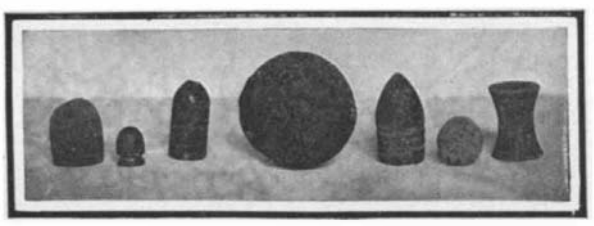
THE EVOLUTION OF THE BLOW.

BY PERCY COLLINS.

That the twentieth century man remains a fighting animal is a fact which, while many of us deplore it, none can deny. Prompted by greed, by the necessity for self-defense, or by a laudable desire to protect the weak and oppressed, he is ever ready, as of yore, to take up arms against his fellow man. Thus, it is not surprising that his inventive faculty is as active in

The Fist Was the First Striking Weapon of Primitive Man.



The Evolution of the Bullet.

the cause of war as in the cause of peaceful progress. While our day has seen the multiplication of labor-saving machinery, and of ways and means whereby the necessities and luxuries of life are rendered more perfect of their kind, and more readily accessible to all classes of society, it has also seen the engines of warfare brought to a state of perfection which, fifty years ago, was undreamed of by even the most wildly imaginative experts.

But in the science of war and weapons, as in all other spheres of human activity, the contemplative mind cannot fail to realize that the path of progress is not marked by a series of isolated inspirations, but proceeds logically—by an unemotional sequence—from a single parent idea. In other words, the devices of primitive man are the forms out of which all subsequent expedients arise. Desire or necessity inspired the untutored savage to do certain things in certain ways, thus meeting the primitive needs which arose in his life. By these means were laid the foundations of all subsequent inventions and contrivances.

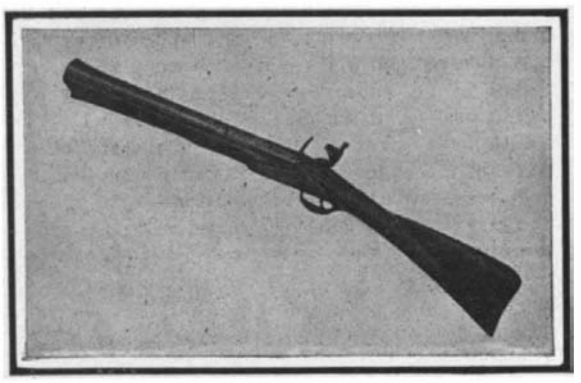
We have said that this is apparent in the science of war and weapons; nor is it necessary to evoke past history in order that we may perceive the evolutionary process through which the power to deal an effective blow has been brought to its present perfection. The living races of mankind supply us with every link in the chain. Every collector of savage weapons, every museum of ethnology, can show specimens which are, as it were, finger posts pointing to the most elaborate developments of modern times.

At first man's method of warfare was as primitive as that employed by the lower animals. He made use of what Nature had given him; that is, his fists. Clenched together, with the bony prominence of the knuckles outward and a strong arm behind, the fist can deal a very effective blow at close quarters. But man cannot long have depended solely upon his fists as weapons. It is certain that at a very early period of his history he began to make use of the objects that he found around him; and to-day no tribe or race is so unsophisticated as not to carry at least some form of club into its battles.

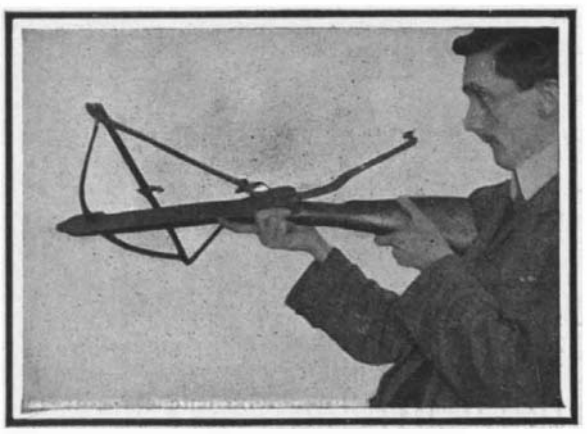
In the first place, doubtless, man in search of a weapon picked up a stone; and when he did so, he at once found himself in possession of a choice of attack. Either he could retain the stone in his hand, and with it deal a much more effective blow than was possible with his unaided fists, or he could hurl it at his approaching adversary, and thus—if his aim were true—avoid the risk attendant upon an encounter at close quarters. In fact, when the first man picked up the first stone, he did something very much more important than he can have realized at the time. He took the first step in that long march which has led him in these latter days to the rifle, the quick-firing gun, the torpedo tube with its deadly projectile.

