219503

SHOOTING SIMPLIFIED

A CONCISE TREATISE ON

GUNS AND SHOOTING

SECOND EDITION,

RE-WRITTEN AND ENLARGED,

WITH A SPECIAL CHAPTER ON BREECH-LOADERS.

"Dost see the mark? Rivet your eye to it!
There let it stick, fast as the arrow would
Could you but send it there."

—SHERIDAN KNOWLES.

BY

JAMES DALZIEL DOUGALL,

AUTHOR OF "SCOTTISH FIELD SPORTS," ETC., ETC.

LONDON:
ROBERT HARDWICKE, 192 PICCADILLY.
EDINBURGH: JOHN MENZIES.
GLASGOW: THOMAS MURRAY AND SON.
MDCCCLXV.

PREFACE.

THE unanimous approval bestowed by the press on the First Edition of "SHOOTING SIMPLIFIED," might have encouraged the Author to sooner issue a Second Edition. Independently, however, of the reasons given at page 269 in this Volume, he has awaited some definite result from the breech-loading movement. That movement, he believes, has reached a stage at which it will remain for an indefinite period. The ingenuity of thousands throughout the civilized world has been brought to bear on this subject. As for some two or three years past the tendency of the change has been in search of merely illusory results, the period of useful invention seems more than reached, and this little Volume goes forth to the world with the conviction of the writer that it is up to the most advanced point on Sporting Fire-arms, and his honest assertion that he keeps back nothing tending to either interest or instruct his readers.

BEDFORD GARDENS,
KENSINGTON, *22d March, 1865.*

CONTENTS.

INTRODUCTION.

FROM the earliest ages, man has sought after and used engines by which animals could be struck at a distance from the projector. The most primitive weapon or projectile of necessity was thrown from the hand—the muscles of the arm being the propulsive agent. In the boomerang of the Australian savage is a remarkable instance of this, it being shaped so that the action of the air causes it to alter its line of flight, and even to return to near the thrower. This fact proves that there may be some hope of a bullet, fired from a smooth bore, being so formed as to rotate by the pressure of the air during its flight, although it must be granted that the cases are widely different. The sling, increasing the power of the muscles of the arm, was probably the first extrinsic appliance, followed by the long bow and arrow, and these again by the more complicated cross-bows, catapults, and other engines of war and the chase. Lately the elastic power of caoutchouc has been applied to the throwing of harpoons, it is said with some success. In all these cases elasticity, or conversely contractility, are

the prime agents, and the efficacy of fire-arms depends upon the same principles. The contractile powers of the human muscles are only elasticity in another form, and the elasticity of the gases produced by the combustion of gunpowder is only an increase of that of the atmosphere. The nearest approach to fire-arms is the blow-pipe of the South American Indians, who send a small poisoned dart with effect to some distance, through a tube, by the action of the lungs. The school-boys in Germany, using a wooden tube some six feet in length, acquire great dexterity in this practice. Forty years ago the author's father had in his employment several journeymen gun-makers who could hit a small mark with a clay ball, blown through a common gun barrel, at a distance of more than twenty yards. So dexterous were they that they could stick these balls upon the hats of persons walking along the opposite pavement of the Trongate of Glasgow, a wide street; feats certainly not to be admired for their prudence, however much for their cleverness. The almost total disuse of other weapons than fire-arms has led us to forget the power of those agents. When at college, the author formed one of a small party who carried the art of slinging to a height surprising to themselves. The Scriptures and ancient history testify to the remarkable dexterity of the slingers who formed so important an element of large armies. We have the authority of Sir

Archibald Alison (History of Europe, vol. ix., p. 181) that the Patagonians, "mounted on their small but hardy horses, discharge their slings, loaded with stones, with such address as to hit any animal at the distance of four hundred yards." Gunpowder itself may probably yield in time to some superior projecting agent. In the first edition of this work, published in 1857, the author referred to the inferior chemical combination of gunpowder, and predicted the almost certainty of some great change in its ingredients. Short as the period has been, there are already ample proofs of the correctness of his views. We have the satisfaction of knowing that our gunpowder manufacturers are the ablest in the world; and Messrs Curtis's & Harvey, Hall & Son, Pigous & Wilks, and the Kames Company of Scotland, will not be slow in advancing with the age. Our interests are safe in the hands of men too enlightened to adopt that which is crude and uncertain on the one hand, or to reject that which is thoroughly approved on the other. The difficulties of the matter will be referred to in the proper place, but it may be mentioned here that all proper propulsive force must be accumulative, and not suddenly expansive.

The art of shooting flying and running game is now so common, and the manufacture of fowling-pieces brought to such perfection, that many readers may be surprised to learn that their use, in field sports,

is of comparatively recent date. Fielding, a correct delineator of the manners of his times, speaks of shooting a crow flying as a feat of expertness likely to be considered as "incredible." The period to which he refers is about the year 1670; but as the passage in question was written about the year 1748, we may safely assume that up to that date shooting-flying was not generally practised, as Fielding was not likely to apply the strong term "incredible" to what was common in his own time. [See the episode of the "Man of the Hill," in *The History of a Foundling.*] At a still earlier period shooting formed so small a part of field sports, that the use of a fowling-piece is only incidentally mentioned in *The Gentleman's Recreation.* (Third Edition, 1686.) In that celebrated work the method of taking all kinds of birds, from the pheasant to the wren, is laid down as "by nets and bird-lime;" and even the use of a setting dog is only employed in netting, not in shooting, partridges. In the pursuit of water-fowl, for sport, nets were used instead of the gun; and the dogs were trained to drive the birds from their coverts into the nets, which sport was practised "in moulting time, when the wild fowl cast their feathers, and are unable to fly, which is between summer and autumn."

At that period gun barrels were made of an inordinate length, which completely prevented the rapid aim necessary in shooting flying; while the action of

the lock was too slow to render the aim and ignition of the powder simultaneous. In the work above quoted, we read:—"That is ever esteemed the best fowling-piece which hath the longest barrel—being five foot and a half, or six foot long, with an indifferent bore, under harquebuss." The barrels made in Spain, at one time so celebrated, were also of extreme length. Spanish barrels were certainly for a long time the best in Europe, although there is no reason to suppose that they were better than those now made in this country, unless it be that fondness for the antique which gives so many articles a false value. Those who are curious in such matters, consider the barrels forged by Nicholas Biz—who lived at Madrid, and died in 1724—to possess a superior excellence; and also those of his contemporaries, Juan Belez and Juan Fernandez. The barrels made by these makers sold at prices above forty pounds sterling for a single barrel. They were composed of horse-shoe iron, not twisted, but welded longitudinally; and so great was the care in manufacture, and attention to the purity of the metal, that from forty to forty-five pounds of iron were consumed in the forging of one barrel, weighing less than seven pounds when finished.

In like manner, the improvements upon other parts of the gun have tended to render its use more effective in field sports. The invention of twisted barrels, giv-

ing great strength with little proportionable weight—of the patent breech—and, above all, of the ignition of the powder by means of the percussion cap, instead of the flint and steel—have all been conducive to that effect; while the superior strength of the gunpowder now made, the use of improved elastic wadding and of wire-cartridges, have still further increased the power and certainty of the fowling-piece, and rendered the old-fashioned weight and length of barrel superfluous. As now made, the modern fowling-piece is an almost perfect piece of mechanism; but its apparent simplicity is the result of a series of small inventions and improvements, which, in the aggregate, have cost an incalculable amount of time and money. Even yet the inventive faculty is racked for new modes of loading, ignition, and obtaining strength in shooting; and hardly a season passes but we hear of new breeches, new nipples, and other novelties, which, though much vaunted, are seldom seen; and it is rare indeed that we now find any maker of eminence bringing out inventions, in so far as these consist of departures from, rather than improvements on, the regular style of the percussion fowling-piece.

(Thus far in 1857, in which year was introduced from the Continent the most daring alteration from the common gun of modern times—the breech-loader—which is yet in a tentative position as to its superiority, but is certain to carry the day against its old competi-

tor in, so far as sportsmen in this country are concerned, although for rough, outlying, or foreign work, the muzzle-loader will hold its own. That the breech-loader, as originally introduced, was defective and open to many objections, cannot be gainsaid; and although on their construction it was plain that they might be equal to the requirements of the weak gunpowder and light charging of the Continent, still they were not equal to our strong powder and severe work. This soon proved itself by their rapid deterioration at the jointing, and it became clear that that jointing was insufficient. In this difficulty the author, resolving that his business should not suffer during a period of uncertainty, invented his Patent "Lock-fast" Gun, which will be fully described in its own place. By a simple mechanism the barrels and stock are interlocked before firing, giving a solidity and strength not likely to be rivalled, seeing that he has taken advantage of the only points where such mechanism can be properly applied, although imperfect locking may be gained by levers and other agents, none of which can possibly have the same power, as inspection of the gun will at once demonstrate.)

A perfect fowling-piece is supposed to contain these various improvements; and it is the aim of the author to point out, in as simple and concise terms as possible, in what they consist. It is at all times difficult to explain mechanical matters to the inexperiencd; but it

were better to err on the side of simplicity than to avoid those subjects which form the ground-work of a knowledge of the Art of Shooting. And if the more experienced sportsman be tempted to throw this little book aside, it is respectfully submitted, that not for him, but for his younger brethren in the craft, are its pages written.

Should the author succeed in making himself understood in teaching the young sportsman the theory of how and why a gun is good, or otherwise; and the proper modes of loading, taking aim, and such simple matters, his end will be served; as no written instructions, however elaborate, can stand in the place of that practice in the field which alone can give experience to the hand and eye. Still, it appears to him that much useful written instruction may be given, with which practical skill may be sooner attained; and that the young sportsman will not be the less certain of his aim, on the mountain or in the covert, because he knows something of the tools with which he works.

THE ART OF SHOOTING.

OF THE BARREL.

THE barrel of a gun is its essential part. Other parts of the work may be clumsy and deficient—the lock may grate fearfully in its action, nay, may be wanting altogether [many a good hart has been knocked over by "Donald," with his "lang Queen Anne," from behind a dyke, an attendant kilted sprite blowing a red peat at the touch-hole]; the stock may possess neither internal toughness nor external beauty—but without a good barrel, all excellence and virtue are absent. The requisites in a barrel are—strength, lightness, elasticity, balance, and force of shooting. To gain these requisites, it is necessary that the metal used be of superior quality, and be in itself tough, and yet elastic, and also that it be wrought so as to give the grain of the iron the greatest resisting power to the expansive force of the gunpowder. While barrels were welded longitudinally—that is, with the grain of the iron running parallel with the bore—much weight was necessary to retain sufficient strength; but the

invention of the spiral twist has enabled the makers to turn out barrels, perfect in strength, of very much reduced weight. On no part of the art of gun-making has more ingenuity been exercised than on barrels. They have been forged of every possible variety of iron and steel—from old scythes, from needles, from wire, from horse-nails, and many other articles. They have even been made, as whim suggested, with a lining of steel, and with a double spiral of iron and steel alternately, and of other intricate combinations. The result of all these experiments has proved that barrels of horse nails, or what is commonly called "stub," are, for the heavier class of guns, unsurpassed; and that, for light barrels, a variety of iron termed "silver-steel" (but which, in its finished state, contains no steel, it being decarbonised in the forging) is preferable to all others. In no variety of iron is the per centage of barrels burst at proof so small as in the last named. The material is old horse-nails and coach springs combined, the metal being repeatedly cleaned, by various processes, from all extraneous matter, carefully mixed, and wrought into barrels, on the Damascus principle. Sometimes the metals are combined in several plates, and the barrels are then termed "laminated steel." The term "steel" is improper. The repeated white-heats to which it is brought remove all carbonisation from the metal, but leave behind a fine, mellow, elastic iron. No barrel of steel, thin enough for a fowling-

piece, could be made, unless at such expense as would be absurd, and would be very unsafe. Steel barrels, sometimes used for rifles and pistols, must be bored out of a solid rod, and unless made of extreme weight, are apt suddenly to fly to pieces. There is a prejudice that silver-steel barrels are also unsafe. The author has in vain endeavoured to discover the origin of this prejudice, and assumes that it has certainly arisen from the confounding of terms, or rather the improper use of the term "steel" to designate such barrels at all. They are certainly the safest of all barrels; and combine the softness once so much desired in flint guns, with a hard, cold-hammered surface outside and inside, and besides possess an elasticity beyond all other barrels whatever. For light guns they are, consequently, incomparably the best. It is a somewhat curious and unsatisfactory truth, however, that there frequently occurs a run of bad metal in one or other of the varieties. This is unpleasant to all concerned; to the sportsman, who, desirous of having a new gun with the barrels made of his favourite iron, is told that that iron is not good at present; and to the gunsmith who is under the necessity of telling him so at the risk of having his motives and veracity brought into doubt. Considering the high prices paid by sportsmen for the finished work, and by gunsmiths for the raw material, it might surely be worthy the attention of the iron-makers to strain every effort to maintain the quality

of each variety of iron in its entirety. The difficulty is, that in this case, as in others of the same kind, the commercial element rules; while the gunsmith, on the other hand, has much of the artist's feeling in his work, is brought into personal contact with his patrons, is anxious to adopt their suggestions, and does not view the matter from a commercial point of view only. Of late Damascus barrels have been much run upon—that metal having been exceedingly good, but a change may come without any warning being given. The efforts of the continental iron-makers have of late been most praiseworthy, and the English will be necessitated to strain every nerve to prevent their being eclipsed.

In addition to the above kinds of iron, the English iron-masters have devoted great attention to the manufacture of new iron, suitable for gun barrels; and, by a proper adaptation of the fuel and methods of working the iron, have succeeded in producing metal suitable for general purposes, and of which, in fact, almost all the barrels now produced are composed. This iron ranges in price from 1¾d. to 8½d. per pound; so that, considering the great loss of weight in forging, the difference in value of the raw material of barrels alone, which might be considered to have no great range, is very considerable. The author has had barrels forged of iron made in the neighbourhood of Glasgow; and although exceedingly tough, not one having given way in the proof house, still

it was unsuited for the purpose, being full of specks, technically called "grays." This shows how carefully the iron must be prepared in the first instance, as no amount of toughness and elasticity will compensate for the absence of a sound, unbroken surface, when finished; and great art and experience are required in the preparation of iron which will be free from these specks, which are the annoyance of the trade. Common barrels are now so little in use, that it is only necessary to dismiss the subject by saying, that they are forged of iron lapped longitudinally round a mandril, the edges being welded together; and that, as the grain of the iron runs along the barrel, it consequently does not possess the elastic strength of the twisted barrels. It is just as if a wine cask were made without hoops, the strength depending on the firm adhesion of the staves at the edges.

Twisted barrels are of two kinds: the one being of simple iron, twisted while cold round a mandril, so as to assume the exact appearance of a spiral spring; and the other of iron which is first twisted on itself like a rope, then rolled out again into a bar, and last of all twisted cold, like the former, into a spiral, before being welded into the barrel. The latter is termed "Damascus," or "stub Damascus," according to the figure into which it is wrought, and quality of the metal; and of late the general term "silver-steel"

is often improperly applied to barrels of this class, although not composed of the proper materials, as described above. The repeated twistings are intended to throw out any hard, gritty particles of iron, and, by increasing the fibre, give the barrel greater strength; and certainly when properly executed, and the metal not too much strained, they must give greater strength and elasticity; and it is well known in the trade that these barrels almost never give way in the proof, and surpass, in light guns especially, all other kinds of metal. The Damascus barrels, as made some twenty-five years ago, were too hard and too much strained; and many of them, in consequence, burst in use. After the iron is twisted into the spiral shape, in pieces of several inches in length, the process of forging and joining the whole is carried on with wonderful rapidity. Three hammers play on the heated part so quickly and exactly as to produce complete adhesion and solidity; and of course on this part of the process depends the freedom of the finished barrel from all flaws caused by imperfect welding. The nearer the barrel can be brought to the intended weight by the hammer the better, because the repeated strokes harden and produce a sort of skin upon the iron, both outside and inside. It is also of the greatest consequence that the process be not hurried through with little hammering at each successive heat. The longer the hammers are kept

in play on the metal after each heat, the better are the barrels, and the stronger they will shoot. This care in forging is called "cold-hammering," which toughens and puts a skin on the iron, closes the pores, renders the barrel less liable to corrosion, and more capable of taking a high polish. It will at once be seen that the necessary time taken by three workmen in this cold-hammering process very much enhances the value of fine barrels. It is in this part of the process that the continental workmen are deficient, but are threatening to rival the English. We have great faith, however, in English pluck and muscle. No foreigner strikes a blow upon the anvil like your English workman, and it will be our own fault, indeed, if we do not maintain our superiority against all the world. It is also proper that the barrel be of equal thickness on each side, so that the bore be exactly in the centre, which preserves the strength and elasticity. After being forged, the barrels are ground outside, then bored inside, and subjected to the proof. In the manner of this, the same means are used in London and Birmingham—the proof at each being now entirely the same in all respects whatsoever. At both, no barrels are proved except at the weight and bore at which they are to be turned out; and double barrels must be filed, put together, and ribbed—in a word, must be almost entirely finished for the second

or definitive proof. The gauge is stamped by the Government officials upon each barrel, to prevent undue widening of the bore after proof. The charge of powder being proportioned to the width of the barrel, it is consequently the interest of the maker to get them proven at as small a bore as possible, the per centage of spoiled barrels being less, and formerly the Birmingham proof did not provide against improper after-boring. Now, however, the gauge is stamped there as well as in London. The barrels, when finished, are, however, generally one size wider than the proof mark; and, owing to the severity of the proof, there is no risk whatever in this final boring. The proof consists, taking twelve gauge as an average calibre, of above four usual charges of powder for the first, and of three charges for the second proof, over which are tightly rammed, with a brass rod, a roll of strong brown paper, then a bullet, and over all another roll of stiff paper. The whole system appears perfect, and is conducted with care, and by men of the greatest caution and experience. The number of good guns bursting in use is consequently exceedingly small, and perhaps never from intrinsic defects.

Great resistance to the force of the powder is necessary in the lower part of the barrel; and consequently the thickness of the metal should increase rapidly in the last ten inches towards the breech. This rapid

swell also reduces the amount of recoil, and makes the gun shoot stronger. Towards the muzzle, a good barrel cannot be too thin; if at all sufficiently thick to prevent injury from coming in contact with external objects, it is enough. No fears of bursting at that part, from undue thinness, need be entertained; and the gun will be found to shoot much harder from the expansion of the metal than when the barrels are thick towards the muzzle. This is caused by the expansion giving greater facility to the escape of the shot, which has already received its impetus and direction. Let us suppose, for instance, on the principle of instructing by showing the opposite, that the barrels contracted towards the muzzle; the pellets, in that case, would be driven in and upon each other (jostling like race-horses in a narrow part of a course), would injure their spherical shape, and both by that and by the general disturbance, lose both force and correctness in direction. It is by the knowledge and careful study of these minutiæ, in each individual gun, that excellence in shooting is attained, and this forms a large branch of apparently unproductive expenditure to all leading gunmakers. Of course barrels of good quality are here meant; and, in fact, when describing those minutiæ which make a really perfect gun, the best quality of material and workmanship are to be understood. For instance, a fine pair of stub or silver-steel barrels may be made of half the thickness of those made of the

"penny three-farthing skelp iron," more especially towards the muzzle; and this is one reason why a good gun, with well-forged and well-proportioned barrels, possesses so find a balance. The weight towards the muzzle is reduced to the smallest possible amount; and the gun comes up to the eye freely and lightly.

There are various kinds of flaws in barrels, such as "cracks," "sand holes," and what are technically termed "grays." The first two are comparatively rare, but the last is the great annoyance of the barrel-forger and gunmaker; and, in fact, may be said to exist more or less in all barrels. They are those little specks in the iron which may be seen more readily after a gun has been used, from the rust showing more upon them than upon the smoother surface. In themselves, unless very numerous, "grays" lead to no insecurity in the barrels, and are rather eye-sores than real flaws; but the freer barrels can be made from them the better, as the rust catches hold of them readily, and unless kept very clean and well-oiled, they may eventually deteriorate the barrel.

The "sand hole" is a more serious flaw; and if the barrel stands the proof at all when it exists of any size, still it cannot be very safe, as the hole will often run in a tortuous direction for a considerable length under the surface, being, as its name imports, full of fine sand, or probably of the powder used as a flux to promote complete adhesion in welding the barrel, which

has adhered to the iron, and been closed upon in the act of forging.

The "crack" is the worst of all flaws. This is a separation of the fibres of the iron from overstraining of the twist; and consequently every discharge of the gun must, by the expansion of the metal, more or less widen the crack, until it run right round the barrel. The same "solution of continuity" may also exist from imperfect forging, and the same result takes place. The author has repeatedly taken old double barrels asunder, with a crack in one of them so lengthened through time that the barrel was nearly separated into two parts. When this crack runs round the barrel the danger of bursting is less; but should it have a longitudinal direction, the danger is much increased, and, sooner or later, the barrel will give way. This longitudinal crack almost never occurs; and all the varieties of Damascus barrels are the most free from this kind of flaw. A hole right through a barrel would be much more safe than any kind of crack; and, in point of fact, many barrels are safely used for years with a small hole right through them. A crack may at once be detected by suspending the barrels, and striking them with a piece of wood, when, if faulty, they will not emit the clear, ringing sound they otherwise do.

The outside of barrels should be well filed and polished. The smoother they are, they will remain the

more free from rust, through the closing of the pores; and consequently they will last longer. The filing should also be regular, leaving no hollows, but retaining an equable strength, and allowing a regular expansion throughout the entire length when fired.

The inside should be as bright as a mirror, and free from flaws. Slight marks or rings, left by the boring bit, can hardly be avoided, and may be found in the best barrels; but there should be no hole likely to retain dirt or damp of any kind, which can corrode the iron.

It is also of particular consequence that what is termed the "shoulder" of the barrel be left full and strong. This is, that the female screw chamber into which the patent breech is screwed, bé wider than the barrel, which should have a very perceptible shoulder at the termination of the screw, against which the muzzle of the breech, when screwed home, should press. No gun can be depended upon when the screw is flush with the inner surface of the barrel; the shooting is generally bad, with a very great recoil, of which this imperfection is a very frequent cause.

Good barrels will often, when subjected to the same circumstances which would burst an inferior article, bulge, or swell out, like a glass tube heated at one part and blown into. When the bulge is not very large it may be hammered down, but no barrel which has been so treated can be called truly safe, until subjected to a

fresh proof. Still, it is a matter of some surprise that so many bulged barrels are in use without further accident occurring. The danger is on the increase, from the bulged part allowing foulness to gather there, causing the corrosion of the metal, already reduced in thickness and strength by the expansion. It may be said that when a barrel gets thus bulged, it need not be thrown aside immediately, as it may occur under circumstances which would lose much sport; but the earliest opportunity should be taken to have the damage repaired.

Barrels should be kept well browned. This is an artificial corrosion, produced by acids and other agents, carried on to a particular point, and then arrested. The result is the showing up of the figures in the twist of the metal, (by many supposed to be painted, and again, in its turn, imitated in worthless guns by what may be termed painting), and the hardening, by carbonisation, of the outer surface, and consequent preservation of the metal. A very few sportsmen prefer keeping the barrels clear and bright; but this is at the daily expense of so much metal, wearing out the barrels much sooner than would otherwise be the case. Experience has convinced the author that guns, if fairly kept and not overworked, become seasoned as it were by time. The whole outer surface, not only of the wood but also of the iron, seems to harden and become less amenable to injury. He lately saw a statement to

the effect that there is reason to believe that iron cannon undergo a similar hardening process, so that they become less liable to burst. Of course these remarks apply to the materials only, not to the fitting.

The form of the gun rib is immaterial; it is sufficient that it be smooth and regular, and, above all, lie flat upon the barrels. The higher it is towards the breech, the greater will be the point-blank range of the gun; but a high rib forms an unwieldy gun, and should be avoided. The longer the barrel, the higher must the rib be at the breech to maintain the elevation. From the improved shape of barrels of late years—swelling rapidly towards the breech—elevation of the rib is not much required, the swell of the barrel in itself serving the purpose of elevation, and from this cause guns can be made much neater in appearance, and more handy than formerly. The sight at the muzzle is a small ball of metal exactly in the middle of the rib. The slower a sportsman shoots, the larger he likes the sight; and with a proper style of shooting it is altogether superfluous.

LENGTH OF BARRELS.

THAT length of barrels which, in proportion to the width, would throw shot with the greatest force and regularity, when perfectly cylindrical, would be the

best; but that length, with the exception of very narrow bores, would be too long for general use; and by proper boring, and having the metal in the barrels properly arranged as to thickness, the same result can be obtained as from great length of barrel; and, in percussion barrels, as a rule, 30 inches have come to be generally adopted. This length is not founded, so far as the author is aware, upon any *a priori* principles, but from experience. When flint guns were in use, it was considered an axiom that barrels should be 49 times the length of the gauge; consequently, a 14-gauge gun being about 11-16th of an inch wide, 33 to 34 inches was a standard length (these dimensions are merely given as an approximation); but, from the different method of ignition by percussion allowing a much thicker barrel at the breech, and the use of elastic wadding, that rule does not now hold so far as that it can produce the strongest and closest shooting barrel possible. So much is the method of boring altered, that length may now be said to be a matter more to be regarded in reference to the strength and style of shooting of the sportsman than to comparative power of shooting; consequently we find what are termed "covert guns" (which will be more completely described below), if well bored, shooting with a force and closeness which sadly damage all rate of length. Thirty inches seems, however, to have been adopted as the length combining the most advantages,

and is a good average. With a barrel much longer, should anything be gained in power, it is lost in unwieldiness, by which the game increases its distance before it can be covered; and, with shorter barrels, unless very carefully bored, and the metal most correctly adjusted, the shot is too much scattered; and as few guns are turned out with proper care in boring, 30 inches, as above mentioned, has become the favourite length, and is likely to remain so.

It is here to be particularly noted, that in addition to long barrels being more likely, in the first instance, to shoot closer than short ones, and therefore kill game at longer distances, this superiority in effective range has been exaggerated by another cause. It is only the centre pellets of the discharged shot which hit an object with full force; and short barrels, though propelling the centre shot with the same velocity, are more apt to hit the game with the outside pellets. The reason is obvious on examination. The shorter the barrel, the greater the ratio of divergence. To illustrate this: draw a straight line of say 3 inches long, upon paper, then draw a second line, at a very acute angle with the first, of 2 inches in length, diverging 1-16th of an inch. Then, making a mark upon the paper say 6 inches from the end of the first line, in a straight line with it, a rule applied to the second line will show the amount of divergence at the mark. Now draw a line 1½ inches in length, but

diverging also 1-16th from the first in that length. applying the rule, it will of course be found that although, in the shorter line, the divergence was exactly the same as in the longer, yet, at the mark, that divergence is immensely increased. The illustration will be much more evident if drawn upon a larger scale. To apply this: the first line is the proper line of aim; the mark upon the paper is the object fired at; the second line is the long barrel, held a little off the proper aim in firing, yet showing a fair chance of hitting; the third line is the short barrel, also held a little away, but at exactly the same degree of error as the other. The result of applying the rule will show how very small a chance there is of hitting with the latter at all; and yet both guns were fired alike—not of course quite correctly, but the one as truly as the other. If the author's advice as to shooting with both eyes open be followed, the difference in length will make a very small practical effect, because the line of aim follows the eye, without any looking along the barrel; but in all other cases, where a fair, deliberate aim is taken, the longer the barrel, consistent with ease in handling, the truer must be the aim. But it is this latter style of shooting that the young sportsman is recommended to avoid; and were it not considered too presumptuous for the author to introduce his own personal experience and skill in shooting, he would decidedly advocate the use of barrels of 26 to 28 inches in preference to all

others, as having, in his own case, enabled him to do all that can be done in the field, in fair average shooting at general game, with guns of any length whatever. But there must be no shutting of one eye, and puzzling the other with looking for and following the game, and keeping the gun all in a nice, correct line at the same time. Both eyes are quite needed, and sometimes even a little more would not at all be unnecessary.

There is not a more frequent question put by sportsmen than that of asking the propriety of cutting barrels to a shorter length. A gentleman finds he has a 32-inch gun, shooting well, properly adapted to his shoulder, but above his strength, or badly balanced. Without wishing to write one line which might possibly be misconstrued, yet a love of truth compels the author to declare that there is a tendency in the trade to induce gentlemen to order new guns of 32 inches in the barrel. Weight gives power, and reduces recoil; and as a 32-inch barrel must necessarily weigh more than one of a 28 or 30 inches, it follows that the gunsmith gains two qualities without cost, for the long barrel costs him no more money than the shorter one. He, in fact, gains a greater profit, for the larger barrels are more likely to shoot well without trouble. He very naturally, therefore, adopts and recommends 32 inches as the best and surest length, and this quite honestly. The gun is examined before delivery, very probably lifted without the ram-rod (if it have one),

and found not ill-balanced. But, after fatigue, the case is altered, and the wrists are worn out. Again, it not improbably occurs—writing from experience of guns submitted to the author—that, to counter-balance the extra weight and length of barrels, the stock is loaded behind with lead. Here is a double evil and no possible gain. Unwilling to spoil a good gun, the owner prefers—unless his purse be a long one, so that the price is of no moment—to go on in a half-satisfied sort of grumbling manner with his 32 inches, and finds such a remarkable diversity of opinion when he does seek for information, that he gives up sufficient inquiry in disgust. The fact is, that the barrels can be cut with safety if the boring be altered to suit the reduced length, and in this boring or not boring lies the whole mystery.

THE GAUGE

Of a barrel is of importance, as the rule of weight at a given length, and for the particular kind of shooting. The gauge is the number of balls the barrel carries to the pound weight, thus—a 14-gauge gun throws a ball of 14 to the pound; a 12-gauge, of 12 to the pound, and so on; and as 30 inches has become the favourite length, so at that length, 14 has become the favourite gauge, and is certainly an excellent one. At this

gauge a good gun of 30 inches may weigh only 6 lbs. 12 oz. to 7 lbs. 2 oz., and that without recoiling, if the metal is properly arranged in the barrels. Twelve is also a good bore, but should be the widest used, unless with great additional weight at the breech; and a good "12" of 30 inches may be turned out at 7 lbs. to 7½ lbs. In weighing guns, the ram-rod is always included.

It is particularly to be noted, however, that narrow bores will throw small shot best, and the converse takes place with wide bores; and also that long barrels, say 12-gauge, 33 inches, charged with three drams powder, will throw small shot, say No. 7, with very great force. In testing the comparative shooting of barrels, No. 6 is the size generally used, as being that in greatest use.

Barrels of gauge 20 are a good deal used. This was Manton's favourite size; and for No. 6 and 7 shot they are excellent when a very light gun, say under 6 lbs., is desired. Properly bored, they need not shoot too closely; and for use in the early part of the season, in warm weather, they are certainly very light and handy. For winter shooting, when the gun is carried only during a few hours, the opposite extreme may be indulged in. Weight is then of less consequence, and 10 or 11 bore will bring down game at a great distance. Of course, from this reasoning, it is at once clear that when the sportsman uses only

one gun (and the less he changes it the better), 12 must be an average size, combining many advantages. It can be charged lightly early in the season, and will bear heavier loading when game gets wild. As already mentioned, 14 is also a favourite bore, and 14-guns, somehow, are more likely to shoot well than any other size. The author's experience is this—that 14 is the size which shoots best, in the first instance; with great care, and after repeated trials and alterations, 12 may surpass 14, but the latter is the more certain size as to shooting well. It may therefore be assumed that, especially in second or third-rate barrels, 14 is the safest size for good shooting; but that, with very great pains, and in rarer instances, 12 will excel all other sizes of equal comparative weight. This, at least, is the author's opinion, founded on very careful investigation and experience in boring thousands of barrels—a process so delicate that the slightest variation produces the most extraordinary, favourable or unfavourable, results.

Guns, after long use, frequently go off their shooting, and should be re-bored. It has been a matter of much satisfaction to the author to have had guns sent to him from the most distant parts of the kingdom for this important purpose, and many a sportsman has thanked him for restoring his favourite tool to its pristine excellence. There is nothing mysterious in the process; but it must be done with judgment and

the most delicate accuracy, and with tools perfect in themselves. A competent person can at once tell, on inspection, whether or not barrels can be successfully re-bored; and in the latter case money need not be thrown away in mere experiment without the fair probability of a favourable result. The same application of judgment and skill can improve barrels which shoot too widely or too closely, and, as mentioned above, barrels should never be shortened without altering the whole internal proportions.

THE STOCK

SHOULD be exactly fitted to the shape of the shooter. With a stock of improper length or bend, certainty of aim may be acquired by long use and practice; but still that readiness under all circumstances which accompanies the use of a properly-suiting gun can never be attained. On putting a gun to the shoulder there should be no straining of the neck to take an aim. When the eye is fixed upon a distant point, and the gun raised to the shoulder, the object aimed at, the sight at the muzzle, the centre of the breech, and the eye, should all be in a direct line, without further adjustment. To ascertain whether or not the shape of the stock is that best adapted for the shooter, he should, in this manner, frequently raise the gun to his

shoulder, and take aim at a distant point with both eyes open; then, closing the left eye, he will perceive whether or not he has mechanically taken a correct aim. If, with the left eye closed, he does not see the object, the stock is too crooked; if he sees all the rib, it is too straight; and if his line of aim is not along the centre of the breech, but from the left corner of it, the stock is not properly cast off. Should the line of aim be along the right side of the breech, the stock is too much thrown off. With a gun properly fitting, the aim is instantaneous; and the sportsman, if not naturally a good shot, is greatly assisted in the field. It will thus be perceived that the objections to a stock, in shape, are various. It may be too straight or too crooked, too short or too long, and may be too much or too little cast off, or it may be cast off altogether to the wrong side. If too straight, the gun will shoot high; if too much bent, too low; if too long or short, the rapidity of aim is retarded; and if wrong cast off, the gun will shoot to one side or other, according to the figure of the shooter. This latter requisite is little understood, and less attended to by sportsmen; and being of great consequence in taking aim, is worthy of particular notice. It is that lateral bending of the but of the stock (generally outwards) which helps to bring the centre of the breech directly before the right eye. In simply raising a gun and taking a slow aim at any object, the neck is instinctively bent over to the right

side, and the centre of the breech attained; but in the field it is far otherwise; and the aim is too readily taken from the left side of the breech, throwing the shot to the left side of the object—one reason why it is more difficult to hit a bird flying to the right than to the left.

