QUESTIONS WORTH ANSWERING

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WHY?

WHEN?

WHERE?

HOW?

A key to many useful problems

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NOTE.

For many years past, one of the most popular and useful features in weekly journalism has been that appearing in PEARSON'S WEEKLY under the title, "Questions Worth Answering." Each week six questions of general interest are asked, and readers are invited to answer them. At the request of many hundreds of correspondents who have found this feature invaluable, we have now made a selection of the most interesting questions and replies, and these appear in this little volume. The book will be found of special use to those entering for examinations in which general knowledge papers play an important part.

THE EDITOR,
Pearson's Weekly.

QUESTIONS WORTH ANSWERING.

1.—What happens when we put a penny in a gas meter?

ROUGHLY, the main "works" of the modern meter are a pair of bellows, which are filled and emptied alternately by the pressure of the gas itself.

With the ordinary meter, the filling and emptying process is automatic, the amount of gas used simply having to be paid for in the consumer's quarterly bill.

With the penny-in-the-slot meter, however, it is necessary for the consumer to open the bellows himself, and so let in more gas from the main. This he does when, having inserted a penny, he turns the handle outside his meter.

Ordinarily, the handle is unconnected with the mechanism of the meter. When the coin passes through the slot, it is picked up by the teeth and held against corresponding teeth on the inside part of the handle. This being turned, the bellows are opened so far (gears make it more or less with the price of gas) till the coin is brought up against a "stop," falls from its place and lodges in the receiver below.

2.—What does "civil" mean in "Civil Service"?

IN ancient times all the services of this country were paid directly by the Crown.

With the advent of modern theories and constitutional government, however, there seemed obvious dangers in leaving the fighting services—the Army and Navy—under the sole personal control of the Sovereign, and so, about two hundred and fifty years ago, these passed into the pay of the State, leaving the Sovereign to run the rest of the country out of his revenues.

The services paid by the Sovereign were called "Civil" from the Latin word for a citizen) as opposed to Military or Naval.

With the growth of the Civil Service the Sovereign could no longer be expected personally to pay for it, and to-day, like the Army and Navy, it comes under State control.

3.—Why does a water-pipe "knock" sometimes?

THIS knock, or "hammer" as it is often called, is usually due to the presence of air in the pipe. The supply has perhaps been turned off at the main and the water drawn off, in which case the pipe has become full of air.

The turning on of the tap will then bring about a conflict between the air and water, the latter "bouncing," as it were, against anything like a bend that stops its progress. Or again, the sudden shutting off of a tap may bounce a ball valve, causing the ball to jump in the cistern, its motion being transmitted all down the pipe it serves.

4.—What causes the white specks on finger-nails?

OUTSIDE our true skin is an outer or covering skin. This consists of many layers of infinitesimally small cells, those underneath being born, reproducing other cells, and finally moving upwards and dying.

What is to-day the middle of our nail was months ago a cell just below the surface of our "skin." Now, if while this cell was growing it received some injury—such as a slight knock—it might in turn damage its neighbour cells, with the result that in the place of a little group of living cells our skin at that point only contained a tiny bubble of air.

The cells grow upward, and convert themselves into "nail," but at one spot there is a gap, a little globule of air surrounded by the horn. And this we see as a white speck.

5.—What invention does the world need most at the present time?

THE most pressing need of the world would seem to be for free transport on an enormous and hitherto unthought-of scale.

Under present conditions half the world is crying out for workers to develop it. Millions of square miles in Africa, South America and elsewhere are practically wasted because they have not the population to work their wealth.

On the other hand, almost every civilised country has its industrial problem, where half its would-be workers have no work to do.

When, however, the day comes that the workman in Manchester, thrown out of a job, can without cost or inconvenience take his family to, say, Brazil or Uganda at will, when, in other words, labour becomes really mobile, then half the world's troubles will have been solved.

6.—Why does a doctor, when sounding a patient, tell him to say "99"?

THE sound produced when we set in operation our "larynx," or voice-box, passes upwards through our mouth, and is converted by our lips and tongue into what we call speech.

At the same time, however, it also passes downwards through the lungs to the wall of the chest, though here it becomes, not speech, but simply a sort of muffled and vibrating echo, its intensity and clearness largely depending upon the condition of the lungs as a carrying medium. The clearness or otherwise of these sounds is, therefore, a valuable indication to the doctor of the state of his patient's health, a diseased lung conveying only a dull resonance.

To set up the required vibration, some definite enunciation of a word is needed, and "ninety-nine," which gives four clear-cut enunciations, together setting up a really resounding vibration, was found peculiarly suitable.

7.—What is the origin of the phrase "popping the question"?

THIS expression refers to the unexpectedness of the proposal, the theory being that the swain had suddenly screwed up his pluck and asked the question upon which his happiness depended.

"Pop," which comes down to us from the Middle Ages, has always meant suddenness.

