THE OMAHA SUNDAY BEE MAGAZINE PAGE

NEW DISCOVERIES OF SHER THE EARTH



Why Honest Witnesses Often DO NOT and **CANNOT TELL** the TRUTH

HE difficulty of establishing a person's identity beyoud shadow of doubt is one of the most perplexing with which lawyers, judges and jurors have to contend in proving any one guilty or innocent

It is nothing unusual for two witnesses of equally high intelligence and credibility to fiatly contradict each other as to the identity of the person they both saw committing a murder, robbery or other crime. One will declare under oath that the prisoner is the man he saw; the other will swear with equal positiveness that he is nothing like him.

As everbody knows, perectly honest witnesses do not tell the truth, and psychology has lately found out that they cannot. The reasons why this is so are clearly explained by Professor C. Sully, of King's College, Lon-

Jones is, say, a porter at a country station, says Professor Sully. On a certain night the half-dozen passengers by the last uptrain have taken their seats when, as gers by the last optrain have taken their seats when, as the train starts, another rushes up and scrambles in. Now if Jones were to be questioned about this next day, can psychology say how much he will be able to report correctly? Much will depend upon Jones. If he could be subjected to a "testimony experiment" we could better form an opinion. As it is, we can only say, probably much less than is commonly supposed.

To take an actual instance. In the course of a meeting of a scientific association, held in Germany during the carnival, a clown suddenly rushes in, pursued by a negro with a revolver. In the middle of the room they struggle, there is a pistol shot and they are out again. The president, with serious air, asks each member to write down as full a report as he can of the matter in

Mistakes in Identity Are Due to Our Short Memories and to the Fact That We Never See

whole thing has been prearranged and photographed, When the reports come to be examined it appears that though written immediately after the event by trained scientists, only one has omitted less than 20 per cent of the characteristic acis; one-third have omitted more than 50 per cent, and in one-quarter more than 10 per cent of the statements are free inventions.

One is apt to be surprised that so much should be "forgotten" so quickly, but quite apart from the fact that forgetting goes on rapidly at first, later more slowly. the "seeing" in the first instance is not the direct, complete mirroring of the actual that it seems to be. Perception is a complex process, involving interpretation and offering many loopholes to illusion. Its apparent completeness is itself largely an illusion, due to the facts that the actual sensations of a given instant are automatically supplemented by the results of previous experience, and that while the object is before us inimpleteness is remedied as soon as felt by movements of the attention

If one looks, with one eye closed, at the wall of a room, the pattern of the paper is "seen" as uniform over the whole visual field. Nevertheless every eye has a totally blind spot, and from one portion of the wall no sensations are received at all; we "fill in" this part in harmony with the rest of the visual field. The existence of the blind spot may easily be demonstrated. On a sheet of paper make a small cross, and two or three inches to the right of it a black spot some half an inch in diameter. Closing the left eye and fixating the cross move the paper toward or away from the eye; at about eight inches the spot will disappear. To illustrate the "filling in" a thick line or bar may be drawn, having a break of half an inch about two inches from one end. On fixating this end and making the gap fall upon the blind apot, the two portions of the line seem to become

Again, in reading, we seem to see all the letters. In reality the eye moves along the line in three or four jumps, seing nothing except at the halting points, and then only the general "optical rhythm" of the words, and a large proportion of the letters may be changed without preventing us from reading the words "correct-The most absurd misprints may be overlooked

Cross the second finger behind the first, leaving a V-shaped space between the finger tips. In this space put some object such as a pea or the shaft of a pencil, so as to touch the two fingers equally; the object will then be felt as two. The illusion is gided if the eyes are closed or turned in some other direction. This is the so-called "Aristotle's experiment."

