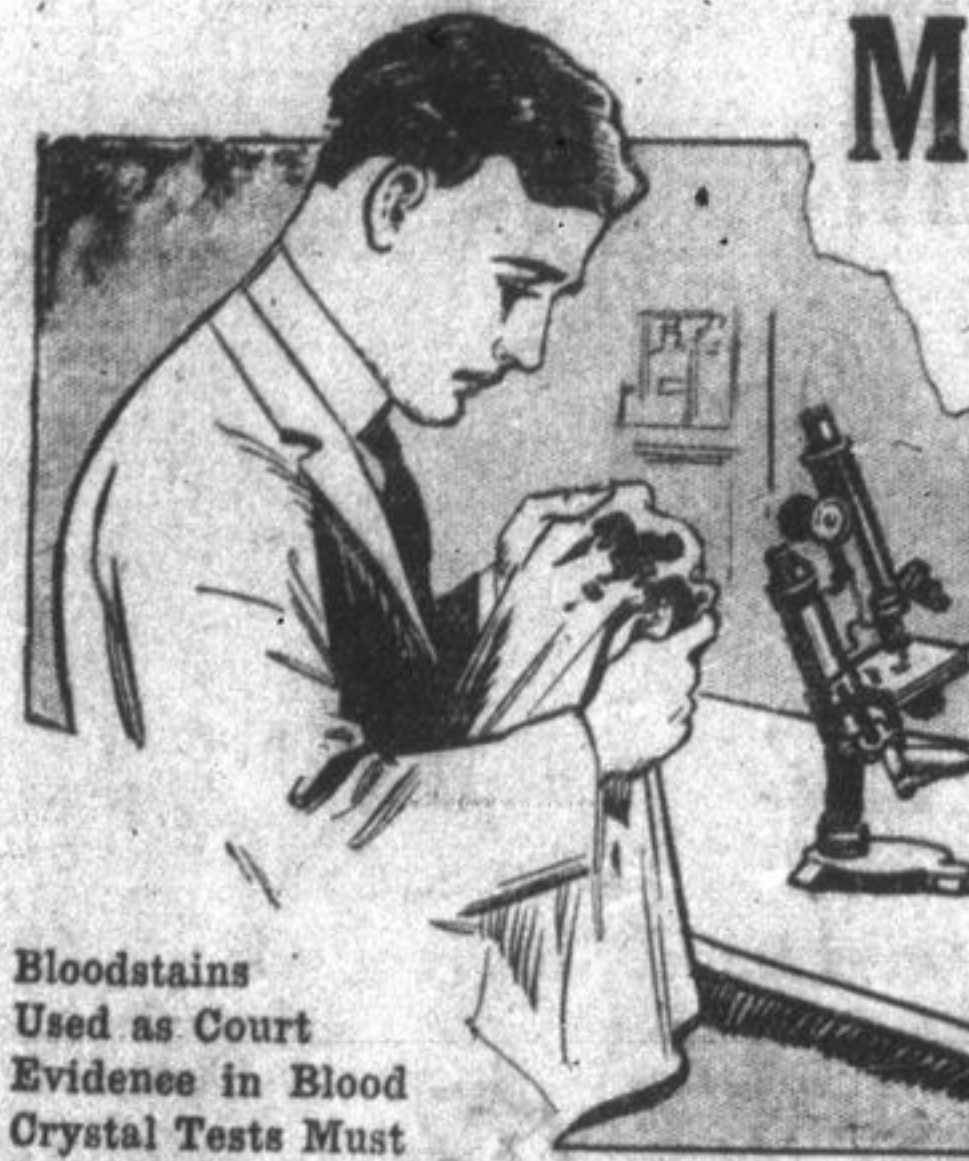


New and Interesting Facts from Science and Life

MAKING BLOOD TELL

Science's Newest and Surest Method of Solving Strange Crimes.



Bloodstains Used as Court Evidence in Blood Crystal Tests Must Be Fresh, or Only Slightly Clotted, to Yield Positive Results for Testimony.

They have always said that "murder will out" and that "blood will tell." In no way is the truth of these two statements better shown than by the manner in which science has come to the aid of the law.

