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NEW DISCOVERIES ALL OVER THE EARTH

LITTLE HARM Done WHEN IT RAINS STEEL DARTS

Why Science Does NOT Believe Them EFFECTIVE WEAPONS for Aviators

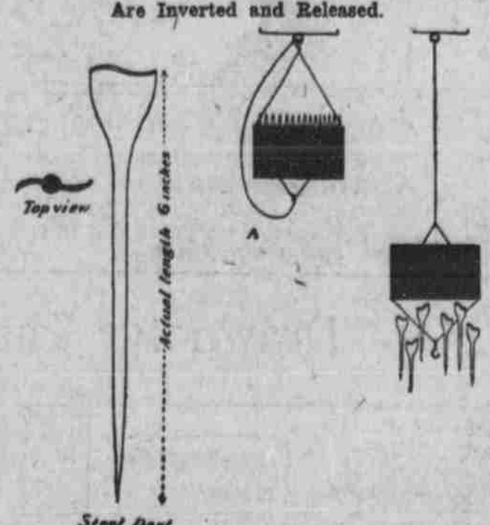
By Prof. A. L. Hodgen

A STORY came out of the war zone some months ago to the effect that French aeroplanes had been showering steel darts from a great height onto the Germans. One account said that these darts fell with sufficient force to penetrate a man's helmet and skull and continue on through his shoulder and body and into the ground for quite a distance.

At the outset it should be said that it is possible for darts dropped from a very great height to do what these are said to have done; but, for reasons which will be explained, it is highly improbable that the French aviators were able to inflict very much damage on the enemy in this way. The story, however, whether true or not, raises some very interesting questions about a falling body's swiftness and how much it is retarded by the air.

The darts in question were probably small, heavy, elongated needles, having fluted ends to give rotation and to prevent their turning over and over in the air. They were probably shaped so as to follow as closely as possible what are known as "stream lines," and thus prevent the air from retarding them too much.

This matter of air resistance has been the subject of an enormous amount of laboratory research work during the last ten years. It is known, of course, that the air resistance varies when the surface of the falling body is at right angles to its motion.



Steel Darts Used by Aviators Showing How They Are Inverted and Released.

Steel Dart

Box of Darts Carried Points Up as A. Unhoop It and One Hundred Darts Fall Out as B.

Take a big drop of water, for instance; it falls very swiftly. Decrease the size of the drop continually and the fall is slower and slower, till finally when a very small mist drop (or what is known as a droplet) is made, it may take an hour for it to fall one inch. This example shows the great effect on a falling body of the air resistance.

This great decrease of velocity is explained on the geometrical property of bodies. If a sphere is decreased in size its area decreases as the square of its diameter, but its weight decreases as the cube of its diameter. As the weight is the thing which makes it come down, its value, therefore, decreases much faster than the value of the area.

But its area determines the amount of air resistance. The more area there is the more resistance to motion. So as the retarding force does not get smaller in as great a proportion as the pull downward, the body slows up. It will always, however, have some fall.

For this reason, a cloud—which consists of small particles—is always falling when it is in still air. It thus is gradually evaporated and disappears while one is watching it. Generally, however, there is a stream of air upward under a cloud, and so more cloud is formed as other parts evaporate. The motion of the air upward keeps the particles from coming down and being evaporated.

A parachute gives a good illustration of the third determining cause in the rapidity of a falling body. It has been found that the greater the speed through the air the greater the air resistance. The parachute starts out as a rock would, falling slowly; then it gets faster and faster till it opens out.

Now when it opens out a great area is presented and a check takes place. But soon it gets swifter and swifter again.

If it were not for this third law this parachute would keep on getting swifter all the time, until, if it had started from a good distance up, it would strike the earth with a force that would kill its passenger. But as the parachute tries to get faster the resistance of the air mounts up—not in exact proportion, but in enormously greater proportion than the speed. It finally gets to a certain speed which it maintains thereafter, no matter how far it has to fall.

