and leaving the contractors' hands.—[Glasgow Herald.

The Tenkis.

The winters on the eastern shores of the Caspian Sea are generally mild, and even during the severest portions of the year—toward the end of February—the snow rarely lies on the ground very long at a time. But about twice a month they are apt to have sudden and violent storms from the westward, somewhat resembling our Western cyclones. This Caspian storm is called the *tenkis*, and is thus described by a recent traveller who spent a winter at Gumush Tepe, where he experienced its effects:

"The first time I witnessed one I was excessively puzzled to understand the movements of the inhabitants immediately before the storm struck the village. It was about two o'clock in the afternoon; the sun was shining brightly, and the sky was without a cloud. All at once I observed persons pointing hurriedly toward the distant Caspian horizon, where a thin, white, jagged line of flying mist was perceptible, which rose higher and higher at each moment, approaching us with rapid pace.

"In the village itself the wind was blowing from an opposite direction, and the mist-cloud, along the Elburz range were moving towards the west, while the advancing scud was still so very indistinct as to be unobservable by the unaccustomed eye. I saw men and women in frantic haste, flinging ropes over the tops of the *kibitkas*, and lashing the opposite extremities to stout wooden pegs firmly embedded in the ground close to the wall of the dwelling.

"In the meantime, within my residence, old Dourdi, muttering prayers in most anxious tones, was propping his boat-hook and several other poles of equal size against the spring of the dome, and planting the lower one firmly in the ground. I could make neither head nor tail of all these preparations, and was still more confounded and amazed by seeing all the women of the community rushing to the bank of the river, some carrying a pitcher in each hand, others with enormous single ones strapped upon their backs. These, with feverish haste, they filled with water, and hurrying with them to their houses, again issued forth with other vessels for a fresh supply.

"Every one was too busily engaged to give me any further answer to my demands as to what all this meant, than to exclaim—

"'The *tenkis!* the *tenkis!*'

"By this time the jagged white mist had risen high above the horizon, and was rapidly veiling the western sky. Flocks of sea-gulls and other aquatic birds flew inland, screaming and shrieking loudly. Ere long I saw that the clouds along the mountain ceased their westward movement, staggered, reeled, and ultimately partook of the movement of the advancing scud. Great sand-clouds came whirling towards us from the beach, and in another instant the storm burst upon us, accompanied by a tremendous downpour of rain.

"The *kibitka* into which I rushed for shelter quivered and shook under its influence, and I thought that at each moment it would go over bodily. The westerly edge was lifted some inches from the ground with each fresh gust, and the eagerness with which ropes were hauled taut, and storm-props made fast by the inmates hanging with all their weight from their upper portions, reminded one of a scene on board a vessel at sea during a violent tempest.

"I was gazing through a crevice in the felt walls out over the plain in an eastward direction, where some camels, laden with grafs and hay, were hurrying forward to gain shelter before being overtaken in the open. I could see their loads seized upon by the storm gusts, and sent whirling far and wide, and to a height of a hundred feet.

"This storm continued an hour; but it was only when it had passed, and the inhabitants had leisure to speak to me, that I could make out the meaning of the hurried rush to the river for water. It appears that when the *tenkis* blows, the sea-water is forced up into the river rendering it unfit for human consumption, often for hours together, and it is with a view of securing a supply for household use that a rush is made to the banks as soon as the jagged mist appears upon the horizon."

Declarations of War.

There is no set form for a declaration of war. It being usually in the form of an address from the head of a Government to his official associates and subjects and to the world at large setting forth his determination to go to war and the causes that have led thereto.

On the 27th of March, 1854, the French Minister of State read to the corps legislatif, in the name of the Emperor, a message announcing that the final resolve of the cabinet of St. Petersburg had placed Russia in a state of war with France. A similar message was sent to the Senate. On the same day the Queen through Lord John Russel, sent a message to the English House of Commons. It announced her purpose to declare war. On the day following the official declaration was made in the London *Gazette*. It recited at length the causes which led to the rupture between Russia and the allied powers. It was of the length of two columns and concluded, as did the declarations of Russia and France, with a pious conviction that England enjoyed the especial protection of the Almighty in her struggle for the right. The announcement of each of these sovereigns to their parliament and subjects and to the world was regarded according to the modern custom of nations as a sufficient declaration of war to the enemy and to all whom it may concern. The correspondence of the state department shows no to her notification to have been given this Government.

GREATER LONDON.

Marvellous Facts about the World's Largest City.