Even in its modern sense, as applied to the pop of a cork, we have the same root meaning to the word.

In every sense, then, to "pop the question" is applicable to a proposal which is supposed to be caused by the sudden explosion of pent-up emotions.

8.—What is the rule of the road on the river?

ROUGHLY speaking, the rule of the river is to keep to the right, and most regulations drawn up by local authorities are based on this.

As a general rule, too, "power" craft driven by steam or motor, must give way to sailing vessels, while a sailing vessel travelling with the wind must give way to another tacking against it.

In other words, the vessel under easy command must always give way to that travelling with more difficulty.

Where the river is used almost entirely by pleasure craft, the regulation is that boats coming down-stream take the middle, while those going up keep to either bank.

9.—Why do we speak of a "Welsh Rabbit"?

IT is just a little joke made by our forefathers, and the "rabbit" is not—as some would have us believe—a corruption of "rare-bit."

In exactly the same way the herring or kipper is sometimes slangily termed a "two-eyed steak," and perhaps a variety of other names varying with the locality of the speaker. In this way toasted cheese (which is mentioned in quite old books as being a favourite dish in Wales) picked up the nick-name of "Welsh Rabbit."

10.—Why is a cricketer who scores no runs said to be out for a "duck"?

THIS term is only a contraction of the duck's egg, to which the figure 0 put down in the score-sheet bears an obvious resemblance. In exactly the same way, a "pair of spectacles" is named after the 0 0 on the score-sheet.

11.—Why is there sometimes a "Halo" round the moon?

UNDER certain conditions of weather, very often preceding heavy rain, the upper atmosphere surrounding our earth contains a peculiar sort of cloud, full of tiny drops of water vapour, or even of minute particles of actual ice.

Each of these icicles or drops acts on light as a prism, that is, it "bends" it just as will the bevelled edge of a mirror. So that between the moon and ourselves are really a number of tiny prisms. If this belt of prisms is so thick as to catch every ray of the moon's light, we see, of course, neither halo nor moon, but only a very dense night.

Often, however, while most of the rays pass between the prisms, other rays are caught on the prisms and "deflected" or bent.

All these deflected rays of light reach the earth, but we only see those that are deflected at such an angle that *we* can see them.

Let us imagine that we see the ray which is bent by a prism a distance of, say, a quarter of a mile to the right of the moon. It follows that we shall also see the bent ray from the prism the same distance to the left of the moon. If we imagine the moon as the centre of a circle, in fact, every prism a quarter of a mile from that centre —*on the same plane*—will bend light towards us, and so we shall see a "halo"—which is, after all, merely an optical illusion.

12.—Why are cricket "bails" so called?

THE wicket of the early days of the game consisted of two stumps only, across the top of which lay a single wood or "bail," generally of substantial size. The word itself came from the French, which, again, was taken from the Latin for "a little stick." When (something like a century and a-half ago) the wicket was heightened and broadened and a third upright added, making two "bails" necessary, the old word was kept.

13.—What makes stainless steel stainless?

THE rusting and staining of ordinary steel is due to the chemical actions of the various substances into which it may be dipped.

Steel itself has been defined as a mixture of pure iron and carbide of iron, fused, cooled, and reforged. Improvements in various directions were then made by alloys, some of which contained about one half per cent. of chromium. Then it was found that the more chromium was introduced, the less liable was the steel to corrosion, till a percentage was added which made the steel really "stainless."

14.—How are coloured films made?

THE processes at present used for colour film production fall under one or two main principles. In the one, the tints are first *hand painted* on to each separate little picture, while extremely ingenious machinery deals with the copies.

The other main principle is really a sort of compromise between colour photography and an optical illusion.

The colour-film maker films his subject alternately through red and green "light filter" screens.

A film, as we know, consists of a series of tiny photographs. From one of these photographs, then, all the red colours will be entirely cut out, while all the green colours will be shown; other colours will be let through in varying degrees, entirely depending upon how little red they contain.

In the next tiny photograph, exactly the reverse will occur, no greens appearing, all reds being clear, and the other colours being let through in accordance with the amount of green they contain.

The result, as we examine the film itself, is in black and white. When, however, it is shown, it is projected on to the screen in red and green light, and the real result, of course, is a series of pictures, alternately incomplete as to their colours.

15.—Why is chinaware so called?

POTTERY, the modelling of vessels from clay, has been practised in all countries from the earliest ages, but the transparent porcelain which alone we call, or should call, "china," was for centuries manufactured only in China.

So superior was it to the ordinary earthenware that on its first introduction into Europe various attempts, all more or less unsuccessful, were made to imitate it. The true porcelain, however, could only be made in China, owing to the fact that a particular clay used in its composition was supposed to be found in China alone.

Then it was found that we, too, had our own banks of that particular clay, and our own porcelain works commenced.

The word "china" still survives, though it has largely lost its old meaning.