Make a tube of about one inch diameter and six to twelve inches long by rolling a sheet of paper. Look through the tube with the right eye, and hold the open left hand before the left eye close against the side of



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All these illusions depend upon ap-plying a mode of interpretation based upon the conditions of normal experience to exceptional or catch conditions where it lead to false results. Thus in ordinary life the outer

All We Imagine We Do simultaneously only by two objects, and so touches at these points continue to "mean" two objects, even in the unfamiliar crossed position. Again, normally, goth eyes see the same objects, and so we interpret our visual sensations as meaning not two separate fields of

usual method of combining yields the result—a hand with a hole through it! To return to Jones: it is then probable that he would in any case be unable to give a very exact description of the belated passenger. But as it is the papers are full next day of a murder in the neighborhood. It is rumored that the murderer travelled to town by the train in question, and later an arrest is made of a young man, tall and well-dressed. Jones thinks of his passenger, and begins to ask himself whether the description

vision but one; although we actually have two eyes, we

combine the information given by them and seem to be looking through one eye situated between the two real one. In the special case of the tube the two eyes are really looking at different things; the right one

looks through a hole, the left one sees a hand, and the

agrees with his memory-image. Now, mental images-what the "mind's eye" sees-do not only arise as copies of what we have perceived; every description that we hear, every story we read, gives us images of the scenes and characters, sometimes so vividly that illustrations to a book previouly read without them may be indignantly repudiated as "all wrong," though conflicting with nothing in the text. Between such images, due to interpretative imagination, and the images of memory proper there is no sharp line or certain cylingion.

The more Jones thinks and reads about the matter, then, the less clear becomes the distinction between his memory-image and his interpretative image, and the surer he grows that they represent the same man, till at last he goes to the police and reports, describing the passenger as a young man, well dressed, tall and fair. Next comes the confrontation. Jones is, remember, already well on the way to believe that the man he remembers is the suspect (or he would not be there), and his "memory" is probably a usend of genuine (but not necessarily accurate) memories with items read or heard. The prisoner is pretty certain to have some re-

semblance to the criminal since appearance will, in most cases, have been a determining factor in his arrest. Jones sees a man who fits his expectation sufficiently to give rise to the feeling of familiarity or known-ness, and suggestion does the rest.

Now since the actual recognizing consists essentially in a percept feeling familiar or known, it follows that if the accused has once been identified, subsequent identification by the same witness can hardly be more than a matter of form. Accordingly, everything depends on this first identification, which becomes an essential, even a vital, part of the trial, and must be subject to every safeguard possible. For instance, the witness should be on his oath, not only or even mainly to guard against lying-for this purpose it is sadly ineffectual-but rather because of its effect on the conscientious man in making him apply all the caution and self-criticism of which he is capable. In passing one may point out that an absurdly exaggerated importance is commonly attached to the question of deliberate lying. Indeed, the fallacy involved in supposing that either a witness is lying or what he says is objectively true has been perhaps the most fruitful one in the history of human superstition and injustice. Far fewer have been condemned on perjured evidence than on false given in good faith.

From what has been said of the psychology of recognition, it will be clear that there are two main dangers:
(1) that the fusion giving rise to the feeling of recognition will be really of what is seen with those elements of the image which are due to newspaper accounts, and so on, and not with the elements due to memory; and (2) that the suggestive force of expectation will bear down any remaining differences between image and percept. Now the group method will, at its best, weaken the definiteness of the suggestion—the witness, instead of knowing that the man before him is the accused, will only know that one of the ten before him is the accused. But this will be true only if the other nine cannot at once be eliminated because of their manner, or because they obviously disagree with what is a matter of com-

Horses Pull Better with SHORT TRACES

can pull better with short traces or long traces, that is, whether it is better for the horse to be close to the load or further away. Their general consensus of opinion is that short traces are better, and, as in most cases where there is great experience, they are probably right. To understand the proposition it is well to remember that it takes a great deal more energy to pull the load at moving than it does to pull it at uniform speed. Also it takes a great deal more energy to pull the load at varying speed than at uniform speed. This is easy to see when we remember that when a body is pulled along at uniform speed on a level surface the only thing to be overcome by the tractive force is the friction at the axies. On the other hand when the present containing the contraction of the other hand when the present containing the same containing the sa On the other hand, when the pace gets faster an acceleration is given it—and there is only one thing that gives an acceleration, and that is a force.

So when the load changes speed a force must be added to the force to overcome friction, thus making it harder

the horse. Of course, the same thing applies to any

speed on a level plane.

Now, to apply this to the problem stated above simply imagine a horse hitched to a loaded wagon and going at uniform speed, but imagine the traces to be one hundred feet long. If the wagon goes over an inequality of the ground (say down hill slightly) the traces, of course, slacken up greatly, and before the horse, going at the same uniform speed as before, can take up the slack, the wagon may have come to rest, or slowed down consider-So to bring it back up to previous speed the horse has to exert extra force.