A gun of the proper shape may be chosen from among others very easily by the above simple means of ascertaining that it carries a correct aim to a given object with both eyes open; and with such a gun, the shooter will acquire a practical dexterity in the field otherwise quite unattainable. To be able to shoot without closing the left eye is, in the writer's opinion, the perfection of that dexterity, giving a complete command over the motions of the object aimed at, and also over the use of the second barrel. It will therefore be perfectly plain that if he is correct in this opinion, the gun must exactly fit the shooter in length and bend. As an illustration: How does a man drive a nail? Certainly not by closing one eye and looking along the hammer; but, with both eyes open, he mechanically balances the hammer, and strikes instinctively, never, if accustomed to the use of the tool, missing his aim. It is the same in shooting: the gun must be rapidly thrown up to the shoulder, the eyes fixed on the object only; the gun must be left entirely, as it were, to take care of itself; and at the moment the gun is

known to be in its position, the trigger is drawn, and the game falls simply because the gun, like the hammer, suits the user, and, accompanying the eye, follows the flight of the game. By this mode of shooting, game is generally killed dead at once, and the disagreeableness and loss of time in following wounded birds and hares avoided: in particular, the wounding and letting away of hares is prevented—at all times so annoying, and in the eyes of good gamekeepers an unpardonable offence on the part of the young sportsman. Since the publication of the first edition of this work, the invention of the stereoscope and other advances in optical science have completely demonstrated the correctness of this argument. It is one of the greatest gratifications to any author guided by a spirit of truth, to find, as is always the case, that new ideas which he has broached and which may have been coldly received, always gather strength as time goes on. Many sportsmen will not believe in the superiority of the "two-eye" system of shooting, and for rifle-shooting it is treated with perfect ridicule. The author has been told that in the army it is not even permitted, let the results in shooting be ever so good. Yet he has more than once, although not pretending to be a great rifle shot, taken a rifle out of its owner's hands, and although he had never handled the weapon before, hit the *dead centre* at the first shot, and this with both eyes open. At very long ranges the advantage

is self-apparent. This digression, however, more particularly refers to the bearing of the science of optics upon this subject. After the publication of the first edition of this work, the author addressed a letter upon the question to that learned and revered philosopher, Sir David Brewster. He received a lengthened and most courteous reply, but it was evident that the questions had been misunderstood, and being unwilling to further intrude upon the valuable time of Sir David, more especially considering his advanced age, the author allowed the correspondence to drop. In No. 92 of that excellent periodical, *Once a-Week*, (Saturday, March 30, 1861), will be found an article entitled "Ocular Stereoscopy," signed D. P., which indirectly bears upon taking aim, and the perusal of which is recommended to all inquirers. Let us quote one or two short passages:—"Binocular vision, then, or the seeing with two eyes, is a most important element in the faculty of sight. To this we owe all our real sense of distance or relief. . . . To many it may seem rather paradoxical to declare that monocular (one-eyed) vision is destitute of any real sense of distance. . . . Place upon the table an empty, small-mouthed phial, and taking another similar bottle full of water in one hand, shut either eye and approach the phial upon the table; then, without any searching motion, stretch your arm quickly out, and pour the water from the full bottle fairly into the other. In

doing this, although you may not be absolutely unsuccessful, you will not fail to be conscious of a difficulty in judging distance, which disappears immediately upon opening the other eye; plainly proving that judgment and experience, without any optical sense of relief, were guiding your first efforts. A similar uncertainty will be experienced in endeavouring to approach and snuff a candle with one eye shut." It is the "judgment and experience" part which misleads the "one-eye" advocates. Through great practice they do shoot well, and therefore insist upon others throwing away "the real sense of distance," and "optical sense," which, in taking aim, are so invaluable. Men whose eyes are wide apart always excel in shooting, through plain optical causes. The nearer the eyes are, the less is the binocular power, and yet how strange it is to find sportsmen who will still further narrow this fine provision of nature into the diameter of one retina only!

When a stock is too much bent, the muzzle is depressed—a bad fault. It is much better to have a stock rather straight than too crooked; and it is a safe rule that, in looking along the rib, you distinctly see one-third of the whole length next the muzzle, as well as the sight. This gives the shot elevation, and increases the range.

One of the most common fallacies still lingering among sportsmen, is the extraordinary delusion—for

it can be called nothing else—that the barrels of a gun can be too much depressed, and consequently slope downwards towards the muzzle, and yet the *crook of the stock* be correct. It is amusing to see this question revived from time to time in sporting prints, proving how hard it is to knock down a good old, respectable, time-honoured error. When a gun seems to have its barrels sloping downwards, it simply shows that it is too crooked in the stock. There cannot be two kinds of crook—the whole arrangement being merely that the barrels and stock are put together at a certain angle. There cannot be two angles in one gun. The barrels are necessarily straight, and the angle is formed in the stock—the degree of bend being entirely governed by the distance of the upper edge of the but of the stock from an imaginary line carried straight backwards from the rib. If you draw the bolt and raise the muzzle, as some do to *prove their argument*, you merely reduce the distance of the upper edge of the stock from the above imaginary line, as would have been the shape had the *stock been made more straight in the first instance.*

The recoil of the shot is said to be less felt in a bent than in a straight stock. This is accounted for by the arch of the bend rendering the impulse less direct upon the shoulder; but as the more direct the resistance to the backward expansion of the evolved gas, until the shot is dislodged and propelled, the better, so

a straight stock, not allowing this resistance to be dissipated through the form of the arch, may increase the propulsion of the shot, and the recoil should be lessened by other means.

The wood of the stock should be hard and tough: walnut is the best. It should be well grown, straight in the fibre at the handle. The mounting and locks should be carefully fitted into the wood. In shape, the stock should be thin and nicely suited to the grasp, immediately behind the locks, where it is termed the "handle." From that it should rapidly swell backwards, and acquire its greatest thickness immediately behind where the but succeeds to the handle. The raised part there, termed the "comb," should not rise too high; and, backwards to the heel-plate, the stock should be all well rounded, with no flatness on the sides. The heel-plate should be well hollowed, and nicely filed upon its outer surface, so as to fit the shoulder closely. From the fore-trigger to the heel-plate, the average length is 14½ inches. A long stock may have less actual bend in itself than a shorter one—length being so far equivalent to degree of bend —and, in the choice of a gun, it is a good rule to take that which is rather long and straight than otherwise. The aim and range will thereby certainly be assisted, as experienced sportsmen will testify. Some guns are made with a projection on the left side of the stock, termed the "cheek-piece." This is exceedingly useful

where the sportsman is thin in the cheek, or has any tendency to bleed at the lips or gums from the recoil —not an uncommon case. The fulness of the cheek-piece will be found to remedy this, and where a gun otherwise suits its owner, a supplemental piece can readily and neatly be applied to the stock.

When a man is more than usually lusty and full in the breast—which is generally accompanied with a short neck—the stock should be short and well bent; and the addition of what is termed a "pistol-handle" will be found an advantage. Under these circumstances, the heel-plate should be well hollowed, being apt to glance off the rounded shoulder, and the pistol-handle gives firmness in the grasp. It is also of use to those who cannot acquire the art of quick firing, enabling them to draw the gun tightly against the shoulder, and thereby steady their aim. It is a projection of the wood, in the shape of a pistol stock, under the handle, enabling the right hand to exert a direct backward pressure upon the gun. These pistol-handles were generally made unnecessarily large and unseemly, much beyond the real requirements. By altering the lines, the author has succeeded in gaining all the advantages of the grasp without any such unnecessary bulk.

The fore-end of the stock should be broad and full, wide at the end of the lock-plates, and may be chequered or not in same manner as at the handle.

A few years ago a new mode of finishing gun-stocks was introduced, by doing away with the spirit varnish and using oil instead. The latter, although apparently less finished, is by far the more expensive process, and that most beneficial to the gun in the end. The wood, continuing to absorb oil, becomes in the end much harder, and any bruises can more easily be removed. If kept properly clean and well oiled, the beauty of the wood is also by no means lessened, although the gun may not be so showy and eye-catching when newly finished.

LOCKS.

An essential part of a good gun is the lock, which should be as simple as possible in its construction, but filed in all its parts to perfection. The main-spring should be lively in action, and depend less upon quantity of metal for its strength than upon width of expansion when released from its confinement, and great care in tempering. The tumbler and scear should be carefully bound down by the bridle, and be justly fitted to each other; the due combination of the whole giving liveliness of action with sufficient strength.

The main-spring should have a force of not less than 10 lbs., and not exceeding 14 lbs. Under 10 lbs. the

percussion cap may not explode in wet weather; and above 14 lbs. the wear and tear of strikers and nipples is greatly increased. A good strong spring is to be advised for breech-loaders. The scear-spring should have a power upon the scear, preventing the dislodgment of the latter from the bend of the tumbler under a pressure of at least 3 lbs. upon the trigger, but this depends much upon the taste of the shooter. The tumbler should have the bend for the reception of the scear at half cock so deeply cut as to completely prevent any amount of pressure upon the trigger from snapping the lock.

To judge a good lock, draw up the striker with the thumb, and observe that there is no grating or roughness—that it rises freely with decreasing power—and that it "speaks" well, with a clear sound at half and full cock. Draw the trigger, retaining the thumb upon the striker, and observe that it goes down freely, with increasing force as it approaches the nipple.

The striker should be so filed as to receive the thumb readily, and not easily slip from it, and should fall directly upon the nipple, which should lie in the centre of the mouth of the striker, termed the "bell," which should also be wide, so as to allow the exploded cap to drop freely from it on reloading. Upon the proper shape and quality of the metal of the striker depends its durability. The former should be such as to prevent much vibration under the shock of the per-

cussion; and the latter be of tough malleable iron. The vibration can only be avoided by a gradual lightening of the metal from the base of the striker upwards, with a fine, light, but broad catch for the thumb. The strikers of breech-loaders are generally governed in shape and quality by the foregoing rules. Any speciality will be referred to in the chapter on these new guns.

There are various shapes of locks, although the internal work is all on the same principle; but two distinct methods exist in their position on the gun—the back-action and the fore-action. The latter, which was much in use at one time, is now seldom seen upon good muzzle-loading guns, although still very considerably used in more common work. It is a very simple lock, easily jointed to the other parts, and having all the lock behind the barrel. It was supposed that this would balance the gun better, and remove the lock from the corrosion produced by the flash of the cap; and also that there would be less chance of damp reaching the springs. But no positive advantage was found to be gained; and a back-action muzzle-loader rolls in the hand, wanting the broad fore-end in front of the guard, which, in the fore-action gun, rests flatly on the left hand, and keeps the gun on even keel.

The back-action lock is again in use in breech-loaders, which, having a broad fore-end, do not roll in hand. The stock is carefully protected at the

weakest part by the use of a strong strap to the false-breech.

There are several varieties of the fore-action lock. The best is the bar-lock, the outer plate of which is jointed close up to the patent breech and barrel; and this forms by far the strongest gun. In the other varieties, where the lock is all detached from the barrel, the thin wood between the two is easily split, and the stock is more readily injured in taking out and putting in the barrels. A recent improvement, however, in which silver plates are placed under the breech, forms a sound gun.

As to this or that plan rendering locks water-tight, the simple fact is that in wet weather the rain penetrates by the triggers, passing through their box, which cannot possibly be rendered water-proof and at the same time allow the free action of the triggers. The workmanship on the highest class of locks is most beautiful; and however simple the mechanism may appear, few lock-filers are able to produce the finest qualities, which in consequence command, in the unfinished state, very high prices. One pair of good locks, in the filed state, without strikers, and still requiring to be finished, are equal in value to two strong, plain, double-barrelled guns, such as are used by colonists, all complete and finished as high as varnish can make them, in stock, lock, and barrel.

The safety-lock is little used. By numberless con-

trivances, greater safety in the use of fire-arms has been attempted, but the ruling principle is to require two distinct points of pressure to allow the lock to act; one point is, of course, the trigger, and the other has been variously placed; but the most simple and common style is to have a lever under the handle, in connection with a tongue pressing upon, and preventing the action of, the trigger, until the lever is acted upon by the hand in firing. A spring keeps the whole in proper position, but the mechanism is delicate, and accidents seldom arise from such causes as may not either be easily avoided, or are likely to be prevented by the use of any safety-lock whatever. In cases where the shooter is of a nervous temperament, let him have a safety action by all means. We must always remember that there is something in guns beyond mere wood and iron. Their use (accompanied with a certain amount of danger) is for the promotion of health in the sports of the field; and if any cause lessen the benefit received from the complete change from business or other fatigues, the beneficial results are so far lost. That to a nervous person a safety-lock must give increased confidence, and therefore enhance the enjoyment of his sport, with all the attendant advantages, is so clear as to require no argument.—(See "Accidents.")

THE PATENT BREECH

Is a modern invention, preceding the percussion system. Formerly the charge of powder lay in the barrel itself, through which the touch-hole was bored, the termination being a simple screwed plug, with a hook outside fitting into the false breech or combining both plug and false breech. Under the mistaken idea that any powder lying behind the touch-hole created recoil (see "Recoil"), this plug had sometimes a diagonal notch cut into the side lying opposite the touch-hole, through which notch the communication took place from the pan with the charge lying in front of the plug. Then the plug was made elongated, and hollowed to contain the charge of powder, but still the whole being screwed within the barrel, and out of sight. Upon these *quasi* improvements at last followed that genuine one, the patent breech, being a solid, separate piece of iron of the same outside dimensions as the barrel, and firmly screwed into it, but so shaped internally as to give the greatest resistance to the expansive force of the powder, and thereby direct it forward towards the muzzle; and externally to allow sufficient metal outside for the fitting of the nipple in percussion guns.

The screw in the breech receiving the nipple should be most carefully made, and perfect in all its parts,

and should not reach down in all its width to the cross-chamber below, but have a more narrow orifice between, on the edges of which it is of particular consequence that the bottom of the nipple should rest. This renders the whole passage continuous, and adds to the strength and security of the nipple. The patent breech, as well as the false breech, is always case-hardened, to prevent corrosion.

The patent breech, inside, consists of a cup with its mouth towards the muzzle of the barrel. From the bottom of this cup, a cylindrical passage opens backward until opposite the nipple, where a communication takes place with the latter, through another bore at right angles with the first, which is termed the "cross-chambering." This second bore is made from the outside, and that part on the outer side of the nipple is afterwards filled up, in fine guns, with platina or gold, and in others with iron or German silver, and through these the vent-hole is driven. (See "Vent-hole.") The whole of this communication should be free, allowing the powder to reach the nipple easily. The shape of the cup is a matter of some interest; that of a half sphere is the most common, and is perhaps the best. Some gunmakers, however, prefer the shape deeper, something resembling a bell, supposing this to make the gun shoot harder; but there is good reason to suppose that on the shape and bore of the barrel, and not on that of the breech, the quality

of shooting really depends, at least as to close or wide shooting. Doubtless the comparatively smaller calibre, as well as the shape of the cup, increase the force of the powder, which explodes the more violently the more it is confined in narrow bounds. This is the principle of what are termed the "Gomer" and cylindrical chambers in cannon.

The central fire-breech is a comparatively recent alteration upon the patent breech, and wants the cross-chambering, the nipple opening direct, and, in some makers' guns, from behind, upon the charge of powder. The sought for advantages are quickness and strength. Now, it has always been, and justly is, a desideratum, that the charge of powder be not disturbed until combustion takes place; and one of the great early objections to the percussion system was, that the force of the percussion cap when fired (which is very considerable, and will extinguish a gas jet at a distance of several feet) would displace the powder, and the combustion would take place after it had left the breech. Against this force the cross-chambering must serve as a protection; and it remains to be seen whether the central fire-breech be any real improvement. The author by no means wishes the reader to condemn the principle untried; but he has not found it any improvement, from his own experience, and does not see in what it can lie—the simple breech being, beyond all calculation, rapid

in ignition, and the powder being less easily disturbed before combustion.

In common guns, the breeches are not cross-chambered, the communication of the cup with the nipple being made by a slanting passage from the bottom of the former to the part under the latter, rendering the communication less central upon the charge. It is of prime importance that the breech should entirely fill the screw made in the barrel to receive it, pressing, as mentioned above (see "Barrel"), against the shoulder. Any part of the screw not so filled up, is a positive dangerous injury to the barrel, breaking on the soundness of the tube, and leaving a space for corrosion and honey-combing, from the action of the damp and dirt lodged in the thread of the screw, which cannot be removed by the cleaning-rod. The recoil of the gun is also thereby greatly increased.

TRIGGERS.

THE triggers should be long and well curved, affording a good hold for the finger. The front of each trigger should be nearly flat, and the curve so formed that when the pressure of the fore-finger is applied, there should be no tendency in the finger to slide upwards along the trigger, but have a horizontally backward

pressure. The edges should be rounded, so as not to cut the finger in firing, and they should be set well separate. For nervous persons, who have any hesitation, under the excitement of shooting, in choosing the proper trigger, the right hand one may be chequered, thus giving a distinguishing mark. Care should be taken in having the triggers always nicely oiled and playing freely in their box, so as to act with ease. Upon this and their proper adjustment, what is called the "speaking" of the locks, depends in a great degree, so that the finest locks will not speak well with improper triggers. The guard of the triggers, termed the bow, should be rounded and rather thickish at the edges, and have no improper projection likely to injure the middle finger in firing.

RAMRODS.

THE ramrod should be made of tough wood—snake-wood, called also letter-wood, is excellent—and should not be too thick at the tip, as that gives undue weight and spoils the balance of the gun. It should be of a good thickness at the screw, where it is most easily broken, and be carefully fitted to the pipes and stock, so as to be readily removed, and still not so slackly as to be drawn from its place by the suction from the barrels when fired. The loading-rod is a

modern instrument, used instead of the common ram-rod. Guns to be used with a loading-rod have no pipes on the barrels, and certainly make altogether stronger and better balanced weapons. The loading-rod is carried in a short leathern sheath buttoned or sewed upon the left breast of the shooting-jacket. It is particularly to be observed that this sheath be fixed on the coat in a nearly horizontal position. The weight of the rod will bear it down behind to about 45 degrees, which is the proper angle. The best balanced rods are those with a light horn tip at the end, and with the screw and joint, necessarily heavy, at the handle, instead of at the end, as originally made.

RECOIL.

THE recoil of a gun is caused by the expansive power of the powder being universal, that is, in every direction, consequently there is the same amount of force exerted upon the breech, and from it along the stock upon the shoulder, that there is upon the charge of shot; and were the powder fired in a chamber of exactly the same strength on all sides, the result would be the escape of the evolved gas through each side alike, by bursting or otherwise. The charge of shot presenting, while in a state of rest, a greater or

obstacle to the escape of the gas, until that obstacle is quite overcome, the pressure tends equally backwards and laterally as well as forwards—this is termed the recoil. It will therefore at once be perceived that all guns must have some recoil, although in some it may be so small as to be hardly perceptible, according to the amount of *vis inertiæ* in the gun itself and shape of the stock, (see "Stock.") But though not felt by the shooter, the recoil does exist the same in all guns of equal calibre when equally charged, and it is only by the greater amount of this *vis inertiæ* that it is not perceived, or is exhausted. There are other elements which enter into the question of recoil, but the above is sufficiently explicit for a work of this popular kind. If it were desirable to bring the matter into figures, the recoil would be measured by the weight of the fire-arm inversely to that of the charge of shot. The weight of the shooter must necessarily be taken into account so far, and also the firmness of his grasp of the gun, and of his pressing it against his shoulder. The yielding of his body to the blow is also to be considered, hence a gun fired nearly or quite perpendicularly upwards from the shoulder, (if the latter were possible,) is always felt to recoil. It follows that it is of prime consequence that a sportsman learn to hold his gun firmly against his shoulder in firing, which is advantageous in every possible way.

When the barrels are too thin at the breech, the

effect of the lateral expansion causes a great vibration, giving the shooter a shock which is not the same as a simple recoil, but is often mistaken for it. From the confusion arising from these two kinds of recoil, many erroneous opinions have been formed as to its cause. Thus, wide thin barrels, although weighing more than narrower and thicker ones, will vibrate severely with the same charge of powder and shot, and this recoil, being lateral, gives a very great shake to the nervous system, and is very likely to produce headache and render the aim uncertain. In fact, such a piece is worthless, and the greatest prudence should be exercised in choosing a gun to avoid one with this fault, which is the more apt to escape notice because a direct recoil against the shoulder is not observed, and it is only when the gun is brought fairly into use that the repeated shocks from the discharges begin to exert their effect upon the nervous system. The effect this nervous derangement has upon the aim is very great; shot after shot is fired, apparently in the right direction, and the sportsman is surprised to see the game go away uninjured, and supposes that his powder is damp, or that some other mysterious cause is at work to destroy the force of the shot—the truth being that he is firing without aim.

One common opinion is that recoil is caused by the touch-hole not being quite at the extreme end of the breech, so that the powder behind the touch-

hole is supposed to shoot backwards; so far is this from being the case, that it has been proved by a series of experiments made at the instance of the Board of Ordnance that the recoil is least of all when the powder is fired exactly at the centre, that is, equidistant between the breech and the wadding in front. The author not being in possession of the details of these experiments, submits in their place those conducted by the French Government for the same end, by which it will be seen that the situation of the touch-hole has very little, if anything, to do with the recoil. The experiments were made by M. Le Clerc, gunsmith to Louis XVI. The barrel used was 30 French inches in length, weighing, with the board to which it was fixed, 28 lbs. The charge was one drachm twelve grains powder, and one ounce eighteen grains No. 4 shot. The target was a sheet of paper 20 inches by 16, placed at 45 paces. Two kinds of wadding were used. The result of the whole is given in the following tables:—

First Set.

WADDING OF CARD-PAPER.

	Discharge.	RECOIL. Feet.	Inch.	Lines.	Mean.		No. of pellets thrown into the mark. Mean.		
Touch-hole close to the breech-plug.	1	1	0	3	0	11	6½	36	27	Mean of all, 28.
	2	0	10	3				14		
	3	1	0	3				31		
Touch-hole two lines from the breech-plug.	1	1	3	9	1	3	0	45	34	
	2	1	2	0				33		
	3	1	3	3				26		
Touch-hole six lines distant.	1	1	0	10	1	0	6	38	25	
	2	0	11	11				20		
	3	1	0	9				18		
Touch-hole twelve lines distant.	1	1	1	7	1	1	0½	27	26	
	2	1	0	3				17		
	3	1	1	4				35		

Extremes—0, 10, 3, and 1, 3, 9.—Mean Recoil—1, 1, 0.
Extremes of pellets in mark—14 and 45.

Second Set.

WADDING OF HAT.

	Discharge.	RECOIL. Feet.	Inch.	Lines.	Mean.		No. of pellets thrown into the mark. Mean.		
Touch-hole close to the breech-plug.	1	1	1	1	1	2	4½	40	51	Mean, 45.
	2	1	4	0				78		
	3	1	2	0				37		
Touch-hole two lines distant.	1	1	0	7	1	2	0½	44	41	
	2	1	2	3				40		
	3	1	3	3				41		
Touch-hole six lines distant.	1	1	3	3	1	3	1	32	45	
	2	1	2	9				50		
	3	1	3	2				53		
Touch-hole twelve lines distant.	1	1	4	5	1	3	1½	60	44	
	2	1	2	7				21		
	3	1	2	5				51		

Extremes—1, 0, 7, and 1, 4, 5.—Mean Recoil—1, 2, 8⅓.
Extremes of pellets in mark—21 and 78.

The author had long been of opinion, from his own experience, that the point of ignition had nothing to do with the production of recoil, and it was a source of much gratification for him to fall in lately with the foregoing tables. But the question, which has been a cause of much contention among gunsmiths, is still further set at rest by the fact, that the Prussian needle-musket, the freedom of recoil in which is a matter of boasting on the part of the inventor, actually has the charge of powder kindled in the very front, so that, if any effect were produced by the point of ignition, the recoil would be the greatest possible. The consideration of this subject led the author, in the year 1858, to institute a series of experiments, which ended in the invention of his "Front Ignition Gun-breech," for which he took Letters Patent in 1859. By this mode of ignition the gun outwardly appears the same as others, but the flame of the cap is driven through a steel tube, lying in the axis of the barrel, to the middle or front part of the charge, as may be desirable. The most remarkable results, far beyond expectation, ensued. Not only was recoil almost entirely done away with, but the projectile force was found to be enormously increased. Altogether it is hardly possible to over-estimate the superiority of front-ignition over the usual mode. The author having turned his attention to the improvement of breech-loaders, necessarily neglected this invention, which, indeed, was too

late in the age, just when these breech-loaders were coming into use. He has, however, learned enough to be convinced that, until front-ignition be adopted, the full power of gunpowder must remain unknown; and let mechanical appliances, such as the steam-hammer, enable us to forge cannon monstrous in size, these cannon never can properly consume their powder when kindled from behind. This is not the place to enter upon argumentative or personal matters; but the author has good reason to expect that the British Government will, sooner or later, introduce this system into heavy ordnance.

In connection with recoil, another part of the gun may be incidentally better discussed here than by itself, —*the vent-hole.* This is a very narrow lateral opening in the breech (through platina or other metal to prevent corrosion), intended to lessen the amount of recoil—to render loading easier by allowing the escape of the air in the barrel while pressing down the wadding over the powder—and considered by some to increase the expansive power of the powder by more rapid combustion through admitting the external air. After the most careful consideration, and as the result of his experience, the author has come to the conclusion that the vent-hole is totally useless, and is, in fact, of contradictory and antagonistic principles.

If the above explanation of the nature of recoil is sufficiently distinct, it will at once be perceived by the

reader that any lessening of the recoil by lateral escape is a diminution of the whole expansive power of the powder and not of recoil in itself, and that whatever gas flies off through the vent-hole is so much taken away from the pressure upon the charge of shot, and consequently lost. It is also clear that, from the position of the vent behind the body of the powder, it must, in loading, be stopped up by the fine grains of powder, or, if not so stopped, it must be at the expense of powder lost, as, where one grain of powder can pass through, many more of the same size may follow; and, in fact, the proper mode of escape for the air is through the nipple, so pressed upon by the striker as to completely prevent the escape of powder, and by the indentations in the wadding itself.

The third so-called advantage of the vent is contradicted by the first, because, if the recoil is lessened by the escape of superfluous gas, then as the current must be outward (as is really the case), and the strength of the powder can only be increased by the admission of the external air, it follows that no air being so admitted, the vent is useless.

The simple facts are, that whatever escape takes place through the vent is so much pressure lost upon the shot, and that the powder in itself contains the necessary oxygen for its combustion, and requires none from without. The vent-hole, at same time, wears wider, and the escape of the gas becomes extreme, fre-

quently burning the hand or sleeve of the coat in firing. Since this was written for the first edition, vent-holes have been almost totally discontinued. It by no means follows, however, that the admission of atmospheric air into the barrel at a *proper point* may not increase the projectile force. This was so done many years ago in London, with great alleged increase of power, and the system is now being revived in Paris, particularly, if not solely, in rifles, with a sliding valve in barrel in front of the conical bullet!

To return to the subject of recoil, it must be understood that the previous remarks apply to barrels in a perfect and clean state, and must be modified so far by circumstances, not, however, in the slightest affecting the general principles. Thus, if a barrel is improperly bored, the recoil will be greater; the same will take place when the barrel becomes foul from repeated firing or other causes, the resistance to the dislodgment of the shot being thereby increased. It is particularly to be noted that recoil does not imply a diminution of force in shooting, hence most gamekeepers, from experience prefer a heavy charge, and have a common and correct impression that a gun should be felt upon the shoulder. But as the repeated shock is very trying to the nerves and hurtful to the aim, the just medium is that charge by which as much strength can be attained as possible without perceptible recoil. In finding out this the truth of the above remarks will be

perceived by the fact that the amount of powder may be very much increased without adding to the recoil, while a very small addition to the shot, by increasing the resistance to its dislodgment, will at once be felt. This of course will only be perceived after the point of perceptible recoil has been reached, and until then may be much modified. Under the excitement of shooting at game recoil is much less felt than in firing at a mark.

The true causes of undue recoil being want of *vis inertiæ* and overcharging, especially with shot, and these being increased by improper boring, or the barrel being foul, the remedies are—due caution in the choice of a gun at the first, particularly in observing that the barrel has the proper swell in the last ten inches towards the breech, and has no improper inequalities in the bore beyond what is necessary in giving due friction and relief—that the barrel has the proper shoulder to meet the end of the breech screw—proper care in loading adjusted to the bore and weight of the gun, and in keeping the barrel free from leading and other foulness. If, notwithstanding due care in these latter particulars, a gun still "kicks," as it is commonly termed, there must be an inherent fault in the barrel being too light towards the breech, however heavy forward; and the recoil may be not so much a direct impulsion upon the shoulder as a vibration, which is still worse. When, through circumstances, the young

sportsman may have for a time to use a gun which recoils, it should be kept very clean, and a very small charge of shot be used, and it is wonderful what even ⅞ oz. of lead will do in the way of killing game. The wadding should also fit as slackly as may be consistent with safety, more particularly that over the shot. Guns, however, have been known to recoil without any apparent cause, and to absolutely refuse to be cured of this vice under any treatment. In fact, it might be jocularly advanced, that guns are believed to have a way and character of their own, much as a sailor seems to think his vessel a sentient being. One of Joe Manton's foremen made a nice little single-barrelled gun for his son. It was, as may be supposed, rather a neat weapon. That gun kicked fearfully, no variation of charge or boring seemed to affect it, and it is now kept as a curiosity in its way. The author has handled and examined the gun, and, like hundreds before him, could discover no cause for its very wilful and most reprehensible behaviour.

THE NIPPLE

Is a small but very important part of a gun, and one which has been the subject of great study on the part of gunsmiths, and of numerous patents and registra-

tions. The essential qualities are—strength, firmness of fitting to the breech, and certainty in transmitting the flash of the cap to the charge of powder. Strength and good fitting are easily attained by using good steel and proper tempering, and by care in forming the screws. But steel is always a treacherous metal in firearms, and some concealed grit or flaw often splits a good-looking nipple; and this generally occurs in the very first day's use. It is safer to have the metal rather soft than otherwise, considerably under a spring temper.

The rapid transmission of flame from the percussion-cap is the great desideratum. This has been effectually accomplished in two ways—speaking only of the nipples in common use—first, simply by countersinking the top of the nipple, thus collecting as it were the flame at a wide orifice; and, secondly and most effectually, by the reversed platinated nipple, which, in contradistinction to the common, is wide at the top and narrow at the bottom. Into this nipple none of the charge of powder enters, and the recoil is consequently lessened. The flame of the cap passes freely into the wide cylinder in the pillar of the nipple, and is suddenly collected and driven with increased speed through a very narrow orifice at the bottom, and invariably kindles the powder. The necessity of making this orifice through platina has so enhanced the price of these nipples as to render their use far from being general; and another great

objection is the difficulty of so securely fixing the piece of platina as to prevent it from being blown away. Were it not for this, no other nipple is so good. The countersunk nipple may, therefore, be said to be the best nipple in common use; and it is quite enough that the countersinking be very slight. On the outside, the nipple should be smooth and not much tapered, and the base should be oblong, not square. The inside should be bored in the shape of a sugar-loaf, gradually narrowing towards the top, and wide below. When a nipple becomes worn through use, it gets too wide and allows part of the force of the fire to escape through it, which, unless the mainspring be very strong, is apt to throw up the striker, and even to blow it away altogether; so that nipples should never be used when thus widened, but be immediately replaced by new ones.

THE "COVERT GUN"

Is a new variety of the fowling-piece as to length and calibre of barrel, and is a departure from all former recognised rules. The opinion of the author is decidedly in their favour. The length of barrel is generally from 26 to 28 inches; the calibre, 9 to 12. The shortness of the barrel renders them unfit for a slow or bad shot; in the hands of a good shot they

are all that can be desired. Why they shoot so well seems mysterious. The author supposes that it is probably from the shot occupying less of the length of the barrel, so that each pellet receives a more direct impulse from the explosion, the more especially with good elastic wadding—from the amount of friction along the barrel being less—and from the barrel containing a shorter column of air necessary to be dislodged before the shot attains its full velocity, which, from all these causes, may thus be much increased. A "covert gun" of 12 gauge and 28 inches length, is an excellent and useful gun; light, handy, and effective at all needful ranges. Of course in covert shooting, whence it derives its name, its shortness causes it to excel any other kind of gun whatever, being easily and freely handled among the bushes.

Silver-steel is the best material for the barrels of this class of gun. Much of the due effect in shooting must depend upon the elasticity of the metal, there not being sufficient length of barrel to obtain readily the full advantages which may be gained by boring and weight; and no other variety possesses so much elasticity as the silver-steel. Taking into consideration all the fair chances of the field, and the very small amount of game which is killed at long distances, there can be no doubt of the fact that these short guns are, from the ease and rapidity with which they

may be used, most useful and effective fowling-pieces. Front-ignition is particularly applicable to these guns. As all the gunpowder must be necessarily burned, and that under the best circumstances, any possible objection to the shortness of the barrels on that score is at once obviated. Quickness of ignition is also of great consequence in covert shooting, and no mode is so quick as that by the front. In the one case the powder has to burn along the cross-chambering, similarly to a train, in the other the flash of the cap passes through the empty tube with the speed of lightning. This increased speed may to many appear superfluous, but it is not so in reality, and must aid the aim, at least in damp weather, which much affects the combustion and strength of gunpowder.

THE FOWLING-PIECE

HAVING now been described in its most important parts, it only remains to be said that in the choice of a gun the young shooter must be guided by such directions as have been already given, and by his own strength and ability to carry weight. It is not advisable that he should use a gun in the slightest degree too heavy for his strength; rather let him err on the other side, even at the presumed loss of range.

He will enjoy his sport the more that he has only to handle a light tool, within his capability, and not overpowering him as the day advances. If he is a slow shot, requiring to dwell steadily on his aim before drawing the trigger, the barrels should be at least 30 inches in length. For a quick shot, who throws up his gun and fires at once, a short, wide gun will be found the most effective; and the "covert gun," already described, will suit him admirably. As to the quality of gun, where the sportsman shoots very often, the best and highest-priced article will be found by far the cheapest in the end. In this respect a gun may be likened to a locomotive engine, which, as is well known, has a certain amount of "life" in it, the duration of which can be pretty well calculated beforehand, according to the efficiency of the workmanship—that is to say, the locomotive will run a certain number of miles, and no more. In like manner, a gun will efficiently shoot a certain number of shots, and no more. When we consider the extraordinary strain and vibration through all its parts to which a gun is subjected at every discharge, and that it is a combination of some sixty to seventy pieces of iron and wood, we shall see the necessity of sound workmanship and good material, where frequent use is anticipated. For an occasional day in the season, a plain gun may serve efficiently for many years. As guns get used, the separate parts become looser, and

the whole gun consequently loses its compactness, and the metal in the barrels its elasticity and tenacity; in a word, the gun gets used up, and this sooner or later, according to its original intrinsic quality. It has been already mentioned that a rather straight stock should be chosen, even although it does not at first appear to mount quite readily to the eye. In the field, the advantages of a straight stock will soon become apparent, and its apparent difficulty to aim with will disappear after a short experience. The gun should have no fantastic devices carved on it, but should be a quiet-looking piece of mechanism, possessing "that within which passeth show."