16.—Why do we say "As tight as a lord?"

PUBLIC opinion nowadays is against drunkenness. Once upon a time, however, things were not so, and in the old days, unfortunately, people who should have known better set a bad example by drinking heavily.

The higher the social rank, the greater the opportunities for indulgence, and at a fashionable dinner-party perhaps half the "gentlemen" would end the evening under the table.

Men used to be reckoned according to their capacities in this respect, and known as "three-bottle men," or four, five, six bottle men.

The wealth of those days was in land, which belonged, of course, to the old aristocracy, and so the peer was supposed to be the man best able to indulge his vice.

17.—Why is it considered unlucky to spill salt?

SALT, as one of the essentials of human diet, possessed in other days a value almost inconceivable to us moderns. Science can now produce it readily and cheaply, but in the old days it was only obtainable in certain places, and was therefore rare and costly. Wages, indeed, were once paid partly in salt.

Salt held a considerable place in many of the religions of antiquity, as being the means by which food could be preserved, and so the symbol of incorruption. In this way it was generally regarded as one of the fittest offerings to the gods, and so to spill the salt was equivalent to risking their displeasure.

18.—Why does a sailor in the Navy wear a lanyard round his neck?

THE lanyard (to which, of course, the sailor's knife is fastened) serves two purposes; in the first place, it makes for the safety of the men on deck, who might otherwise be liable to injury from a knife dropped from aloft. At the same time, a lanyard properly adjusted to just short of arm's length allows its owner to open his knife with one hand, by holding the cord out to its full.

The wearing of a lanyard is compulsory in the Navy, because of the accidents that might happen were knives carried unsecured.

19.—What is meant by horse-power?

EVERY movement we make uses up a certain amount of energy. For instance, a man weighing ten stones, in stepping on to a platform raised one foot off the ground, is really lifting 140 lbs. 1 foot, and is using up exactly the same energy as would be needed to raise 1 lb. 140 feet.

In other words, he has used 140 "foot-pounds" of energy.

Force, however, is different from power. For while one man may lift a box weighing 10 lbs. on to a table 3 feet high in 5 seconds, another may take 15 seconds over the task. Each has used 30 "foot-pounds" of force, but one has three times the other's power.

James Watts, when he was bringing the steam engine into commercial use, found some uniform standard of comparison necessary in selling his engines. He therefore worked out the "foot-pounds" that the average draught horse could manage in a minute, and after various experiments settled this at 33.000. That is, he reckoned one horse as being able to raise 33,000 lbs. 1 foot in 1 minute.

Then he applied this to mechanical power, and an engine which developed enough power to lift 33,000 lbs. 1 foot in 1 minute was scheduled as of 1 H.P., and so on. And this standard has been in use ever since.

20.—Why does a policeman on duty wear a striped armlet?

SIMPLY as an outward and visible sign that the constable is on duty.

The policeman "off duty" and without his armlet is, of course, entitled to the respect due to the law, and in an emergency his simple uniform would probably make him master of most situations.

21.—When is a man at his prime?

IN the old days a man was considered at his stronge and most beautiful between twenty and thirty, at h best as a leader or manager from thirty to forty, as a experienced man of business from forty to fifty, and as councillor or judge of other men's troubles from fifty to sixty Roughly these divisions are to some extent still correct.

Modern life, however, with its increased opportunitie for travel and education, has so speeded up condition that young men of business and politics have by th twenties often acquired enough experience to allow ther to rise to their prime early in life.

22.—Why is a skeleton key so called?

IN the old-fashioned type of simple "tumbler lock" th bolt was really shot by the outside rim of the projectio bit—called the "web"—of the key.

To guard against the insertion of the wrong key "wards" were put in the lock, so as to oppose the passag of any key not notched accordingly; and these notche made up the pattern in the "web."

If, however, the whole of the inside of the "web" was cut away, the key passed over the "wards" without touching them, and the bolt was shot by the rim of the "web." Such was the "skeleton key," literally only the skeleton or rim of the "web."

The better-class modern lock, however, is fitted with levers, only reached by "steps" in the key of different lengths, the mere skeleton rim being therefore insufficient.

23.—Why do we grow a first and second set of teeth?

THE lower orders of creatures are able to produce an almost unlimited number of teeth, fresh ones growing to replace those which have been broken off in some way.

With the passing of the ages, however, man, thanks to soft foods, used his teeth less and less, till the necessity for such frequent replacements vanished, and Nature gradually brought us down to our present two sets.

We are born with the rudiments of our real set of 32 permanent teeth in our gums, but with a jaw too small to hold that number. Nature, therefore, provides the child with a temporary set of 20 "baby" teeth, just the number that the child's jaw can conveniently hold, almost ready to break through the gums. As the child grows up, its jaw enlarges, until it is able to hold its real set, and the temporary teeth, having accomplished their purpose, fall out, to be replaced by the permanent set.