A correspondent of the New Orleans Times Democrat has supplied the following particulars:—London, England, is the greatest city the world ever saw. It is the heart of the British Empire and the the world. It covers within the fifteen miles radius of Charing Cross (Strand) 700 square miles. It numbers within these boundaries 5,000,000 of inhabitants. It comprises over 2,000,000 foreigners from every quarter of the globe. It contains more Roman Catholics than Rome itself; more Jews than the whole of Palestine; more Irish than Dublin; more Scotchmen than Edinburgh; more Welshmen than Cardiff more country-raised persons than the counties of Devon, Warwickshire and Durham combined. It has a birth every five minutes, it has a death in every eight minutes, has seven accidents every day in its 8 000 miles of streets, has on an average forty miles of streets opened and 15,000 new houses built in it every year. In 1883, there were added 22,110 new houses to the vast aggregate of dwelling which is called the metropolis, thus forming 368 new streets and one square, covering a distance of sixty-six miles and eighty-four yards It is difficult to form any mental picture from these figures. Brighton (the queen of watering places) in 1881 had 20,379 inhabited houses, so that London in 1883 added to itself a town bigger than Brighton. It would require two Cambridges, or Oxfords, or Baths to represent the additions made in London in a single year. London has 46,000 annually added (by birth) to its population; has over 1,000 ships and 10,000 sailors in its port every day; has as many beer shops and gin palaces as would, if placed side by side, stretch from Charing Cross to Portsmouth, a distance of seventy eight miles; has 38,000 drunkards annually brought before its magistrates; has seventy miles of open shops every Sabbath; has an influence with all parts of the world, represented by a yearly delivery in its postal districts of 288,000,000 of letters. Eight hundred and fifty trains pass Clapham Junction every day, and the transportation (underground) railroad runs 1,211 trains every day. The London Omnibus Co. have over 700 busses, which carry 56,000,000 passengers annually. It is more dangerous to walk the streets of London than to travel by railroad, or cross the Atlantic from New Orleans to Liverpool; last year 130 persons were killed and 2,600 injured by vehicles in the streets. There are in London 15,000 police, 15,000 cabmen, 15,000 persons connected with the Post-office. The cost of gas for lighting London annually is $3,000,000. London has 400 daily and weekly newspapers. Last year there were nearly 600 fires. The ancient and famous city of London was first founded by Bute, the Trojan, in the year of the world 2,832, so that since the first building it is 3,006 years. The drainage system of London is superb, and the death rate very low.

Meal Worms.

"Say, boss, d'yer want any meal worms?" The question was put by a dirty specimen of humanity to the proprietor of a bird store.

"How many have you got?"

"About tree tousand; all very fat."

"Let's see 'em."

The man drew two tin cans from a dilapidated coat pocket and opened the lids. The cans were brimming full of small and lively crustaceous worms. They ran from yellow to dark brown in color, and were an eighth of an inch in thickness and an inch and a half in length. The bird fancier took one and ate it with critical slowness. After a gulp he said, "These are rather inferior, but how much do you want?"

"A dollar a tousand."

"All right; hand 'em over."

In answer to a question, the purveyor of worms said: "I've caught meal worms for ten years. Biz is generally good, and I can make twelve or tirteen dollars every week. Where do I get 'em? Why, in meal, of course! In dese big grain warehouses on the river front, in flour mills, and in old feed stores you can always find 'em, if you know where to look for 'em. De people wot owns dem here places are only too glad to have a perfeshional like me come in, cos dey breed fast and eat up lots of stuff. When I fust begun catchin' 'em, de bosses use to pay me a half; but when dey found out dat I sole 'em again, dey shut down on de racket. How do I get 'em? Wid my hands, and sometimes wid a sieve. Dey generally go in gangs togedder, and when you find one of 'em, you most always find fifty. I put 'em in tin mustard boxes, which hold one or two tousand, according to de size. Some days I get tree hundred, and some days, when luck is good, I get tree tousand. Den I go round to my customers. Meal worms are good for mocking birds, and nearly all birds with soft bills. Meal worms are very healthy, and taste a good deal like shrimps. Dey're hard and crisp, and very nice when you ain't very hungry. I know lots of fellers in de warehouses what eats 'em regular, and like 'em. Prices ain't very good now—not so good as in de fall. In de summer dey are quieter, and harder to get, and we put de prices up. Don't you want to try a couple? No? Well, all right, boss; we won't quarrel about it. So long."

First Plumber—"Whew! This is hot! But, say, Winter did everlastingly hang on." Second Plumber—"Yes—must have been working by the day."

"Yes, her story is rather exciting, but is at the same time pure and elevating." "Any murders?" "Just two, and she is only divorced three times in the whole book."