It is right at times to test the shooting of a gun before purchase, although with all real gunmakers of reputation, and not mere gunsellers, it may safely be left to their own care. All tests except at game or live fowls are, however, more or less fallacious, from the want of being able to bring into computation the degrees of resistance in the comparative hardness of shot and objects fired at. For instance, no test is more fallacious than firing at a powder canister with a common sized gun, in the hope of driving an average sporting charge of No. 6 through both its sides at 40 yards. When a gunsmith or other tells you his guns do this, ask him the *weight of his canister*, and then go and weigh any average canister in your own possession. It has been even whispered that powder

has been ordered in light canisters for the purpose of being shot at. Government officials, when testing a small arm, fire a pure steel ball, whose dynamic qualities are known.

THE POWDER-FLASK

Should have a wide orifice between the body and the head, allowing the powder to pass freely. The most pleasant flask to handle is that covered with leather. A metal flask is excessively cold to the hand in severe weather. Avoid all German novelties, with hinged tops and other devices to deceive the eye. The simpler the mechanism the better; and all contrivances by which you are led to insert the head of the flask into the muzzle of the gun, and then press it to free the charge of powder, are most dangerous.

THE SHOT-POUCH

Of the most approved pattern is the lever-head pouch, which is instantaneous in its action, but is not so well adapted for large sizes of shot, say under No. 4. For heavy shot, the old-fashioned belt, with patent top, into which the lead falls, is certainly preferable; but

as such shot is very seldom used, the lever-pouch has almost entirely superseded every other kind. A combination of the two, called the serpentine belt, equalises the weight of the shot better than the pouch. In its use, however, it is right to guard against it being so tight around the person that you have to bring the muzzle of the gun close to the chest to insert the pouch-head into the muzzle of the barrels. In all cases in loading, keep the gun upright and well out from the body.

THE PERCUSSION-CAP CARRIER

Is a small instrument, which is so constructed that, when filled with caps, it presents one cap after another at an orifice, whence it is directly placed upon the nipple. It is suspended from the neck by a cord, and is useful in cold weather. This little article is less in use than it deserves. A short narrow pocket in the shooting jacket should admit the carrier half its breadth, and no more. It is thus easily drawn out, and is prevented from knocking about. Messrs Dixon & Son of Sheffield manufacture all the above implements of excellent quality, as also do the Messrs Hawksley of the same place.

THE DOG-CALL AND NIPPLE KEY

ARE the only other instruments necessary to conclude the young sportsman's personal equipment—and the former only if he hunts his own dogs, which forms a great part of the sport in shooting. The best dog-calls are made of ivory, and are clear and shrill in sound. A small, well-toned, shrill call will be heard further than a larger soft-sounding article. Some sportsmen always use a dog-call of a peculiar tone, to which their dogs get accustomed, and will alone obey. This plan is sometimes very useful. This may be termed a "dodge," or "wrinkle," of which there are as many in shooting as would fill a volume. A nipple key and turnscrew should always be carried —the former containing a pair of spare nipples, or the whole may be combined in one instrument.

THE DRESS

USED in shooting excursions should be of neutral colours, or a mixture of colours: shepherd's tartan is, perhaps, the best of all. The whole suit should be of wool, widely and freely made, with cap of the same material. In winter, dark colours will be found the warmest, by absorbing the sun's rays, and, from the

converse reason, light colours should be worn in summer. Where game is very wild, it may be prudent to dress like the shepherds upon the ground. Have nothing glancing about the person. A light waterproof coat, carried in the game-bag, may save many a rheumatic twinge; and, while mentioning waterproof garments, it may be as well to add that a similar cover for the gun will save much trouble after heavy showers. Beware, however, of tight waterproof clothing. One of the author's earliest friends had a suit of such stuff made for the moors, and on the first and only day he wore it he was taken ill on the ground, and, notwithstanding great exertions on the part of his attendants, who stripped and rubbed him, and applying every restorative in their power, he died the same evening. The perspiration had been checked and literally poisoned him. Unless accustomed to their use, let no sportsman rashly trust his feet into laced boots. These articles are seldom made to fit properly. Custom and gradual use may enable the sportsman to wear them with impunity; but impeded circulation and stiffened ancles result from lacing them tightly: slacken the laces, and blistered heels follow. This apparently trifling matter has blasted many a young sportsman's high-wrought expectations on the "twelfth." Plain lacing shoes, with light hob-nails, and leathern gaiters, are by far the best things for partridge-shooting. They are light, do not impede free motion, and are

sufficiently protective to the ancles. Laced boots are good for rough ground to those accustomed to their wear, and leathern leggings for covert and turnip or potato fields. Soft iron or copper nails prevent slipping on rocks; steel nails are highly objectionable. The author has no faith in waterproofing boots and shoes, still many readers may wish to have a recipe for so doing. It may be premised that all such preparations must have at least one antiseptic ingredient, else the leather and sewing will become rotten. Of these probably common rosin is the best, and there is no better compound than equal parts of tallow and bees'-wax, with the addition of about one-half the weight (one-fifth of the whole) of each in rosin. Common resinous ointment, to be had at any apothecary's, may be as effective as the most elaborate compounds. To apply the mixture, the boots must be first quite saturated with water, else the leather will not absorb it, and repeated coatings are then laid on before a gentle fire. It is bootless (without punning) to apply the mixture to dry boots.

AMMUNITION.

UNDER this head fall to be described—gunpowder, shot, percussion-caps, wadding, and wire-cartridges. All articles connected with breech-loaders will be

separately treated of in a future chapter. Gunpowder is composed of nitre, charcoal, and sulphur, in proportions to the 100 lbs. of 77½ lbs. nitre, 10½ lbs. sulphur, and 16 lbs. charcoal = 104 lbs., 4 lbs. being allowed for loss in manufacture. These proportions vary, but the above may be taken as a fair average. Like the fowling-piece, gunpowder has been gradually improved for a long period, since the time when the alchemists, as was their wont, concealed the names of its ingredients under the veil of anagrams. It is certain that for a long period gunpowder was known to learned men as a deflagrating substance, previously to its use for the propulsion of solid bodies from fire-arms; and the Chinese used it for fireworks 2000 years before the Christian era. Sporting gunpowder is much more carefully manufactured than the more common varieties for blasting and heavy ordnance. The charcoal in particular is most carefully prepared from well-washed and picked wood—the alder, black dogwood, and Dutch white willow being preferred. It does not fall within the scope of this short treatise to enter more fully into the chemical qualities of gunpowder, yet the following remarks may not be uninteresting.

The effect of the combustion of gunpowder is the sudden conversion of a small solid body into a voluminous one of elastic gas. The nitre supplies the oxygen, which enables it to burn without the presence of the external atmosphere. The sulphur, burning at a very

low temperature, increases the combustibility, and the charcoal supplies the carbonic oxide and acid, which form the largest proportion of the evolved gas, which, at the moment of firing, is estimated at about 2,400 times the bulk of the powder. There is room, however, for much speculation on this point. Perhaps the safest calculation is to compare the bulk of the gunpowder with that of the gas, when the latter has cooled to the temperature and is expanded to the rarity of the air, when it will be found to be 240 times that of the powder. Suppose this pressure of 240 atmospheres to be only quadrupled by the heat of the explosion, and we have in round numbers 1000 elasticities, and taking the pressure of the atmosphere at the popularly-assumed weight of 15 lbs. upon the square inch, we arrive at $15 \times 1000 = 15000$ lbs. pressure upon the square inch at the moment of firing. This immense pressure is probably still greater under such circumstances as prevent any possible escape of the gas, save by bursting, as mentioned in the next sentence. It is this extraordinary expansion which propels the ball or shot from fire-arms, and its power is enormous—28 grains of powder having been known to tear asunder a piece of iron calculated to be capable of resisting a strain of 400,000 lbs. The sporting powder made by the best manufacturers is generally of so good a quality that it is enough to point out to the young sportsman that it should not be too

fine in the grain, rendering it apt to get caked in loading; or too coarse, which is slower of combustion, and does not enter the nipple readily. The size called No. 2 will be found to combine the most advantages. Breech-loaders are charged with coarser-grained powder. (See "Breech-loaders.") Almost every sportsman has his favourite powder, but the following manufacturers, alphabetically arranged, have long enjoyed a decided pre-eminence, to which they are fully entitled:—Messrs Curtis's & Harvey, Hall & Son, Laurence of Battle, and Pigous & Wilks; in Scotland the Kames Gunpowder Company, whose works are situated on the Kyles of Bute, have honourably distinguished themselves by producing the best sporting powder ever made in the North. Should circumstances render it necessary for the young sportsman to exercise his own judgment in the choice of powder, the following test is the most efficacious. Place two small heaps of powder, say the quantity used in charging a gun in each, 3½ inches asunder, on a sheet of clean writing paper. Fire one of them with a red-hot wire, when, if the powder be good, the flame will ascend with a good distinct report, the smoke forming a white ring; no white specks will be left on, or holes burned in, the paper, and the other heap will probably not be kindled by any sparks. Should the powder not burn at once with a well-defined noise, and the other tests fail, the quality is not good. A simple and good test is to

throw small pinches of powder into the fire, darting them quickly into the bright places. If the quality be good the powder will explode simultaneously and sharply, not desultorily and slowly. This is the most common test in use, and none is perhaps better for persons of experience. In damp weather, a highly-glazed powder is the best; but in good weather, a plain coloured less sparkling powder is the strongest. Strength may exist without cleanness, and *vice versa*. Of two evils, foulness is certainly the worse. Strength may be gained by adding to the charge, but nothing can compensate for stopped nipples, fouled barrels, and a rattling recoil. When powder has become damp, it may be readily and safely dried by heating a common plate and then spreading the powder upon it, turning the whole repeatedly, to dry it properly.

Gun-cotton has hitherto not been applied, except experimentally, to fire-arms in this country. Although in America and Austria it is said to be successfully used in artillery practice, the present civil war in the former shows no proof of its actual use in that country. It is exceedingly probable, however, that we are upon the eve of some great invention in propulsive power. Powder is confessedly a coarse and not very scientific vehicle for the production of the great desideratum—a large volume of suddenly, yet not too quickly, evolved gas;—and now that the attention of chemists has been directed to this fact, great results

may be looked for. In a foregoing passage the new white gunpowder has already been referred to. It is to be feared that this new compound has too much of the quality of gun-cotton to be suitable for sporting purposes. Rending and propulsive qualities are widely different. The former may be compared to a jerk, the latter to an accumulative sweep of the arm. The barrel of a gun would be burst by a rending agent possessing little propulsive force, and as it is the latter that we desire for fire-arms, the former is useless for the purposes of this volume. But there is another and fatal objection to every new compound of which the author has yet heard, in the great residuum or deposit of nitric or nitrous acids, which will rapidly destroy the best metal of which gun-barrels can be constructed.

Shot needs very few remarks. It should be clean, bright, and spherical in shape, and the greater its specific density the better. It is common to hear sportsmen praise shot for being hard, but this is a great mistake. No comparative increase in hardness can compensate for the want of weight. Soft lead is heavier than hard; and the first consideration is a pure, sound metal, from its density possessing the greatest available momentum. The best size of shot for general purposes is No. 6; and the proper quantity for the various bores will be entered upon below. (See "How to Load.") It may be here laid down as a general rule, that small shot requires most powder;

also, that the smaller the size the less must be the weight of charge, and the larger the size the heavier must be the weight of charge. Want of momentum must be compensated for by increased velocity; and paucity of pellets to a given weight must be compensated for by increase in number, by adding to the whole weight. The range may be from $\frac{7}{8}$ oz. to 2 oz.

Since the above was published in the first edition, the author has frequently been asked to reduce the above general remarks to a formula. It would be easy to do so were guns all of one weight and calibre, but taking fair average guns into consideration, and allowing modifications for individual cases, the following may be adopted as a safe guide:—

Size of Shot.	Powder.	Shot.
B.B.	2¼ drachms avor.	2 oz.
No. 1	2¼ " "	1⅞ "
" 2	2¼ " "	1⅞ "
" 3	2½ " "	1¾ "
" 4	2½ " "	1½ "
" 5	2¾ " "	1⅝ "
" 6	3 " "	1¼ "
" 7	3¼ " "	1 "

Of course the above applies to average guns, of 7 to 7½ lbs.; and it may be noted that a good shot need not use more than 1 oz. No. 6 shot, but retaining the 3 drachms powder. When guns weigh over 8 lbs., the powder may be increased for the larger sizes of shot, but the shot will certainly be more scattered. Cart-

ridges are by far the best for such work as heavy shot is used for.

Percussion caps have a great range in quality. The priming may be of silver or of lime, and there are also various metals used for the shell, but pure copper caps with silver lining should be used. The inferior caps fly to pieces, and cut the face and hands, and the eyesight even has been thus lost; while the common primings rapidly corrode the gun, and also, by absorbing moisture, become useless in damp weather. Waterproof caps are prepared by a covering of varnish: they require a very strong mainspring to make the ignition certain. They are excellent for the purpose desired, but damp will find its way to the powder in the nipple. This has been again very effectually obviated by a lining of gutta percha to the cap; and such caps should undoubtedly be solely used in our army and fleet, and where there is much exposure. Caps should not require much pressure to fit them on the nipple, as this splits them open at the joinings and admits the damp. The English capmakers are the best in the world; and the names of Eley and Joyce are as household words among sportsmen.

Wadding, at one time considered a matter of little moment, now enters largely into the question of how to shoot well. The qualities desired are toughness and elasticity. When flint guns were in use, the combustion of the powder was produced without any

pressure from without, but simply by the continuous train from the pan through the touch-hole; consequently there was no direct impulse upon the charge itself. The percussion system has a different effect. The flash of the cap is in itself pretty strong, and that flash and the gas evolved by the burning of the powder within the nipple and cross-chamber are both prevented egress backwards by the pressure of the striker upon the nipple. There is therefore considerable force directed upon the charge; and it is of much consequence that this be not removed from the breech until combustion takes place. (Here is another proof of the advantages of front-ignition.) This desirable result is attained by the use of thick elastic woollen wadding, which being not readily displaced when rammed home, resists the pressure sufficiently for the purpose desired. Completely filling up the calibre of the barrel, it may be said quite to obviate windage, and thereby much increase the projectile force. It also possesses the very excellent quality of not being blown to pieces in the barrel, and therefore it drives the pellets of shot regularly before it, keeping its position transversely in the barrel, as may be seen by the marks of the pellets upon a discharged wadding. It is of less consequence that the wadding above the shot be equally thick and elastic with the other, as far as the above reasons go; but a very thin wadding permits the shot in the second barrel to be

dislodged by the firing of the first, which is carefully to be avoided.

It may be useful to mention here that an over-tight wadding causes a gun to scatter the shot, and that it is particularly essential in all guns of wider calibre than 16 that the wadding fits correctly. Under that calibre the comparative amount of difference in the width of bore is less as between the sizes, but in the wider guns nothing but the most exact fit will do. On this account, half-sizes of wadding have been introduced to suit such wide guns as have been necessarily worn or bored so as not to gauge to an exact size, but thick elastic wadding renders such half-sizes practically superfluous.

Good wadding is prepared with greased edges, and a comparatively recent, but very great improvement, is the addition of mercury, which rapidly removes the lead deposited in the barrel on every shot being fired. To judge of good wadding, cut it through with a penknife, and see that it be perfectly solid and compact in its consistence. There is much occasion for this examination, for it is quite a usual practice for wadding to be sold as of the best quality which is far from being so. From the high price of good wool there is a wide margin, as commercial men term it, for a profit, by substituting material of inferior quality; which not only injures the shooting of the gun, but is unjust to the fair trader, who, selling the really

genuine article, which necessarily must cost more money, is therefore supposed to be making an overcharge. Very probably he would make a greater profit by selling the inferior wadding.

(For breech-loading wadding see "Breech-loaders.")

The wire-cartridge is a modern improvement in ammunition now coming into universal use. Its name has rather operated against it, as it is not in reality a cartridge (which, according to Walker, is a case of paper filled with gunpowder), but is simply a shot-case, and contains no powder. It is a well-known rule in the science of gunnery, that the heavier a projectile is, the greater is its momentum—that is to say, the farther it will go when once started at a certain velocity. The purpose of the wire-cartridge, therefore, is to give to each separate pellet of shot, as far as possible, the momentum of the whole charge. For this end, the charge of shot is placed, along with a certain quantity of bone-dust to fill up the interstices, in a little wire basket, with a wadding at one end, the whole being enclosed in a roll of paper. The effect is that the cartridge leaves the gun like a ball, and gradually as it advances throws off its shot, increasing the range of a common fowling-piece by at least a third. The first wire cartridges, introduced by the father of Messrs Eley, the well-known makers, in fact had the fault of being only

too long in their range; but former difficulties have been overcome, and their proper action is now made certain. For greater advantage in use, two varieties are now made—the Green, for very long distances, and the Royal, for general use when game is wild. There is still another variety—the Universal cartridge—which has no wire-basket, but is simply a charge of shot, with bone-dust and wadding enrolled in paper, and is useful for quick loading, and for guns which scatter. This last certainly throws the pellets much more regularly than in a loose charge; this is presumed to arise from the presence of the bone-dust preventing their jostling. The Messrs Eley manufacture a special wire-cartridge for breech-loaders, and the author has found them to possess extraordinary advantages. Indeed, the distances at which he has known hares killed with shot from these cartridges fired from his Lockfast Breech-loaders, exceeds all his former experience of the best guns' performances, extended as that has been. This may partly arise from the extreme solidity of the gun being more observable and effective on a compact body like a cartridge, and from the latter being complete and unaffected by pressure of the ramrod, as when fired from a muzzle-loader.

Cartridges may therefore be assumed to increase the range of the fowling-piece, but it is the particular wish of the author of this little treatise to instruct the young sportsman by pointing out both the objections

to, as well as the advantages of, the various subjects discussed. Were game to rise regularly at a given distance, or were only one variety of game to be fallen in with at a time, there would be no objection whatever to the use of the wire-cartridge. It is the uncertainty in these matters that is the objection. If you load both barrels with cartridges, and then be obliged to fire at a short range, you either miss the object altogether, or blow it to pieces. Again, if you so charge one barrel only, you get puzzled in the excitement of the field, and very probably pull the wrong trigger. The young sportsman must therefore be cautious in adopting the use of an article which otherwise is inestimable; and when he does use the cartridge, must keep himself particularly cool, remembering that his range is increased, and also calculating, on taking that long range, on the effect of distance, as will be more fully entered upon below. (See "On taking aim.") The Universal cartridge has not a single ground of objection to it. Its use increases the range of every gun, by the regularity with which the shot is thrown, having no open spaces through which the game may escape. When a gun shoots weakly or irregularly, this cartridge is consequently invaluable. As it may also be used without a wadding, the ramrod need only be brought into play once, instead of twice as with loose shot. The immense saving of time, with birds rising before the sportsman, will at once be apparent. The

barrel is also much less fouled than with loose shot. Altogether this is an excellent article, and the sole objection is a small one—some little additional trouble in carrying so many separate charges, instead of the whole supply of shot in a pouch or belt. These Universal cartridges can also be fitted to breech-loaders, and for these new guns generally all the varieties can hardly have an objection, seeing how readily the charge can be removed and another substituted when a different kind of game is likely to be found.

DOGS.

THE various articles more immediately connected with the use of the fowling-piece having been now described, the next step in the equipment of the young sportsman may be supposed to relate to the canine genus. Two varieties of dogs are in common use in the pursuit of game in shooting—the pointer and the setter, each of these having his good and bad qualifications. The first question is, what is the nature of the ground over which the dogs are to be hunted; and the next, the probable amount of work they are expected to do. The pointer is the more slow and sure dog; the setter the more swift and lasting; but he is decidedly a degree removed from the natural, steady, and full-developed

pointer. All dogs make a pause before rushing on their prey, and this pause has been educated up to a certain steady stand-still, until the dog is permitted by his master to break it. The smooth-haired variety frequently raises one of his fore-legs while on this pause; this has procured him his name, as if he were pointing out the position of the game before him. The other variety, whose rougher coat and general appearance give him a resemblance to the spaniel, from which he is probably descended, usually crouches in his pause, and has therefore been termed the "setter." The qualities to be desired, and the faults to be guarded against, are the same in both; but, as already mentioned, there are inherent qualities in each variety which render them different in nature and capabilities. It may at once, however, be decided that for the beginner the pointer is the preferable animal. Their several and also general merits may, however, shortly be discussed.

The pointer is supposed to be derived from the wild dogs of Andalusia, which a Spanish monk observed to possess the habit of making a full stand before rushing upon game. Seeing the great use which this habit might be turned to, the monk carefully trained a dog and his progeny, from which is descended the whole modern race of pointers. The story may not be true, but is exceedingly probable; and the Spanish pointer is still in request, although not so good as our own.

Other animals of the canine race, however, make this pause as well as the dog. The grey fox of America makes a dead set upon his game for a considerable time before delivering the fatal leap. It must be kept in mind, also, that a high-bred dog is positively cataleptic when standing over his game, and it is hardly probable that in a wild state this can be the case, as it would frustrate the certainty of seizing the prey. It is perhaps idle to hark back upon the past history of the pointer and setter; their future capabilities are of more consequence than their preterite origin. It is to be feared, however, that the continual necessity of bringing new blood into a kennel would prove a damaging argument against the Darwinian theory of development, which, if true, would go on to eliminate a still finer breed out of a superior family, and who knows what a crack lot might arrive at, something as different from the present varieties, perhaps, as a huge pouter pigeon from the nun or tumbler!

The Spanish dog is a more sluggish animal than the English, and has the peculiarity of having a very large nose divided perpendicularly by a deep fissure. The well-bred pointer should have a sleet coat of hair —fine soft ears—a high poll—open nostrils to permit the full development of the nerves of smell—a deep hollow under each eye—straight forelegs, and well-crooked hindlegs, so as to project well at the hocks—

back well coupled at the loins—fine tapering tail set on level to the back—and small round feet. A good pointer has an air of quiet sagacity and education, easily observed; while a froward, foolish animal, has a careless, roving eye. Good dogs of any kind watch their master's eye, and appear anxious to please him. Much may also be judged by the shape of the ear, which should hang easily, and not be partly raised or cocked when the attention of the dog is drawn to an object. The chest or counter should be full and deep, for the free play of the lungs. There are other points varying in different stocks—such as deep flews; and some good breeds have not the fine tail usually desired as a proof of good blood—but an unusually long jaw and tail, and general swankiness, denote a trace of foxhound descent, giving a good nose, but a wild and unmanageable temper. Better to err upon the other side by choosing a short, compact, yet slower and more obedient animal. As to sex, there are circumstances which render the dog more generally to be preferred, and they are therefore the higher prized; but the slut is the stauncher animal. Fineness of smell, called "a good nose," is indispensable; but the young shooter may be suprised to learn that this essential may be too good for use. When the sense of smell is over acute, the judgment of the dog is baffled. He may doubt that there is game before him; but that sensibility of the nerves over which he

has no control misleads him, and he points against his better judgment, as it were. That he has so erred against his judgment we may safely believe by the evident shame he feels at discovering his mistake. He makes "false points"—*i.e.*, he points at where game has recently been and left its scent. We can form no conception of the power of the sense of smell as developed in the dog by our own. The following anecdote may give some idea of it:—The author had a black pointer slut (from the kennel at Lennox Castle) which, while shooting on a moor in Argyllshire, he had severely rated for eating some carrion, part of a dead and putrid sheep. Passing to leeward of the same carrion about an hour afterwards, "Bess" evidently remembered the former rating, and, giving an expressive look to her master, continued to hunt. The stench from the carrion was so great as to be almost insupportable, and hurrying past it, the author was surprised to observe the pointer, generally a most obedient animal, make a sudden wheel, and "draw" directly upon the carcase, from which no whistling or command could prevent her. An advance to check her led to only her steady and regular approach, making point after point, to the dead sheep. Annoyed at this, he seized her by the neck and drew her away, when at that moment a cock-grouse rose from the very mass of carrion, where it had possibly been feasting on maggots, and gaily crowing, flew down the hillside,

but was in a few minutes afterwards safely bagged. After the bird had gone, the pointer at once cheerfully resumed her hunting. Now, here was the sense of smell so powerfully discriminative as to detect the presence of one small bird, from which not very much scent could come, amid the horribly tainted air from the dead sheep. The same pointer would road a bird through apparently endless windings until she made it out, but was frequently led into errors, of which she was evidently ashamed, by the over acuteness of her sense of smell.

The setter points are more varied than those of the pointer, according to the breed. The black and tan variety is the most beautiful. These should have long, soft, and silky ears. Some of the best English breeds have short ears, a fact which not unfrequently confounds the judgment of would-be connoisseurs. The Irish breed is coming into repute. They are uncertain, but sometimes magnificent animals, requiring a great deal of work to keep them in order. It may be said of them, that they are either very good or very bad. All the varieties should have long feet, in contra-distinction to those of the pointer. The hair on the tail, and on the rear of the legs, should be long and soft; this is called being well feathered. The "dog" should be a rather square-built, up-standing animal, the "slut" more rounded in form, with smaller and more tapering head and nose.

The setter is a more lasting animal than the pointer, and besides being swifter while at his work, can also do more work; and indeed many setters may be hunted for several hours daily. The "rough" dog is therefore preferred generally for grouse shooting, as the ground to be gone over in a day on the moors is much more extensive than at partridge shooting. In fact, setters require much work to keep them steady; and it must also be particularly noted that they do not hunt to advantage on a dry moor. They delight in wet ground, and take every opportunity of crouching and wading in shallow pools. Both varieties require some work and fresh tuition before the opening of each season; but the setter being, as mentioned above, not a pure pointing dog, and possessing less of the instinctive quality of such, generally requires more of this fresh training than the pointer. It is not to be supposed, however, that all setters are not perfectly staunch. The author has known of dogs which, having suddenly crouched on a point while the attention of the shooters was otherwise directed, have required other dogs to be sent for to hunt them up—the grouse sitting close, and the brown colour of the setters rendering them, for the time, invisible among the heather.

The above few remarks are perhaps sufficient to show (and it is not intended that this treatise go fully into such matters, which would require a volume in

themselves) that the setter is the dog for wide, open country where game sit well to the point, giving time to the shooter to walk up from a distance; and that the pointer is less active but more cautious, and is also a better partridge, dog. The setter is a much bolder dog than the pointer, and has many qualities, such as taking the water, which render him a more companionable animal to man. It is more difficult to get a thoroughly good setter than a pointer equal in quality; and, as already stated, there is more difficulty in keeping the former free from faults. Pure blood and good stocks are therefore rare, and their pecuniary value is greatly enhanced.

The more prominent faults possessed by dogs are—running into shot, chasing game on the wing, chasing hares, pointing larks and such "trash," and blinking. Inherent faults, as want of a good nose, cannot be remedied, but the foregoing usually proceed from a bad education, or being allowed to ramble when in a state of puppyhood. The author had a splendid young dog spoiled by the herd-boy, at a farm were it was at walk, taking it out to hunt rabbits. The vice, unknown in his stock (the sire was "Punch," a celebrated pointer, the property of the late Mr John Crooks, one of the best sportsmen who ever handled a gun), was ineradicable.

"Running into shot," is dashing forwards from the point when the shot is fired, instead of dropping flat

to the earth, called, "Down to charge," which is a *sine qua non* in every dog. Some old dogs, however, will not actually drop, but remain standing, or merely "sit" down; this may be permitted in an old, sagacious animal, but never in young dogs. The word of command is, "Down to charge."

"Chasing game on the wing," is the dog following their line of flight when a covey has risen before him; this, like the former fault, is unpardonable. The dog must be broken off it, or is worthless. The punishment given him is accompanied with the words, "'Ware wing; 'ware wing, will you, then."

"Chasing hares" is less heinous in degree than the foregoing. Many otherwise good dogs cannot be broken from this vice; others will chase hares one day and not another. Many modes of cure are adopted. A long "trash" cord, say 60 yards in length (used also to exhaust the superabundant vigour of a fresh young dog), is attached to a collar with spikes pointing inward; a sudden check of this teaches the dog a lesson. Another plan is to fix a triangular collar on the neck, pointing so downwards that on the dog lowering his head to go off at speed, the apex takes the ground and throws him head over heels. Many dogs, when otherwise sagacious, may be broken off chasing hares by simply allowing them to exhaust themselves in the chase, and on their return treating them with coldness and contempt, not allowing them

to hunt for some time afterwards, if other dogs are in company. A dog knows when he is in fault, and also supposes that punishment wipes it out and restores him to full favour. Hence most dogs after a sound punishment will rise and express their joy at getting it over, when before it they would come creeping in with all the symptoms of conscious guilt. Another excellent method of punishment with a high-tempered, generous dog is not to use the lash at all, but to make him drop and keep him inactive for some minutes; this moral chastisement has often a very good and lasting effect. When a dog is otherwise so valuable as to make it a matter of some moment that he be cured of chasing hares, the best plan to follow may be to send him to hunt on ground where hares are particularly numerous, so that he may get familiarised with them, or satiated with their pursuit. Certainly a hare popping suddenly out of a clump of rushes, from before a dog's nose, is a very great temptation to the weakness of canine flesh, and a bit of a spurt after it should be leniently looked upon. The cautionary terms of "'Ware hare," and "'Ware chasing hares," are used in punishing a dog for this fault. The foregoing applies equally to chasing rabbits.

"Pointing larks," when inveterate, makes a dog worthless. It often arises, however, from a dog being fatigued, or from game being very scarce; and when such is the case, fair allowances must be made. When

a frequent habit, however, the dog possessing it is not worth having. "'Ware trash" is the common term used in checking this fault, which is most tantalising to the sportsman, none the less so if game be scarce, and the day be hot and fatiguing. Continually "serving" such a brute, and as continually seeing a lark rise before his nose, is about the most disgusting thing in shooting. One's fingers mechanically play with the triggers, and there is a decided tendency to deposit a shot somewhere or other which *Ponto* might not altogether relish. Having, through professional reasons, and the pressure of business in August, frequently had to start for the moors with such animals as the chances of the demand for dogs had left him, the author has had all manners of experiences in canine flesh—good, bad, and indifferent, but of all pests avoid the "larker." He is a hypocritical rascal, who makes his horridly deceitful points with all due solemnity and precision, utterly deceiving and decoying the already worn-out sportsman to "serve" him once more, and yet again once more. The name "Bob" for a pointer sticks in our nostrils, through having had sad experience of such a fine-looking, sagacious-looking, but most arrant humbug.

"Blinking" arises from a fear of the gun. Many good young dogs blink at first, and much care is requisite on the part of the breaker. It consists in breaking the point and running behind the shooter when the gun is raised or fired. Sometimes the fear

of the report is so great that the dog leaves the field altogether, and goes home or takes refuge in the nearest farm-house. Nothing but the greatest gentleness will serve to remove this fault. No sportsman worthy of the name will grudge devoting time to such a case. The young dog should be shown the gun; the sportsman lying down on the turf beside him, caressing and encouraging him to look at the gun in different positions, and using every means to make him understand that it is not used with intent to injure him in any degree. A dog, judiciously treated, will actually lick a fowling-piece all over, and an hour thus spent will never be regretted. When a young dog has accidently received a shot, the probability is that his blinking is incurable.

Besides these more common and prominent faults, there are various degrees of excellence in dogs, which need not be fully entered upon, neither need the proper number of dogs to be kept or hunted. These specialities are foreign to the purpose of the author. A few additional sentences may therefore serve to dismiss this subject for the present, only premising that the smallest possible number of dogs kept the better. Dogs, like horses, must be regularly wrought to be kept steady.

A good dog follows his master quietly. He never crosses a fence before him—he ranges only at his command of "Hie on," or "Hold up"—he quarters his ground well, missing no part—he redoubles his

caution on approaching game, and becomes immoveable when the covey is made out; if the covey runs, or is at some distance, he moves steadily at the side of his master—drops when the gun is fired to allow time for re-loading, and only rises again at the word of command. When a bird is wounded and runs, a good dog roads it through its windings (as he also does to a single running bird); he "seeks dead" patiently, and does not mouth the dead bird when found. In ranging, he still keeps his eye on his master at every turn —does not go out of a moderate distance—obeys the sound of the call or the motion of the hand—and generally seems to understand what he is expected to do, and is anxious to do it.

A bad dog rambles about as if without purpose—sometimes before and sometimes behind—now runs right through the middle of a covey, and anon fiddle-faddles where a covey has been. When a hare crosses him, however distant, but yet in sight, off he goes in pursuit. When he does make a point, he rushes in headlong on the gun being fired, and pursues the covey through perhaps the best of the ground, raising other birds as he goes. Lagging behind at one time, the next minute he makes a start right off, and ranges almost invisibly some half mile away. In a word, he is worse than useless.

But let us say a word on the other side. A good sportsman attends to his dogs—he is particular in

checking firmly, yet tenderly, every fault—he is doubly so in the mornings on beginning to hunt, and while the dogs are yet fresh, and faults more likely to be committed. He never breaks a rule for a mere shot, or to avoid a little trouble. He remembers that a fault passed over must upset the dog's sense of right and wrong. He encourages his dogs by word and gesture. If by gestures, he makes them fully and properly. For instance, if he raises his arm, he takes care it be that next the animal—a point of more importance than appears at first sight. He punishes judiciously, telling the dog what the punishment is for. He at once controls, admonishes, and gives encouragement as needed.

A bad sportsman hurries and hustles his dogs—he works them into a nervous excitement—he presses them on at one time unduly, at another he calls them to heel to steal a pot shot at a covey. One day he is severe in his rules, the next he hounds his dogs after a wounded hare. He exerts little control, forgets to watch his dogs and to keep near them. He lets them pass into contiguous fields, or on the moors, may be said to literally hunt with "Rover" and "Ranger," for roving and ranging wide are the concomitants of his slip-shod mode of hunting.

The loss of sport by hunting young dogs at the beginning of the season should not be risked; and in the afternoons, when the coveys are dispersed, a steady

old pointer is the best at picking up the single birds. No rule of hunting should ever be broken by the sportsman himself. The dogs must be properly treated, or be spoiled. There is no medium in this particular, and the education of months may be lost in a day by bad hunting, or the overlooking of faults to save time and trouble. A bad sportsman will punish a dog one day for hare-chasing, and the next will encourage him in the pursuit of a wounded puss for the sake of filling the bag, or send him into a covert to drive out hares at a gap.