In fact, during some experiments on airships it was found that air resistance increased as the square of the velocity for all ordinary speeds, but soon rose to the cube of the velocity at much greater speeds. Suppose that a thing had a certain high speed where this law held and the speed increased to twice what it was. The air resistance would immediately be eight times what it was before. There is, therefore, a limit to the speed that any body can attain in the air. There is practically none to what it could attain in free space.

It has also been found out that the resistance of the air depends on the shape of a body. If it be made to conform to what are known as natural "stream lines," which play such an important part in the construction of automobiles, the resistance is much decreased for any speed.

It is interesting to compute what velocity these French darts might have attained in free space. This, of course, can only be approximated, because we do not know their exact shape, material and weight, or the height from which they were dropped.

If they were dropped from a distance of a mile up their velocity in free space (that is, considering the air on the earth absent) would probably have been only about 600 feet a second. If from four miles up only, it would have been 1,200 feet a second. In fact, for these darts to acquire the speed of a rifle bullet from mere dropping they must have been let fall from a distance over ten miles up in the air. And this estimate neglects entirely the resistance of the air. In actual practice the distance would have to be much greater.

So the story may be discounted as to the great force of the darts, although if they were as sharp as needles they would certainly have an enormous penetrating power.

WAR Declared on WOODEN FENCES

WAR is being declared upon the wooden, tight-boarded fences which disfigure the back yards and alleys of so many cities. Such fences are declared to be "time-dishonored breeders of fires, crime and disease," and officials of the health, police and fire departments everywhere are urging that they be prohibited by law.

The wooden fence probably came into use when lumber was cheap and privacy seemed attainable by this sort of screen. But with the building of rows of two and three story and even higher dwellings, privacy is invaded by the eye of the neighbor in the upper story and is no longer a valid excuse for the evils promoted by the wooden fence.

Statistics show an unusually high percentage of serious fires in localities where the wooden fences abound. A fire starting in one block may easily be carried through a whole block by the fences.

These fences also are a great hindrance to the police. They prevent the proper inspection of a neighborhood, serve as screens behind which crimes can be committed in safety and supply hiding places for burglars and sneak thieves while waiting their opportunity to break into houses.

Other charges in the indictment of the wooden fence are that it is unsightly, that it encourages the accumulation of disease-breeding rubbish and that it shuts off the light and air from what would otherwise be attractive playgrounds for children.

How MINISTERS Came to Be Called REVEREND

AT some time in the Middle Ages the custom grew up of applying to clergymen the term "reverendus." This word was a part of speech known in Latin as a gerund, and meant "one who ought to be revered."

Gerunds could be compared like adjectives, and it seemed natural to the people of those days that, if all clergymen were reverendi, a bishop should be designated by the comparative degree, "reverendior," more reverend, or right reverend, while the superlative degree, reverendissimus, most reverend, was reserved for archbishops.

As these terms referred to individuals, they were never used in connection with the family name alone, but with the Christian name, which indicated the individual.

A great many people in our day are committing the unfortunate blunder of using the term "reverend" in connection with a family name. Mr. Smith is a clergyman. He is frequently spoken of, and sometimes spoken to as "Reverend Smith." This is wrong. Smith is a family name, and does not refer to an individual. The only proper way of speaking of him is as the Rev. Mr. Smith, or the Rev. John Smith, or plain Mr. Smith, but never Rev. Smith.

Never Rev. and Mrs. Smith, but the Rev. and Mrs. John Smith. Strictly speaking, the only possible way of speaking to him is "Mr. Smith," for the old English, "Your Reverence," has died out

One does not speak of or to a judge as Honorable Jones, but one speaks or writes of him as the Hon. Henry T. Jones, and addresses him as "Your Honor."

As concerns the use of the word "reverend," no one applies it to himself or signs his name with it prefixed.

Scholars urge us to try to preserve the use of the English language, and not be attacked by the modern disease which impels so many people to use nearly all the nouns and many of the adjectives as if they were titles.