To Dr. Edward Tyson Reichert, the internationally famous physiologist and biologist of the University of Pennsylvania, belongs the credit of having built up the new science of blood crystallography, which has made it possible to bring criminals to book so surely. But that is, after all, only one phase of the wide application of Dr. Reichert's discoveries. It is claimed that there is hardly an aspect of plant and animal life which is not illuminated in some way by Dr. Reichert's work.

Blood has always been held in a kind of superstitious regard by humanity. Hundreds of proverbs have blood for their theme. "Blood will tell" is one of them.

Just what blood does tell Dr. Reichert's investigations are now beginning to show and how it all came about, in a very curious way, is told as follows by a contributor to Popular Science Monthly:

One day a scientist in a laboratory was interrupted in the examination of a drop of blood. Impatiently complying with the demand upon his attention, he left his task for a few minutes. Returning, he resumed his work at the microscope. To his astonishment, he beheld upon the slide a totally transformed specimen. Hardly realizing the great significance of the change that had taken place, he nevertheless recalled the way in which he had prepared the specimen. He experimented again. Once more the peculiarly formed crystals appeared. Scientists became interested and re-

peated the experiment, but made nothing of it. To Dr. Reichert and some other specialists the red crystals with their sharp edges and flat surfaces presented a scientific problem of irresistible interest. Did the crystals in blood really convey a message of which any practical use could ever be made?

Dr. Reichert decided to solve the problem. He secured blood of wild and domestic animals, the former with danger and difficulty. He made tedious and refined tests of human blood. An exhaustive study involving years of patient effort and highly specialized knowledge in biology, crystallography and physiology began. At last he succeeded in disclosing scientific facts of inestimable value to every scientific man who studies living things.

The blood is an extraordinarily complex fluid which consists of what is called the plasma, in which living cells, "corpuscles," are held in suspension. Most persons think of blood as red; yet not all blood is red. In the lower animals the blood corpuscles may be colorless or colored, and if colored they may be green, red, yellow, blue, violet, purple, madder, mahogany, brown or lilac. Some blood has corpuscles of varied hues.

In all cases perhaps the principal function of the blood and in particular of the colored constituent of blood is the assimilation of oxygen from the air. We breathe in order that our blood may breathe; for we care about oxygen only so far as our blood corpuscles care for it.

Now, one of the discoveries recorded by Dr. Reichert was that the red coloring matter of our blood, which is called "hemoglobin," is closely related to the green coloring matter of higher plants, called "chlorophyll." Our blood is red merely because it contains iron; the blood of an octopus is blue merely because it contains copper.

The red blood corpuscles of the higher animals are inconceivably numerous. It has been estimated that the total number of cells in the human body is 26,500,000,000,000, and that of this number 22,500,000,000,000 are red corpuscles. This of this vast crowd of corpuscles—numbering in the case of man more than 10,000 times the population of the earth—hurrying through the channels of our system at such a rate that the majority of them complete one entire circuit in the space of less than a minute! The traffic of the New York subway is slight in comparison.

It is the crystals formed by blood which reveal so much to Dr. Reichert. Suppose he has a specimen of blood to be examined. Dr. Reichert adds oxalate of ammonium to prevent coagulation. Then he shakes the mixture with ether to free the hemoglobin from the corpuscles in which it is found. After that the ether is separated from the mixture and some of the latter is placed on a microscope slide, protected with a glass cover and sealed with Canada balsam.

Slowly the crystals become visible under the microscope. They can be identified by reference to the Reichert classification of blood crystals.

Soon after he began his investigations, Dr. Reichert found that the blood crystals of one species of animal can be distinguished from those of others and that blood crystals of the human being can be differentiated from those of the lower animals.

Striking is the likeness between the blood crystals of monkeys and human beings. Such close similarity does not exist between the crystals of

YUCCA as FODDER

A FEW years ago stockmen in the Southwest might have scoffed at the idea of using soap-wood and bear grass as cattle feed. When periods of drought came around they either shipped their cattle to a more favorable state or imported vast quantities of feed from states to the east and north. But during the past two years, being badly affected by drought and finding the supply of other feed high-priced and difficult to obtain, they have utilized with surprising success the supply of the different species of yucca surrounding their ranches. Not only have these



The Yucca Plant.

plants been of real value as a supplement to regular feed, but it has been discovered that cattle actually live entirely on the food contained in these yuccas.