The qualities of dogs are hereditary. It may be enough to state that the rule in breeding should be, that the sire be proportionately smaller than the dam; that the best season is spring, as winter puppies are always inferior; and that the young dogs get abundance of sweet milk. In the choice of dogs to breed from, the great physiological fact must not be lost sight of, that the organs of digestion are generally derived from the female, and of locomotion from the male parent. This rule pervades all nature; and a due attention to it is of the greatest consequence to procure the finest progeny. No dog should, therefore, be chosen to breed from with weak legs, large feet, or a bad style of going, and no slut which is known to have any weakness of digestion or disease in the brain or stomach. Proprietors of kennels will have reason to thank the author for bringing this physio-

logical fact before their notice. Since the first edition of this treatise was written, these and other breeding rules are becoming universally known. The "Dog Shows" are doing much to improve this noble animal and companion of man. The author was one of the very first to advocate the institution of these Shows in the columns of the *Field* newspaper, confessedly with little hope of seeing his wishes so grandly carried out.

Dogs, being carnivorous, must have some animal food when hard wrought. On the moors a whole sheep may be boiled to a jelly, and a portion mixed every day in the food. Sea-biscuits are strengthening food for the moors, at other times nothing is better than oatmeal porridge. A mixture of oat and Indian corn-meal forms an excellent variety of food. It is not customary to feed dogs oftener than once a day, and that in the evening. After a day's hunting, their feet should be examined for thorns or cuts, their legs rubbed and dried, and dry straw be provided. General kennel treatment is out of the range of this work; but common sense may guide the sportsman in providing that the tables on which the dogs sleep be broad and comfortable; that ventilation be provided for; that the supply of water be ample; and that perfect cleanliness be aimed at. The walls should be well washed with Irish quicklime to kill ticks and other vermin. The dogs should get a run out twice a-day.

Dogs have numerous diseases—internally, worms are the most common and troublesome, and externally, the mange. The best remedy for the former is the areca nut, or roughly ground glass among butter, with a purgative afterward. For common mange a change of food, mild purgatives and mercurial alteratives, and the outward application of sulphur, are the best remedies. For red mange, arsenical preparations are to be depended upon. See "Stonehenge's" excellent Treatise on the Dog—a book indispensable to sportsmen. Distemper, *scottice*, "the snifters," carries off very many puppies. It seems now to be an ascertained fact that vaccination either entirely prevents or modifies this disease, which is, however, much less virulent when the puppies get plenty of milk and little animal food.

The breaking of young dogs should be entrusted only to a man who will really educe their capabilities, not beat them mercilessly into the performance of a few set rules. This education may be begun at an early age—say six months; but the young dog should not see game for some months afterwards, or he may learn to hunt cunning, and not as desired by his master. After his breaking-in is completed, practice, and the killing of game over him, are still required to ensure steadiness; so that it may be a good hint to the young sportsman that one good old dog is worth three young ones, and that the heaviest

bag is not filled by him who runs fastest over the ground.

The young sportsman is now prepared to take the field; but before entering upon some general remarks upon the choice and management of ground, this may not be an improper time to introduce a few observations upon the cause of accidents.

ACCIDENTS FROM FIREARMS

In the field are very rare, when the extent to which shooting is carried on in this country is taken into consideration; and these accidents occur generally from three causes, the avoiding of which would render the risk very small indeed. These three causes are:—*Carrying the gun with the striker resting on the cap; drawing the gun through a hedge with the muzzle forward; dogs being allowed to jump and fawn upon the sportsman.*

The first of these has been of late years the origin of more serious and fatal accidents than all other causes whatsoever. When we consider how very subtle in their action percussion caps are now made, and how very slight a blow is sufficient to ignite them, it is surprising to find any sportsman continue to carry

his gun with the striker down; and yet nothing is more common than to find it so carried, actually as a precaution against accidents. For some years past the author has carefully read the accounts of accidents from firearms as reported in the public prints, and he has almost invariably found that they arise from this absurd practice. What is more surprising still is, that a very large proportion of sportsmen, after the discharge of one barrel, proceed to load it after carefully and prudently, as they suppose, putting the striker of the other lock down on the cap, thus placing themselves in the most dangerous position they could choose, next to that of having left the other lock on full cock, or putting a fresh cap on the nipple of the discharged barrel before loading. The author has actually known an instance of the second barrel, under these circumstances, being discharged by the striker coming in contact with the sportsman's knee, at the cost of the forefinger of his right hand. How easy, then, is the discharge of the gun, from striking against a stone or other hard substance? A gentleman wrote the author on this topic as follows:—"You are quite right about carrying the hammers resting on the nipples. A friend shooting with me fell with his gun in hand, and so severe was the fall that one muzzle came in contact with a stone and nearly closed it, but by having the gun on half-cock it did not explode." The rule should be to carry the gun always on half-cock,

unless game is immediately before you, and never to load a discharged barrel with the other lock in any position but on the half-cock.

Drawing the gun through a hedge with the muzzle forwards, is another comparatively fruitful source of mischief, and is generally in connection with the foregoing; and perhaps it would be safer to do so with the lock on full-cock than with the striker down. The reason is obvious. The guard is some protection to the trigger being caught by a twig, but there is no such protection against the striker being raised by contact with any part of the hedge, and then let suddenly down upon the cap. As a rule, however, independently of any state of the lock, the gun should be invariably either shoved before the shooter, or drawn after him, according to circumstances, or whether or not he has companions before or behind him—the stock being grasped by the handle, and towards the person. Of course the locks should be on half-cock.

Permitting dogs to jump and fawn upon the sportsman has led to fewer accidents than the two other named causes, but those accidents have generally been of a most deplorable and fatal character. It is only necessary to say, that no sporting dog at any time, in the field or out of it, should be permitted to leap about his master. The practice is annoying and troublesome at all times (not the less so in dirty weather), and in the field is positively dangerous. Of course the strict

observance of the former rules would greatly obviate the danger, but no rule is without exceptions. There may occur circumstances in the pursuit of various kinds of game, when the gun must be kept ready on full-cock, or where even the click of the lock might frustrate your object. Independently of this altogether, the rule should be strictly observed, that in the breaking of young dogs, leaping on the person should be punished as a serious fault.

Accidents from other causes seldom happen; and it is rare indeed that one sportsman is injured by the discharge of another's gun. The word "sportsman" is used in its legitimate sense. Against the accidents we daily read of from the wanton discharge of firearms, nothing written here could avail. In beating coverts, some degree of caution is necessary, and it is the duty of the gamekeeper to place the guns and to give such instructions as the nature of the ground renders necessary; and no written rules would be of the slightest use beyond the inculcating of common prudence in taking up a position and in firing.

It is perhaps superfluous to add that the percussion caps or breech-loading cases should be removed before entering any habitation, and that no gun should be laid aside or put into its case loaded.

Accidents from bursting are very rare indeed, and even when a gun does burst, the shooter is seldom injured—the broken parts of the barrel not being apt

to come backwards against him. The most frequent cause of a gun bursting is the stoppage of the muzzle by snow or earth, which, although apparently easily dislodged, will burst the strongest barrel. This arises from the extraordinary velocity of the expanding gas —some 7000 feet per second—receiving a sudden check. As its expansion is universal—in all directions—the walls of the barrel are unable to bear the increased pressure suddenly thrown laterally upon them, and the metal is literally blown outward. A solid body would continue in its line of propulsion, but the gas has no line of propulsion, and seeks only the easiest exit. Close that exit for a moment, and repel the gas upon itself, and it will break through almost any bounds. The slightest stoppage of the muzzle being so dangerous, it should be always examined after there is any reason to suppose a foreign substance may have got into it, such as taking a leap over a peat-bog or among snow.

When the charge of shot is not lying closely down upon the wadding over the powder, there is a risk of bursting—hence one of the great advantages of elastic wadding, which is not easily started by the discharge of the other barrel. Thin, non-elastic wadding is, therefore, unsafe over the powder.

In addition to the foregoing remarks, it is only necessary to add that, when shooting in company, the gun should never be suddenly swung round in taking

aim with the finger on the trigger. The eye alone should follow the line of flight, and at the proper moment the gun should be raised to the shoulder.

Before entering upon a short sketch of the usual manner of pursuit of the principal varieties of game, it may be better here to make a few remarks upon cleaning and preserving firearms. After use, the first thing necessary is to wash the barrels well out. This is most effectually done by placing the breech-end of the barrels (the nipples not being removed) in hot water, and using the cleaning-rod, with a plug of tow, or safer and better, a piece of linen rag, as a pump. In fact, the process is so well known as hardly to call for description. After the barrels have been well washed out, place the breech-end upon the floor, and continue the rapid pumping for some time. Then place dry rag upon the cleaning-rod and pass it rapidly up and down until the barrels are quite dry. Finally, with a third plug of rag, slightly oil the inside of the barrels, and also oil the outside, passing the tow or rag used for the purpose through the pipes, and carefully round about the seat of the nipples. Breech-loading barrels may be effectually cleaned without washing, using oil only on the tow. If the residuum of the powder has hardened on the barrels, use oil freely, and leave them awhile to let the residuum soften. Hot water is not essential, and in the moors

barrels may be effectively washed in any pool of water. The strikers and mounting generally are to be well rubbed and oiled, and, if necessary, the locks removed and cleaned. It is not advisable that the works of the locks be dissevered, as all needful cleaning can be done without. Upon no account must much oil be put upon the works of the locks; only a very little, and that of the finest quality, should be put where friction takes place, such as on the axle of the tumbler passing through the lock plate, on the swivel, and points of contact between the scear and the scear-spring, and point of scear and tumbler. Neats-foot and fine olive oil are the best for guns, and to extract the water which is present in all oil, and render it still purer, throw some shot into the bottle; the lead has an affinity for the water and will extract it. It is the presence of water in oil which makes it improper to put much oil upon guns, or other fine iron-work. The effect may be seen in the numerous spots of rust which are the result.

When guns are laid aside for a time, plugs of cork or wadding should be put in the muzzle of the barrels. If a gun is kept in a country house ready for being loaded in a hurry, let it always stand with the muzzle downwards, so that no dust may fall into the breech and cause a misfire. All guns are best preserved in cases of oak or mahogany, where they are safe from damp and external injury. Of course this remark does

not apply to such sporting establishments as possess a regular gun-room. At sea, or on the coast, rub the whole outer parts of the gun, and the inside of the barrels, with turpentine instead of oil. For rough work at sea, the barrels may be well protected by smearing them with the blood of aquatic birds. These hints are given from the author's actual knowledge and experience, as, indeed, are the whole contents of his treatise, and he only makes this remark here from the frequency of the question, "What will keep guns from rusting at sea?"

In placing the barrels in the stock, hold the latter horizontally in the left hand; hook the breeches into the breakoff, with the barrels at an angle of 45 degrees, and then let the latter fall by their own weight into their place. Never try to shove or force the one into the other. Attention to this trifling hint will save much injury to the stock. When you wish to remove the barrels from the stock, place the gun over the left shoulder, rib downwards, and placing a turnscrew carefully under the head of the bolt, which you have previously started by a tap on the other end, force it firmly but slowly out. It is quite disgusting to see the stock of a gun disfigured and destroyed by the careless drawing of the bolt. The same position is the best for unscrewing the side-nail when you wish to remove or replace the locks. These operations may appear trifling, but when carelessly done, a gun is rapidly

deteriorated; and the author's wish is to instruct in all really useful subjects appertaining to shooting. The great fault in books intended to be instructive on such subjects is, that the reader requires to know about as much as the writer to be able to understand his meaning, and perhaps the great secret in conveying instruction is simplicity and reiteration.

To dismount a breech-loader, say a lock-fast, open the lever, draw the bolt, unship the fore-end, and gently unhook the barrels from the stock. To mount a breech-loader, hold the stock horizontally in your left hand, with the lever open, hook on the barrels to the hinge, throw the gun over with the rib and hammers downwards, holding the stock by the handle (behind the locks), this will retain the barrels in their place by their own weight, then affix the fore-end and push the bolt home. All these operations should be performed with the locks on half-cock.

THE CHOICE OF GROUND

Is important to the young sportsman, who is too apt to overlook circumstances which may render 1000 acres in one place as good as 3000 in another. It will suit the present purpose and space to put the following advice in the shape of rules—or rather hints.

In the choice of a moor, first learn the nature of the ground—if it is all or only partially heathery, hilly, or flat—has the heather been lately burned—what are the contiguous lands, and how shot upon and preserved. If flat, the grouse will sooner become wild; if very mountainous, and far from cultivation, the birds will leave for lower lands as autumn advances. Low-lying moors, near cultivation, may not afford good bags at the very beginning of the season, but if near mountainous country will, on the other hand, be stocked thence in autumn. Avoid moors with open or common ground contiguous; also, try to learn if there are peat-mosses in the centre (often the case), from which the neighbouring cottagers procure their fuel. If so, you may rest assured that, if not prevented, the collies are busy chopping young birds as rapidly as their masters are casting peats. This is one reason why moors, apparently well stocked in April or May with abundance of nests, if not preserved, show so few young birds in August. Stony and grassy lands may afford hares and some few black-game, but are worthless for grouse.

The best grouse lands have high dry clumps of heather favourable for nests—no part being far from water, with undulating swells and hollows. Heathery hillocks afford excellent basking ground for grouse, and also give concealment to the approach of the sportsmen. Flat ground gives no such shelter, and

the birds soon become unapproachable. Grouse generally become sooner wild south of the river Forth, except in Argyllshire, than in the more northern parts of Scotland, but the southern birds are larger, and are also earlier on the wing. When only a few days' sport at the beginning of the season is desired, the southern moors are therefore excellent. In Argyllshire grouse sit well throughout the season unless the weather be very stormy.

But the most particular circumstance connected with grouse shooting is the amount of burning of the heather which has recently taken place, or is proposed to be done, on the shootings. This burning destroys the old, and brings up a crop of new heather. This is a matter of so much importance that there have been several statutory laws passed for its regulation. The last is that of 13 Geo. III., cap. 54, which repeals all previous Acts, and provides that any person setting fire to any heath or muir in Scotland, from the 11th day of April to the 1st day of November, in any year, is liable, for the first, second, and third offence respectively, to a fine of 40 shillings, £5, and £10 sterling, or to imprisonment, for non-payment within ten days, for six weeks, two, and three months. The tenant or occupier of the ground will be deemed the party guilty by his own act or that of his family or servants, unless he can prove otherwise. On high lands the heather may be burned up to the 25th April, provided

that the tenant receive written permission from the landlord or his factor, and that such permission be recorded in the county Sheriff Court books. Prosecutions must be begun within six months from the date of offence. This statute is termed the Law of Muirburn, and by the word muir is not meant heather only, but the nature of the ground; and withered grass, whins, broom, bent, and other vegetable productions growing upon a moor, are all included.

Farmers are not likely, for their own sake, to burn too much heather in one season, still the young sportsman will see how closely this must be looked into, as an extensive muirburning may alter for some years the whole value of a shooting. It is customary also on many farms to gather and drive the sheep about the 13th of August, and the extent and date of this annual driving may be worthy of inquiry. The question of burning moors has been keenly debated as to its effects on the abundance of grouse. It is a great pity that in all such controversies the extreme point of view is taken. Men, led away by their sympathies or interests, will not condescend to admit the possibility of any truth on the side of their antagonists. Because young heather feeds grouse, one side wishes all young heather —burning, say they, can do no harm. Because old heather shelters grouse, the other side would burn none. Truth, as usual, lies in the middle; burn regularly, and not too extended tracts at once.

Low country shootings should have good large coverts in their centre, with stripes of plantation here and there. Very flat, highly cultivated ground, where the stubble is cut as short as the grass on a lawn, affords smaller shelter to partridges and hares than where there are occasional fields abounding in rushes, with broken ground full of whins and similar shrubs. Beech hedges are excellent for partridges. If there be no good coverts on the estate, every hare, and nearly every covey of birds you put up, will make straight to the nearest, thus giving small chance of a second find that day. Green cropping gives good shelter to partridges; and, generally speaking, you cannot go wrong in the choice of ground if there are good hedges and a fair extent of wood, but bare, stone-fenced, and woodless lands will never afford good sport. The existing stock of hares can easily be estimated by the number of their runs; these not being to be found, you may put down the available stock at "nil," any protestations to the contrary notwithstanding. Numerous roads through an estate give opportunities for the practice of all kinds of poaching. The character and density of the neighbouring population must also be taken into account. As to the abstract question of the propriety of preserving game, it is enough here to say that the security to property and fences created by moderate game-preserving far outweighs, in the eyes of all judicious farmers, the value of the occasional

food of the game. One great error has been the belief that partridges and pheasants live entirely upon grain, while the true fact is, that these birds consume, at the most critical period of the season, whole myriads of wireworms and other most destructive insects. Partridges are particularly beneficial to the farmer during the rearing of their young, by this wholesale slaughter of noxious grubs. Rabbits are the only animals of the game kind very injurious to crops, and should be kept down in summer. Over-preserving of game, for the sake of wretched *battues*, has led to much of the outcry against the game laws, which, if repealed to-morrow, without some very similar safeguard to land-proprietors and farmers, would very soon be again called for. Suppose that the game laws were repealed, a stricter trespass act would be required, while the farmers themselves would find that landlords would retain the privilege of killing game in granting leases. That trespass act would lead to a greater popular clamour than before. It is a well-known fact that in America the frequency of trespasses is most annoying, and that altogether the British farmer, with heavy rents and taxes, could not bear such a state of the law as permitted his crops to be trampled and his fences to be broken down. Damage from excess of game is always recoverable from the landlord or lessee of the shootings; and farmers lie under a great mistake if they suppose that the abrogation of the game laws

would improve their position. Allowing that they might be satisfied with a very stringent trespass act, there would be an immediate outcry against it from the public in general, and it would likely become a dead letter from the impossibility of enforcing it; while the expense of watching the lands would be transferred from the proprietor or lessee of the shootings to the farmer. The truth of the above remarks has been fully proven since they were first written, by the almost universal adoption of game laws in the American States—those very States in whose blessed bosoms radicals, heaven-born high-minded poachers, and game law haters, were to find a congenial earthly paradise of freedom, call it license if you will.

As a general rule, no shootings should be taken without previous inspection; if personal, so much the better, but at all events by a trustworthy person. Grouse moors should be hunted rapidly all over, doing as much as possible in one day. An interested keeper, who knows the ground, may otherwise, according to the direction of the wind and other circumstances, lead you to where the birds will be congregated (to use a somewhat inapplicable but expressive term) on that particular day, or period of the day. He may, and often will, continue to show you the same grouse twice over, while you are in the belief that you are viewing, and are making a mental note of, fresh birds, instead of those to which the enthusiastic "green jacket" has

already called your excited attention. "Just look there, Sir; another pair, and another, and another just on a wee bit! What a 'twelfth' this *will* be, Sir!" You fall into his assumed ardour with all a sportsman's sympathy—the landlord, or the factor, or the lawyer does the rest; the lease is signed, then come the realities! Another good rule is to apply to the previous tenant for a description of the ground and list of the game killed. Grouse moors vary according to the state of the weather; some days countless birds may be seen, on other days none, so that a moor ought to be viewed more than once. Grouse may be judged by the amount of recent droppings; partridges are not so easily estimated; but the abundance or scarcity of hare-runs will at once show if there is a fair stock of hares. Many good shootings derive their game from contiguous lands, which must be taken into consideration, even if a scarcity of breeding birds appear in spring and summer.

No shootings can afford sport without the superintendence of an efficient, and, above all, a sober and prudent gamekeeper. No keeper *fond of drink*, or open to bribes, ought to hold the office. I have here a word to say for the knights of the green jerkin. No men have harder or more responsible duties to perform. They are also beset with numerous temptations; and it is a dangerous policy to pay a gamekeeper scantily.

The "keeper" is also too apt to be looked upon by the general members of a household as a half-idle official who may run with a letter here, or be sent after some runaway cattle there. Now the fact is, that no routine of duties can be more regular and exact than a gamekeeper's. Trapping is perfectly essential to getting up a stock of game, and there need be no attempt at such without the vermin being regularly and systematically destroyed. This emphatic statement may dismiss the subject—that trapping vermin is the sheet-anchor of the sportsman. Then poachers must be watched by night and day—dogs must be exercised, physicked, and trained—and altogether there is a multiplicity of work to attend to which makes a gamekeeper's life far from being a lazy one; while the necessary trustworthiness of his situation calls for adequate remuneration.

A deputation, written upon a 35s. stamp, gives the gamekeeper the due authority to protect your lands. The following is the form of a deputation by a proprietor; some slight verbal alteration may be necessary in that granted by a tenant of shootings. The writing must be on one page only of the stamp, or be so mentioned, and have no interlineation, erasure, or marginal addition:—

Know all men by these presents, that I, of in the county of have, by virtue of the statutes in such case made and provided, nominated, authorised and appointed, and by these presents do nominate, authorise, and appoint

residing at , in the county of , to be my lawful gamekeeper, to preserve and kill the game within the said property, for my sole use and immediate benefit; and farther to do, execute and perform all and every act and acts, thing and things within the limits of the said property, which by virtue of the statutes in such case made and provided, or of any laws of this realm, belong and appertain to the office of a gamekeeper, during my will and pleasure, and for which this shall be sufficient warrant. In witness whereof these presents, written upon stamped paper by , are subscribed by me, at on the day of before these witnesses and (Signed)

, Witness.
, Witness.

While our hand is in these law forms, we may here add the authority to kill hares:—

I, do authorise to kill hares on my lands within the [parish, county, or other place, as the case may be] of
Dated this day of Eighteen hundred and

This authority should be written by the granter's own hand, and be subscribed by two witnesses, who must give their profession and residence. The lord of the manor is the only party competent to grant such authority. No tenant of shootings has such power. There is no form expressed for Scotland—the above is from the English Act. The author, some years ago, heard a doubt expressed by an able lawyer as to the requirement of a stamp to render the authority efficacious and beyond cavil, but he is not aware of such stamp having been ever found necessary in practice.

The young sportsman may now be supposed to

fully equipped for the field. He has "his dog and gun" in full efficiency. The former well-broken and seasoned for the campaign, the latter exactly fitting his eye and become familiar to his hand. He can wield it with ease, and requires no manœuvring to catch the centre of the rib in looking along the barrel. Anxious to instruct, the author will run the risk of appearing to *dwell upon trifles*, rather than of being obscure. In this spirit, then, he proceeds to teach the young sportsman in

HOW TO LOAD.

THIS head embraces not only the mere act of charging the gun, but also the various sizes and quantities of ammunition.

There are two principles of charging a gun—one, to use a large quantity of heavy shot, and little powder; the other, less shot, of smaller size, and a full charge of powder. Both systems have their advocates, but the latter is the more generally practised, and it is the most honest way of firing at game. It may be perfectly true that 2 drams of powder and 2 oz. of No. 1 shot may be a very destructive charge in a 12 bore 7½ lbs. gun, but it is uselessly so, the great weight of the pellets wounding game at long distances, not so as to immediately kill, but ultimately causing a lingering death by suppuration, caused by pellets lodged under the skin. This system, therefore, though strongly

recommended in a well-known work on shooting, is most properly little practised. The author has known the game on a moor nearly exterminated, but not bagged, by this style of shooting—the bones of the grouse whitening on the heather for a year afterwards.

Some barrels shoot well through weight, but thorough good barrels shoot well from elasticity and proper boring. The former require a heavy charge of powder, the latter do not. Assuming 14 bore, and 7 lbs. weight, as an average gun, let the powder flask be set at 2¼ drams, and with this use 1 oz. No. 6 or 7 shot, and 1¼ No. 5. Of Nos. 3 or 4 shot, use 1½ oz., and two drams powder; or you may very safely use 1⅛ oz. No. 6 shot, with 2½ drams powder. There is no exact rule, as guns have, as it were, ways of their own, and it may appear somewhat strange to say that the author has seen the force of some guns increased by decreasing the charge of powder—yet such is the fact. Since this was written great changes have been made in loading proportions, and the above is allowed to remain, as originally printed, with the following additions:—

Only a comparatively few years ago fine-grained powder was all the rage—burning quickly, with a sudden discharge. Now, coarse-grained powder, slower in ignition, but accumulative in propulsion, is in universal use. The charge of powder is increased; 2¾ drams being now thought a moderate charge, using the

same proportions of shot as formerly, and 3 drams are in common use to 1 or 1⅛ oz. of shot. In accordance with this modern light the table at page 76 is constructed, and will be found a safe guide, always bearing in mind that average calibres are referred to, and that the grain of the gunpowder be equal to that of Messrs Curtis's & Harvey's No. 2 for muzzle-loaders, and No. 3 for breech-loaders. As a general rule, also, the wider the calibre the coarser may be the powder, and when a gun is found to recoil, let a coarser-grained powder be used.

Short barrels should be charged with fine-grained powder. The coarse-grained powder burns more slowly, and may be driven more readily unburned from the muzzle, although the width and consequent compactness of the charge militates against this, especially with good wadding. Long barrels, say 32 to 34 inches, will consume more powder than shorter, and hence such a gun may be effectively charged with even 3¼ drams of powder, driving one ounce of 6 or 7 shot with great velocity. But taking 14 as a medium, let, under 7 lbs. weight of gun, the powder be 2½ drams and the shot be 1 oz. No. 6—and above 7 lbs. 2¾ drams and 1⅛ shot, and a very safe charge is reached.*

* The above will be found to give more powder than the proportions named in the First Edition, which referred entirely to No. 2 grain. No. 3 is above referred to. If No. 2 be used, good proportions for light guns, gauge 14, are 2½ and 2¾ drams 1 oz. No. 6; 2½ drams and 1¼ oz. No. 5. 2¾ drams and 1¼ oz.—equal bulks—are good proportions for guns over 7 lbs.—avoirdupois weight, 16 drams to the oz.

Let it be borne in mind that it is better always to decrease than to increase the quantity of shot.

On proceeding to the field, the gun is supposed to be perfectly clean, and the breech and nipple to be free from stoppage—the strikers resting on the nipples. Placing the but of the gun upon his left foot, and holding the barrels perpendicularly and well out from his person, let the young sportsman, by a rapid inversion and shake of the powder-flask, with his forefinger firmly placed upon its mouth, fill the top with powder, and pour it down the barrel farthest from him—and repeat the action with the nearest barrel. Then placing a wadding in the muzzle of each, he rams both home, striking one good solid blow upon the wadding to send the powder up the nipple. Then returning the ramrod to its place, he pours in the shot, holding the pouch at an angle of 45, not perpendicularly, and then repeats the ramming down in the same manner as before, but not striking the ramrod home, and observing to hold the gun perpendicularly, and giving it a slight shake to make the shot lie level. In both instances, enter the ramrod a few inches, and then raising the right hand to its upper end, bring it home by one continued motion of the hand downwards, and not bit by bit. On finally returning the ramrod to its place, raise the gun with the left hand also by one motion, grasp it immediately behind the locks with the right hand, then in front of the locks with the left, and

half-cock the locks with the right. Do this in a regular and formal manner—one—two—three—four —and you will acquire a dexterity enabling you to load in one-half the usual time. Place the caps firmly down upon the nipples, and the process of loading is over. On firing and proceeding to reload, if your gun has any tendency to miss fire, lower the muzzle, holding the gun in the left hand, and strike it forcibly on the heel of the but with the right palm. If only one barrel be fired, see that the other lock be on half-cock, load as before, and do not remove the shell of the exploded cap until about to put on a fresh one. Always hold the gun well from you, and never load in a hurry under any circumstances whatever.

Should, from any cause, a percussion gun miss fire, unscrew the nipple at once. If you have not a nipple key (which you should have), try to get the nipple filled with powder by the orifice—a small funnel is sometimes used for this purpose—pricking the powder down with a pin; never put a hard needle into a nipple—it is pretty sure to be broken into it: a common pin is the safest. If your gun is apt to scatter, use as slack a wadding as is consistent with safety over the shot; and on the other hand, a full-sized wadding for a weak, close-shooting gun. Also you may, in loading one barrel, put the ramrod down the other to replace the wadding over the shot, in the event of it having started. If by inadvertence you

have allowed any pellets of shot to fall down a barrel while the ramrod is in it, they will wedge it in, and you may pull upwards in vain; but invert the gun, shove the ramrod home, and the pellets will drop out. This happens not unfrequently with inexperienced sportsmen. In ramming home the wadding, observe that it lies flat across the barrel, which is made certain by a little caution at first.

ON TAKING AIM.

It has been already mentioned that the greatest dexterity is attained by shooting with both eyes open. The gun may become quite familiar to the hand by being frequently lifted, in a room or anywhere, taking aim at an object with both eyes open, and then closing the left eye to ascertain if the gun be bearing directly on the object aimed at. In this way the young sportsman may so far learn to shoot without firing a shot—more lucky than the youth sung of by old Hierocles, who resolved not to enter the water until he had learned to swim—because if he once acquire the knack of instantaneously covering his object, he has but to gain nerve and judgment in the field to make him a good shot. Let this knack be once certainly acquired, and the rest follows as a matter of course. The mere power of taking a rapid and correct aim will not make

him a skilful sportsman, or even a certain shot, but it forms the groundwork of his future skill, and practice will do all the rest. The ability to kill game with certainty is as much attained by a knowledge of their mode of flight as by manual dexterity in handling the gun. Thus many men are famous for hitting such objects as a penny-piece thrown into the air, who cannot kill game well. But that dexterity in throwing the fowling-piece into a line with the object of aim by an instinctive effort, keeping both eyes firmly fixed and following the flight of the object, is the first great principle in shooting well. This dexterity may be easily gained by frequently handling the gun as directed above, without actual firing. Many gentlemen have been rapidly taught to shoot in this manner by the author.

A frequent subject of discussion among sportsmen is the position of the left hand in firing a gun. The question raised is, Whether it should be well extended, grasping the barrels at a considerable distance from the breech, or immediately in front of the trigger guard? A long consideration of the subject, and much observance of the different styles, have convinced the author that the question is quite an open one. The former is the crack mode, and certainly looks more stylish, while some of the best shots he has ever known prefer the latter. The probability is that much depends upon bodily configuration and muscular power. The author

has observed that tall and strong men prefer to extend the left arm. His own system is most peculiar, acquired he cannot tell how. Supporting the gun entirely by the right hand, he half clutches the left immediately in front of the trigger guard, the thumb and forefinger being uppermost, and upon these he merely rests the gun as on a cushion. His left hand, therefore, exercises little sway upon the gun in directing its aim. There is not the slightest wish to recommend the adoption of this system, which is here mentioned, as an extreme case, to illustrate his opinion, that either mode may be safely practised. The hand in front of trigger guard is certainly the safer, and possibly quicker.

RABBIT SHOOTING.

THE very best initiatory practice is shooting rabbits, and this sport is also one more readily to be had than the higher branches of game. For various reasons, therefore, rabbit shooting will be the first discussed. Rabbit shooting is practised at all seasons; but they are in good condition for the table only from the end of October until the beginning of March. They are generally to be found either in thick coverts or in burrows. The former are hunted with cockers or terriers trained to the pursuit, and ferrets are used in the latter, to drive the rabbits from their retreats.

In rabbit shooting in coverts, great quickness in firing is necessary; and it is this which tries the nerve and gives dexterity to the hand of the young shooter. He should walk quietly and watchfully through the covert, as the rabbits, when put up by the dogs, run hither and thither, pausing now and again to listen for any sounds. The best course is always along or towards a clear space, free from underwood, so as to get a fair aim should a rabbit cross it, where the gun must be fired at once. The eyes should be fixed on the head of the rabbit, as if that were the whole animal, and the gun will then do its duty, and the shot not strike behind. Rabbits are so active and tenacious of life that unless severely hit they are almost certain to get away if there be a burrow near; being also very acute in the organs of smell and hearing, never hunt down the wind or walk upon the top of the burrows. The range at rabbits is short; unless running right across the line of aim, their small size, thick fur, and tenacity of life, render killing very uncertain at any distance above 30 yards. Nos. 5 and 6 shot are the proper sizes.

FERRETING RABBITS

Is an exciting, and, in good weather, a very pleasant sport. A fine, calm, sunny day is the most suitable;

and no other variety of shooting is more calculated to teach the young sportsman the several virtues of patience, quietness, and promptitude. The picture formed in ferreting is often quite as good as a bit of Landseer. The cool, listening, and picturesque attitude of the gamekeeper—the more ardent and expectant position of the several "guns"—the sagacious face of the retriever, who seems to say, "I know the game you are playing as well as any of you"—and the generally rough and scrubby foreground—combine to render "ferreting" quite an artistic and engaging pursuit.

The rabbits seldom "bolt," as it is termed, immediately on the ferrets being put in, but when they do, there is no time for thinking—"sharp's the word"—and the game must be well killed, if the bag is to be filled—as rabbits carry off a heavy shot, and soon disappear in the first burrow they reach. The gun should be thrown well forward, even in advance, and discharged at once, if the aim can be taken at all, as the chances are against a second sight of the rabbit being obtained. With a good eye they may often be hit even though they have disappeared, by firing through the brushwood right in the course they are taking. This the author has often seen done by himself and others. When one rabbit bolts, it is pretty certain to be followed immediately by another. No. 6 is the best size of shot for this sport, in which the young sportsman has three

things to recollect. To keep quiet; to avoid a position where he can easily be seen from the mouth of the burrow, which keeps the rabbits from bolting; and to take good care not to shoot until the rabbit is quite clear from the mouth of the burrow, else he may kill still more than his most sanguine wishes would desire, viz., the ferret itself. Should the ferrets "lie up" in the burrow, it is dull work waiting on them. Sometimes they have to be dug out, an operation quite *infra dig.* of the sportsman, who should at once move off in quest of further sport, either with another ferret, or in search of outlying rabbits. Some ferrets must be muzzled when hunting, but the right sort of thing is a small, plucky, unmuzzled animal, too light to hold a rabbit when it seizes him. The best mode of drawing the ferret from the burrow is to open a newly-killed rabbit, allowing the scent of the warm entrails to penetrate the burrow. If this fail, the spade, where the nature of the ground permits its use, must be resorted to. Puffing tobacco smoke into the burrow has been tried, with success, to drive out "lying up" ferrets. These savage little animals are peculiarly repugnant to many people. There is a snakiness and a cool malignancy in their nature and appearance which quite justify this feeling. They should not be entrusted among young children, and are always treacherous, and not to be safely handled by unskilful strangers. You may always, however, safely lift

a ferret by the tail or by the neck, and as it is impossible for the gamekeepers to be everywhere at once, and time being so valuable in ferreting, every young sportsman should learn how to lift them, and with a proper system a bite is impossible.

Ferrets, being originally from a warm climate, are very delicate, and it is said that if you handle their young ones, the mother will destroy them. They are seldom kept so cleanly as they require. What is needed is perfect shelter and warmth, but with the means of taking fresh air when they are inclined for it. A gentleman of great practical sporting experience, resident in the North of England, who has kindly given the author several hints by naming subjects likely to interest his readers, informs him that his gamekeeper has found cats' flesh "a sovereign remedy for many diseases in ferrets."