You may find in the papers any day such expressions as Motorman Brown, Witness Green, Suspect Robinson, Optician White, Pitcher Jones.

It ought to be stopped; but who will stop it? Scholars tell us that this is one of the signs that the English language is degenerating very rapidly.

Be Sure You Use the Right WHETSTONE

NOT many people realize that there is a special sort of whetstone for nearly every purpose. The proper sharpening stones for each different use are exhibited in the National Museum at Washington, D. C., and there are hundreds of them.

The hard, white, compact sandstones found near Hot Springs, Arkansas, are among the best whetstones known, equalling, if not surpassing, the Turkey stone which for years has been considered one of the best.

The hard, flint-like stone should be used only to sharpen instruments made of the very best steel, requiring very keen edges and points such as those used by surgeons, dentists and jewellers. Other grades, although composed of the same ingredients, are more porous, the sand grains are not as close together and a rougher edge is given to the sharpened tool. Because of their more porous nature, these stones cut faster, proving suitable for the finer edged tools and for honing razors.

Indiana and Ohio supply a whetstone made from a sandstone of a coarser grain than the novaculite of Arkansas, but nevertheless quite uniform. It may be used with either oil or water, and is useful for sharpening household cutlery or ordinary carpenters' tools. But since it is easily cut and grooved by hard steel, it is not suitable for the fine instruments of dentists and surgeons.

Scythestones and mowing machine stones are practically all made from mica schist rocks found in New Hampshire and Vermont. These rocks are composed of very thin sheets of mica and quartz crystals. The grit of the schist is not as sharp as that of the sandstone, because it contains foreign material other than silica which prevents the quartz grains from abrading freely.

Mica schist stones wear down quickly from constant use—an advantage rather than a disadvantage, for as they wear down, more of the hard silica grains are exposed to do the sharpening. Neither oil nor water is needed to keep the pores of the stone open as with other whetstone rocks. Scythes require stones with these qualities.

SCIENCE NOW KNOWS—

Why Vaccination Pays.

STATISTICS show that to vaccinate a person against smallpox at public expense costs about twenty-five cents, while the disease itself costs the public on an average about $50 per case.

When We Work Best.

AUTUMN and Spring are the best seasons of the year for all kinds of work. At a very low temperature both mental and physical work are depressing. Mental work reaches its highest efficiency at a temperature of 38 degrees, while physical work reaches its maximum at 59 degrees for men and 60 degrees for women. Recent investigations show that weather variations are distinctly good for us and promote our mental efficiency.

To Prevent Frost Bite.

DURING the present war an old method of preventing frost bite has been revived. It consists in pouring melted glue over the feet, especially about the toes. As the glue dries it makes a superior non-conductor and retains the heat of the foot so that soldiers so treated are able to march for days in severe cold without frost bite.

Arsenic Not Fatal to Birds.

RECENT investigations by Government scientists show that the spraying of trees with preparations of arsenic to eliminate the gipsy moth is not necessarily fatal to birds. The scarcity of birds in regions where much spraying is done can be explained by the fact that the spraying diminishes the supply of insect food and the birds are obliged to seek it elsewhere.

How Fast the Churches Are Growing.

THE year 1914 was a most encouraging one for the churches of the United States. The net increase in membership for all denominations, both Catholic and Protestant, was 760,000, and during the year the total church expenditures amounted to $410,000,000.

Children Are NEVER BORN NEAR-SIGHTED

ONE has only to look about him to see that nowadays many more children are wearing glasses than used to be the case. The reason undoubtedly is that the average child has more school work than formerly and that among all classes young eyes are being continually used for near work to a greater extent. During the growing period of the child the outer envelope or supporting tissue of the eyeball does not attain its full degree of firmness and hardness, and any strain on the focussing muscles has a tendency to make the eyeball stretch. This stretching of the eyeball is really the condition which is commonly known as near-sightedness, and is caused in most instances by strain in reading.