But we must not anticipate. Let us, for the moment, fix our attention upon the man with the stone in his hand. We will ignore for the present the possibilities which present themselves if he should elect to throw it, and imagine that he makes use of it to add weight and power to his blow. He thus makes his hand into a kind of club. Notice, however, that he does so at considerable inconvenience to himself. His stone, if brought into contact with a hard body—such as the skull of his adversary—will be likely to injure the palm of his own hand. Thus, it cannot have been long ere man's attention was directed to the imperfections of the grasped stone as a weapon, and his intelligence stimulated to devise something more serviceable.

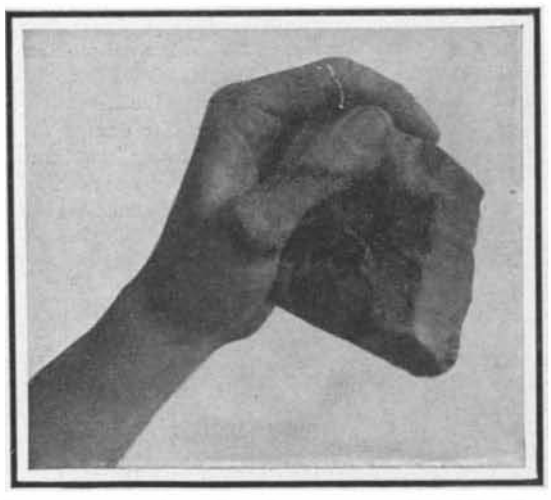
So the idea which originated in his mind when he first grasped a stone became amplified; and the savage warrior evolved the club, which of all true weapons is probably entitled to be considered the most primitive. Originally, it took the form of a heavy stick; but the discovery was soon made that a knobbed and weighted extremity added to the power and deadliness of the blow; and on this principle all the many varieties of the club have been designed. The early forms are simply the root stocks, with part of the trunks, of small trees, such as would demand both hands for their use. But there are also smaller, single-handed clubs as well; and between these extremes, almost every conceivable variety of club has been made and used. Space will not permit us to deal adequately with the club, but some of the more important varie-



The Eighteenth Century Flint-Lock.



The Arbalist, or Crossbow.

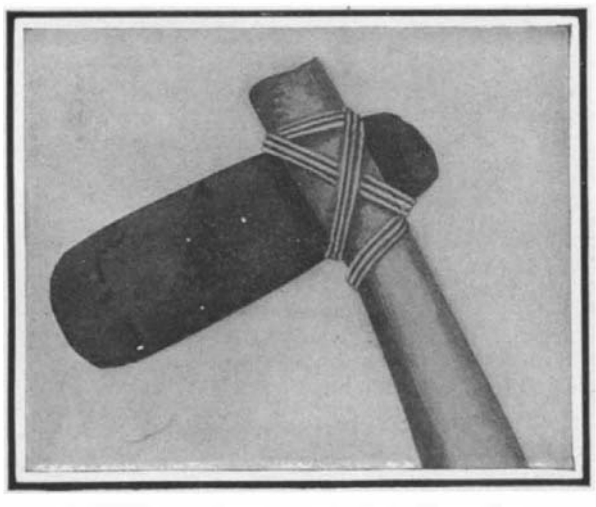


The First Step of the Evolution of the Blow Was When Man Took a Stone in His Hand.

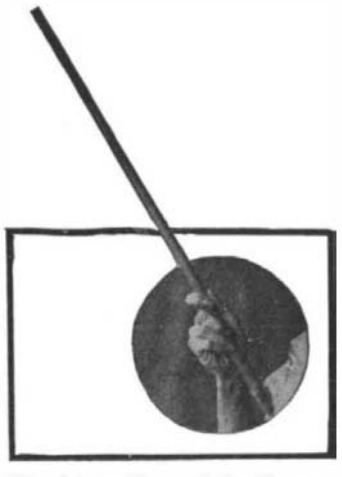
A West African Throwing Club.