One of the most extraordinary results of a shot the author ever saw—and in his time he has seen some strange ones—was while ferreting rabbits at the late Sir James Boswell's of Auchinleck. One of the "guns" fired at a rabbit "bolted" from a hole on level grassy ground. The mouth of the hole entered at right angles from the direction of the shot, and indeed was invisible from the position where the sportsman stood. The ferret, a very valuable one, not appearing for some time, the gamekeeper went forward, and, thrusting his arm into the burrow, drew

out the poor animal, quite dead, one pellet having penetrated its heart. In this case the pellet of lead had struck a pebble, or other hard substance, in the grass, and had its original line of flight altered to one exactly at right angles! How may this authentic and true anecdote not bear on criminal jurisprudence, where it is often impossible to reconcile conflicting evidence on death caused by the discharge of firearms?

HARE SHOOTING.

THERE is a simple rule in hare shooting, attention to which will very greatly simplify the matter, viz.:—under every circumstance, to fire at the tips of the ears, letting these alone be your mark. All other rules are contained in this one; still it is necessary to exemplify this more fully. For instance, when a hare is running straight from you, the ears form the proper mark; but if running across ridges, never fire while she is descending from the crown of the ridge, but while ascending from the furrow to the crown, which will throw her ears fully into view. If a hare happen to run right towards you, the ears would still be the mark, but this is the most difficult shot of all, and the proper mode is to remain perfectly motionless until she is within 30 yards, then by a slight motion or sound to attract her attention, when she will turn off

after a pause, and afford an excellent shot. A hare running across may be killed at a long distance with No. 5 shot—even heavier is used with deadly effect—but it is inconvenient to load with a larger size unless hares alone be looked for, which is seldom the case with the genuine sportsman. A thorough good gun will knock over a hare, running broadside, with 4 or 5 shot at 70 yards distance, but full elevation must be taken, and the gun smartly fired with the head well raised and the eyes kept steady upon the aim. If the reader consider for a very short space the effect of looking at the hare only at this long distance, he will at once perceive the rationale of not taking his sight along the rib, with his eye well down behind the breech, as is most erroneously recommended in a well-known book on shooting. Distance requires elevation in proportion. A rifle is fitted with graduated sights to meet this, but the elevation of the rib on a fowling-piece is fixed and immoveable. But by a simple law in perspective, when you look at a hare at 70 yards, bringing mechanically the sight at the muzzle to bear upon her, you must have the breech of the gun lower than if she were only 40 yards off, whereas, if you adopt the one-eye system, you fire at exactly the same elevation at all distances, because your fowling-piece possesses only one fixed elevation. It is the non-perception of this that has given cause to so much bitter controversy on the effective range of fowling-pieces. It would be as

absurd to take a level aim along the rib at 70 yards, as it would be to fire a rifle at a mark at 200 yards with the sight set for 100. By some inadvertence this matter was not fully treated under the head "ON TAKING AIM," and the following remarks will more fully explain the author's meaning.

The strength of guns and their power of carrying a large charge of powder have been greatly increased during the last 45 years. The shape of the barrel has been altered and its calibre widened. Ezekiel Baker, a good authority, writing some 45 years ago, gives 1½ to 1¾ drams of powder, and 1⅛ to 1¼ oz. of shot, as the proper charge for guns weighing 6 lbs. 4 oz. to 6 lbs. 12 oz. It will be at once apparent, that a gun carrying 2½ drams of powder and only 1 oz. of shot must possess a greatly increased range. 2½ drams powder and 1 oz. shot may be freely used in a properly made gun of 6 lbs. 12 oz., and 3 drams powder with 1 oz. shot in a gun say 7¼ lbs. The question then comes to be—Here is an enormous increase of power, can a gun be so made as that it shall not scatter in proportion? If it can, the effective range must be about doubled. Now, while the small charge of powder was in use, Colonel Hawker declares that at 50 yards the chances are three to one that a bird be killed with a good aim. There can be no doubt that, by modern improvements, what was said by Colonel Hawker of 50 yards may now be said of 70,

but the elevation must be very much guessed. Here, then, is the question which has been so keenly disputed in the columns of a London periodical. Should a gun of 7¼ lbs. in weight shoot so as to give a regular power of killing a hare, running broadside at 70 to 75 yards, with No. 5 or 6 shot? It certainly should. No doubt the eye will be more easily deceived at 70 than at 40 yards as to the rate at which game is going, and from the natural obstacles to getting a clear view the average of killing shots at the longer range will be much smaller. But that is not the question. What is the gun's power to kill if properly aimed with? And this can only be proven at a target; taking means to ascertain velocity as well as closeness in shooting. The author maintains that this power is attainable, and that the reason why in practice the range is not lengthened, is because the question of elevation has been nearly lost sight of. In simple terms it may be said, that while everything has been done to increase the range of the fowling-piece, nothing has been done to give the elevation necessary to take full advantage of the increase of power. The greater thickness of the barrels at the breech has been of some use, but as long as the one-eye style of shooting is adopted, the object, if hit at all, will be struck only by outside weak pellets, and not by the effective central shot. The very great difference in power of the central and pellets can only be known to men who, like

author, have to make it their business to master these details, and who have to combat and overcome the various peculiarities, in quality of iron and other matters, which make the comparative shooting powers of some guns a mystery to the most experienced. The farther off the object is, there is the greater difficulty in commanding its motions with the eye; and to shut the left eye and lower the other to the level of the breech, with the "sight" at the muzzle intervening, is a very likely means to lose sight of the object altogether. The proper way is to throw the gun well up and into the shoulder; the setting-off of the stock will then bring the barrels right in front of the face; and, the head being erect and both eyes fixed intently on the object, the line of motion is commanded, and the aim taken instinctively in advance if crossing, or above if going right out. The central pellets have thus an allowance given them to compensate for distance and the motion of the object. Within what may be termed the short range, say up to 40 yards, the outer pellets have, when fired from a gun of average power, strength enough to bring down a hare or bird. Here those who deny the truth of the longer range completely mystify themselves. They argue thus—If a gun shoot well at 70 yards, it must cut game to pieces at 30 yards, and how can it shoot correctly as to elevation at both distances? It has already been shown, that the farther the distance an object is looked at, the

muzzle bearing upon it, the higher will it be in perspective, just as a level distance in a painting rises higher on the canvas. You look along an imaginary line, higher at the breech according to distance, and at this elevation the gun is fired, exactly as a rifle target-shooter sets his breech-sight to a given distance. Consequently, as his rifle will shoot true to any distance within its range, the breech-sight being set accordingly, so will the fowling-piece throw up its centre pellets to the object of aim as long as it is within effective range, your line of vision, high at the breech, forming the true elevation. These central pellets are to the smooth bore what the single bullet is to the rifle; and by their aim and power, and not by the weak outsiders, the question of range must be judged. As to cutting game to pieces with a hard-shooting gun at short distances, the fact is that a good gun disperses its shot so regularly, that at 30 yards the number of pellets which will strike a grouse, partridge, or hare, will not cut it to pieces, as it is termed. It is your weak, close-shooting gun, made for a deceptive display on a white-washed target, that cuts up and destroys game at short ranges. The error has consisted in supposing that a gun to kill at 70 yards must shoot very close. Practically this is not the case. A good gun discharges its shot regularly, neither too closely nor too widely. And, what may be particularly noticed is, that while the outer pellets increase their

divergence from the same cause, whatever that may have been, which first made them to diverge at all, there remain in the centre a sufficient number, which have received a direct impetus, to hit and bring down game at the long range, provided allowance be made for the distance they have to travel. Let any one stand near a target and mark the difference of time that small shot takes to come up from 40 and from 80 yards, and he will perceive that a bird or hare going at speed has had time to escape, unless the gun is fired in advance and follows its motion. This can only be effectively done with both eyes open, the gun being suited in shape to the figure, and the finger instinctively drawing the trigger at the proper moment. Why this is not so particularly required at short range is, that up to 40 yards the rib and thickness of barrel at the breech give elevation enough, while the spread of the shot, all strong enough at short distances, compensates the momentary loss of sight of the object which must occur at the moment of firing if the left eye be shut and the right be brought down level with the rib. Finding in practice that this system kills well enough at short ranges, the one-eye men—who rarely fire at an object above 40 yards, and when they do, must, except by accident, shoot under or behind it—come to disbelieve altogether in a mode of shooting which nearly doubles the power of the gun and the capability of the sportsman.

GROUSE SHOOTING.

THERE can hardly be a greater proof of the national fondness for field sports than the importance which is attached to the TWELFTH OF AUGUST—the opening day of grouse shooting in Great Britain, as the twentieth of the same month is in Ireland. The red-grouse, *Lagopus Scoticus*, has been watched by thousands of persons interested, through all the incidents of the pairing, hatching, and rearing seasons, and has now reached the very climax of his fate. It is not too much to say, that the pursuit of this beautiful and gallant bird moves the very mainsprings of a great part of the higher branches of society, while to very many individuals its comparative plenty or scarcity is a matter of grave concern. During the whole spring and summer there is a stream of sportsmen setting into the North in quest of shooting quarters; towards the end of July this stream becomes a torrent—and it has even been whispered that Parliament itself is not unaffected by the strength of the current. About this time a hurrying on of the legislation, and that post-poning to a future session, and indiscriminate throwing out altogether of numerous bills which has been aptly termed "the slaughter of the innocents," come round regularly with the season; and however grave the state

of public matters may chance to be, somehow or other the sport of grouse shooting seems paramount to all questions. Of course, no hint of such a thing is ever given in the "houses of parliament assembled," but the fact remains the same nevertheless.

In our northern cities, for some weeks previously to the Twelfth, countless pointers and setters may be seen being led about the public streets and in the neighbourhood of the shops of gunsmiths, who brighten up wonderfully about this season. Most of these dogs are curs of particularly low degree, if indeed it be possible to invest them with any right and title to what may be called a "degree" at all. Certainly many of them have not studied their profession under a breaker, even if their pedigree were such as to entitle them to enter themselves as candidates for canine honours. Yet it is a remarkable fact, worthy of grave consideration by psychological students, that the sellers of these dogs are never known to be aware of their having a single fault, but, on the contrary, declare them to possess every good quality which can endear them to the heart (and the pocket) of the young and ardent

It may also be a subject of curious inquiry why it always does happen, that about the first of August, old gentlemen, who have avowed all the summer that they will not shoot this season, suddenly become sanguine and declare that they will. And, *per contra*,

how it possibly can occur, by a regular concomitance of circumstances, that young gentlemen, who for weeks have donned shooting-coats and laced boots, and have canvassed the state of the birds in every company, suddenly discover that they are called away on business, or that, owing to a thousand-and-one unforeseen causes, they will not "get away on the Twelfth, but may possibly turn out about the first of September."

By the tenth of the month, or even earlier, poachers are at work on the outlying grounds; and it has never yet but so happened, that poulterers, by noon on the twelfth, have just received one box of grouse warranted to be killed that very morning; while it will go hard, indeed, but that you find "grouse" on the "cartes" of the principal restaurateurs.

It has been attempted to make an approximation to the annual value of grouse shootings in Scotland; and a popular periodical some years ago set down the rents alone as at least £70,000. But this sum is undoubtedly far under the mark, while the money brought into, and expended in the country by sportsmen and their families, must, in the aggregate, be so large as to invest the sport with quite a national interest. Many grouse shootings are let at from £300 to £1000 per annum. Add to this the very great contingent expenses for keepers, watchers, bag-carriers, carriage of game, etc., etc.; and let it be observed that a large amount of this expenditure is by strangers

who, without this attraction, would not visit Scotland at all. These large sums are annually brought into the country, not in payment of exported produce, but of rents and services. In point of fact there is an annual introduction of new capital, the profits or accumulations of other countries, which is carried in a golden stream into the most remote Highland valleys, and all this occurs, without affecting, in any appreciable degree, the pursuits of cattle-rearing or agriculture. It is, therefore, not without some reason that the proprietors of grouse shootings should pay attention to this source of income. It is a matter which cannot be concealed, that the avidity with which every thing possessing the name of a "shooting" is taken by English gentlemen, has caused many places to be let as such, and as being "strictly preserved," where no heather is known to bloom, and whose nearest approach to a keeper is the shepherd.

This is certain to have a reactionary effect. Grouse shootings are now a recognised element in the value of Highland estates; and what sportsmen have to complain of in many cases is, that while high rents are charged for such shootings, there is a looseness in the management of the ground when not let, as well as in the general character given to the ground, which would not be tolerated in any other pecuniary transaction where a full *quid pro quo* is expected and given. No proprietor, for instance, would allow an unlet farm to

return to a state of nature; yet in the matter of shootings there seems to be a very frequent disregard of proper trapping and preserving, so that, on entrance, the tenant has to begin anew to raise a stock of game upon what may be termed the raw material, while the rent is far from being proportionally low. These remarks are, it is to be hoped, not out of place here, and are worthy the attention of landowners, who have merely to adopt the same management of shootings which they use in other matters to enhance the value of their estates.

The author writes guardedly, and from considerable experience on the subject; and were he inclined, or were this the proper place for such expression of his opinion, he could make not a few remarks which would tend to prove that the system now carried on—not universally, yet still too frequently—has begun to have the effect of deterring many sportsmen from taking the risk of a Highland "moor." The remedy is simple. Stop all poaching, trap the ground duly, and, in general, let there be the same consideration given to the interests of the prospective tenants as would be in letting farms, but do not treat the question of the stock of game as a mere sporting matter, and yet charge for the shootings a solid and substantial rent, which is no matter of sport at all.

A very conspicuous instance, proving the truth of the above, occurred in 1863. A large shooting in the

west of Scotland was taken by the Duke of —— on the good faith of the proprietor's statements. The author of this treatise exerted himself to procure exact intelligence respecting the true state of the game and red-deer, but was quite baffled. At great expense the party of distinguished sportsmen went to the north, with a large establishment, and found the much-praised ground a blank. At this present writing, February, 1864, it is reported that the whole affair will go into the courts of law. But if ducal rank and means cannot give the power of reaching the truth, how must other sportsmen be too frequently victimised!

It frequently happens too that there is a very great disregard for the interests of tenants of the shootings, as secondary to those of the farmers, whenever the driving of cattle and gathering of sheep are concerned. Now, although as a question of social economy the farmer's interests are superior to the sportsman's, yet when there is a mutual agreement and a full rent paid, the sportsman has as undoubted a right to be protected from all unnecessary annoyance in the prosecution of his sport, as the farmer has in the rearing of his cattle. The general reader—who may be disposed to view this question in that utilitarian spirit which seems to reduce every subject to a pecuniary standard, and forgets that there are such things as health and recreation required even to fit mankind for the pursuit of wealth—is re-

minded that grouse moors are here treated of, not the over-preservation of game on arable land. The preservation of grouse, and the business of the sheep or cattle farmer, may be carried on in perfect consistence with due justice to both interests.

That these remarks are not uncalled for, one anecdote only out of numerous others may be here recorded. The author advertised for many consecutive weeks, in a well-known newspaper, for good grouse shootings, and having formed quite a collection of replies, all more or less highly laudatory of the excellence of the various shootings, the gentleman who wished to become the lessee started on a tour of inspection. Not one of the letters conveyed a just description of the respective shootings. Preservation or trapping was generally unknown. On one estate not a head of grouse was known to exist, and on the proprietor being asked why he could possibly recommend his place as likely to suit the advertiser, he coolly replied, "Oh, there's capital otter-shooting along the shore here!" The gentleman on his tour luckily hit upon a shooting of 30,000 acres which had never been in the market or let before at all. Once for all, let no grouse shooting be taken without inspection, or a reference being made to the previous tenant. Many proprietors are themselves ignorant of the state of their game. In other cases the question has not yet been properly viewed; or it has been treated as a trifling and unimportant

consideration. Because the shootings are let for recreation and amusement, the proprietor does not attach the same importance to the state of the game as he would if drawing the rent for farming purposes. By and by, if they continue in the same demand, shootings will be regularly treated like other articles of property, and will not be let as simply containing so many thousand acres, but rather according to how these acres have been fitted for letting by proper management.

The young sportsman—having surmounted all the difficulties of inexperience, and having arrived a few days before the twelfth at his shooting quarters—should devote the interim to acquiring a knowledge of his ground, its water-courses, places where the grouse love best to feed and bask, and such other information as the keeper or watchers can give, which will much enhance the pleasure of his sport, and give him a fair start. If he has never shot grouse before, let him bear in mind that he is about to enter upon an exertion of strength beyond anything he is likely to have experienced. Grouse shooting is about the hardest work possible; and were it not for that indomitable love of the chase in some particular form or other, from angling to elephant shooting, which is inherent in human nature, few men, unless of the most robust constitution, would attempt its pursuit at all. The reflected heat in a Highland heathery glen is some-

thing tropical in character, with an amount of anything but tropical exertion. Regular and gradually increasing exercise should, therefore, be taken, and early hours kept. Let temperance be the unfailing rule; and under the influence of the bracing air and regulated fatigue, the young sportsman will acquire a due capability of following his game from "morn till dewy eve" on the twelfth, and make a bag accordingly. On that all-eventful morning let him breakfast at seven o'clock, rest for an hour or even more, find himself slowly approaching his ground about nine, and about ten o'clock let him begin thoroughly to enter upon his work. Shooting steadily until two, about which time the grouse feed, let him rest an hour, and lunch upon biscuit and cold tea; then over old and cautious dogs let him shoot on until evening, never hurrying or getting excited; and he may rely upon returning to his quarters with a bag far outnumbering that of the impatient sportsman, who starts while the dew is yet on the heather, knocks the birds about before they have fed, thus unsettling them for the whole day, and who tires himself out by his morning's exertions, losing thereby the very best period of the day—the afternoon.

In hunting a grouse moor, it is proper to take such a course (working against the wind) as will drive the birds to a central and less elevated position. Indeed grouse, when disturbed, generally go down hill, but it should be the aim to drive them inwards from the

marches, and to break up the coveys so as to make the single birds certain to sit close and afford good points. This gives the superiority of the afternoon, when the ground should be slowly hunted, with the utmost care and deliberation, otherwise very many close-sitting single birds will be passed over. The scent differs very much on different days, and sometimes the best dogs will be puzzled with birds sitting like stones under their very noses. When the heather is shedding its bloom, which may be known by it adhering to the boot of the sportsman, there may be said to be no scent at all, or else the bloom gets into the nostrils of the dogs and renders them useless. On such days all that can be done is to move about very slowly and hunt up every corner.

Should the strength and nerve of the young sportsman fail him after the first exertion, let him at once lie down on his back for half an hour upon a clump of dry heather, taking proper precautions to avoid catching cold. The climbing a steep ascent has a peculiar effect upon the nerves, making many a good shot miss every bird he fires at, and to follow up the game while in this state is a needless waste of time and ammunition. How common is the remark, "I had only a few birds at lunch-time, having gone off my shooting, but missed nothing in the afternoon." When, therefore, the birds are missed without any apparent cause, let the shooter lie down for at least half an hour,

and not grudge the time so spent. There is no peculiarity in the flight of grouse which calls for any specific advice in taking aim. It is almost superfluous to say that of course one bird should be singled out at each discharge; but "the brown of them" is very seductive to a tyro anxious to make a bag, a miss being sure to follow. In general, especially at the beginning of the season and in dry weather, they are easily brought down; but there is no shot more trying than an old cock in windy weather. He has such a knack of rising rapidly, and again as it were throwing himself on the heather, all the time going off like a whirlwind, that it takes the very quickest eyes to follow and cover his movements. No young sportsman need therefore vex himself at missing such a bird, which certainly is of all shots the most difficult. Very young birds, called "cheepers," from the cry they make when taking wing, are on the other hand beneath notice, and should never be fired at. Anxious, however, to "make a bag" in print, too many of these short-lived wretches fall beneath the sportsman's aim on the twelfth. Unless the birds are particularly well-sized and strong upon the wing, No. 6 will be found the best size of shot. Towards the end of the season No. 4 will be found to bring them down, when No. 6 will have no effect beyond driving out a few feathers. But, as mentioned in a former chapter, the use of very large shot for grouse should not be tolerated,

as it wounds very many birds, and produces, by being lodged under the skin, suppurative sores, causing a lingering death. When it is of importance to the shooter that he should feel no jar whatever from the gun, through nervous excitability or any organic disease, let him by all means use No. 7 shot, charging with only $\frac{3}{4}$ or $\frac{7}{8}$ oz., and $2\frac{3}{4}$ or 3 drams of powder. During all August, this size of shot will be found sufficiently deadly. The same advice may be extended to partridge shooting in September.

On the first rising of a covey of grouse the inexperienced sportsman is apt to be flurried by the noise of their wings, which is somewhat startling from its suddenness, and consequently to fire rashly into the middle of the lot, or, as it it is termed, into "the brown of them," when he is pretty sure to miss them entirely. The trigger should never be drawn until one bird is singled out and covered; and every exertion ought to be made to acquire the capability of doing this without the slightest abstraction of the attention from it to the other birds. It is somewhat difficult for the young sportsman to do this, because he naturally thinks that it must be better to watch the motions and to fire at a number of birds than at only one, but experience will teach him that it is by fixing his eye on one bird and allowing the others to go that he will make sure of bagging any at all, and especially of getting right and left shots. Meantime the keeper and markers are

watching the flight of the birds and "marking them in;" that is, making out the exact spot where they alight. It is wonderful how far a good marker will follow the flight of birds upon the wing with the naked eye, and there is also some art in the matter. Keep your eye upon the line of flight after you have quite lost sight of the birds, and if they alight within eyesight, you will likely catch a glimpse of them from the manner in which they flutter their wings in doing so. Birds so marked should always be followed up, as it is a rule in shooting, that where a bird is known to be it should be searched for until found, as it both saves time and gives the dogs confidence in the superior knowledge of their masters. Small telescopes are sometimes used in marking grouse, but persons accustomed to the practice can do all that is required without the aid of mechanical optics, while the shooter himself has really other things to attend to than following the flight of birds (if he could) through a small field telescope. As a general rule, all such gimcracks and appliances are best let alone, notwithstanding the endless puffs and advertisements contained in newspapers of this, that, and t'other new invention being quite "indispensable" to the sportsman.

As the season advances grouse become wild, and must be approached with caution. Still, the ground should be carefully hunted, as a great many birds which have received a slight wound will now sit singly

until you actually tramp them up. These birds may be generally known by their comparative leanness and being always found singly. Take advantage of every inequality in the ground to keep concealed, and you will get many shots by coming suddenly on birds sitting behind knolls and in moss hags. On a continuance of wet weather, grouse in the Highlands—and with any weather early in September on the Lowland moors—congregate in large flocks called "packs." The term "pack" is used by many writers to denote a single brood or covey, and may be the more correct term, but in common parlance a brood of grouse is a "covey," and a "pack" is a number of broods gathered into a large flock. These packs separate again during fine weather in mountainous districts, but rarely if ever do so south of the Forth. They are very wary and vigilant, and difficult of approach; and the only chance of getting a shot is by "driving" them, that is, sending a man round to disturb them, the sportsman being placed in concealment on their probable line of flight. The rapidity of their motion is so great that quick work is required, the aim being taken a full foot in advance of the bird, and, above all, the gun not being fired until the bird is a-breast of the shooter; for to hit an advancing bird is almost an impossibility. If the shooter have the coolness and nerve to keep himself concealed until the birds are just about to fly over him, and rise suddenly at the critical moment, their direct

flight will be broken and their velocity lessened by the divergence and ascent they are sure to make, and a better shot will be afforded. But the whole thing passes so rapidly, that to a young sportsman the chance of hitting driven grouse is very small indeed. On low country moors, after the grouse have once become wild and packed, their is little probability of sport during the remainder of the season, which closes on the tenth of December, unless during a hard—what is called in Scotland a "black"—frost, when grouse sit and bask on the sunny side of peat-hags. A dog is useless or worse on such occasions; and shots are only to be obtained by quietly slipping about among the deep hags. The bag is not likely to be a large one, but the birds are now all full-grown and plump, and somehow or other, in both shooting and fishing the pleasure seems to be equally great with moderate as with immoderate slaughter. The whole seems a question of comparison. If you expect to kill 50 brace and kill only 40, you are disappointed—whereas 15 to 20 brace may exceed your expectations, and give more zest to your sport than the bagging of three times the number.

As an instance of the uncertainty of all rules, or rather of no rule, as to grouse sitting well being at all times absolute, the author may mention the following, of which he made a note at the time. Shooting on the afternoon of the 3d November, 1857, on a moor he rented on Lochfyne-side, after devoting the previous

part of the day to the pursuit of black-game in the coverts, he went up to the open moor from mere curiosity, not expecting any red-grouse to sit, it having rained heavily for the six previous days. To his surprise the grouse sat like stones, and although it was too late in the day to make a large bag, he made a considerable one, no bird rising until fairly walked up from before the dog's nose, so that he killed at every shot. A sudden and sharp frost set in that night.

When the wind is blowing strongly off your ground never hunt near to your leeward marches, as you will drive your birds off. At once make towards the direction from which the wind blows. On the other hand, when the wind blows on to your ground from lands where shooting is going on, do not disturb the birds on that day—on the next you will have excellent sport. When birds sit well, but only if you are a good shot, make a circuit when the dogs point, and approach them from the other side of the covey. Both grouse and partridges are more easily separated in this way, but go off more irregularly, and are not so easily killed. It is the favourite mode, however, with many experienced sportsmen, and partridges especially are more likely to separate when so approached, and also to rise singly, as they sit watching the dogs; but they also fly off more swiftly, and in uncertain directions.

Young grouse (and this will serve for partridges and

other hard-billed birds) may be known from the old by suspending them by the lower mandible of the bill, which in a young bird will bend and give way, but not in an old.

All game should be thoroughly cooled before being packed. This applies especially to grouse, which are mostly killed in a hot season. When a grouse or partridge is lifted, however anxious the man may be to put it into the bag or basket, he must be made to carry it in his hand until cold. On large and thickly-birded moors this may be hardly practicable, and game-panniers, well-ventilated, are used; but nothing will make up for the hand-carrying, by which grouse will keep fresh for many days longer. Never trust to any "grouse-sticks," loops to game-bags, or other such apparatus, from which birds are very often lost.

To preserve game for travelling, place them, if held overnight, in the coolest place possible, but particularly in a dry place; the best way is to suspend them on a line. Put a peppercorn down the gullet, and dust the vent with pepper when being packed. There is a new system broached, very likely to be a good one, viz., the use of coffee, a well-known disinfectant, to be used freely in packing grouse. This holds out a really simple plan, and is quite consistent with the general known properties of coffee.

It is not the object of this little work to give any description of the natural history of game, yet a few

words may be expected on the mysterious diseases of grouse. Placed by his profession in a position which makes such subjects his daily conversation, and continually meeting with the most intelligent sportsmen and game-keepers, the author must frankly confess his utter inability to explain the origin of these epidemical diseases. Besides these opportunities of acquiring information, having from early and general studies a strong bias to the elucidation of all questions connected with physiology, he has yet been perfectly unable to reconcile the conflicting opinions of sportsmen upon this matter. Grouse are found in some years dead and dying in hundreds—well-stocked moors are left with scarcely a breeding stock. On the same moors the black-game are quite healthy—so that feeding in autumn upon corn-stubble, which both kinds do alike, is not likely to be the sole cause, as thought by many. Grouse feed principally on the fragrant young heath-tops; and it has generally been observed that any blight of the heather is followed by disease. This would be quite clear if starvation only ensued, but the new element comes into the question of tapeworm and disease of the liver. Why should a scarcity of food produce tapeworm and diseased liver? and why should such an over-abundance of grouse as existed in the Ayrshire moors in 1853 be followed by the scarcity of 1854? Either black-game are naturally of a more robust constitution, and more adapted for our changeable

climate, by seeking a greater variety of food, which keeps them free from the epidemical diseases to which grouse are subject, or there is some cause yet unknown which periodically devastates the latter, and blasts the hopes of the sportsman. It would appear that grouse do not become diseased by seeking unusual food, but that they seek the unusual food in consequence of the disease. Thus they may be seen to leave their usual haunts and feed on the common haws on hedge-rows, and even to descend to the sea-shore and feed among the sea-ware; but as far as can be judged, the disease exists before the migration. May the questions not be raised, Is there anything in the isolation of the British breed of grouse by which the usual effects of breeding in-and-in are produced? Are the birds too numerous, so as to render the ground foul and unwholesome? or is the mode of shooting such as to kill off the best breeding birds? And in particular, might not an infusion of fresh blood—by introducing the varieties which exist in the mountains of France, Spain, Italy, and other countries—have a beneficial effect? Although differing in some respects, there is a strong opinion, amounting with some naturalists to a certainty, that these foreigners would breed with our grouse; and we have only to look at our domestic poultry to see the benefit of crosses with Cochin-china and other varieties, certainly not more like in outward appearance to our barn-yard fowls than foreign are to

British grouse. It is very probable that the differences between the latter may be climatic; and the suggestion is here hazarded in the hope that some patriotic sportsman may take it up and give it a fair trial, by procuring and turning out a number of foreign grouse on our Scottish wilds. Meanwhile, and with our present knowledge, it seems an impossibility to arrive at the real cause of these diseases. No sooner is the mind satisfied with one explanation than facts equally creditable upset the previous arguments, or are incapable of being reconciled with them. The pecuniary value of grouse moors to this country is too great to allow the question to be treated with indifference. The theory of improvement by cross-breeding with foreign birds is, however, very likely to be a wrong one, and has been less freely asserted since the above remarks were first written. The disease may be an effort of nature to re-establish a just balance where the birds are too numerous. If the gun has not killed what would have fallen to the vermin (trapped off), over-stocking and disease follow. Moors well shot over are always the most healthy, but if wet weather sets in, the gun cannot do its work through the wildness of the birds.

Even supposing that foreign *Tetraones* are so distinct from the subgenus *Lagopus Scoticus* as not to breed with the latter, may it not be better to have on our moors a greater variety of game, so that the same extent of country might easily supply with food an

equal number of birds, without periodical starvation? This would arise from the diversity of food used by the various breeds, while at present one breed only is highly preserved, and, when it fails, all is lost except the much less-prized black-game. Pasture for instance is known to support a greater amount of animal life when fed upon by oxen and sheep, or oxen and horses, than by one kind alone. May it not be worthy of the attention of our landowners to follow up the same rule in stocking their moors? The North American continent possesses many varieties of grouse, and some of these seem adapted for this country—in particular, *Tetrao Richardsonii*, *Tetrao Urophasianellus*, *Tetrao Sabini*, and *Tetrao Franklinii*. All these would undoubtedly breed in this climate, while their food seems equally certain to consist of plants abounding in the Highlands.

BLACK-GAME SHOOTING

Commences upon the twentieth of August, although many of this large breed of grouse, *Tetrao Tetrix* (a much better, as more descriptive, title is that adopted by Swainson, *Lyrurus Tetrix*) fall in mistake for their red congeners before that day arrives. At the very beginning of the season the mode of shooting black-game differs in little from grouse shooting, but they

are to be looked for in soft, swampy, and rushy ground. The habits of the mother (termed the grey-hen, which is much smaller than the male bird, and of mottled colour) in the rearing of her flock, approach nearly to those of the domestic fowl. On being hatched, she leads her brood to some little meadow, such as may often be seen on Highland moors, where a rivulet flows, and which abounds with rushes and long waving grass, the seeds of which constitute their principal food. Her object is to conceal the nest and brood from the male birds, which are polygamous, and are said to destroy the eggs. This is doubtful, however, as after the spring season the male birds, from a period of high courage and of daily combating, become very shy and timid, and retire to thick underwood or fern coverts to moult. At all events, the mother alone performs all the duties of incubation and rearing, laying from six to eight eggs, and leading about her brood with unceasing care—the male birds associating through the summer in small flocks, and keeping themselves quite distinct. This difference in mode of breeding from that of the red-grouse (which pair, the hen laying from six to ten eggs, and both birds attending the young*) creates a corresponding

* Will any naturalist, sportsman, or game-keeper tell the author how many days red-grouse sit on their eggs? It may appear strange to assert, yet he can do so boldly, that no research in books or by personal inquiry has ever obtained him this information. Nay, he has never known any game-keeper or other to even hazard an opinion on the matter.

difference in the mode of shooting black-game. The young birds having been under the unvarying guidance of the grey-hen, and their feeding ground being sequestered, and their food easily obtained within a narrow range, are consequently, while very young, much more easily approached and more dependent upon the mother's care. On a brood being fallen-in with on open ground, they may consequently be all bagged by proper management. This may look rather a harsh and cruel thing to do, but the fact is, that unless you wish to preserve black-game, where the ground is unsuitable for red-grouse, you cannot have both. Black-cocks especially are positive vermin, and will drive the more highly-prized red-grouse off the ground. Besides, although so easily shot at the beginning of the season, black-game, as will be further explained presently, are very shy afterwards, and are far from being likely to be much thinned.

The scent from black-game being very strong, all that is needed at the beginning of the season is to approach the ground slowly, hunting one steady dog, and preparing yourself for rapid action when the birds are made out. At first No. 6 shot will prove effective, but later in the season use No. 4. Many use 6 all through. At the first point the birds will sit close, under the very nose of the dog, the grey-hen being most unwilling to rise, which is rather trying to the nerves of the young sportsman. But let him wait

patiently; he is sure to get easy shots at birds going right out from him. At last the old grey-hen gets up with a prodigious flutter. Take a steady aim at her head alone, make sure she does not escape you, and down she falls with a heavy "thud." Immediately another bird rises, probably the largest and most promising young Lyrurus—down with him in like manner. With a spare gun, or a breech-loader, you may have them all—without these, go on to load as rapidly as you can, no one advancing an inch or lifting the fallen game. Having loaded, advance very slowly, step by step with the steady old dog, and the birds, rising one by one before you, are either brought down, or marked-in individually. They will not fly far, and may be easily made out, unless some peculiarity of the ground favours their escape. Such is the fate of many a brood of black-game; but let this dangerous season be once passed and the sport assumes another aspect. Leaving the flat, sedgy meadows, the grey-hen leads her young to the outskirts of corn-fields, and among thickets of birch and alder, and of that fragrant shrub termed "gall-wood." Here they become partly gregarious; and when they feed upon exposed ground place vigilant sentinels, whom it is almost impossible to deceive. Now a quite different style of shooting must be followed; and in the early morning and in the evening you may get a good few shots by ensconcing yourself in ambush,

getting only sitting shots, however, and not lifting your birds until all is over. But this is poor work, and would not be lawful at all to the genuine sportsman were it still possible fairly to hunt for and kill black-game over dogs, which is now out of the question, beyond the occasional chance of an outlying single young bird. In ambush you must remain perfectly quiet; after firing load rapidly, and again ensconce yourself. In a few minutes birds will likely arrive from fresh quarters to feed, especially if you are near a stubble field. Black-game are said to generally follow the same line of flight, so that where a bird has passed which you have not fired at, it is most probable that you get other shots immediately afterwards.