Many people believe that a child may be born near-sighted, but this is not the case. Near-sightedness always results from strain, and in the great majority of cases can be prevented, or at least kept down to low degrees.

It requires no special knowledge to appreciate the fact that a tissue when stretched is weaker than before and is likely to go on stretching, and this is the danger in near-sighted eyes. Such eyes are apt to stretch and grow worse until the child attains its full growth and the tissues have a chance to become hard and firm, hence it is during the period of growth that damage to the eyes is most apt to occur.

If the stretching of the eyeball goes beyond a certain point the delicate nerve tissues inside the eye are apt to become stretched to an extent which they cannot stand, and tears and breaks occur in them with damage to the sight. The breaks cannot be remedied, nor for that matter can the eye when it is once stretched come back to its normal size.

There is a current belief that near-sightedness runs in families, and this, while partly true, is really an unfortunate misconception, says a writer in the Critic and Guide. Certain families have softer tissues in the eye than others, and their eyes stretch more easily to a certain degree of strain. This should only make such people more cautious to avoid strain and does not by any means imply that it is necessary for such children to be near-sighted.

The cause of this strain in the young child is astigmatism. There are contributing causes, such as a too short eyeball, poor general health, which makes the tissues weaker and less resistant, and also the disposition of the child, some children preferring to sit and read all day, but that astigmatism is the principal cause is well known.

This word is becoming rather familiar, and yet its meaning is constantly misunderstood. Many people suppose that astigmatism means a difference in the two eyes, which is entirely wrong. It is an irregularity of the front part of the eye, where the curves should be symmetrical, but are not. This irregularity or inequality of the curves makes objects appear blurred. Certain lines in the objects looked at seem fairly distinct, while certain others are blurred, and this causes the eye to make strong muscular efforts to overcome the blur. The strain brought about leads to stiffness and cramps of the muscles, with headaches, and in severe cases to an actual stretching of the eyeball.

The surest way to stop the ever increasing dangers of near-sightedness is to correct astigmatism by means of properly fitting glasses during the growing period.

A Great Many WEEDS Which Would Be GOOD FOR US TO EAT

IN the effort to perfect fruits and vegetables, as well as to evolve new varieties, the expenditure of much time and money is involved, with, in some instances, most gratifying results.

Not only have inferior species been brought to perfection, but entirely new varities have resulted from the cross-fertilization methods and a careful study of the laws of heredity as applied to plant culture.

The Familiar Curled, Sometimes called Sour Dock, Owing to the Presence in It of Oxalic Acid. Its Leaves Make Good Food and Have Some Medicinal Value.

Accepting the results of scientific research at their full value, and in no manner seeking to minimize their worth, let us consider the food and other values of some forms of vegetable life which are usually ignored.

An eminent authority has defined a weed as "a plant whose virtues are unknown." Former generations were fully acquainted with the edible qualities before they learned the medicinal properties of what are termed weeds. The introduction into materia medica of the essences of weeds with curative values came as a recognition of their dietary values first. It seems more consistent with reason to utilize the unappreciated weeds in the dietary form rather than to wait and take them in the form of medicine. They would thus serve the double purpose of a food and remedial agent at the same time.

The dandelion as well as the sour dock, the leaves of both of which have served as articles of diet for centuries, have also been used with gratifying results as curative agents for disorders of the liver and blood.

The dandelion, as now generally prepared for the table, has not come in for its full share of recognition owing to the improper ways of preparing it. It should always be scalded to remove the bitter tendency. When this is done it makes a most delicious salad.

Dandelion, milkweed, dock and other weeds were designated by the older generations as greens or "pot herbs," and were always cooked with meats. Their dietary uses should not, however, be wholly confined to this method of preparation, as some can be made into salads alone or cooked like green peas and asparagus. Some are also good when eaten raw.