Representatives of the department of agriculture estimate that, even allowing for feeding of a concentrate such as cottonseed meal, the cattle can be kept in good condition during a drought season at a cost of approximately five cents a day an animal. The cost of preparing an adequate ration of yucca feed runs less than two cents an animal a day. Machines designed for this work are built on the same principle as a silage cutter or a wood pulping "hog." The machine consists of a cylinder carrying numerous teeth or knives which, rotating before a cutting block, shred or slice the feed into small pieces.

Not only are bear grass, sotol and soapwood of value in feeding, but other similar relatives of the yucca family may be utilized for feed.

HOW to SEE a GHOST

HAVE you seen a ghost? Much has been heard lately of apparitions; distinguished men like Sir Arthur Conan Doyle and Sir Oliver Lodge have declared their belief in them.

The reports of famous professors incline to the explanation that "ghosts" are really after-images impressed on the retina, or membranous screen, of the eye. All images remain on the retina for a certain time after they are seen. Should the person enter a dark room the image will remain for a longer time, and the return to the light will cause the image to reappear.

Sometimes these images are seen in their original colors, at others in different colors. The latter phenomena are illustrated by the simple experiment of looking at some red object, and then turning the eyes to a white wall. You will probably see a blue spot on the wall, due to the fact that part of the color-perceiving nerves of the eye are tired, so only the remainder are being used. Similarly, if the light is strong enough, the after-image will be black, only retaining the original colors as the nerves become rested.

A distinguished scientist has revived an after-image artificially by means of the following experiment: After remaining in darkness for some minutes, he flashed a light on his hand. He then went to bed in total darkness and slept through the night. Before opening his eyes in the morning he again flashed a light, but this time on his wrist. By this means he revived the after-image of his hand in front of him, although he had not seen it since the previous night.



Fig. 5—A Tiger's Blood Crystals. Fig. 6—Bar-Shaped Crystals Are Found in the Blood of a Leopard.



Fig. 3—Blood Crystals from a Horse. Fig. 4—Blood Crystals from a Mule.

blood everywhere except upon the body itself. Nor were there any wounds. The man had been strangled to death. And the blood? The dead man must have wounded his murderer.

And so the detectives of the French town in which the crime had been committed looked about for a wounded man. They did not find him. There were finger-prints enough. They revealed nothing, for they did not correspond with any finger-print records at police headquarters.

At last it occurred to an official that perhaps the blood with which the room was so liberally bespattered should be analyzed. That was done. It was not the blood of a human being at all, but the blood of a bull!

The crime was more mysterious than ever. Here was a murder which had been committed by strangulation; the finger-marks on the throat were those of a strong man; yet the blood in the room was that of a bull. True, it would be easy to obtain blood from a slaughter-house; but why?

Someone remembered that one of the few persons who disliked the murdered man was one who worked in a slaughter-house not very far away. He was arrested. His finger-prints agreed with those upon the wall of the room where the crime had been committed. The man confessed.

Wild BURRO STEAK, a la SHASHLIK

WILD burros have become a pest in some parts of Arizona. The little, long-eared animals are not exactly wild, for the reason that they do not have enough energy and spirit to be that way. They are a good deal like the bears of Yellowstone Park. The mountain

valleys of not only Arizona, but of New Mexico and northern Mexico are overflowing with droves of burros. They infest the mining camps and ranches and are a nuisance. Hundreds of them are killed for their hides and grease. It has been suggested by Dr. C. C. Young, a noted Russian traveler and Karakul sheep breeder who has lived in the southwest for several years, that the wild burros be utilized as a source of meat supply for the people of that part of the country. Dr. Young says that he has eaten the flesh of camels and various breeds of sheep and that they do not compare with burro meat.

"As far as the meat of the young burro is concerned I can only state that I have eaten it for months and like it," he said.

"A fat burro about 1 year old furnishes a steak that will satisfy the taste of the most fastidious, especially if prepared in 'shashlik' fashion, which means that after the steak has been cut into short pieces and properly seasoned it is put on a spear and placed into the low flame of burning sakau until done.