Another way of following black-game, when become wild, is by beating the coverts. This must be done properly and with great caution. The birds will either sit very close in thick bushes, or slip away to the other end of the covert and be lost. Send in one man only, with a steady old dog, to do the best for you according to circumstances, as no rule can be laid down. At one time black-game will rise from the covert on loud sounding wings, at another you only get a glimpse of them through a bush as they go off in noiseless flight. Keep at all events in advance of the beater; and when the dog points at a bush, send the man round to the far side to beat the bird out from that side and towards you. Take every advan-

tage of open spaces to have free scope in firing, (never, if possible, getting under over-hanging branches,) sending the beater into the thicker parts, where he should beat and shout lustily. Never refuse any fair shots in the hope of getting better, as black-game may often be seen in abundance for a minute or two, and the rest of the covert be found empty. They will fly off from the far end with a steady flight and outstretched necks to some distant shelter across a glen or even an arm of the sea, and for the present be seen no more. If the birds are evidently running before the beater, slip quietly along to the extreme end, or to the first break or "ride" (open passage), and take up your position there, keeping very still, the man beating on towards you. On reaching the open the birds are pretty sure to rise, and good shots to be obtained. When the shooting of grey-hens is restricted, the young sportsman may distinguish the young cocks by the white feathers in their tail, otherwise for a few months the plumage of the young male very much resembles that of the adult female. The large size and dark plumage of the old male bird (which weighs four pounds) readily distinguish him.

One other mode of shooting the black-cock, and one which the author has followed with peculiar zest and success, is "stalking." It is a very common thing in the Highlands to see a cock, black or red-grouse, perch himself on a spot from which he can command a

view all around, and remain there for a considerable period. The red-grouse generally selects a rocky knoll, which can hardly be approached without discovery, and where he sits and crows in triumphant notes. The black-cock's position is more likely to be taken near a covert, or on ground so unequal as to give the stalker a fair chance of approach, provided he use all those arts, and maintain that guard over his conduct which give the interest to stalking, and enhance his triumph. Having observed by a bird's manner that it is likely to keep its post for some time, the first object of the stalker should be to quietly take the bearings of the ground under the bird. Let him observe the run of any water-course or other inequality which will bring him to within forty yards of his quarry, particularly noting the very point at which an uninterrupted shot may be obtained. If the upper ground holds out very superior advantages, let him try that course, but unless these advantages are at least double, let him take the lower course, because birds on the watch always look upwards, (as deer, on the other hand, are said to always look downwards,) and also on rising seldom if ever fly up hill. Having made up his mind, and with both barrels charged with No. 4 green cartridge, the stalker should now pass with an unpurpose-like air out of the bird's sight—it has doubtless been eyeing him all the while—and then rapidly getting into the lowest part of his course, make an immediate advance upon his

adopted line, losing not one moment by the way. Choosing some object already marked, after a pause to recover breath, let him creep onwards to it; and now comes his skill. Many men lose their way in woods and on moors with an ease which is astounding to others who possess, according to phrenologists, a larger development of the organ of LOCALITY.* The stalker rejoicing in this bump will be pretty sure to find himself, through thick and thin, arriving at the mark he aims at—if not, let him look cautiously about, and, above all, make every detour downwards. This is most essential—throwing himself quite under any possible range of the bird's vision, or even where he may shake the branches of trees, the tops of which the bird can see. Again, let him pause to reconnoitre; and when he has at last made out his whereabouts, and the position of the bird, let him cock his gun with the finger slightly pressed on the triggers to prevent the sound of the click, take off his bonnet, and, grasping the gun by the handle, ascend slowly, shoving it before him. On reaching the edge of his shelter—if

* The author, at an early period of life, made very long and wild pedestrian excursions in the Highlands, in company with a relation who was certain to wander himself on every occasion where he was permitted to choose his own way. Not only was he sure to go wrong, but nothing could convince him to the contrary, short of his arriving (not a rare thing) at the point whence he had set out. On one occasion the author lost nearly the whole of an excellent day's shooting through his bag-carrier, despatched for a brace of fresh dogs, utterly losing his way back, where to do so seemed an impossibility. It was impossible to convey to the latter any knowledge of topography, or of the nature of a map!

he has not come right opposite the bird, by error or by it having changed its position—let him quietly draw back without a turn of the head or glance of the eye, submerging, as it were, into the covert, fall back some paces, make the necessary side-movement lower down, and then re-ascend as before. Now he has hit the precise spot, and through some slight opening he looks upon the gallant bird, which frequently, by its disturbed air, seems to fear danger, yet is not resolved from which quarter it should retreat. Gently thrusting the gun forward, and doing everything in a right line, and not sideways, the aim is at last taken, the lyre-tailed Tetrao falls over dead, even before it hears the report which is its knell, and the young sportsman has achieved a feat which he will value in reminiscence beyond the slaughter of countless poults and cheepers on "the fair-stricken field," and all appliances to boot.

In winter black-game perch on trees in great numbers near turnip and stubble fields, and then demand the particular care of the game-keeper. Red-grouse, in autumn, also approach stooks and grain stacks, and many are then shot in a very unfair manner, and taken by other means, to tell all which, albeit well known to the deponent, would be but to increase the evil. Old black-cocks are also fond of perching upon trees where they can see all around, such as on small islands on a lake; and the finest shot the author ever saw taken was in the following way:—While

following other sport on the banks of Loch-Chon, in the west of Perthshire, for which the author's companion was armed with a single-barrelled rifle, and himself with a fowling-piece, two fine black-cocks were seen to perch on a high tree on an island more than a mile to leeward, a brisk breeze blowing. An immediate embarkation was made, and the boat flew before the wind towards the quarry. Now the nerve which can for some minutes retain composure to make a steady shot at a flying object must be pretty strong, the gradual approach with the eye fixed on the birds being most trying; but if this be difficult with a fowling-piece, it is infinitely greater with a rifle. Yet the coolness of the sportsman in question—who always shot with both eyes open, be it marked—was extraordinary. The author was to fire second to give the rifle the better chance, yet his friend allowed the birds to take wing, and not till then raised his rifle and fired, sending the ounce ball right through the shoulder of his bird. This was certainly an extraordinary shot from a light boat dancing on the water, and rapidly progressing. The author was equally successful with his bird, but his shot possessed no greater merit than the distance and height at which it was taken. Many fine shots from the rifle may be had at sitting black-cocks, and better sport in a clear afternoon cannot well be imagined; yet the art and practice of stalking them seems not yet to have met with the attention they deserve.

While writing of remarkable shots, the following anecdote occurs to the author's recollection, and is related as well for its curiousness as to show how fantastically guns will sometimes throw their shot:—Mr Shaw, game-keeper at Drumlanrig (to whom the world is indebted for the discovery of the breeding habits of that valuable fish—the salmon), was shooting grouse one day late in the season. His wadding running done, he loaded with paper, and on firing at a grouse 45 yards out, he was surprised to observe something large fall separately from the bird. On going up he found the bird running about with one wing, the other being as neatly cut off as if amputated with a knife. His shot was No. 4. *

Black-game shooting, like that of grouse, closes on the tenth day of December.

* Mr Shaw is an instance of the truth of the oft-repeated assertion, that pioneers in science and improvements seldom meet their reward. The natural history of the salmon had been a mystery for ages. Among conflicting theories of smolts, parrs, brandlings, fingerlings, and a whole host of provincial terms, the young of the salmon had been a bone of contention to naturalists. Mr Shaw stepped in, and in that truly practical and simple manner, which is at the bottom of all sound philosophies, solved the question. He proved the parr to be a young *Salmo Salar*. Mr Shaw unselfishly published the result of his experiments, when he might have secured by patent a system of artificial salmon-hatching, now so common, and thereby amassed a fortune. Since then, his process has been adopted of forming artificial spawning beds, while Mr Shaw has been assailed in certain quarters because he had given two years as the age at which the young fish generally assume the smolt or "fry" appearance, whereas some do so at one year, which he had not denied, and even yet it is very questionable if any young, *hatched and reared in the open streams*, do so until two years old. However, his name is immortalised in the annals of Natural History.

THE CAPERCAILZIE.

Since the modern system of planting large tracts of the Highland districts with fir trees has begun to re-clothe parts of the country with forests, such as existed in the olden time, when the wild-boar and the wolf haunted our Scottish hills, an attempt has been made to re-introduce at least one animal formerly indigenous. The Wood-grouse, Cock-of-the-Wood, or Capercailzie—*Tetrao Urogallus*—is the largest of the Tetraones of Europe, and is rivalled alone by the bird known to hunters in America as the "prairie turkey," not the "wild turkey," be it observed. The fine American species is now called the Cock-of-the-Plains, *Tetrao Urophasianus* of Bonaparte; and however proud American naturalists may be in adding it to the Fauna of their great continent, it does not surpass in size or beauty of plumage the magnificent bird which, in a few years, it is hoped, will be again abundant among us wherever tracts of fir forests will afford its proper food of cones and young shoots. Until then the Capercailzie will not be a fair object of sport, and it is only mentioned here incidentally. This noble grouse, on being disturbed, usually alights in a tree, and in northern countries they are there shot, certainly not in the most sportsman-like manner. They weigh sometimes as heavy as fifteen pounds; the females, however, being much smaller, and resembling the grey-hen in

general appearance, while the male bird is principally black, marked with glossy-green and grey. The hen lays from eight to sixteen eggs, and in general habits the Capercailzie resembles the Black-cock.

THE PTARMIGAN.

THERE is yet another variety of grouse which may be shortly treated of—the White-grouse, or Ptarmigan, *Tetrao Lagopus*, which dwells amid the rocks, snows, and storms of our highest mountain solitudes. There is something peculiarly interesting in this little bird braving all the terrors of these wintry wilds, voluntarily denying itself the amenities of the milder climate to which one minute's flight downwards from its height among the mists would bring it. There cannot be a finer manifestation of a governing instinct among the lower animals than the fact of the Ptarmigan—by nature an Arctic bird, and in all probability originally introduced into this country by accidental causes—perhaps by a few individuals having been blown over in a gale of wind from Iceland or the hills of Norway—thus finding in altitude that climate which it should possess through dwelling in a higher latitude. True to its original nature, no length of sojourn or number of generations have modified its habits; it remains the same, burrowing in its native

snows, or screening itself from the blast behind a granite boulder, and looking down with contempt upon the smiling landscape outstretched beneath it, and so easily within its reach. Rather smaller than the red-grouse, the Ptarmigan is in summer of a greyish brown, gradually changing as autumn and winter advance to a pure white, but always retaining the grouse marks of well-feathered legs and feet. To lay down rules for the pursuit of this exceptional and interesting bird—even had the writer ever practised it, which he has not, and he writes only from experience of what he does treat, however imperfectly—would be quite uncalled for. Loath to be a means of disturbing this lofty dweller in the wilderness, he gladly takes refuge in what few authors are willing to admit—his ignorance—and substitutes a few lines hastily composed in honour of a bird for which he has ever entertained a peculiar admiration:—

Far up on desert mountains lone—
Where all is rock and cold grey stone,
Save where the hard and glistening snow
Mocks at the noontide's fiercest glow;
Where naught of vegetable life
Can bear the elemental strife;
Nor track of foot, nor sound of wing,
The presence tells of living thing;
Where even the blood of him, whose tread
Climbs the scathed mountain's mist-wreathed head,
Bounds through his frame in unwont play,
As if to warn his steps away—

Yet may be found one creature fair,
To mark that breathing life is there!
The PTARMIGAN—whose kindred race
On Greenland's icy shores we trace,
Or by that Hyperborean bay,
Once hailed as route to far Cathay—
Securely dwells, nor seeks to know
The placid scenes outstretched below;
Where far beneath her cloud-girt nest
The grouse and grey-hen seek their rest.
In vain the seasons come and go—
In vain for her the wild-heaths blow—
In vain fair Spring, with flowery grace,
Would wile her from that barren place;
Summer in vain his glory pours,
Or Autumn opes his golden stores;
In vain fierce Winter's ruthless gale
Would drive her to the sheltered vale.
Oh let her there unharmed remain,
Nor grudge her that remote domain!
Rather rejoice that, unlike man,
The lone but lovely Ptarmigan—
Pleased with her scanty mountain fare,
The open skies and ambient air—
Seems to our earth on purpose sent,
An emblem of sublime content,
To show how beauteous lives have thriven
On naught save penury and Heaven!

PARTRIDGE SHOOTING.

THE partridge is the "bird," *par excellence*, of the low country sportsman, by whom the FIRST OF SEPTEMBER

is looked forward to with somewhat of the same feelings as the Twelfth of August is by the grouse shooter. Somewhat of the feelings only, however, because the First is merely the legal day of opening; and however ardent the sportsman may be, his movements must be regulated very much by the state of the harvest. This is especially the case in Scotland, where too often "Winter, lingering, chills the lap of May," and where the fields are sometimes not ripe for the sickle in September at all. This gives a less enthusiastic character to partridge shooting, whereas on every moor in Scotland and England we know that countless guns are abroad betimes on the Twelfth, and we keenly canvass the chances of success as governed by weather and other causes.

The partridge, *Tetrao Perdix*, is widely scattered over Europe, and is particularly abundant in the British Islands. There is only the one variety, as acknowledged by naturalists, indigenous here, exclusive of the French or Red-legged Partridge, *Perdix Rufa*, which has been introduced into England, and which is the partridge of Scripture. Notwithstanding, the author has repeatedly shot, on cultivated land on the edge of Highland moors, what appeared to him to be a smaller variety than the common; they are shy and cunning, not rising readily, and often running an hundred yards and more before the dogs. This seems to be a distinct species of the bird, not produced by

climate only, because at one place in particular, where this small partridge is readily found, the shores of the Kyles of Bute, the climate is peculiarly genial, and pheasants thrive well.

This bird is lighter than the common partridge, more elongated in shape, and more shy and wary. The legs are long, and of a reddish colour. You may flush them backwards and forwards for hours without getting a shot, unless they be driven into potatoes or turnips. On bare land they may be marked-in distinctly, yet not a trace of them be found on going up with the dogs, escaping by some method unknown in other game. The author first saw them in the year 1845, while shooting with a friend who called them simply "red-legged partridges," and who often spoke of their extraordinary power of disappearing. That they may sit so close as to puzzle the dogs, at the same time retaining their scent, may be inferred from an anecdote related to the author by a gamekeeper, who, shooting in the North, found a covey of partridges disappear in this curious way from before the dogs, and who, making a most minute search, at last found one crouching so closely that he secured it alive. Supposing it to be a cross between the partridge and corn-crake, he took it carefully home alive, but that fell destroyer, the cat, which seems to have a peculiar *penchant* for all pets and curiosities, carried it off. His description of the bird quite agreed with the above,

which is, in all probability, a variety of Perdix not yet classed by naturalists. Should this turn out to be a distinct species of the partridge, it will certainly be a curious fact that it has so long escaped the notice of naturalists, only to be attributed to its cunning and shyness. The coveys are very small in number of birds. Although the existence of this variety of the partridge has been seemingly questioned, so far from the author seeing occasion to withdraw or modify the above, he now (1864) distinctly states that all he has learned by the most diligent inquiry is in favour of its existence. These birds are more cunning and "secretive," to use a not inapt term, than the common partridge, will run any distance before dogs, and if not shot quite dead, will, when wounded, hide themselves in cavities, or any fissure or other place of concealment, almost beyond the power of recovery.

In general, however, the partridge is a plump and well-known bird, which lives entirely on arable lands, where it generally builds its nest quite near to a public foot-path or highway, as if seeking protection rather than obscurity. They pair early in spring, and are very prolific, the hen laying from twelve to twenty eggs, which seems a wise provision against the numerous enemies which would otherwise exterminate the breed. The male bird shares all the toil of rearing the young, which run as soon as hatched, often with part of the shell adhering to them, and are frequently lost in this

early stage by being drowned. The author once counted nearly forty dead young birds within a few yards in a ditch flowing into the Clyde, opposite Hamilton Palace, all which had evidently been destroyed during the heavy rains of the previous night. As already mentioned, it is not his object to enter upon the natural history of game beyond what is likely to be instructive as to their habits and preservation; therefore it may only be stated that the partridge is a most valuable bird to the farmer by destroying immense quantities of wire-worms and other noxious insects. This most farmers are willing to acknowledge, and it can easily be proven by examination of the bird's crop; yet, somehow, the partridge has been ignorantly set down as destructive to grain, although the small amount of damage it can by any possibility inflict upon standing crops is a mere bagatelle to the service it renders in destroying insects of the most injurious character.

While the grain is yet uncut, partridges remain in its safe shelter, or if found out of it, immediately upon being flushed take refuge there. It is, therefore, needless to follow the sport until the grain be almost entirely cut; besides, it is nearly impossible to keep dogs, especially if young, from rushing through the grain—an injury to the farmer which no sportsman should tolerate. The rapid motion of the dog and whisk of his tail shake the grain and do much damage.

Such practices often breed ill-will between sportsmen and farmers, and the latter retaliate in many ways, very often by objecting to the former passing later in the season through potato and turnip fields, when they really do no harm. This and other blunders most young sportsmen—for whose guidance these pages are written—are apt to make through ignorance. Few, if any books on the subject have ever treated of them; but it is the writer's object to teach, however simply, or however superfluously it may appear to old sportsmen, so as to give the beginner such useful knowledge as otherwise he can only acquire through experience. Many young men who know nothing of country matters, would probably deem it less harmful to put a dog through a field of standing grain than for themselves to walk through a field of turnips or potatoes, and most innocently act accordingly. The farmer looks on, perhaps says nothing, but immediately sends in a complaint to the landlord of wilful disregard for and damage to his crops. The author has known a case exactly in point. In partridge shooting never make a hole through a hedge or other fence—go round until you find an opening, and leave every gate as you find it, or shut it if there is apparent need of it being shut. Avoid driving cattle or setting cows galloping about. All these, and other general considerations of the farmer's interests, will greatly increase the pleasure of your sport by raising a kindly feeling between you; and

instead of entering upon a farm half expecting a lingual contest on some former misunderstanding, which breaks sadly upon a day's pleasure, you will in all probability receive such advice and information, beyond even the gamekeeper's immediate knowledge, as will greatly tend to swell the bag before evening. An occasional present of game to the farmers upon whose ground you shoot is a praiseworthy practice.

The general principles in partridge, are similar to those in grouse, shooting. No. 6 shot is the proper size to use. Nine o'clock is soon enough to begin; and the ground should first be hunted round the marches, driving the birds inwards, and trying to break up the coveys. Partridges are much more afraid of the gun than grouse, and, therefore, when they rise wild it is proper that a couple of shots be sent after them, which often has the effect of causing some of the young birds to drop suddenly, or else to leave the covey and take a separate course—they should then be marked-in, and followed up. The rule for singling out a bird to the aim is equally imperative as in grouse shooting. Many more impediments to taking aim will be found in partridge shooting, such as the contiguity of hedges and plantations, which mar the fair sight of the birds, so that in all such cases the bird should be rapidly covered and fired at. They are also often found in patches of whins or furze, and in beech hedges, in all which cases the young sportsman

must quietly and coolly await their rising, which they will likely do singly, and fire at once without a moment's delay. When basking at the roots of hedges, a man should be sent round to the other side to drive them out to the side of the gun.

In general shooting, however, partridges are found in open fields, especially at the beginning of the season, and wheat and barley stubble are their favourite resort. The latter has always been a sure find in the author's experience. When driven thence they generally make for the nearest potato or turnip fields. Pointers are preferable to setters; and good, old, slow dogs will make the largest bag. A dog accustomed to partridges, on entering a field, will rapidly course round the boundaries, experience having taught him that birds are most likely to be found there. This may be permitted in a sagacious old dog, but in regular course the field should be hunted from the leeward in the same manner as a moor for grouse, and, if possible, the old birds should invariably be shot at, so as to thin them off the ground. This is desirable from the fact that old and barren partridges will drive off young and breeding birds from their neighbourhood; and it should therefore be the object of the sportsman to re-stock his ground annually with young birds. Old cocks are particularly obnoxious to younger breeding birds. When the birds are marked into potatoes or turnips—which latter are in Scotland grown in drills similarly to

the former—the dogs should be entered at the leeside and hunted very slowly to windward. The powerful smell of the potato and turnip leaves is destructive to the scent, and the birds are also apt to run rapidly along the drills before the dogs; yet notwithstanding, these fields are considered a safe place to get birds into, from the certainty, that however puzzling they may be to make out at first, yet that they will sit close and afford shots in the end. In some parts of England, Norfolk for example, no dogs but retrievers are used, the sportsmen walking in line across the extensive turnip fields; but somehow this appears an inferior mode of sport. Shooting, as an art and recreation, includes much more than merely killing game, and the pleasure of "hunting," or seeing "hunted," a brace of good dogs, is more than equal to, and of a higher order than, the actual drawing of the trigger; of course with this admission, that game be found and killed in fair numbers. When birds allow you to pass them and then rise and give cross shots, do not forget to take the aim in advance, according to distance and rapidity of flight. This is less needed with the two-eye system of shooting, which keeps the gun moving with the objects. When a bird falls among potatoes or turnips, no time should be lost in lifting it, unless there are insuperable objections to advancing for that purpose. Wounded birds are often lost in such fields, running before the dogs, and their scent being finally lost.

Even in stubble, partridges, when only wounded, will crouch in a furrow and lie so close as with difficulty to be retrieved, especially where the ground is foul with the scent of the covey when ranging while feeding, previously to being disturbed. Their colour so much resembles that of the ground as to cheat the keenest eye. A dog which "seeks-dead" and "roads" partridges well is a great acquisition. Excellent partridge shooting is often to be had on the edge of moorland, when the object should be to break them into the long grass called "bent." From the open character of the ground this is first-rate sport.

When birds are numerous and the lands extensive, markers may be judiciously placed on elevated positions, where they can command a view of the country and watch the birds in their flight. As in grouse shooting, all marked birds should be followed up and perseveringly looked for.

Partridges shift their ground very much with the changes in the weather, and are most difficult to find after a storm. The author once experienced this in a most remarkable manner. On the day after the great storm which occurred in December, 1848, he hunted, with excellent dogs, one of the finest partridge estates in Ayrshire, Rowallan, the property of the Marquis of Hastings. On this estate 20 brace of partridges could easily be killed on a favourable day; yet on that occasion, with the exception of a covey which rose from

among the very stacks of a farmer's yard, not a partridge could be found in either stubble, covert, or fallow. Whether this arose from their lying so close as to deceive the dogs, or from the tremendous wind of the preceding day and night having driven them into some most unusual quarters, must remain a mystery. They had disappeared somehow, bfflaing all the ingenuity of a keeper of great experience, with first-rate dogs to boot. Hares, on the same day, were all out on the stubble, and lying until almost literally kicked up. The weather was clear, and the air purified with the storm, a gentle breeze blowing; altogether, there was something quite tantalising in the completeness with which the birds had made away with themselves. During wet weather partridges are fond of turnip fields and furzy coverts, lying very close. Further on in the season they are often found on the fallows. At all times beech hedges are a favourite resort, and when expected to be found there a man should be sent to the other side to beat the hedge with a stick, as mentioned above. This is one of the most difficult partridge shots, as they fly out diagonally at great speed.

During the middle period of the day partridges approach water-courses, and afterwards are fond of basking in the sun for some hours. They feed early in the morning, again about one o'clock afternoon, and also before dusk; and should not be hunted for at these periods, nor when they begin to call with that

peculiar "juck," "juck," to which they give utterance in the evening. As they are then gathering for the night, they should not be further disturbed. They are partial to the neighbourhood of the field in which they have been reared, and hence the same ground may be advantageously hunted more than once during the day, as the probability is that the birds will have returned to it.

Occasionally when a partridge is struck he ascends, almost perpendicularly, to an extraordinary height in the air—this is called "towering," and seems to be occasioned by the destruction of some nerve of sense, which leaves the bird incapable of self-guidance, and his flight is directed upwards in the blind effort to escape. Some sportsmen consider that this occurs when the bird is shot through the brain, others that it only happens when shot through the liver; the former is the more probable cause, as there seems to be no primary connection between the liver and the power of directing the flight. One thing pretty certain is, that the throat and bill of birds which have towered are found full of blood; the author has never found one instance otherwise. Is the upward flight not an effort to keep down the rising blood? Possibly this rising blood may press upon the optic nerve and produce blindness. Thus the common rook is said to fly perpendicularly upwards, if temporarily deprived of sight, as by the old trick of laying in its

feeding places cones of bird-limed paper, baited with a bit of flesh in the interior at the apex, a puerile but ludicrously cunning, not to say cruel, device. Whatever may be the cause, "towering" is certainly a very curious phenomenon, the bird always falling quite dead. Black-game also tower, but more rarely.

Partridge shooting closes on the first of February.

PHEASANT SHOOTING.

THE Common Pheasant (*Phasianus Colchicus*) has existed in these islands in a semi-wild state for nearly six centuries, so as now to be looked upon in quite the light of an indigenous bird by those unskilled in natural history. Yet here it is by no means quite capable of self-support, and differs from other game in this, that it must be fed in winter, particularly when preserved in any number. In point of fact, the pheasant cannot be strictly said to exist here in a wild state, but rather holds a middle position between domestic poultry and birds which are really *ferœ naturœ*. He is never to be found at any distance from thick coverts, especially such as have a thick undergrowth of brambles and other shelter. In judging, therefore, of coverts, this essential underwood must be looked for by the young sportsman. From this semi-domestic state it also arises, that where pheasants are extensively preserved a large number are raised by the keeper "by

hand," from eggs either taken from wild nests, or laid by birds kept in aviaries, termed "pheasantries." It is said that if the eggs are removed judiciously from the wild nests, one by one as laid, but always leaving the first three or four in the nest, the wild hen will in the end lay eight or ten more eggs than she would otherwise do. This may be questioned; but, if true, is well worthy the notice of keepers, who may thus raise many more birds. In a wild state the hen lays generally about fifteen to twenty eggs, but only eight or ten in a pheasantry, although to this there are curious and great exceptions, up to seventy or eighty eggs. In pheasantries, means should be taken to prevent the eggs being destroyed by the male bird; and, as it is impossible to keep continual watch, the hens should be induced to seek a dark secluded corner, by forming for her an artificial nest covered thinly with straw. Under this straw have a net exactly of mesh wide enough to allow the egg to drop through into a box below, filled with soft seeds or shellings, leaving only a few inches between; the cockbird cannot then reach the egg, which falls uninjured on the soft seeds below, and is safely removed. The propensity of gallinaceous birds in confinement to destroy the eggs seems to be very general. The best domestic fowls under which to hatch pheasants' eggs are of a cross between the barn-door and the game fowl. Bantams are also very good; the former may be entrusted with eight

or nine eggs. On being hatched the hen and brood are placed in a well-roofed coop on a close-shaven grass plot, the hen never being allowed to go at large. The author published, early in 1856—in that excellent newspaper, *The Field*, which all sportsmen should read —very minute directions for the rearing of the young birds, too long for the purpose of an elementary treatise like this. But he may here mention, that great and unceasing attention is necessary; and that when the young birds are not supported by acidulous stimulating food they invariably droop. This may be prevented by regularly giving them crumbs of toasted bread which has been soaked in chamber-lye—a mode of feeding known to very few gamekeepers, the benefit probably arising from some affinity between uric and formic acids, ants being a favourite food of pheasants. Their other food consists principally of chopped eggs, cresses, ants, shelled oats, and maggots. Maggots, however, should be always scoured and purified by being kept for a night in clean river-sand, and never be given fresh from the carrion in which they have been engendered. The poults are turned out when about three months old. A brood is called a "nide."*

Pheasants taken from coverts and placed in aviaries

* The author has seen a cock-pheasant busily engaged in scraping and feeding among sea-ware on the beach, and as this second edition passes through the press, a paragraph has run the round of the London newspapers of a "fine cock-pheasant being seen feeding on the beach near Brighton."

for breeding purposes should be put together not later than January, all the better if sooner. The same may be said of birds introduced to re-stock coverts. The system of raising pheasants by hand, and the precariousness of their general propagation in coverts, owing to wet seasons and other causes, have created quite a trade in eggs and live birds. This is severely reprobated by sportsmen who yet buy them. Were the hens prolific in confinement, all causes of complaint would cease, because it would become a business so to keep them for their produce; but so few eggs being laid, a high price must be charged to remunerate for a whole year's expenses. This gives the poacher great temptation to rob nests in coverts, and renders it difficult to point out a remedy for the pernicious practice. Where battue shooting is not carried on, it will rarely happen that a sufficient stock of pheasants cannot be kept on an estate; and battues, by over-preserving rabbits and pheasants in particular, have done more than any thing else connected with shooting to increase poaching, trafficking in eggs, and other evils which have rendered the game laws obnoxious to non-sportsmen and utilitarians; and perhaps while these miserable apologies for shooting are practised, being as like to real manly sport as slaughtering a fallow-buck is to deer-stalking, it will be in vain to decry the traffic in question.

As already mentioned, pheasants are put into an

aviary for breeding purposes, or into coverts to re-stock them, not later than January or February. For the former there should be one cock to four hens. Hens only one year old are nearly if not quite barren. The male birds should be at least two years old. The variety with the beautiful white ring on the neck are the finest, but they breed indiscriminately. Indeed, the cock-pheasant, being a bold bird, will breed readily with domestic poultry, and even with the grey-hen. The author had the pleasure of preserving a beautiful specimen of the latter hybrid, shot in Ayrshire. It has been asserted that the hybrid of the pheasant and domestic fowl is not barren if bred with the cock-pheasant, and that the progeny revert to the pheasant type, but are finer and more prolific birds; this is worthy of a trial, but, if true, is contrary to the general laws of animated nature. A white variety of the common pheasant, and the gold and silver species, cannot with propriety be classed among our birds of game. Some common pheasants are of a buff colour. Pied pheasants, which some admire, are merely birds having disease of the skin, and should invariably be shot off, as the disease, although cuticular, must affect (or be produced by the disorder of) the internal constitution.

In pheasant shooting two varieties of the dog, not already treated of, are used—the cocker or spaniel, and the retriever. Both may be used with advantage in other kinds of shooting, the retriever being invaluable,

and far too little employed by sportsmen. The retriever, as his name implies, is simply any dog which recovers and fetches game when killed, as some pointers and setters do by nature, while others of these varieties are so taught, especially on the Continent. This is an accomplishment, however, these breeds are much better without. But a proper retriever should be a powerful dog, patient, and quite under command, and never leaving your foot until told to do so. The Irish and Tweedside water spaniels make good retrievers, but want power, to secure which a cross with a genuine Newfoundland dog is recommended. A perfect retriever must possess a good nose, strength, and steadiness, and must take to water freely—acquire these qualities by any manner of breeding whatever. He must be soft-mouthed, *i.e.*, he must not injure game while carrying, but, like Izaak Walton with the frog, use them as though he loved them. The produce of a strong Newfoundland dog with a gentle-tempered setter slut is as good as can possibly be advised. Such will both hunt covert well, doing quietly the work of a dozen noisy boys, and retrieve wounded and dead game successfully through goodness of nose derived from the dam. But as good and bad qualities in dogs are hereditary, the young sportsman need not pay particular attention as to how the good qualities have been obtained by crossing, provided that they are there, and cannot do better than purchase the progeny

of proved parents, regardless of the breed—this being quite a different thing from setters or pointers, which have a certain specific and instinctive work to do, independent of general sagacity. Retrievers are seldom thoroughly trained until two years old; they cannot be broken-in at once like the pointer—hence the best are those which have followed a keeper's steps from puppy-hood, and their price is high when perfect in all their parts. In fact, no dog is so valuable to the sportsman, yet, notwithstanding, they are not used to nearly the extent they deserve. A retriever saves time, game, money for beaters, and also saves labour in trapping, by recovering dead game which would otherwise be lost and serve for food for all sorts of running vermin, which are thus drawn into ground where retrievers are not used.

The "spaniel," "springer," and "cocker," are terms for varieties of the dog according to size and appearance, but perhaps all of the same stock. They may be called diminutive setters, which they much resemble in appearance. The best breed is the Clumber spaniel, which is usually white in colour, marked with large lemon spots. They are larger than the cocker, and should always be mute, hunting close, and examining strictly every nook and corner, and if possible should be trained to go "down to shot." They are used in all kinds of covert shooting, and sometimes may be brought judiciously into play for grouse, when they

sit very close on bad-scenting days. Our little staunch friend, the common terrier, may do much of what the best cockers are capable; and some good breeds of the Skye terrier (not the insignificant and half-idiotic wretches now sold as such, and which are mere lap-dogs) will do all that spaniels can, even to retrieving. The genuine Scottish terrier, a taller dog than the Skye, and now seldom to be met with, makes an excellent covert dog, especially for rabbits, which it pursues with great cunning and perseverance.

Pheasant shooting opens on the first of October. It is seldom that the coverts are then searched for them, the leaves and underwood being as yet too thick. What birds fall before the gun early in October are generally found in turnips and stubble near coverts. Many sportsmen consider a pheasant the most easily killed of all birds, from its size and heavy flight—yet this is hardly correct. A pheasant certainly does rise slowly, but it continues to do so to a very considerable elevation, and, besides, spreads out its tail broadly, and in such a manner that the young sportsman is apt to be deceived as to the position of the body of the bird, and from both these causes fires too low. A pheasant rising to a great height, and hence called a "rocketer," is, therefore, a hard bird to bring down, and it is next to impossible to hit him with a gun having much crook in the stock. Grouse and partridges generally rise to a certain height, and then

go off more horizontally, but the steady ascent of the pheasant renders it proper to fire at the head only, and then any common size of shot, from 4 to 6, will readily bring them down. As they always fall diagonally, with a wavy motion of the tail, it is hardly possible to know when they are killed dead; and as a winged pheasant will run quicker than a man through covert, not a moment should be lost in sending a dog after a fallen bird. When searching for pheasants in fields, near coverts, always hunt outwards from the covert, whatever may be the direction of the wind, otherwise the birds will run in on your approach. Either pointers or setters may be used, but it spoils any but very old dogs to allow them to enter the covert, where even when they do find, you cannot make out, if the underwood be thick, where the point is. Pheasants are most readily found in the open fields in the afternoon.