A Powder-Horn of the Eighteenth Century.

The Australian Boomerang.



A Blade, Attached to a Club, Became the Tomahawk.



The Blow-Pipe of the Savage May Be Termed the Genesis of the Rifle.

The Polynesian Paddle Club Which Will Bruise, Cut or Pierce.

A Fiji Donble-Hand Club; Made from the Root and Trunk of a Sapling.

THE EVOLUTION OF THE BLOW.

ties must be mentioned, as it is to be regarded as the primal ancestor of every other form of weapon.

The men of the "stone age" used clubs weighted by means of an attached stone—the stone being either pierced and wedged upon a wooden haft, or else strapped there with strips of rawhide or the sinews of animals killed in the chase. Thus, we have the stone tomahawk, or primitive battle-ax, modifications of which are still in use among savage tribes. The Polynesians, or Vikings of the tropics, who were exploring the Pacific Ocean in their canoes as early as the seventeenth century, have developed an interesting series of weapons known as "paddle clubs," in which they seem to have summed up the whole story of their method of going to war. As the name implies, these weapons are an obvious combination of the club and the canoe paddle. In other words, they are paddles made unusually heavy, and often carved into knobbed prominences. With them the deadliest blow can be dealt, while, should occasion arise, they can be equally well employed in getting a canoe out of danger, or into closer contact with the enemy.

Weapons may be classed, for convenience, under three heads, according to their character and application, viz.: Blunt weapons for bruising, edged weapons for cutting, pointed weapons for piercing. But in practice these arbitrary distinctions do not hold good, for it frequently happens that a single weapon possesses two, or even all three characteristics. For example, there is the saber bayonet, which may be used in many ways. Moreover, as we have already said, there can be little doubt that all weapons had their origin in the club; and in the American area the club is a compound weapon for bruising, gashing, and piercing in a most dreadful manner. Mexican specimens are heavy sticks grooved along the side for the insertion of blades of obsidian—that is, volcanic glass. The Sioux club is a flat piece of wood, curving and widening away from the grip, and terminating in a spherical head, which in modern times carries a long spike, while the blades of several butchers' knives are commonly inserted along the margin. The National Museum of the United States possesses a great variety of these shocking weapons, designed, as the frontiersmen say, to "knock down the white man and then to brain him and cut him into mince-meat." The Kingsmill Islanders, and other Polynesians, make dreadful slashing weapons by securing rows of sharks' teeth along a haft of wood. These weapons vary from a few inches to sixteen feet in length; and it has been said that in all the range of weapons devised by mankind, there is nothing more blood-curdling to behold. They possess considerable interest, moreover, as showing how the sword may have been evolved from the club, even by tribes unacquainted with the use of metals. African weapons, again, are exceedingly complicated, owing to the acquaintance of the natives with iron. The standard club is converted into a sort of tomahawk by the addition of blades, or into a primitive spear by the addition of a sharp spud. In fact, the plain clubs in the African area are used chiefly for throwing.

The above remarks, though brief, will suffice to convince the reader of the fact that from the primitive idea of the club were evolved the more perfect forms of the spear, the dagger, and the sword. The small knobbed clubs, or "kerries," such as are found among the Kaffirs and other African tribes, bring us to another phase of the subject; for these, while they may be employed as ordinary clubs at close quarters, are generally used as missiles. In them, indeed, we see the further development of the idea which originated in the mind of the man who first threw a stone. And here the reader must be reminded that whereas the club proper was soon brought to perfection among savage tribes, and was long ago abandoned as a weapon of civilized warfare, the missile—typified by the thrown clubs or "kerries"—is still being improved upon.

In tracing the development of the blow as dealt with a missile, mention must be made of the boomerang—perhaps the most remarkable of all savage weapons, especially when we remember that it was invented by the aborigines of Australia, the lowest and most degraded type of humanity known. The boomerang is a curiously curved piece of wood, varying in length from fifteen inches to three and a half feet. It is shaped with a view to securing the utmost steadiness and buoyancy in flight; while in the hands of a skillful thrower it can not only be made to deal a most deadly blow, but to follow a course which appears to the onlooker to be opposed to the laws of Nature, ultimately falling at the thrower's feet. Yet the boomerang, upon which much careful labor has been expended, seems to the uninitiated to be merely a piece of crooked stick.