"Burro shashlik is not as delicious as shashlik made of Karakul mutton, but it is good enough for anybody, and for that reason I cannot understand why there exists so much aversion to burro meat in this southwestern country, especially when one bears in mind that there is no cleaner domestic animal in existence than the burro.

"Smoked burro meat, called 'bastrama,' is very nice and is eaten raw like Westphalian ham, and is especially adapted on long journeys and in hard countries.

"Dried burro meat, resembling the well known Mexican carne seca, is not bad, providing the burro is killed while young, otherwise the meat is very tough, but free from the odor of an old goat."

DECISIVE EVENTS IN THE WORLD'S GREATEST WAR

- 1914.
 - June 28—Archduke Francis Ferdinand, heir to the Austrian throne, assassinated at Sarajevo.
 - July 5—Kaiser's Crown Council meets at Potsdam and decides upon war.
 - July 28—Austria declares war on Serbia.
 - Aug. 1—Germany declares war on Russia and invades Luxembourg and Belgium.
 - Aug. 3—Germany declares war on France.
 - Aug. 4—Great Britain declares war on Germany.
 - Aug. 25—Germans destroy Lovain and massacre the inhabitants.
 - Sept. 1—Germans reach the outskirts of Paris.
 - Sept. 6—Battle of the Marne, in which the French forced the Germans to retreat to the Aisne.
 - Dec. 24—First German air raid on England.

- 1915.
 - May 7—The Lusitania torpedoed by a German submarine.
 - May 23—Italy declares war on Austria.
 - Aug. 26—Italy declares war on Turkey.
 - Oct. 13—Edith Cavell shot by Germans in Brussels.

- 1916.
 - Feb. 21—Germans attack on Verdun begun.
 - April 19—American ultimatum to Germany threatening to break off relations unless Germany stops sinking our ships.
 - May 31—Germans defeated in naval battle off Jutland.
 - Aug. 27—Roumania and Italy declare war on Germany.

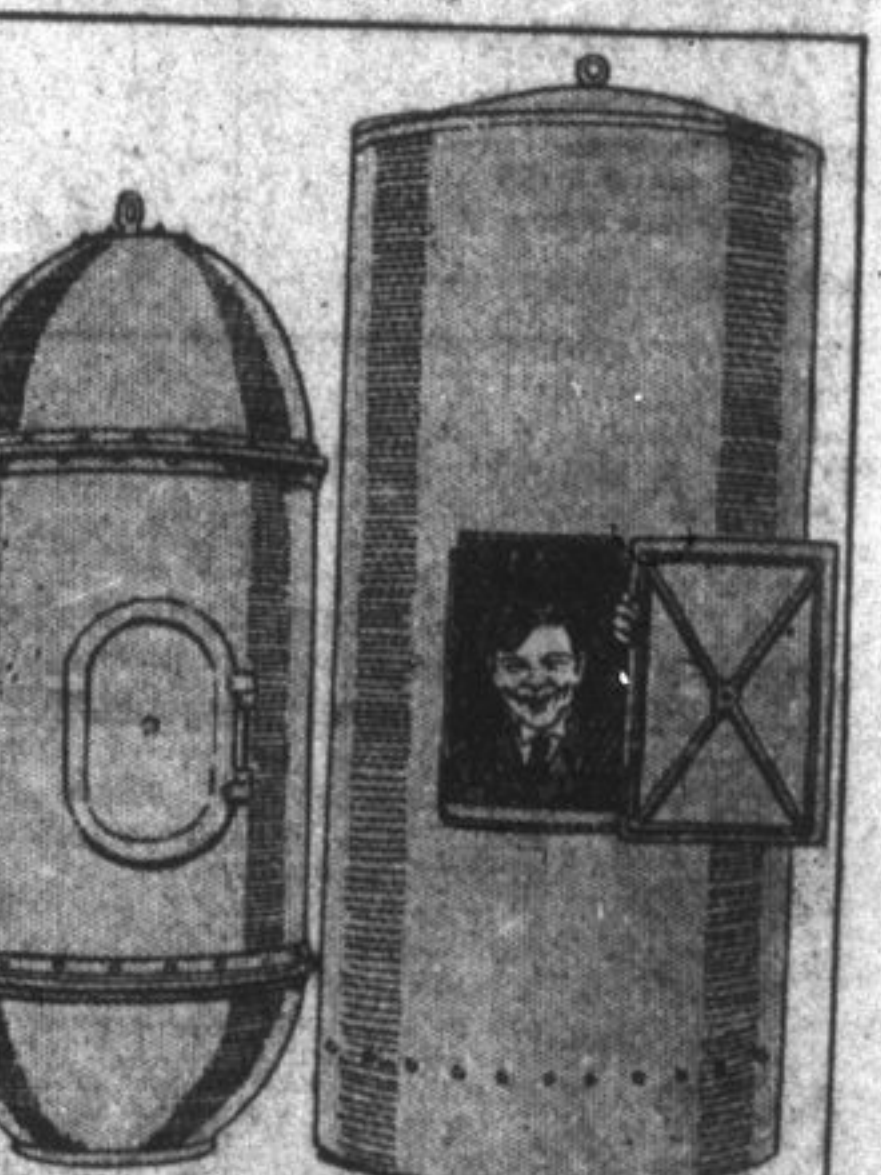
- 1917.
 - Jan. 31—Germany announces ruthless submarine warfare.
 - Feb. 3—United States breaks off diplomatic relations with Germany.
 - April 6—United States declares war on Germany.
 - June 26—First American troops land in France.
 - June 29—Greece declares war against Germany.
 - Dec. 9—Jerusalem captured by the British.