"Covert shooting" is the term applied to the sport of driving game of all kinds out of the woods or coverts, the sportsman being placed either on the outskirts, or in very large woods at open passages called "rides," which are made through the woods for that purpose. A number of beaters, each armed with a stout stick, march in line through the covert, beating the bushes, and enlivening the air with cries of "Cock-cock," "Hey-cock," with such variations as may happen to strike the mind of the more imaginative youth, who is

above mere routine. It is customary for one gun, generally the head keeper or a practised shot, to accompany and direct the beaters. The game, disturbed by the steady advance of the beaters, run forwards or to the sides, and, when seen, are signalled to the sportsman by cries of "Mark, cock," "mark, rabbit," and so on, or by the warning cry that the bird gone off is a hen pheasant—"Ware hen, ware hen." When a shot is fired, all the beaters stop until commanded again to go on, and on no account must one beater advance before the others. The sportsmen, meantime, when on the outskirts, and not placed at rides, advance with the beaters, but keeping up the relative distance before them according to circumstances, in general about 50 yards, making no noise which may deter the game from leaving their shelter. When placed at a ride, the position should be maintained until the very last yard of brushwood be beaten, as it will often happen that game, pheasants especially, when so driven, will squat in the last bush and not leave its protection until very hard pressed. The same rule applies to the termination of a narrow covert, to which one gun should proceed when the beaters approach to within 150 yards of it, and where pheasants will often lie on the extreme verge, being most reluctant to rise from their final shelter. Every bush and cover of any kind should at these places be searched most carefully, as pheasants run so low and

so cunningly as to gain unseen little nooks and hollows, where they lie close. The author has not unfrequently, even while the thing appeared to be correctly done, seen pheasants rise from the extreme end of a covert, after the sportsmen had stood for some minutes, within two yards of them, conversing upon their surprise at finding the covert "blank," the discussion receiving a sudden solution by the sonorous sound of uprising wings. After the coverts are beaten, all the neighbouring hedges and clumps of bushes and brambles should be searched.

It is customary to shoot cock-pheasants only, and to impose a fine upon the sportsmen who break this rule, the money being escheated to the head keeper, or applied to defray the expenses of a dinner at the end of the season when shootings are rented by a party of gentlemen. This rule is very frequently overstretched. It should not be forgotten that the desired end may be frustrated by having too many hens, as well as by having too few, and in whatever way the disproportion of sexes is caused, the result—reduction in increase—is the same. If the cocks are continually killed down, few male birds will arrive at that complete maturity so essential to producing a healthy stock. On the other hand, if the hens are continually spared, they will not only grow out of proportion to the number of cocks, but the aged hens will beat off the two and three year old birds. There is a well

ascertained fact, that the further polygamy is carried, the fewer males are produced. Very old hens should certainly be destroyed. The most prolific are the two and three year old birds. Hens rise very gently and equably compared to cocks, which beat the air noisily and irregularly when taking wing. When the hen first begins to lay, she drops six or seven unproductive eggs promiscuously through the woods. These eggs are often picked up and sold; this may explain to the uninitiated why bought eggs so very often prove unproductive. There are various modes of feeding pheasants, so as to prevent the grain being picked up by other birds. The most simple is to feed them at regular hours, to which they will soon learn to attend. All pheasant preserves should have sheltering underwood, and there is no plant for the purpose equal to the rhododendron. Pheasant shooting closes on the first of February.

WOODCOCK SHOOTING.

THE Woodcock (*Scolopax Rusticola*) is a bird of passage, and is found widely spread over the world. They are well known by their long snipe-like bill, being in fact the largest of the genus to which snipes belong, but differing from them very much in their resorts, preferring thickets and woods, whence their name is derived. Their principal breeding habitat is Norway, but numbers undoubtedly breed in this country, and

these are apparently on the increase. In Perthshire, during the breeding season, the author has often admired their continued flight, by way of exercise, during the long and lovely "gloamings" of the North. The first immigration from the Continent generally occurs in October, during moonlight, and with an easterly wind. On their arrival they are often found on the coast in considerable numbers, termed in Ireland "wisps," and are then thin and weak, and are easily killed. On the west coast of Scotland they are to be found out on the heather, but as the season advances they take to the woods, and become solitary. Along burn-sides, among thick patches of heather, or in thick coverts, they lurk during sunshine, being semi-nocturnal in their habits. The best woodcock shooting is to be found in Ireland. No bird is more irregular in its habits than the woodcock—one day flying slowly and to a short distance—the next going right away to seek a distant shelter. This very uncertainty and solitariness give great zest to his pursuit, and a "cock" is spoken of at the termination of a day's sport as something of peculiar interest, not lessened by its delicacy as an article of food. To furnish an idea of the irregularity of these habits, the author may mention a circumstance within his own knowledge. A sportsman—a crack shot—killed, in one season, in the Island of Mull, one of the Hebrides, 199 couple of woodcocks. Resolved to make out the 200 couple, he continued to beat for them for a whole

succeeding fortnight without getting another shot, and left the island with his purpose unaccomplished! As spring approaches and during frost they again draw towards the coasts, and are much followed after when the season has closed with other game, it being lawful to shoot them during any period of the year to which the Government license extends. February is a good month for this sport on the west coast and in the Hebrides. There is a common belief that woodcocks, snipes, ducks, and rabbits are not strictly within the protection of the game laws, but this is a mistake. The pursuit of none of these can be followed by unlicensed persons without infringing the game laws, with the following exceptions. Farmers or warreners may kill rabbits on their own lands, and with permission from their landlord. Ducks may be killed within tide-mark, but snipes and woodcocks are closely protected, with the curious exception that the latter may be lawfully taken in horse-hair nooses. "Springes to catch woodcocks," as old Polonius says, may be set by any unlicensed person, subject of course to the law of trespass. It would be in vain to point out to the young sportsman any one method of pursuing cock shooting. It is quite similar to other covert shooting with beaters or dogs. When struck, they are easily brought down, and No. 7 shot is the best size. It is needless to attempt to make further remarks, where no guidance can really be given, and where the practice

of one day may be diametrically opposed to that necessary on the very next. The coverts must be beaten in the usual manner, and the birds, when not killed at the first rise, followed up according to circumstances.

SNIPE SHOOTING

NATURALLY follows that of the woodcock, but is more amenable to rule. There are three common varieties of the snipe in this country. The common snipe, or Heatherbleater, (*Scolopax Gallinago,*) is that found most plentifully. Then there is the eccentric little Jack-snipe, (*S. Gallinula,*) and the Great or Double Snipe, (*S. Major.*) All three are migratory, and their general habits are similar. Other rare varieties are occasionally to be met with. The common snipe breeds with us to a limited extent; and in very dry weather in July and August may be found congregated in large numbers on marshes and water-runs, near extensive moorish uplands. The author once rented a small moor, Peelhill, in Avondale, Lanarkshire, where in dry weather in August he has seen hundreds of snipes rise at the report of his gun from the quagmire borders of a little tarn, termed Loch Gett. Their habits seemed altered by their numbers, displaying all the usual restlessness and watchfulness of birds in large flocks. Outlying single birds in the immediate

neighbourhood of a few yards sat to points as usual, but the discharge of a gun on the edge of the sheet of water sent the whole of the flock a-wing, uttering shrill cries. They were undoubtedly the old birds which had bred in the boundless surrounding moors, accompanied by their young, and driven by the drought to the nearest piece of water and marshy ground. The author certainly there saw in one week as many snipes as most sportsmen in Scotland do during a whole lifetime.

The popular belief that a snipe makes the most difficult of all shots, has arisen from its comparative smallness, its sudden rise, and swift, corkscrew flight. When shooting snipe over dogs, the best modes of killing them may be reduced, generally, to two. These two are, either to fire the moment the snipe rises, or to give it time to get over the tortuous and resume the direct flight. Thus extremes meet, and one man is a crack shot at snipe for being very quick, and another quite as crack for being very slow. One of the latter caste managed thus:—Carrying his gun over his shoulder, in the other hand he held between finger and thumb a pinch of snuff. A snipe rises; with due deliberation and emphasis he inhales into each nostril the titillating grains; down from the shoulder comes the deadly tube; it is levelled, fired, and Scolopax is done for. Wonderful analogy discovered by this original-thinking philosopher between the period necessary to take snuff with full enjoyment, and the

mode of flight of the poor heatherbleater! This particular mode, first direct, then tortuously, and finally direct again, may be called the normal flight of snipe, when they sit close, as in warm, dull weather. During frost their flight is much more rapid, requiring instantaneous action on the part of the sportsman. In blowy weather they fly more slowly, and usually face the wind—so that it is quite common to hunt down wind, against all general rules in hunting for other game—but the aim is perhaps more difficult then than at any other time, and must be steadily taken. No. 8 is the best size of shot, with a light charge of powder to prevent undue scattering. It is not to be supposed, however, that the snipe is very easily brought down, like the woodcock. Having a great expanse of wing, it flies easily, and unless winged or struck on the head, a snipe will fly a considerable distance after receiving a body-shot. They are easily marked-in on open ground, flying high before settling down, and seldom going far off. They run, however, after alighting, and the author cannot call to recollection a single instance where he found a snipe exactly where it was supposed to settle. With a steady dog, coolness, and due attention to the above remarks, the young sportsman may readily become a good snipe shot, and having once got over the belief in its difficulty, will find it quite as easy as any other; certainly very much more so than pheasants or grouse late in the season. The Double

and Jack Snipes call for little notice. The author has, during several hours, crossed an extensive level moor in Renfrewshire, in pursuit of the former, without obtaining a shot—the birds rising as regularly about eighty yards out as if at the word of command. This is unusual, however. Their general habits are solitary and shy, and they are easily killed. As for Master Jack, he is such a queer little elf, that were it not for the delicacy of his flesh, he might be let alone altogether. Now squatting close, anon going away as slovenly as an owl, then a run, and again a flight, escaping your shot unless you use "dust," it is only after you have acquired a thorough contempt for him, by reason of his mean and artful dodging, that you become suddenly impressed with a sense of his power to come out strong under difficulties, and you see him go off like an arrow and leave you wondering at your slowness in not dispatching him in the first instance, while yet in his original simplicity. And then only consider his diminutiveness! Wrens and humming-birds! To see a youth of six feet in his Shetlands, attended by a hirsute keeper, hunting a dewlapped old pointer, a bag-carrier hovering in the wake, not to mention a retriever of the breed termed Newfoundland, all enticed into pursuit of a feathered biped whose weight in the scale would be overborne by five half-pence of Her Majesty's coin in copper! Turn aside at once and seek a nobler prey.

WILD-DUCK SHOOTING

MAY be classed generally into three kinds—that of the young birds, termed "flappers;" of the old birds on fresh-water lakes and streams; and of the latter, with their numerous congeners, on the sea-coast and estuaries of our large rivers.

Flapper shooting begins in Scotland about 20th July, a few days sooner or later, according to the state of the weather during the laying season. They are found on all water-courses and marshes where wild-ducks breed, or among reeds on lakes; for the latter sport a boat being necessary. During dry weather they are easily found on mosses, being then confined by their aquatic habits to the wettest part of the ground; but during rainy weather they spread widely, and to find them is often a laborious task. At all times you must search for them with a good, bold, but close-ranging retriever, or a steady old setter. When very young they are readily killed, but when full-feathered they rise rapidly, and afford fine and not too easy shots. The favourite size of No. 6 shot will be found by far the best; indeed, it is difficult to say for what kind of shooting it is not the best. From a boat and among reeds, flappers are easily found and killed. When old enough to rise freely their ascent is rapid and continuous, so that the same style of shooting as at a rising pheasant should be practised, aiming at the head only. While shooting

grouse in August, wild-ducks are frequently met with in moss-holes, and they then rise with great quickness, and their flight being so different from that of grouse, to which the hand and eye are for the time accustomed, they are therefore very likely to escape. Firing high will, however, compensate the rapid ascent and error of the eye, and bring them down; but as they carry off a considerable shot, a bird which goes away apparently unstruck should be carefully watched and marked-in. The smaller *anatidæ*, such as Teal, rise almost perpendicularly, with their heads erect, turning at the same time as it were on their axis, so as to render the aim somewhat puzzling. A cool, deliberate, and high shot will alone bring them down, the more so that they are small in size, and if struck by only one or two pellets their strength will carry them off.

Old ducks may be followed with success during frost upon running streams, to which they betake themselves when the marshes and ponds are clothed in thick-ribbed ice. Rivers with high banks are the best for this sport, where you can approach the birds unseen, and get excellent shots as they rise. All this kind of sport is, however, uncertain and desultory. No. 4 is a good size of shot, if No. 6 is not still preferred, and for far shots wire-cartridges may be used to great advantage. A retriever is of course indispensable, but he must be thoroughly under control and kept close in; and it is only on few places, such as where a stream divides and

forms islands among which the ducks may lurk, that they require a dog to put them up. The approach within shooting distance will be found the greatest obstacle to good sport, and great wariness and a knowledge of the river's windings, and of the elevation of the banks, are required to get shots at all.

On large sheets of water and on estuaries, as well as on the sea, duck shooting with common fowling-pieces is practised most successfully from a sailing boat during a fine steady breeze. On the Clyde, below Dumbarton Castle, there extends for some miles a range of banks, on which a long green grass with sweet orange-coloured roots grows abundantly. This sweet root is a favourite food of the various tribes of ducks, which consequently congregate on that part of the river in countless numbers. Punt-gun shooting, as practised in England, is here unknown, the professional shooters, who are very few in number, using single-barrelled guns of moderate weight and calibre, and lying out on the banks at dusk, morning and evening, when the tide suits, bring down the birds flying overhead. But this is dull work and rather confusing to a tyro, as the author was when, while yet a very small stripling, he was taken out to the bank by Malcolm Macrae, that prince of rowers, scullers, and duck-shooters, under whose tutelage he made his first essay, and bagged a widgeon with a pride and pleasure he has since seldom known in shooting. He cannot readily forget that when Macrae

landed on the bank, and desired him to scull the boat up the stream to disturb the birds and send them flying downwards, how he sailed in the darkness into the midst of what seemed floating sea-ware, which suddenly rose all around with dreadful clamour, so startling and bewildering to his tender nerves as to render him for the nonce incapable of action. Then the whole air suddenly became vocal with the shrill and warning cry of the curlew, the whistle of the widgeon, the scream of the lesser black-legged ducks, (*Scottice*, "*Shinnan*") mingled with the deeper "quack," "quack," of the true or moss duck, (*Anas Boschas*), while the motion of their pinions seemed to fill up the interstices of sound and make the whole air vibratory and tremulous with their passage. Half in fear and trembling, the very young sportsman let bang his little single 20 gauge (what stories could he not tell of that gun, of what it did, and what it did not!) at a flock of something flying past; he heard, literally, the shot rattling, like pease thrown against a barn door, upon their quill feathers, and with a long, sloping fall one of the something came down, proving to be, oh, such a widgeon! But the mischief was done, the birds were not properly managed, and the morning's sport was lost.

During clear weather, with a steady breeze, it has been the author's lot, however, to enjoy excellent shooting at the same place and under the same guid-

ance. Macrae is a skilful boatman, and understands as well as any man how to circumvent his game. Running down with a flowing sail upon a large flock of floating birds, which when raised usually fly to windward, you may get shots as they pass, but the principal object is to separate the birds. If two or three are seen to detach themselves from the main body, pursue them at once, gaining their weathergage. If they have flown near to the shore, their chance of being bagged is greatly increased. Not showing as much as a finger outside of the gunwale of the boat, run steadily down upon them. Unwilling to fly over the land, the birds will permit your near approach, and when they do rise will fly outwards, giving beautiful shots, often right and left. Cartridges and No. 3 shot will be found the most effective, the winter plumage being thick and not easily penetrated. It is proper to state that the ducks to be found on the Clyde are principally of the less valuable kinds, and the Barnacle geese have become much scarcer of late years. The author has shot there the beautiful pintail (*Anas Acuta*). The wild swan is a winter visitor. It is a remarkable but undoubted fact, that ducks will not sit well on the Clyde, here nearly three miles broad, if snow be lying on the banks!

On moonlight nights good shots may often be had at the duck tribes (especially teal, which fly low) where they pass over narrow necks of land on their

way to and from their feeding-ground. They may also be successfully laid in wait for at favourite places of resort; and on the banks of fresh water lakes it is not uncommon to build huts or other places of concealment, whence the gunner—not sportsman—fires forth his volley of large shot upon the unsuspecting palmipedes.

Punt-shooting, with a large staunchion-gun, has been reduced to rule in the elaborate work of Colonel Hawker. It is very questionable, indeed, if this *quasi* sport would ever have been much practised, except for market purposes, but for the Colonel's writings. Himself an enthusiast, and of an original turn of mind, having a method of his own in everything, he had the power of conveying a portion of his enthusiasm to his readers. But a few nights on a damp raft—for the punt is little better—poling like a bargeman among oozy tide-ways, half mud and half water, are quite enough for all but the most energetic and persevering sportsman. Yet Colonel Hawker was a great man, and his mind was evidently of that acute class which achieves success and celebrity in whatever branch of human research it is directed to. The author has recently invented and patented a breech-loading punt gun, of a very strong and inexpensive description, taking the charge of powder and shot into a thick and solid iron breech, and thus getting rid of the usual tremendous recoil.

MISCELLANEOUS BIRDS.

ALTHOUGH seldom forming distinct objects of pursuit, there are several kinds of birds at which the British sportsman does not disdain to take a passing shot. Such are the Curlew, Whimbrel, Golden-plover, whose flesh is excellent, Coot, Water-hen, Rock and Wood Pigeon, Heron, and Green Plover or "Pease-weep." It is beyond the intention of this simple treatise to discourse upon the little niceties of mode in following these minor objects of sport. Golden-plovers when rising wild should be fired at from any distance—these birds having a fatal propensity to return, as if impelled by an irresistible curiosity to the place whence the report proceeds, thus affording an easy and destructive shot from the second barrel. The wood pigeon, Cushat, is a noble bird, but is most damaging to the farmer, from its mode of feeding and its voracious appetite. In autumn it spreads itself upon laid corn, which it literally threshes out with its powerful wings, beating out twenty times the number of grains it consumes. It is also very severe upon beans and pease, and is said to injure turnips by pecking deep holes through the skin. From all these causes it is considered an enemy to the farmer. The common way of destroying them is by lying in ambush under their roost-trees in the evening, shooting them on the branches as they alight. Beech mast is a favourite food of the Cushat,

as are also the seeds of the butter-cup; and in the months of July and August the young pigeons may readily be found in fields where this plant is abundant, where they will sit until a fair shot is afforded, being not so wild as the older birds. Rock pigeons are found in the caves on the coasts of Britain and Ireland, and are killed as they dart out on being disturbed from the entrance to the cave.

Herons are quick of eye, but dull of ear. It is in vain to follow them in open ground, but when one is observed to alight behind a rock, it is easy to steal closely on him without alarm. The Coot is rather of a pugnacious character, and drives other aquatic birds from the sheet of water on which they breed. They are, therefore, so far vermin, and should not be preserved unless no other birds frequent the same pond. The Curlew and Whimbrel are most annoying birds, their extreme watchfulness often frustrating the results of a weary hour's travel in pursuit of game. The Pease-weep is a most harmless and graceful bird. Its mode of flight, however, often tempts a shot—most frequently an unsuccessful one, the body of the bird being small, and its flight uncertain. The eggs are finely flavoured, and in the season are gathered largely for the London market, where they fetch a high price. With the true spirit of adulteration, which reaches depths beyond even the sounding line of Dr Hassall, the eggs of other birds are

painted to resemble those of the poor harmless Peaseweep (*Anglicé "Pe-wit"*).

Rook shooting (of the branchers in May) is a favourite amusement with young sportsmen. Properly done, a small rifle is the right instrument. When it is desirable to kill a great number, use large shot, 3 or 4, which knocks them over at once, as, if not upset by the shock of the shot, the claws contract round the twig they are perched upon, and maintain a grasp for several hours after the bird is dead. The question of whether or not rooks are injurious to crops seems likely to be continued for ever. The truth lies on both sides—they are and they are not. They will, in a few hours, root up every grub in a field, and have a wonderful power of detecting, from a great height, ground so polluted, but at other times they feed on seed-wheat and potatoes. If this be the true state of the matter the remedy is self-evident. Let the farmer protect his ground at the right season, and at other times leave the sooty game to follow the plough in security. Rooks, feeding in flocks, are easily seen and scared, unlike the cushat, which works mischief in unsuspected places.

ROE-DEER SHOOTING.

THE author may here incidentally remark, that he has no pretensions to write one line on deer-stalking,

although it would be easy enough to compile a chapter thereon. It is not every one who has been to Corinth, and deer-stalking is caviare to the million. The graceful Roe, however, comes within his province. This small deer (*Cervus Capreolus*), is largely on the increase in Scotland, owing to the extent of recent plantations.* The rutting season is during the last and first weeks of October and November. The female brings forth in April or early in May, producing two and sometimes three fawns, which she conceals with great care and ingenuity. They live about twelve years, and a good-sized roe weighs about 70 lbs. Like other deer they shed their horns annually, and the mature buck has a very graceful head. The following are the dimensions of a pair of horns in the author's possession, and which are the largest he has ever seen. They once adorned the head of a large roebuck which frequented the woods around Culzean Castle, Ayrshire, the seat of the Marquis of Ailsa. The horns spread into three branches,—extreme length, 10 inches; width between extreme points, 6¼ inches. Their symmetry is remarkable. These graceful animals usually lie on the windward side of coverts, upon dry spots, within 20 or 30 yards of their extreme verge. When disturbed, they generally take a regular line of flight, and this being known, is fatal to many of them, the guns being

* In the woods around Inveraray Castle, the seat of the Duke of Argyll, fourteen hundred roe-deer were shot in four years!

posted on the route. They possess a peculiar habit, in common with the elephant, of slipping quietly off this route when suspicious of danger, and retracing their steps, invariably running round a knoll, never by level ground. In other tactics of escape, the similarity with those of the elephant is truly surprising, such as dipping quietly into hollow places, and out-manœuvring the beaters.

Roe-deer go to and fro from covert to covert, so that they cannot always be found even where closely protected. In the night time they pass unseen to far distant places of shelter. The sport of roe-deer shooting is practised with a common fowling-piece. The best size of shot is No. 1. The guns are placed at the wonted passes of the deer, and the woods should be *slowly* beaten by one or two men and dogs. The greatest possible quietness on the part of the concealed sportsman is necessary to ensure success. If the roe pass rapidly, giving no prospect of a shot, a slight cough, cry, or whistle, without movement of a limb, will cause the timid animal to pause for a moment, to master the nature of the new danger. A shot is then easily taken, aiming behind the shoulder. When killed, the carcase should be immediately gralloched. The venison is in much lower repute than it deserves, and is very easy of digestion. When lean it may be used in soups, but if in good condition few kinds of food are more grateful to a weak stomach. The flesh

of the roe is at its best about the age of eighteen months; that of the barren doe is truly excellent. They are considered very injurious to young trees.

When the ground is suitable—small coverts with wide intervening open ground—coursing the roebuck is exciting sport. The best hounds alone are equal to them in speed. The roe runs without apparent effort, but its rapid bounds carry it along with great smoothness and quickness. More extended experience, since writing the first edition, has convinced the author that a light rifle is the true weapon for shooting roe-deer, which display great intelligence in keeping just beyond the range of a fowling-piece. Caution must be used, however, in firing towards the beaters.

A FEW WORDS ON TRAPPING.

SPORTSMEN may occasionally find it useful to have some knowledge of trapping—in which there is very great room for the display of ingenuity. Practice alone will give proficiency; and a few lessons, by going the rounds with an experienced trapper, will teach the young sportsman more in a week than he would learn by reading in a year. A few remarks on the leading principles of trapping may, however, not be out of place, premising that the author does not intend to give more than an outline of the art.

Trapping is the mainstay of preservation. The following list of vermin destroyed in three years by the famous keeper and manager of sporting estates, Mr D. Scott, on Glengarry, Inverness-shire, not only shows the description, but also the proportion, of the vermin usually found in Highland districts:—

11	Foxes.
198	Wild Cats.
246	Martin Cats.
106	Polecats.
801	Stoats and Weasels.
67	Badgers.
48	Otters.
78	House Cats, going wild.
27	White-tailed Sea Eagles.
15	Golden Eagles.
18	Ospreys, or Fishing Eagles.
98	Blue Hawks, or Peregrine Falcons.
7	Orange-legged Falcons.
211	Hobby Hawks.
75	Kites, or Salmon-tailed Gleds.
5	Marsh Harriers, or Yellow-legged Hawks.
63	Gos-Hawks.
285	Common Buzzards.
371	Rough-legged Buzzards.
8	Honey Buzzards.
462	Kestrels, or Red Hawks.
78	Merlin Hawks.
88	Hen Harriers, or Ring-tailed Hawks.
6	Jer-Falcon toe-feathered Hawks.
9	Ash Coloured, or Long Blue-tailed Hawks.
1481	Hooded or Carrion Crows.
475	Ravens.
85	Horned Owls.
71	Common Fern Owls.
8	Golden Owls.
8	Magpies.

The increase of game after this wholesale destruction of vermin was proportionate. It is customary to allow gamekeepers head-money for vermin in addition to wages, and it is money well spent. Foxes will not destroy game to any appreciable extent where they can get rabbits. Hedgehogs are supposed to destroy eggs, but many experienced sportsmen deny this. The evidence, *pro et con*, is, on the whole, rather against their innocence, and it is well ascertained that they rob poultry-yards of both eggs and chickens. But the following anecdote is decisive. A most intelligent gamekeeper informs the author that he once saw a

hedgehog bring a very young rabbit from its nest, kill it, and suck its blood. The destroyer then went and fetched another young rabbit, which was immediately despatched in a similar manner. The mode of killing was to fix the teeth right upon the mouth and nostrils, which in Scotland is called the "fox's grip," and then to suck the blood from the same wound. This anecdote may be relied upon as genuine and authentic.

House cats run wild, or addicted to hunting, are perhaps the most destructive of all vermin, and are a standing cause of war to the knife between their owners and gamekeepers. It may be a cruel, but yet a timely, hint to observe, that cats whose ears are cropped have no tendency to hunt wild; at least, so say gamekeepers. The author once shot a most powerful domestic cat, but evidently gone quite wild, dislodged from a rabbit burrow, and his very next shot was to kill an immense rat, likewise sprung by the ferret, with the most beautiful rich brown fur on back and sides, and with that on the breast and belly of pure white. Many dogs, cross-bred curs, are most inimical to game, driving them from woods by incessant hunting and yelping. Collies, if permitted, chop young grouse. Owls are harmless on the whole, and the fern-owl, or goatsucker, is quite so. Hooded crows are very bad, robbing nests of their eggs by inserting the closed bill in the egg, and then exerting an opening pressure on the mandibles, so as it were to

wedge on the egg, they fly off to where they find water, and there devour the contents. Why they carry the eggs to water is not known. Jays and magpies should be rigidly kept down. Magpies are cunning and wary, yet may be destroyed by any active game-keeper who will take the trouble to rear a tame one and train it to squeak when desired. So provided, let the keeper conceal himself in a covert, set his bird "a talking," and the wild ones near will shortly come around and afford easy shots. This may be said to fairly turn the poor bird's chattering propensities against itself, but larger and more pretentious bipeds suffer from a love of gossiping as well as the magpie. Stoats and weasels are particularly destructive in the low country. Black-cocks and old birds of any kind may be classed among vermin, in so far as that they beat off younger and more productive birds. Otters very rarely attack other prey than fish, but will take rabbits in their burrows.

It is questionable how far the destruction of the eagle and larger falcons is advisable. These noble birds drive off the smaller and more insidious vermin. The best bait for an eagle is a live white cat, placed within three traps in a triangle. The following hints were the substance of letters by the author of this treatise, published in *The Field* in 1856. The reader will find, in the winter of 1855-6, most instructive letters in that newspaper on vermin trapping.

"In trapping hawks, it is necessary, in the first place, to draw a distinguishing line between birds which strike a living and those which the more readily feed upon a dead prey. The falcon, merlin, and sparrow-hawk are bold game birds, and the art of trapping them is very different from that of taking the buzzard, ringtail, and hen-harrier. The eagle may be rather out of place here among his smaller congeners; and it is enough to state that the best possible bait for him is a live white cat, pegged to the ground so that it may keep its legs moving, and so placed among three spring-traps as to render the capture of the eagle certain when he is striking and killing his quarry. The falcon may be taken in the same manner, using a live pigeon as bait. The sparrow-hawk and merlin may be best taken with a piece of scarlet cloth fastened upon the plate or table of the common spring-trap, or a circular trap (best sizes 5 to 6 inches in diameter, with a spike to be driven into top of pole, and a chain and spike when used otherwise) placed upon the top of a stone or earthern hillock. The sparrow-hawk hunts over the same ground regularly, going his rounds so punctually that, where he is observed to-day, he may confidently be looked for within ten minutes of the same hour to-morrow. Let the trap, baited with red cloth, be placed as above, and he is sure to strike at it. Another excellent plan is to place on an exposed situ-

ation a common wire cage, containing several live larks or other birds, with well-limed twigs on and around the cage. The falcon, sparrow-hawk, and merlin are sure to make a dash at a cage so situated, and get limed.*

"To take the buzzard, ringtail, and hen-harrier, let it be observed that these birds are best taken with a dead bait, and that nothing is better than a rabbit or hare. The mode of trapping lies in the fact that they light upon an elevated spot near the bait to reconnoitre, as it were, before proceeding to feed upon it. Let their hunting-ground be observed, and where no natural hillocks or large stones are found, let the trapper proceed to throw up earthen hillocks, or small cairns of stones; or where wood is to be got handy, let him drive in poles of five to six inches in diameter, height from three to six feet, with a flat top. Upon these let him place some common moss, and leave them for a few days, until the birds have become accustomed to see, and perhaps light upon, these new objects. Then let him place his traps upon them, laying within the distance of a few feet his bait, so that it may be easily seen by the hawk flying over, which will then alight upon the nearest elevation, where the trap is, and be taken. The jaws of all traps should be smooth,

* A very ingenious wire trap has been invented, the top of which, when a hawk strikes at the birds within, shuts, and the marauder is himself encaged—a horizontal division still separating him from his intended prey.

without teeth, and should not come quite close together, but have a little space between, by which the limb caught is prevented from being cut off altogether; and the whole must also be so covered with moss that the hillocks and poles may present the same appearance as they did before the traps were put down. There is no rule for the distance from one another at which the traps should be placed. Much depends upon the nature of the ground; but they need not at all events be within a quarter of a mile of each other, and of course may be much further separate on wild, uncultivated ground. Scotch gamekeepers excel in the art of trapping hawks, and the above is their mode; but no trapper will excel in his art who does not study the habits of the vermin he wishes to destroy."

"The eagle and falcon, I have every reason to believe, are friends to the gamekeeper, by destroying and scaring away other and more bloodthirsty vermin. A few years ago eagles were plenty in Sutherlandshire; and a keeper there, boasting to a well-known naturalist of having trapped eighteen of these noble birds in a certain period, had a new light thrown upon him when a very marked decrease in his grouse was attributed to the real cause. The peregrine banishes the hooded crow from near his nest, and the benefit to the increase of game thereby given may be guessed from the fact that the hooded crow diligently hunts for the nests of game; transfixes an egg upon his beak; invariably, from

some curious reason, carries it off to a pool of water, upon the brink of which he quietly sucks its contents, and then returns for another. At one pool of water in Dumfries-shire upwards of ninety egg-shells were found in the month of May—seventeen being pheasants', and the remainder principally of black-game. This is wholesale destruction compared to grouse being the occasional quarry of the peregrine, whose favourite food is the wild duck and rock-pigeon. The difficulty of trapping the hooded crow, and of holding the raven when trapped, have induced the use of that detestable strychnine, the mere effluvium of which in an apothecary's shop, when making a purchase for a nobleman, so sickened me as to give me a lively horror of it ever since. *Horresco referens.* To those keepers who may be deficient in the knowledge of how to trap the raven and hooded crow effectually, the following may be of use:—

"On the edge of a pool of water or rivulet, sloping into deeper water, let a trap be thus placed and baited. Take a common hen-egg, blow it, and fill it with soft earth. Insert a pin of wood by the side of the egg; thrust the other end of the pin into the bottom of the pool so deeply that the egg is just afloat with the water, at the distance of the trap's length from the brink. Set the trap end on to the egg, covering it neatly with moss, so that the bird uses it as a bridge to reach the egg and gets trapped. Have the trap-chain long, and

the bird is at once quietly drowned and disappears, however slightly caught, and thus does not alarm his friends and neighbours; and every keeper knows how sly vermin become on ground regularly trapped. The raven makes such violent efforts to escape from a trap, that this quiet submerging method is the only sure way to capture him, and not to find that he has been there and disliked his treatment so much as to depart at any sacrifice, leaving a foot or claw behind as his P.P.C. Running vermin are also readily taken in a trap so set; and even when the water is not deep enough to drown a raven, the wetting of his wing feathers weakens his powers of escape.

"I think we must all admit that falcons and merlins do prey occasionally upon grouse and partridges; but do not let us forget their nobility of nature, their ancient renown as the companions and mark of gentlemen, and out of their very speed and courage raise a cry for their destruction—forgetting the more crafty, insatiable, and often invisible prowlers, which are infinitely more inimical to game, and which I verily believe to be kept down by the higher members of the great family of Falconidæ."

To trap running vermin let it always be borne in mind that they hunt along water-courses. Look there for their marks, and set the traps accordingly. For the common steel traps, hang the bait so that the attention of the vermin is withdrawn from the con-

cealed trap, over which it is induced to walk, by forming a little avenue of twigs or stones. Let the traps be always clean, and avoid leaving any scent thereon from your hands. Better still, when once a weasel has been caught—especially a female—let no bait be used, as the effluvium will be sufficiently attractive. For otters, place a common sized trap, attached to a chain and rope, on the edge of a deep pool, where their marks show they are in the habit of leaving the water. To the rope, a yard from the trap, attach a stone or a few pounds of lead. On being caught, the otter instinctively seeks the bottom of the pool, and the weight there drowns him. Have no faith in large traps for these, or in fact for almost any animal, as they will free themselves therefrom at the expense of a limb; whereas the smaller, light trap, with a sufficient chain, is knocked about, but does not give enough of resistance to allow the dismemberment of a limb.

For stoats and weasels an excellent trap is simply constructed of an oblong flat stone, one end resting on the ground, the other supported, in a sloping position, by a slip of wood standing on end. To this upright a diagonal and horizontal piece are attached by notches, forming exactly a figure 4. To the right hand, or inner extremity, of the horizontal limb, attach the bait, (a small bird is suitable,) which when moved causes the fall of the whole fabric, and the weasel is crushed.

These traps are not only cheap and effective, but are not likely to be stolen, and also do not destroy game. They also lure the other vermin to the place when one has been killed, as the weight of the stone presses out an attractive effluvium from the dead weasel.