Purslane, or "pusley," as it is commonly called, makes a valuable addition to a mixed mess of greens when cooked with salt meat. It possesses purifying properties beneficial to the blood. It appears in May, growing close to the ground, and is of a trailing habit, one root having many stems that branch out in a circle. The stems are of a reddish color and the leaves round, being about the size of the thumbnail. It can be used for a salad or for garnishing.

Dock, the familiar curled variety, is sometimes called sour dock, owing to the presence in it of oxalic acid. The leaves only are used for food, and they have a laxative value.

Sorrel, which was formerly cultivated in gardens, is now found in the wild state. It is closely related to the dock family, having a similar sour taste. The leaves are pointed and notched at the point where they joint the stem.

The "sheep" sorrel, another variety, is usually found along fence rows and in stony soil. The leaves are round and about one-half inch in diameter, growing on delicate stems from eight to ten inches in height. Several branches grow from one stalk, the leaves forming a cluster at the top of the branch. This is said to be very helpful in skin disorders because of its action upon the kidneys.

The Pigweed Is a Near Relation of Spinach and the Beet and used to be cultivated. When Young Its Leaves Make Excellent Greens.

Both varieties of sorrel are used for greens as well as for salads. They combine well with dandelion, the flavors blending admirably.

The common plantain, growing in almost every locality, may be used with safety for greens, and the young and tender leaves may be used for salads.

Pigweed was also once cultivated, much as spinach now is, but owing to lack of attention it yielded to the call of the wild. It now frequents the garden as a weed, also the barnyard, growing from one to five feet in height. Its leaves when young make excellent greens.

The cowslip, or marsh marigold, is among the earliest greens of the season, appearing in April. It makes a splendid green alone or mixed with other varieties, and also figures as a delicious salad.

Mustard, either black or white, is a valuable addition to the diet. It is best used when young and tender. Its value as a green or for salads cannot be overestimated. It is a stimulant and a laxative of a highly beneficial nature.

The nettle was used extensively in former years as an article of food, but is now not much in use. Gloves should be used in gathering it. When young the tender shoots make delicious greens. Its medicinal qualities are diuretic to a marked degree, so much so that it was formerly prepared as a nettle porridge for its therapeutic value alone.

The use of mint to flavor sauces and beverages was at one time more common than at present. The variety known as "black stem" was the most desirable. Mint grows in moist places best and may be found along small streams, where it attains a height of from a few inches to over a foot. In combination with celery and cabbage it adds to vegetable salad a delicious flavor.

Numerous other weeds that make excellent food include field cress, wild lettuce, white top, wild onion, rusty allium, muskflower, kouse, wild carrot and wild horseradish.

Most of the weeds that can be used for food grow readily, and it would be an easy matter to improve them by cultivation and to educate the public to their values.

Knitting Causes Neuritis

SINCE the outbreak of the great war many women have taken to knitting with a vigor that knows no bounds. Unfortunately their zeal has produced in many cases a new disease—one which physicians say may be compared with tennis elbow or writer's cramp.

In one English village where the knitting fever ran very high three women are suffering in various degrees from what is known as "knitting neuritis." It affects the upper arm and shoulder rather than the fingers, and seems to affect only those who knit with difficulty, having not practised the art in their youth.

It is said that the English method of knitting, which is as popular in England as the German method, has a greater tendency to produce this affection.

"When any untrained set of muscles is suddenly called upon to repeat indefinitely a complex and unaccustomed sequence of movements," a London physician says, "a spasmodic paralysis is very likely to develop.

"In knitting neuritis the trouble begins with the worker feeling that the usual wrist and finger movements cannot be followed out with their customary ease. Later the muscles get stiff, and finally, in the later stage, develop a spasmodic cramp as soon as the knitting needles are taken into the fingers.

"A peculiar characteristic of the ailment is that while the fingers are thus affected when any attempt is made to knit, there is no interference with other varieties of finger movement.

"The only treatment is to give up knitting indefinitely. Sometimes after a couple of months' complete rest one can begin again. In other cases a year or more of abstention is necessary, otherwise the trouble recurs immediately."