- 1918.
 - April 14—Gen. Foch appointed commander-in-chief of allied armies.
 - May 27—Great German drive on Paris begun, reaching the Marne.
 - June 6—American marines smash Germans back at Chateau-Thierry, marking turning point of war. Gen. Omar Bundy, American commander, refuses French command to retreat.
 - June 23—Italians drive the Austrians back across the Piave with losses of 150,000.
 - July 12—French and Americans break the German line north of Cantigny.
 - July 18—Marshal Foch begins his great counter-attack.
 - Aug. 6—German "75-mile gun" kills women and children in Paris.
 - Aug. 25—British cross the Hindenburg line north of the Scarpe.
 - Sept. 2—The United States recognizes the Czechoslovak nation.
 - Sept. 12—First American army smashes the St. Mihiel salient, taking 15,000 prisoners.
 - Sept. 22—British trap Turkish army in Palestine.
 - Sept. 29—Bulgaria quits the war.
 - Oct. 15—Germans driven from Belgian coast.
 - Oct. 24—Italians launch victorious offensive against Austrians.
 - Oct. 30—Turkey surrenders.
 - Nov. 2—Gen. Pershing begins drive toward Sedan.
 - Nov. 3—Austria surrenders.
 - Nov. 7—Americans capture Sedan.
 - Nov. 9—The German Kaiser abdicates.
 - Nov. 10—Germany surrenders. The Kaiser flees to Holland.

A FLOATING SAFE MADE OF STEEL

A FLOATING safe, the invention of Menotti Nanni of Chicago, was given an official trial recently and came through successfully, thereby fulfilling the predictions of the inventor and proving to everyone that it is now possible to safeguard mail and treasure aboard steamers, even if the ship should sink.

Mr. Nanni's floating safe is rather complicated in design. It consists of a steel outer shell with a door. The next shell is also steel, perforated with a number of holes, for all the world like Swiss cheese, and this case has a door. The real workings of the contraption, however, are centered in the inner case, which like the two others has a door. This is made of two layers of steel, the space between the two shells being filled in with a substance "stronger than concrete, lighter than cork and of secret composition," and it's this that does the work. When the water penetrates the two outer shells it forces out the inner case, causing it to push off the lid and fly to the surface.



Retaining Shaft is Shown at the Right and Buoyant Safe at the Left.

A number of these floating safes are placed one above the other in a long tube or shaft extending down through several decks of the steamer. At each deck a door is provided, so as to give access to the safe opposite that deck. In this manner any safe can be reached with the same convenience as the conventional safe, and by turning the inner arrangement any compartment can be brought in line with the door.