Now, in a short trace the stretch of the leather is much less than in long ones, and so, if the wagon starts any-thing it simply shoves the horse ahead and he has no slack to take up.

In using short traces, too, there is much less danger of their breaking, for the load is felt by the horse before he has moved his body very far, and his force is applied gently and evenly, whereas if he jumped forward with a slack long trace he would have acquired considerable velocity when the traces became taut, and, trying to

INCE Pasteur's great discovery of the baollius of anthrax, the part played by mlcrobes in the universe has constantly grown in importance, until it is now thought by

factors in its life. Plants, as everyone knows, take carbon from the carbonic-acid gas found in the atmosphere, turn it into starch, cellulose, sugars and oils, and thereby store up energy. When the plant is eaten by an animal, it furnishes the eater with glycogen and fats, which are in their turn converted into muscular work. The energy thus put at the disposal of living beings comes in the first instance from the sun, but it is made available largely by means of microbes.

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Microbes prepare the soil for regetation and agriculture, and accumulate in the earth the nitrogen that we absorb with cereal food. They even help to break up rocks, and thus to produce earth that eso be worked, while they are among the chief agents of fermentation and digestion. Yet in spite of all this, microbes have for the majority a bad name, and most people look on them rather as the enemies of life than as its heipers and friends. This is largely due to the behavior of a relatively small class among them who are the agents and effective causes of certain mortal diseases by reason of the poisons or toxins which they manufacture in the system.

One has only to mention the bacilli of tuberculosis, or diphtheria, of smallpox, and the vibrio

of cholera to show how terrible is their work in this respect; and yet these dreaded agents of death are in themselves a kind of sport, being species which the struggle for existence, through which all organisms pass, has armed with the weapons they use against us. Most of them are parasites which can only live at the expense of an animal or vegetable host and in a medium which they have to create for themselves. Pasteur showed that their virulence could be abated or even abolished altogether by providing them with another medium; and the reverse of the picture was shown when another investigator succeeded in producing pathogenic or disease-causing bacilli by introducing into the peritoneal cavities of guineapigs and rabbits microbes whose normal function is to reduce to their chemical constituents as quickly as possible the tissues of dead plants.

Fortunately for us, if the parasite can thus use means for making good his habitation at the expense of the host, the host is not without allies which enable him to make harmless the parasite. The most efficient of these are in the majority of cases the leucocytes or white corpuscies of the blood, which act, as is so often said, as police-men in arresting and rendering harmless the

By the bites of insects, the microbes causing malaria, yellow fever and sleeping sickness all pass directly into the blood. Others gain an

entry into the intestinal canal by the medium of food containing putrefactive bacteria either generated therein or deposited on it by flies. And lately it has come to be seen that a great carrier

Professors Trillat and Fousssler, in a recent communication to the Academy of Sciences, showed that the small vesicles or water-drops present in the atmosphere form a medium in which many pathogenic microbes will multiply and flourish; and Professor Bordas has given it as his opinion that this is one of the chief routes of transmission for the bacillus of typhoid faver.

This microbe, which is the same as that which causes typhus, or the disease of camps, is probably always with us, but has little effect save on enfeebled bodies or those suffering from actual lesions of the tissues. It generates most quickly in moist and tranquil air, but seems of reproduction if the air is dried and

The investigation now proceeding into its means of transmission will doubtless throw light upon the attacks of this and other microbes; but in the meantime it may be said that overcrowding seems one cause of their increase. The filtering of water and the avoidance of certain foods are rightly recommended as prophylactic measures; but it may well be that in open win-dows, well warmed houses, and the avoidance of crowds, we have even more effective means of otection against our unwelcome guests.

MORE BOYS to Be Born Than GIRLS

URING the next twenty years it is probable that many more boys will be born than girls and it is expected that this disproportion will be large enough to make up for the present over-supply of women. That there are too many women in the world is very evident. The suffrage movement and other plans to give women more independence are largely due to this femi-

nine over-supply. If there were an exactly equal number of men and women, and if each lived equally long, there would be no need for women to enter bustness life, because there would be a husband for each one. As it now is, there are not enough husbands to go around and this brings such an element of chance into the marriage

against the possibility of never marrying by learning to make their living in some other way.