Turning from the thrown club, of which the boomerang is the most perfect form, we come to missiles ejected by means of mechanical contrivances. The most primitive of these are the sling and the throwing stick, which latter is found in Australia, Melanesia, and in America from Point Barrow to the Argentine. Slings are in use to-day in many parts of the world, their principle being the conversion of circular motion into rectilinear motion, thus adding momentum to muscular force. But in the case of the sling it is obvious that the force of the blow will be limited by the muscular capacity of the individual warrior. The same applies, but in a less degree, to the bow—another device whereby the pent-up energy of wood, animal substance, or metal is converted into rectilinear motion and employed to convey the missile, which may be either blunt or pointed, to a distance. The same principle is involved in those gigantic engines of ancient warfare known as catapults, by means of which javelins or blocks of stone were hurled at the enemy.

It is the blow-tube of the savage, however, which is really the legitimate prototype of our modern gun. It converts the elasticity of compressed air into rectilinear motion. From it, by means of blasts of air from his lungs, the savage expels slugs or darts. But with the invention of gunpowder it became possible for civilized man to employ blasts of gas in the same manner in which the savage had used his pent-up breath. Early types of guns were made of wood wrapped in folds of linen and secured with iron hoops. Later came the various forms of arquebuse—the early examples of which were so heavy that they had to be rested upon a support when they were fired. All early types of gun were widest at the muzzle—this, too, being a pronounced characteristic of the primitive blunderbuss. But gradually the barrel assumed a more cylindrical shape, until in the eighteenth century a fairly handy, flint-lock weapon, such as is seen in the accompanying photograph, was obtained. In like manner, heavy guns, or cannon, passed through many strange forms ere they came to resemble, even in a remote degree, our modern ordnance.

All this time the bow and arrow and the arbalest, or cross-bow, were rivals of the gun. The latter, as is well known, attained a high standard of perfection, and was at one time extensively employed both in warfare and in the chase. But these weapons were destined to be discarded by highly civilized mankind, and to-day they are known to us only as curious relics of the past.

The gun, on the other hand, has continued to advance. Breech loading, by means of cartridges, has taken the place of muzzle loading by means of a powder flask and ramrod. The percussion cap, in one form or another, is found instead of the old flint-lock attachment, whereby a spark was struck upon the priming of powder. Equally numerous are the changes which have taken place in the missile itself. The early bullets were of stone and more or less circular in shape. Then came metal bullets—either of lead or iron; and later the form began to vary, in obedience to the will of mankind, until it reached the cone shape of the present day.

In the limit of a short article, the story of the blow can be told only in the briefest possible way. To deal with it fully would call for a bulky volume. Enough has been said, however, to show the romantic interest which attaches to the subject, and to show that the most perfect weapons of civilization are really the direct outcome of a single idea which, in the first instance, formulated itself in the mind of primitive man.

Inlaid Linoleum Making.

Consul John N. McCunn, in his annual report covering Dunfermline, furnishes the following description of the Scotch manufacture of linoleum:

Inlaid linoleum is making rapid strides in public favor. It is more expensive, as the colors are not merely printed on the surface of the fabric, but are solid all through. Under the original patent it was manufactured by means of stencils. The fabric which was placed on the canvas foundation was a mixture of oxidized linseed oil and ground cork, and to this mixture was added the desired color. By means of a stencil apparatus the black colors of a pattern were laid down on the canvas; thereafter the red parts were also laid down, and so on, and after the pattern had been completed the whole was subjected to hydraulic pressure and then dried.

This patent has expired, but a new process has been introduced in which each color is manufactured in sheets. A sheet is passed through a cylinder having knives which cut out the requisite parts of the color for making the pattern, and the machine deposits these parts on the canvas in the appropriate places. Each successive color is dealt with in this way, and after all the colors have been laid on the whole is subjected to heavy pressure. The benefit of this new patent, which has not expired, is that the division lines between the different colors are much more clearly cut at the joinings. The machinery for this new patent is very elaborate, the works being about 120 feet high, while the machine itself is nearly 110 feet high; the building and equipment cost about $340,655, and there are some fifteen flights of steel stairs built into the machine.

The Two Stellar Streams.