The tube has really two skins; the outer one, which is intact but for the exception of the doors at each deck, and an inner or perforated skin. The object of this double skin arrangement is at once evident; it permits water to pour down through the tube to the very bottom of the shaft; so as to give the proper buoyancy to the safe. The top of the shaft, extending through the upper deck, is provided with a buoyant removable cover which, in turn, has a suitable inlet for water.

Should the vessel be sunk, water would enter through the inlet in the buoyant removable cover of the shaft, and pour down between the skins and through the perforated inner wall to the safes. Soon the safes have sufficient buoyancy, and press up through the shaft and out at the top, thence making their way to the surface.

How COTTON Is PICKED by VACUUM

COTTON is now picked in the Imperial Valley of California by a device, that works on the principle of the vacuum-cleaner. It is asserted that cotton picked in this way is cleaner than that picked by hand and that with this machine an inexperienced laborer can work three or four times as fast as experts in the old methods. The apparatus weighs but 1000 pounds, and is easily moved. Around its light skeleton are a 300-pound, 16-horsepower engine, a suction pump for the nozzles, and a centrifugal separator for parting the cotton from leaves, sticks and other debris taken in by the picking nozzles. These nozzles are

pipes connected with an eight-foot tube running transversely over the machine.

The powerful suction-pump on the machine endeavors constantly to keep the picking pipes in a state of vacuum, wherefore, when the nozzle is passed over a row of bolls, the suction picks up the cotton and carries it through the pipe, and to the centrifugal separator. Here a powerful fan with hollow vanes, a departure in fan construction, separates the cotton from the leaves, the sticks and the "motes," which are not desirable, and finally drives the separated bolls through a curved pipe at the rear. The leaves and motes are driven out through perforations in the top of the pipe, the cotton is driven through to the sack or basket at the end.

Each one of the five picking nozzles and rubber pipes is handled by a man, and the speed of action depends on the skill he acquires. A single sweep of the patent nozzle across a row of the white blossoms is alleged to pick them clean, the time being about that required to pick one boll.

The rate of picking cotton by hand seems to vary from 100 to 200 pounds per day—the record being made by a colored person who picked 900 pounds in a day, but did it on the run, and without attempting to do more than to get the easiest reached. Also cotton-pickers are "wasteful," the waste running as high as 50 per cent. of the crop, and the amount, according to the government reports, running into hundreds of millions. It is human nature to pick the bolls on the top, and to let those lying in the back-breaking straits at the bottom of the bush remain to sleep in the sunshine.

The persons running the California machine, which is pictured and described in the Scientific American, claim that five men with the machine can pick 1000 pounds per man per day of 10 hours, or 5000 pounds per day, and that it does a clean job instead of a wasteful one, because the nozzles do not mind being required to get down into the bottoms of the plant.

As cotton authorities allege that last year not far from a million persons were engaged in the harvesting of cotton, the machine able to do the work of five times the number of men needed to operate it, and to do it with little labor on the part of the crew, might well be an invention of serious national need.

DOGS of ST. BERNARD

ALL but six of the famous St. Bernard dogs kept by the monks of that ancient monastery in the Alps have been killed, according to a recent report from Paris. Shortage of meat caused by the war was said to have led to this massacre.

The St. Bernard pass is of historical renown. It connects the valleys of the Rhone and the Dora Baltes. It was traversed by the Roman legions thousands of years ago. In mediaeval times the pass served the armies of conquerors and the bands of mercenaries. Napoleon crossed the Alps at this point in 1800.

The great monastery was built in the middle of the 16th century. It was maintained for the relief of travelers who were surprised by snowstorms while crossing the pass. The St. Bernard dogs were used to lead the frozen victims of the storms in the snowdrifts. They were specially trained for this work of relief and carried the first aid to the injured in a little basket attached to their collars. These dogs rescued thousands of human beings, many of whom were of historic prominence. And for the first time in the history of this famous monastery the dogs had to be slaughtered for want of food.

At other times a report of this sort would create profound interest in Paris, but at present the human race is thinking so much of its own necessities that it cares less about dog heroes living more than 5100 feet above the surface of the sea. Five in number, at the end of light, 18-foot rubber