The younger a woman is when she

gets married, the more likely that nost of her children will be girls; the older she is at marriage, the greater the likelihood that her children will be boys. Recent investigations have shown that where omen have become mothers at nineteen years or younger, there was an average of forty-four girls to twenty-nine boys born. In the case of women who were between nineteen and twenty-four years of age when married, the figures showed an average of fifty-three girls to fortyfive boys. Between the years of twenty-four and thirty-two, the proportions gradually became less and between the years of thirty-two and thirty-six, boys and girls were born in equal proportions. From thirtysix to forty-two, the proportion was fifty-two boys to forty-one girls and between the ages of forty-two and forty-eight, it was sixty-four boys to

twenty-seven girls. The two or three preceding generations have been as notable for marrying young as the present generation is for walting until later

question that most girls think it ation is likely to have more boys wise to safe-guard themselves than girls. than girls. The larger the number of girls. the greater opportunity a man has to make his choice and the less he

feels the need of baste. Where women are few, a man is more likely to take advantage of the first opportunity to secure a wife, lest other chances should not arise. Again, the girl who is self-supporting is well aware that marriage implies the stoppage of many privileges and she is therefore less ready to re-spond to the advances of a lover. The high cost of living also helps prohibit early marriage.

All these conditions tend to delay the age of marriage. Our grand-mothers married when they were seventeen or eighteen years of age, our mothers when they were twentyone or twenty-two. During the last ten years the average age of marriage has advanced to twenty-four or twenty-five. The rate of delay is increasing and shortly will have reached the point at which more boys will be born than girls, and for a generation or two boy babies will be in the majority and girl babies will be few and far between. Within two or three generations this will make more men than women in the world and will of itself make a tremendous difference in the whole question of women's sphere and

Chemical Tests Prove COFFEE

but as a matter of scientific fact they are very much alike.

In certain ways they ought to affect us simflarly, for they both contain the alkaloid called caffein, which, as has long been known, is a powerful stimulant of the central nervous It is generally admitted, however, that the

two beverages, although having this one thing in common, afford different results. Tea, it is well to point out, contains a much larger pro-portion of the alkaloid than coffee, but in the

portion of the alkaloid than cones, but in the preparation of tes in ordinary domestic practise a much smaller quantity of material is used than is the case with coffee.

Since tea contains from 3 to 4 per cent of caffein, and coffee seldom more than 1 per cent, it follows that as regards this alkaloid both infusions of coffee and tea made on common domestic lines will contain practically the same amout of caffein, volume for volume

The inference is that whether it be a oun

coffee and tea seem distinctly different, the same. But according to the present investigation the caffein in coffee infusion has quite different associates from those in tea. This would appear to be the case, inasmuch as while little caffein is extracted from teaby cold water, we find that practically the whole of the caffein in coffee is taken out.

There seems to be little doubt that the caffein in tea is for the most part combined.

with tannin in the form of caffein tannate, which is not very soluble in cold water, but is easily soluble in hot water. English chemists, who have been investigating the matter, think this is an important observation, for it points to the probability of caffein existing in offee in a quite different form which is easily

soluble in cold water. Subsequent experiments showed that the caffeis in coffee is combined with a peculiar acid allied possibly to tannie acid, but exhibiting different properties from the tannin present in tea. Thus this acid (it has been called caffetannic acid by some observore) is not particularly astringent, has a sour coffee-like taste, and, in fact, shows altogether dif-

ferent properties from the tannic acid of tea. As the caffein tannate of tea is precipi-tated by weak acids, it must be precipitated by the gastric juice, and therefore the caffein is probably not absorbed until it passes beyond the stomach. In coffee, however, the caffein is soluble in both alakline and acid fluids, and therefore the absorption of the alkaloid prob-

why coffee is often used as a poison antidote, and tea rarely.

As a writer in the Lancet points out, coffee is often made with a generous proportion of the powdered bean as in the case of the after-dinner "black" coffee, the view being that the secret of good coffee is to make it

Finding Out How "WILL-O'-THE-WISPS"

Hitherto the usually accepted explanation has been

ably takes place in the stomach. As coffee is generally considered more stimulating than tea, perhaps these findings may in life. It follows that the preceding generations had more girls than strong. This, of course, is an entirely esthetic demand, which may likely enough be opposed to physiological morality. boys, and that the present generwomen's work.

By Dr. L. K. Hirshberg.