Systematic observation of the heavens has proved the existence of at least two great stellar streams, one of which includes our sun. Prof. Dyson has resumed the analytical study of stellar motions, observing 1,100 stars whose proper motions range from 20 to 80 seconds of arc per century. These 1,100 stars are distributed over both celestial hemispheres.

Dyson's observations confirm those of Kapteyn and Eddington and practically the same apices, or objective points, have been found for the currents by all three astronomers. The right ascension of the apex of the first stream of stars is between 85 and 94 degrees, and its declination is between 7 and 19 degrees, south. For the second stream the right ascension of the apex is between 240 and 292 degrees and the declination is between 48 and 74 degrees, south.

Kobold, at the observatory of Kiel, has been studying the subject from a different point of view. He has proved that the sun is moving through space in company with a great swarm of stars. It is the ignorance of this fact that has introduced the systematic errors in the earlier determinations of the apex of this swarm. Kobold's conclusions are in perfect accordance with those of the three astronomers quoted above, so that the existence of two great stellar streams appears more probable than ever.

Enameling Cement-Coated Walls.

The question of enameling cement-coated walls has frequently come up for discussion and various have been the suggestions as to the treatment likely to produce the best results. A correspondent of The Painters' Magazine asked in a recent issue as to the proper proportion and treatment of interior cement surfaces that are comparatively fresh and are to be enameled. He is called upon to finish in white some bathroom walls that are lined in imitation of tiles and are composed of Keene's cement. The walls have been finished for several weeks and appear to be fairly dry. In answer the authority in question says:

Keene's cement or marble cement, as it is sometimes called, is composed of plaster of Paris that has been steeped in a solution of alum and is then recalcined and reduced to powder. It is used the same as plaster of Paris, and while it will not stand outside, it is admirably adapted for interior work as a stucco. There is no extra caution required in preparing it for painting, as it is not caustic, like Portland cement, but requires sizing to stop suction.

For the walls of a bathroom, we should not suggest the use of glue, or glue or alum size, but for economy's sake would recommend the use of a good wall varnish, such as is offered by reputable varnish manufacturers. Two thin coats of this will stop all suction effectually. Over this two coats of a good inside flat white, the last coat of which should be smooth sandpapered, if required, in order to obliterate brush marks, then one coat of a good white enamel, which for a first-class job should be mossed down and finished with a flowing coat of the same white enamel, to which has been added some white enamel varnish or white damar varnish to enhance the gloss. Of course, every coat must be permitted to dry hard before applying another.

In cases where Portland or similar cement has been employed, two coats of white or bleached shellac varnish are preferable to the ordinary wall varnish, but in all cases the walls must be given time to dry before sizing.

Official Meteorological Summary, New York, N. Y., July, 1908.

Atmospheric pressure: Highest, 30.26; lowest, 29.70; mean, 30.5. Temperature: Highest, 93; date, 6th and 12th; lowest, 62; date, 16th; mean of warmest day, 84; date, 7th; coolest day, 70; date, 9th; mean of max. for the month, 84.3; mean of min., 69.4; absolute mean, 76.8; normal, 74.1; excess compared with mean of 38 years, +2.7. Warmest mean temperature of July, 78, in 1901. Coolest mean, 70, in 1884. Absolute max. and min. for this month for 38 years, 99 and 50. Average daily excess since January 1, +1.7. Precipitation: 4.33; greatest in 24 hours, 1.68; date, 14th; average of this month for 38 years, 4.38. Deficiency, 0.05. Accumulated excess since January 1, +2.47. Greatest July precipitation, 9.63, in 1889; least, 1.18, in 1907. Wind: Prevailing direction, south; total movement, 6,528 miles; average hourly velocity, 8.8 miles; max. velocity, 33 miles per hour. Weather: Clear days, 9; partly cloudy, 16; cloudy, 6; on which 0.01 inch or more of precipitation occurred, 8. Hail, 14th; dense fog, 31st. Thunderstorms, 2d, 3d, 4th, 12th, 14th, 22d, 23d, 24th, 25th.

According to a recent patent specification, a self-glazing fireproof clay is composed of a mixture of dried and powdered common clay, finely ground sand, and rock salt, in or about the proportions of 66 pounds of clay, 46 pounds of sand, and 9 ounces of powdered rock salt. Water is added to the mixture in order that it may be molded into crucibles or retorts or used as a lining for furnaces.