OT long ago, every neighborhood had its doleful folk-tale of how some unhappy mortal lured into the marshes among the boggy moors and swamps, by Will-o-the-Wisps, or St Anthony's fire, went to his untimely death while purpuing what he thought was a guiding beam of light from some plo-

is the same gas that occurs in mines and causes serious catastrophes there, or electric discharges in a

damp atmosphere caused the will-o'-the-wisp. Its clusive nature is now recognized by Dr. Henry Watkins and others to be due to a continuous sparking and ignition of the gas as it comes in contact with fresh draughts and strata of oxygen. Its glow is between a dim blue alcohol light and a real phosphores-

Now a conservative British savant, Prof. Hayward Cooper of The Leeds Institute of Science, has just described the results of a careful investigation into the will-o'-the-wisp superstition. He visited mines, marshss, and sailed on ships that brought tales of the "swamp lights," and he refutes all the commonly accepted scientific explanations. Professor Cooper says that although some of the

jack-o'-lanterns may have been a spontaneous ignition of vapors from swampy bogs as well as mines, and some of these may have been luminescent insects such as glowworms and fireflies, yet he was able to literally capture from the topmasts and in the rigging of several ships, what the sailors in awesome tones always called will-o'-the-wisps or jack-o'-lanterns.

They were nothing more or less than luminescent owls and smaller birds of nocturnal habits. These winged creatures had skimmed over the waters or touched the surfaces of the marshes and the phosphorescent, luminous moisture had clung to them as they took flight. When they momentarily rested or flew about where the conditions were proper, this phosphorescence was visible. Some of these birds were the white owls, while many others were much

How OIL Makes the ROUGHEST SEAS SMOOTH



The Difference Between the Thickness of the Oil Film on the Crest and in the Trough of the Wave Creates a Tension Which Quickly Pulls Down the Crest. The Result Is That the Whole Wave Is Finally Lowered to a Level Like That Indicated by



The Oil, Starting in the Trough of the Wave (A), Works Its Way Straight to the Crest (B). At the Crest the Film Becomes Thicker Because It There Has a Much Narrower Space Over Which to Spread.

to facilitate the leakage of the oil.

The use of oil in lessening the force of atorms

that they will just touch the water small canvas bags holding from one to two gailons of oil. Holes are pricked in the bag with a sail needie

sea was well known to the ancients, includ-All organic life exists in a state of continuous dec position and rebuilding or a continuous state of dying and living. As soon as decomposition ceases recoa-Copyright, 1914, by the Star Company. Great Britain Rights Reserved.

Why LIFE Is a CONTINUOUS DEATH

IVING is a continuous process of dying. When we cease to die we cease to live. One can readily understand this by means of a very concrete example. Suppose you arise some cold morning and find that the fire in your furnace has "gone out." It will do no good to utter malicious invectives against the poor furnace. Just philosophize as follows: "My furnace has ceased to die: In other words, it has ceased to consume that very expensive article called coal. The continual consumption of coal is fire or life in the furnace. When the consumption or dying ceased the fire or life Accordingly, you proceed to make the furnace "die" some more.

What is true of the furnace is true of ourselves.

atruction ceases, or, in common terms, as soon as we cease dying we cease living. Certain poisons, if swallowed by a human being, destroy life by annihilating decomposing or dying process which is necessary for life. When they enter the system a chemical com-pound is formed which resists decomposition. Upon ex-amination of the dead body it will be found that putrefaction does not take place. With these poisons in the hody there is no process of dying; hence there is no

The same truth holds in regard to our mental and moral existence. If we cease to struggle or think and are content to live a purely animal life, the activity of our brain powers quickly ceases and we are mentally dead. Struggle, action, aspiration is dying, but it means living. Introduce the poison of vice, and there is a cessation of mental life as fatal as that caused to the

in the use of oil in calming troubled waters and caving ships from wreck. Scientists say that seven square feet of rough seas, and nine pints

THE valuable part played by the oll tank

steamer Narragansett at the time of the

Voltarno disaster has renewed interest

a film sufficient to prevent its breaking luto waves. This oil film is effective when so thin that it is almost unimaginable.

Oil is most effective when the water is very deep and the heaviest, thickest oils show the best results. The best method of applying oil from a ship at sea is to hang over the side so

ing the officers of Pliny's fleet, who practised H 1,800 years ago,