Should, under any circumstances, strychnine be used to poison vermin, the most efficient measures should be taken to prevent accidents therefrom. The best way is not to use it at all, and no man can be held guiltless who, knowing its fearfully destructive nature, places this deadly poison where there is any possible risk of the loss of life to men or cattle. The eye of the law has been directed to this mode of destroying vermin, and in Scotland it has formed the subject of admonitory proclamations by the Sheriffs of counties. It may not be out of place to mention that camphor is maintained to be an antidote to this poison. When convulsions have destroyed the power of swallowing, camphorated injections may be given, and the patient placed in a camphorated bath. But the rapid action of this drug renders curative measures of little avail, and the only safety is in its entire disuse.

COMPENDIUM.

CARRY a gun within your strength. Have the stock as straight as a broom shank, if you can get your eye to it at all. If you require, on lifting the gun, to dodge your head about to catch the centre of the breech with the eye, the gun is worthless to you, although it may be invaluable to a man of different build.

See that your gun be perfectly clean and free from stoppage at the nipple. N.B.—Carry a nipple-key, with spare nipple, on all occasions.

In loading, invariably charge the barrel farthest from you first, and when one barrel only is to be charged, place the gun so that that barrel is on the outside. This will prevent all mistakes. In loading one barrel, see that the other lock be on half-cock. Use as little shot and as much powder as the gun can carry properly.

For wide guns use coarse-grained powder. In moist weather use high-glazed powder. In wet or blowy weather set the top of your powder flask half a drachm higher. In rainy weather do not shoot at all. *Decrease* your charge of powder with heavy shot, such as 1, 2, or 3; and *increase* the quantity of lead.

TROY *v.* AVOIRDUPOIS.

(It was accidentally omitted in the proper place to state that a very frequent confusion of apothecaries' with imperial avoirdupois weight leads to great mistakes in the charge of gunpowder. In commerce, now-a-days, the word "drachm" is never used except as representing *one-eighth* of the avoirdupois ounce, with perhaps the exception of weighing silk. But the drachm of gunpowder, with sportsmen, is *one-sixteenth* of an ounce. Making allowance for the difference between the two above varieties of weights, the sportsman's drachm is actually still less than *one-half* of the other. In exact terms—of troy grains there are in the sportsman's drachm 27·34375, or, as near as may be, 27⅓ grains. But in the apothecaries' weight there are no less than 60 troy grains in the drachm! In the confusion arising from the above, many sportsmen apply to a pharmaceutical chemist to weigh them out an exact drachm of powder, so as to adjust their charges; and the necessity for these differences being properly understood is well known to sportsmen of experience and editors of sporting periodicals. Gunpowder is never *weighed* for ascertaining the exact charge for a gun, but always *measured* in standard instruments, which may be purchased for a few shillings of any gunmaker. The ounce of shot is the common avoirdupois ounce of commerce; but the little instrument just mentioned is so made as

to give, by measure, the exact weight of shot as well as of powder.)

Place your wadding firmly over the powder, and slackly over the shot. Use tight wadding for a weak-shooting gun, and slacker and thinner wadding for one which scatters.

Never start immediately after breakfast, unless you have to drive to your ground. Active exercise, within less than an hour after the morning meal, will cost you two hours in the afternoon.

In the centre of your shootings, keep a piece of ground undisturbed as a nursery for game. Never beat this, and your stock of game will be maintained.

In all kinds of shooting over dogs, attend to your dogs. Never keep the eye long off them, and trust to them in all cases of doubt, following up a trustworthy animal to the most unlikely places. Always serve a pointing dog. The man who keeps nearest his dogs will make the heaviest bag. Always prefer old dogs to young ones. Walk up quietly to points, and do not get flustered.

Hunt your widest ranging dogs in the forenoon over grouse ground. Slip about over a single steady old dog in the afternoon, among hollows and sheltered nooks. Give your dogs plenty of dry straw for bedding. Have them rubbed down in the evening. See to their feet for cuts and thorns. Give them animal food

when hard wrought on the moors. Altogether, try to bring out their natural sagacity by encouraging and coaxing them, and use the lash as little as possible.

In taking aim keep the body well up, the head erect, the gun close to the shoulder, both eyes fixed on the object. You have already chosen a gun by trying it to the eye, but in shooting there must be no heed taken of the gun at all. *It* will come right to the eye, which is fully occupied with the object. The mere muscular action will be governed by the brain, simultaneously with the aim of the eye; the whole producing that correctness which we call "instinctive," for want of a better term. Read the motto on the title page. The poet is ever the true teacher. A good shot cannot tell how and why he kills.

At long ranges throw your line of sight in advance of a crossing shot, and above one going right out. At long ranges, throw the head over the gun when the object goes to the right; keep the head straight when the object goes to the left; and keep the head most erect when the object goes right out. These three arrangements compensate for distance and speed, by a rule as certain in effect as the sight on a Minié rifle.

If suddenly overcome with fatigue on the moors, lie down on your back on dry heather, for half-an-hour, without moving. Drink cold tea, and avoid spirits as you would poison. Preserve your strength for the afternoon. In walking, allow your body to swing with

the inequality of the ground, and you will lessen your toil by nearly one-half. If your feet become painful and threatened with blisters, shift your stockings, the right to the left, and *vice versa;* this will alter the points of pressure and relieve the skin. Wear thick woollen stockings. *

In every kind of shooting stick to its rules. For the sake of a heavy bag do not condescend to any mean manœuvre, which will spoil your dogs, lower the pleasure of your sport, and get you a name which will cost you many a pleasant invitation to shoot. The true end of shooting is its recreation. The game is but the object to induce exercise. Call on holders of adjoining ground and make pre-arrangements for following wounded game over the marches, etc., etc. Instruct your gamekeepers to co-operate with their neighbours. Avoid injury to the farmers' crops and cattle. Vigilance, circumspection, and perseverance are the royal rules in shooting.

CONCLUSION.

DURING the period in which this treatise, short as it is, was detained in the press, through the author falling

* When a youth, the author was in the custom of making long pedestrian angling excursions, during which he invariably anointed his feet in the morning with a little soft soap, which was a sure preventive to blistering during the longest day's travel.

into bad health, several circumstances connected with guns have occurred worthy of notice.

One of these is the alteration of the Proof Act. By the new regulations the proof test is the same in London and Birmingham; so that unless it be merely for the name of the thing, London-proof barrels have not now the slightest claim to superior safety. In every possible respect the test is exactly equal in both Proof-houses. By the new Act it is also provided that after double barrels are put together and ribbed, they undergo a second proof. This provision gives the greatest possible security against undue tampering with the barrels after first trial, and the purchaser of a gun should see that it bears the mark of this final proof. Beyond this it is impossible by any enactment to provide for greater security to the sportsman.

Another novelty is the rapid introduction of breech-loading firearms. These have been in common use in France for the last fifteen years, and are said to have stood the test of that period. It is yet immature to decide upon their merits. They are strongly advocated as excellent by many sportsmen, but the strength of our powder is so much greater than that of the French or Belgian, that they have still to pass through a severe ordeal before receiving the full confidence of British sportsmen. How long the jointing at the breech end may continue to withstand the tremendous vibrations of our heavy charges, time alone can show. It is far

from the author's wish to attempt giving an *ipse dixit* opinion upon these new arms; his only desire is to place the question before his readers. He will not be the last to give his free adhesion to a movement when there is really an increase of quickness or power.

It is this word, "quickness," on which the whole question hinges. Is this great quickness desirable in sporting as well as in war? And is it quite an improvement to deprive the pursuit of game of those little rests, while loading, to men and dogs, which preserve their strength throughout the day, and add a zest from the incidental conversation during these pauses? In grouse and partridge shooting can the dogs be so handled, after firing and killing, as to render the quickness in loading advisable? Were extermination of game the purpose of the sportsman, the use of a gun which can be loaded in a few seconds would certainly be a desideratum. The author is informed by an experienced sportsman that he can raise a hare from her form, place his cartridge in his gun while she is running, and kill her afterwards.

On the other hand, it may justly be argued that great rapidity of loading is an advantage in many cases, for instance where birds, after long, unavailing pursuit, are suddenly fallen in with. All sportsmen must know what is here meant—the huddling up, as it were, of game in a corner, where only one or two shots can be obtained, and the remainder of the birds

go off before the guns can be reloaded. Such tantalizing incidents must be fresh in the memory of most sportsmen. For the wilder kinds of sport, as duck-shooting, that of rock pigeons on the coast, and of golden plover, rapidity of loading is much to be desired. For woodcock at certain times, when they are found in wisps, breech-loaders will also be in request.

The reader may desire to know something of the formation of this novelty. Instead of being closed behind with a breech, the barrel is an open tube, working on a hinge at the extreme forward end of stock. The false-breech is a solid mass of iron, with the front perpendicular surface of which the breech end of the barrels, when in position for firing, is in close contact. There is a small notch in the top of each barrel. An apparatus below rapidly fixes and unfixes the barrels. The ammunition is made up in cartridges, containing powder, shot, and the means of ignition, all in one. To load the gun, the barrels are removed from their seat, and, playing on the hinge, expose the open breech-ends. Into these the cartridges are placed, and the barrels restored to their seat. A wire connected with a detonating cap in the cartridge comes through the notch in top of barrel, where it receives the blow of the hammer when fired. Of course no powder flask, shot pouch, wadding, caps, or ramrod are used. When fired, the process is re-

peated, only withdrawing the empty shell of the cartridge. Many of these shells are so little injured as to be fit for refilling. The barrels are said to keep wonderfully clean during the hardest day's shooting. One of the very best judges of firearms, a gentleman of scientific attainments in these matters, for whom the author has had the honour to make many guns, writes to him in these terms: "In a few years muzzle-loaders will be, as flint locks are now, in the category of things that were." *Nous verrons.** There has been considerable discussion as to the comparative expense of ammunition for these guns. At present it is certainly dearer, but if the breech-loaders come into common use, the price of cartridges will fall as the demand increases.

* The author has allowed the above to stand as in First Edition. Now, 1864, *nous avons vu*, and breech-loaders are an established fact and the step in scientific progress of the age.

BREECH-LOADERS.

ALTHOUGH it is not probable that any reader of this little book is ignorant of the construction of breech-loading guns in some one or other of their varieties, it may not be an injudicious mode of treating the subject to go back at once to their first principles, and putting the question of, What is a breech-loader? proceed to reply to it.

A breech-loading gun, then, is a weapon giving the exact same results as a muzzle-loader in the object or purpose of its requirements, viz.—to discharge shot of any kind with force and accuracy, but differing from a muzzle-loader in the manner in which the gun is charged, and in several contingencies arising therefrom. This appears to be a fair logical definition of the new weapon, and we may proceed to describe the general distinctive features of the gun upon that definition, and to discuss the question of its comparative merits.

Custom habituates mankind to many imperfections and fallacies which—when, in the course of time, once broken in upon or dispelled by discovery or improvement—are looked back upon with surprise and regret. When we consider the purpose of a gun—that it is

intrinsically a tube of metal through which a projectile is to be driven by the elasticity of a certain gas, and that much of the force of this gas depends upon the exact fitting of the projectile to that tube, or, in other words, upon the absence of windage—one would suppose that it would never have been attempted to insert the projectile by the muzzle at all. It might have been argued: "You have to ram home, by the mere muscular power of your arm, a bullet, or wadding, or other substance; and yet you hope to be able to do this with that substance fitting so tightly, that, when the gunpowder is fired, you expect that the greater part of its strength will not escape between the sides of the projectile and the barrel. The thing is out of the question. You may as well expect to hold water in a sieve." This language, although exaggerated, if used to the supposed first inventor of a fire-arm, would have had much plausibility; and in point of fact contains a great deal of truth. Were it not that the absolute velocity of expansion of the exploded gunpowder is far beyond that of the velocity of the projectile, the latter would not acquire speed to any great degree. As it is, under the most imperfect arrangement, the shot necessarily acquires a share of the almost inconceivable velocity of the expanding gas —equal to some 7000 feet per second. But that speed is much modified by the amount of windage; and experiment has demonstrated that a thirty-two

pound ball fired from a cannon having ·013 inches of windage, has an initial velocity of 1401 feet; while a windage of ·253 reduces that velocity to 1170 feet, with the same charge of powder—yet this *decimal* difference in windage is practically small. The results, however, are immense, being a difference of 231 feet *per second!*

It is needless to pursue this branch of the subject further. Enough is shown by the above that it is a prime necessity towards procuring the highest possible results from the explosion of gunpowder, that the projectile to be acted upon fill up the tube of the barrel so accurately that there shall be little or no room for the escape of the evolved gas by its sides. Upon this fact depend most of the modern improvements in gunnery. The thick elastic wadding, referred to in a former chapter—the "Minié," or "expanding" variety of conical bullet—are both to be attributed to this desire to lessen windage. Possibly the invention of breech-loaders was originally more directed to facility and quickness in loading than to any other advantage, but whether or not, breech-loaders have only to be made upon sound mechanical principles to gain a manifest advantage over muzzle-loaders in this respect. It cannot be denied, at the same time, that the successful introduction of the common French breech-loading fowling-piece into this country has stimulated experimentation on cannon so charged, resulting in the

famed Armstrong guns, and other wonders of the age. When, in 1857, breech-loading fowling-pieces first came into general use in this country, the author at once saw where a great advantage could be gained by using a wadding one calibre larger than the tube, and he forwarded to the *Field* newspaper a letter to that effect, with drawings, all which duly appeared in that excellent periodical, which he may say, *en passant*, has done more than any other agent whatever for the improvement of sporting fire-arms. But, in the hurry of thought, and in that peculiar progressive degree of knowledge which seems to attend the study of things new, he forgot that it was easier to make the tube a size narrower, in the first instance, than to fit a somewhat conical cartridge with a thick wad in the rear. In detail, therefore, he was wrong, while correct in principle, and on this principle breech-loaders now are, or should be, constructed, and by use of which it follows that these guns, if their other mechanical fittings be correct, must surpass in shooting powers any muzzle-loaders of similar weight and dimensions.

A breech-loader, therefore, to repeat, is a gun which is charged, not by the muzzle, but at the rear of the barrel. By this mode of construction it is no longer necessary that, in loading, the charge be passed down the tube of the barrel, and the size of the wadding or projectile is no longer governed by the ability to ram it home easily and effectually, but by the power of the

explosion to drive these forward without danger of bursting the piece or undue recoil. It follows that windage may nearly be done away with; and, to repeat again, if the gun possess other mechanical requirements, it must therefore excel in shooting powers.

There is a vast variety of these new guns before the public. In the month of April, 1861, the author saw, in one room in Liege, forty different breech-loaders, yet there was one radical defect in them all—a want of locking power: or in the one or two instances where that was imperfectly gained, the means were complicated and apt to go out of order. Facility of loading seemed to have been the ruling idea, and not the great force which English sportsmen demand, and will have. The invention is said to be originally French, and quite carries out the national character for quickness in thought and arrangement. "They manage," said Sterne, in the hackneyed quotation, "these things better in France;" but their powers of administration surpass those of producing lasting effects and solid power in mechanical and other objects. The general system of breech-loaders is that the barrels play upon a hinge situated about two inches from the breech. A moveable key or lever, passing up from below the "action" or iron piece into which the hinge-pin is fixed, has a screw working itself into a notch in the "lump," a bar of metal descending into the action from between the barrels. The perpendicular face of the

breech against which the base of the barrels abuts and that base are both smooth, and have no grasp upon each other. The whole catch, therefore, depends upon the lever holding firmly into the notch or notches in the descending lump. This point of grip is manifestly deficient in every essential quality. First, the lever itself is moveable, and therefore cannot give an immoveable catch. Secondly, the lines of resistance are in the worst position, for the point of grasp being much under the barrel, is necessarily subjected to severe leverage on the gun being fired, exactly as when you wish to tilt over a chair most easily, you catch or push it by the upper rail of the back, and not by the seat or centre of gravity. Thirdly, it presents no hindrance to the barrel rising at the breech at the moment of firing, and consequently dipping at the muzzle. There is the best reason to believe that every breech-loader on this construction, however tight the mechanical fitting may appear, does so rise, and the reason is plain—that the barrels, of necessity, leap upwards at the breech from the vibration against the horizontal part of the action. This vibration extends itself by a natural law in the direction of least resistance, and the hinge being under the line of fire, the barrels strain, as it were, to revolve around that hinge. Against this revolving tendency the catch of the moveable lever is not sufficient, and this want of security and the general elasticity of all the metal in effect permit this

revolution to take place in a slight degree. However slight this may be at the breech, the effect is serious at the object of aim. The hinge-pin being at the distance of a little more than two inches from the breech, should the latter rise only 1-64th of an inch, the muzzle of a barrel of thirty inches will fall some 15-64ths, or nearly a quarter of an inch, and that deviation will go on at the same ratio up to the thirty, forty, or fifty yards at which the object of aim is distant. To compensate this drooping it has been customary to make the stocks straighter than those used in muzzle-loaders, so as to gain elevation, thus making the gun awkward to wield, in order to compensate another fault.

But this is not all, for this tendency to revolve upon the hinge, not being checked in the first instance, necessarily throws a severe strain upon the mechanism; and, despite every attempt by means of wedge-shaped fittings and other contrivances, the parts become loose, and the gun loses that solidity which is the first essential shooting quality. So certain is this deterioration in the jointing, that it is quite common to provide for it by making the parts so that new steel facings and other means of repair can be put on when required; and the maker points triumphantly to this provision—forgetting that he is, in fact, thereby admitting that the gun is built on a false mechanical construction. What maker of a muzzle-loader, on the

other hand, would complacently point out how he had provided for some certain rapid tear and wear by this or that contrivance, and would not at once make his gun so that this imperfection be remedied?

This disjointing, then, has been the cause of many breech-loaders shooting badly, and the great results which might have been gained by this superior system of loading have been lost, and the breech-loading principle has been, in consequence, not unfrequently most unjustly condemned. The obvious cure for the fault was, first, to inquire into the difference between a muzzle and a breech-loader; to learn wherein this difference affected the solidity of the gun, and if possible to assimilate the two. The excellence of going back to first principles, which so many affect to despise as being beneath their dignity, would then have been seen. A muzzle-loading gun is held in the stock, first, by hooks on the extremity of the barrels, which are received into corresponding recesses in the false breech; and, secondly, by passing a bolt through a loop on the barrels at some distance from these hooks. This bolt is frequently very loose and imperfect, yet performs its work notwithstanding; and it is evident that the breech-hooks form the real grasp—the bolt doing little beyond holding them into the recesses. What sort of shooting or security should we expect from a muzzle-loader held by the bolt only, its breech and the false breech being alike smooth, and

taking no hold of each other? Yet this practically is the position of the French breech-loaders, which probably now form ninety out of every hundred in use, and still more so, if possible, of all the "self-locking" guns, not one of which can possibly have a solid grasp of the stock upon the barrels. The remedy—had the thing been properly inquired into—is as apparent as the fault, viz.: to obtain an equivalent to the hooks and recesses of the muzzle-loader's breech; using the bolting part to interlock the barrels and stock, and not requiring of it to be both the grasp and bolt, and be provided for the tear and wear produced by its being overtasked. In plain terms, then, what was wanted was, that the barrels should be firmly held at the breech end by the solid stock itself, and not by an instrument or catch merely moving in that stock, and not forming an integral part of it.

Notwithstanding the perfect clearness of this reasoning, and of the complete proof of its correctness from the experience of seven years, the tendency is now (1865) to run into still greater error, and to sacrifice all mechanical advantages and correct shooting powers for increased speed in loading. This speed in loading is now estimated apparently by decimals of seconds; and every other week we hear of a new "self-locking" gun, as being a vast improvement—the fact being, that the "self-locking" mechanism is that, above all

others, the most ineffective. It not only places the closing of the gun beyond the power of the sportsman to exert his own faculties upon it, but by one of the best recognised mechanical laws makes that easy to open again exactly proportionally as it is easy to shut. All these self-closing guns depend upon steel springs to hold stock and barrels together; and steel is the most treacherous metal in gunnery, as witness Sir William Armstrong's parliamentary evidence on his own cannon.* Exactly as a gun is a self-closer it is not a proper and solid fire-arm. The user cannot at any time know, before firing, whether or not the internal mechanism, at all times beyond his reach of observation, is still effective. In a word, in using such a gun, he deprives himself of his own control over it, and trusts to agencies beyond his means of manipulation. As a proof of how insecure these guns are, it is notorious that they so "spit" at the breech that after a day's shooting the sportsman's face is blackened over, and the author has just been informed by Colonel J. W—— that within his own experience of season 1863–64, two of his friends were led off their shooting-ground temporarily blinded by discharge of gas from the breech.

* From this sweeping condemnation of steel it is exceedingly probable that, so far as gun-barrels are concerned, those about to be introduced on Hawkesworth's patent process will prove an exception. But all steel springs and such like are never trustworthy under severe vibration.

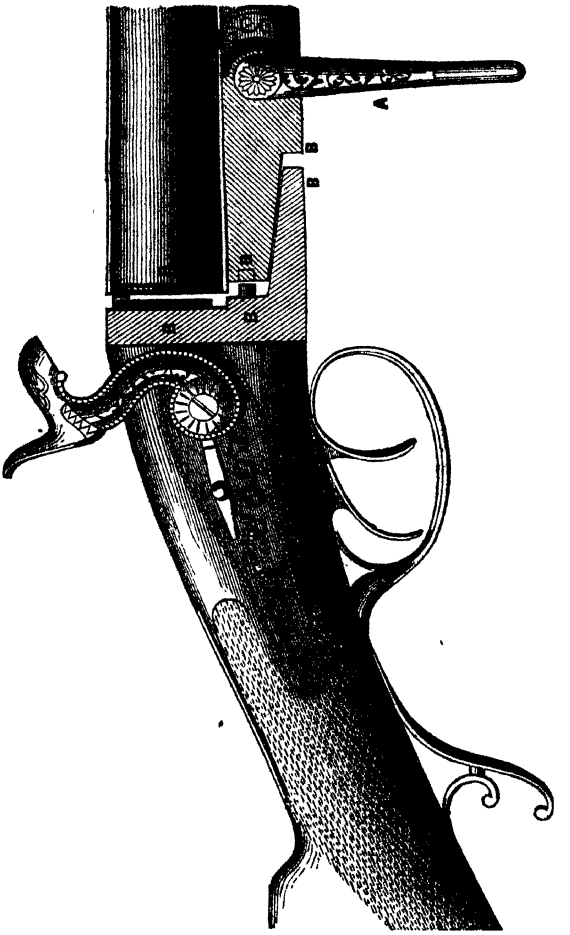
It was from a quick observation of the above deficiencies in all the varieties of breech-loaders, and at the instigation of some of his best friends in Glasgow, that the author set himself to the task of finding out a means to overcome the acknowledged defect. One gentleman in particular, an excellent judge of mechanics, Mr A—— E——, when told by the author that it was impossible to interlock the stock with barrels playing on a hinge, justly "pooh-poohed" the assertion. Others said that they would never be induced to buy the breech-loaders while in their French imperfect form of construction; and Glasgow sportsmen, as may be supposed of a city so eminent for manufacturing and engineering skill, are not unfrequently mechanical proficients. Here was a pretty dilemma; muzzle-loaders were passing out, and few would buy the breech-loaders coming in! What the author saw must be done was to draw the rear end of the barrels into corresponding annular recesses in, or upon equivalent projections on, the stock, and this was done, and the problem solved, by converting the hitherto fixed hinge-pin, on which the barrels play, into a movable eccentric rod. The eccentricity of this rod's motion causes the barrels to play in and out from the stock, completely altering the whole construction and quality of a breech-loader, by permitting the end of the barrels and the false-breech to interlock with each other, *the grand desideratum*. Hence

the gun is termed the "lock-fast"—a really proper designation, and not a catch-word for commercial purposes. This locking power exceeds 1200 lbs. in the lightest fowling-pieces, and can be, and is, increased to much more for heavy rifles and other guns; and the author has taken a fresh patent for light artillery on a somewhat similar construction. So clearly did he demonstrate the superiority of this lock-fast system to Lord Vernon and the Jurors of the Great International Exhibition of 1862, that the author was awarded the *sole* medal for principle of construction of breech-loaders—a unique honour. The only similar award in any other branch of fire-arms was to the late Colonel Colt, for his revolvers. This, then, was the only breech-loader, the construction of which was unqualifiedly approved of, and the award was carefully distinguished from approbation of mere general improvements, workmanship, or ornamentation, at that Exhibition, by a body of Jurors, British and foreign, of the greatest experience and intelligence. What guns have been invented since, the author emphatically declares—and time will prove his correctness—to be steps in the wrong direction; and one gun at least, long known on the Continent to be one of the most faulty, has been brought out in this country with a flourish of trumpets as a new and great invention.*

* The writer has frequently been requested to turn his attention to military breech-loading firearms. This is a most difficult task, as, to

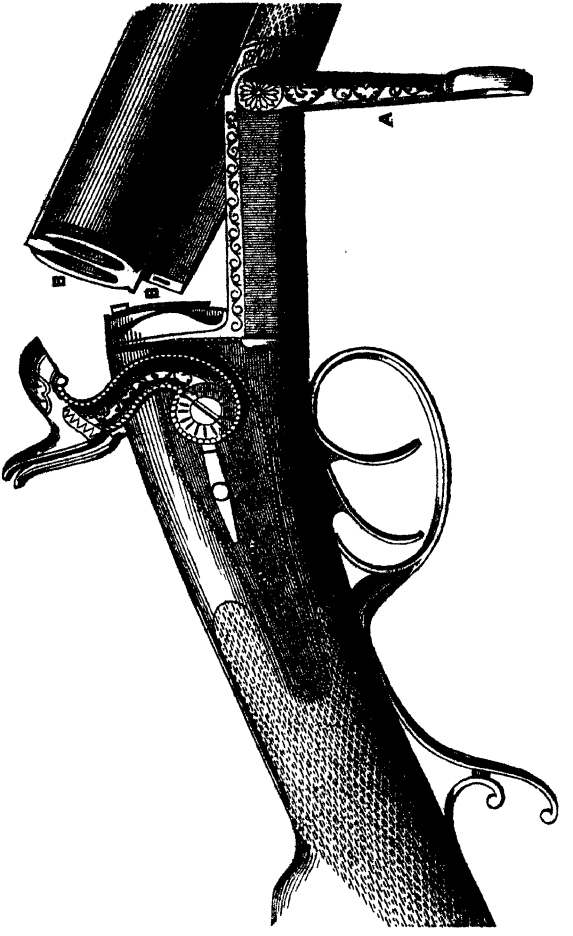
The author feels pained to depart from his usual reticence in thus seeming to praise his own gun on the one hand, or, on the other, to show any of that unfortunate *jalousie du métier* which seems an inseparable characteristic of gunsmiths; but a stern necessity has proved to him that any such reticence is uncalled for, and would be misinterpreted; and knowing his gun to surpass all others for every sound quality, he has no other course open to him, in justice to his readers, than to write in this strain. If he knew of a better gun, he should at once adopt it; and he feels assured that no unprejudiced reader will blame him for thus frankly stating his most honest and conscientious opinion, and the results of his experience. Beyond this, however, he will not go, or carry the war into the camp of the enemy on matters of detail, although he would certainly be *commercially* justified therein by the thousand and one ridiculous mis-statements which have been set afloat against the lock-fast breech-loaders, but which each succeeding season sends to the limbo of untruths. It is a fair logical inference that the perfect success of any gun against

use the bayonet, the gun must be the soldier's spear as well, and the breech-mechanism interferes with the grasp of the gun as a spear. Certainly no rifle with a hinge or "break," as it is termed, is adapted to carrying the bayonet, although it may be very good for cavalry. There can be no doubt that to breech-loaders soldiers must finally come, when war, the game of kings, will become more expensive, in every sense of the word, than ever. Query: Would bayonets not be superfluous? How often have they really ever inflicted a wound? Are they not more a demonstrative than an actually offensive weapon?



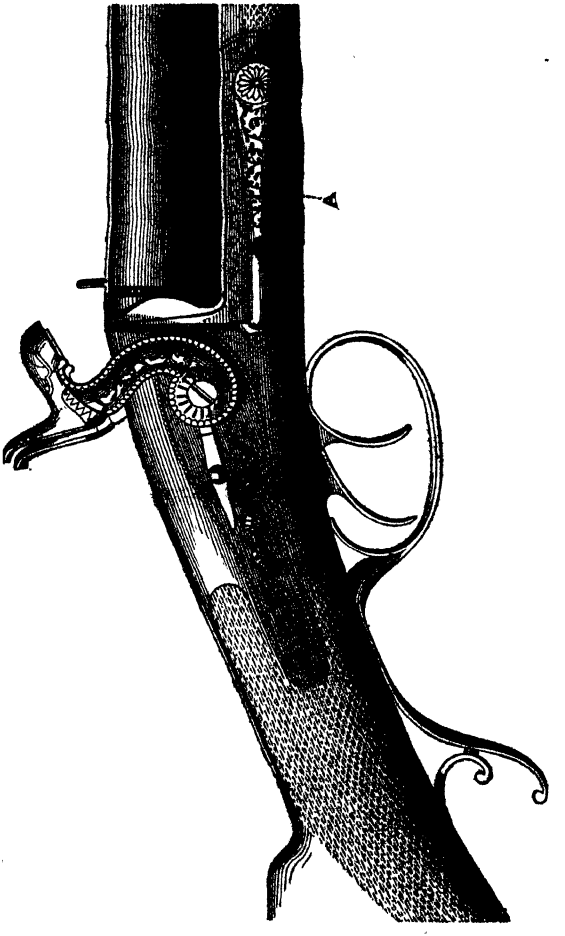
such unparalleled opposition is the best proof of its excellence.

The opposite woodcut represents a lock-fast rifle partly in section. The gun is open so far that the barrels are detached from the breech, but not thrown open to receive the cartridge. In the "Lefaucheux" gun a lever alone holds the barrels in their place by means of a projection fitting into a corresponding recess in the "lump," or bar, under the barrels. But the reader will observe that by means of the sliding motion gained by the hinge being an eccentric rod, of which the lever A is a part, projections on the breech fit into the barrels and lump beneath, B B B B, under the immense leverage bringing the barrels and stock as solidly together as if one piece. The barrels of all breech-loaders, from their construction, have a tendency to rise at the breech when fired, and to dip in much greater degree at the muzzle. In the lock-fast this is impossible. The discs on breech, fitting tight into the barrels, prevent upward motion in the slightest degree. Another great advantage is gained by this sliding motion. In 99 cases out of the 100, it will be found that in all other breech-loaders the cartridge falls within the rear of the barrels, so that the copper base is not in contact with the breech on the stock. Hence, when fired, the cartridge is driven back against the breech, the *vis inertiæ* of the gun is lost, and recoil is produced. In the lock-fast this is impossible. The



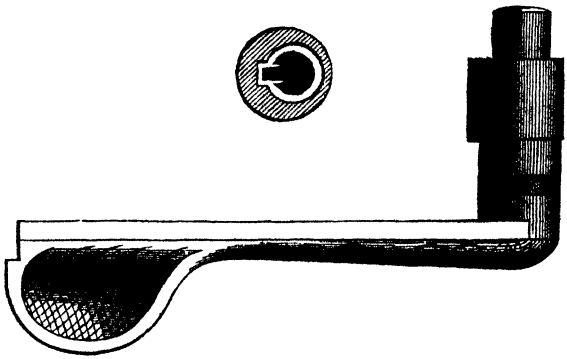
sliding motion acts equally on the cartridge, so that when fired the copper of its base is not only in contact with, but under great pressure upon, the false breech, producing the most regular and correct shooting. This has been so demonstrated, that for sporting rifles the lock-fast is not even approached, much less equalled, correctly delivering its balls with a velocity that literally smashes a "10" or "12" bore bullet to atoms against a target, under charges of powder which would soon tear the mechanism of other breech-loaders asunder. To those skilled in rifles, some idea of this soundness may be conveyed by giving one instance of a double-barrelled rifle, "12" bore—barrels 27 inches—throwing a 2½ ounces conical bullet, being fired easily with 5 drachms of powder, and yet only weighing 8 lbs. 13 ounces! In a word, the locking power, with other careful arrangements, is equal to dead weight.

The opposite illustration is of the gun with the barrels thrown open to receive the cartridges. On these being inserted, the barrels are lifted into their place by the left hand, and the lever A is drawn back into the position shown in next illustration. The solid grasp the barrels and stock now exert upon each other must be seen to be credited, as an "eccentric" is the most powerful agent known in mechanics, every part being an additional lever in itself.



The gun is now represented, in the opposite wood-cut, with the barrels closed and in position for firing.

The extraordinary simplicity of the mechanism is shown by the following representations of the whole agencies. The lever and eccentric are shown together, and the smaller figure is an end view of the eccentric, which will be seen to be quite circular in itself, but



set on a false axis,* the unequal revolution of which creates the slide. It thus presents no points for friction to wear off, and is quite another thing from a "cam," which is oval in shape, the extreme ends soon wearing.

* Among the many false statements set afloat about the lock-fast gun by interested parties, one is so ludicrous as to be worthy of repetition here. A gentleman, who has since been a kind friend and patron, devoted two months in 1862 to investigating breech-loaders. Among others, he diligently inquired into the merits of the "Lock-fast." Of course it was heartily abused, but on such false grounds as left no trouble in correcting. One day, however, this gentleman entered the

The cause of the superior shooting of these guns, perhaps the best the world has yet seen, may now be perceived. Not only are the barrels and stock so locked together, but the rear of the cartridge is pressed as firmly against the face of the disc, an immense advantage possessed by no other breech-loader whatever. The question has often been asked, May not this great pressure cause the exploded cartridge to stick in the chamber? So far is this from being the case that no extractor is required, and a fixed, self-acting extractor, with which the author fitted several of his first-made guns, was discarded as superfluous. The exploded cartridge is removed with a touch of the finger; and indeed all self-acting extractors are better avoided. They break on the amenity of the mechanism and barrels. There can be no doubt that the Lefaucheux or "pin" cartridge is, for many reasons, the best and safest. This will be referred to

author's office in St James's Street, and with a grave countenance seated himself in a chair. "Mr Dougall," he said, "I have been told something about your gun to-day which, unless explained, will debar me from giving you an order. I am informed by a respectable gun-maker that your eccentric is set on *a false axis*. Of course any such mechanism must be fatal to the gun!" Thus was the invaluable mechanism, producing the most important results, so grossly or wilfully misunderstood, as to be turned into a fault! This anecdote may be taken as the climax, however. Absurdity or ignorance could go no further. One common remark was, "He must have some concealed mechanism to gain such solidity; and how do you know that this secret mechanism may not get out of order?" This was even insinuated at the 1862 Exhibition by an eminent gun-maker to Lord Vernon, but instantaneously and indignantly disproved. The paradox is, that with *less* mechanism than in other guns, there are *more* results. No logician need be reminded that paradoxical truths are of the highest order.

further on. Besides all this, the slightest derangement of an extractor is fatal to the further use of the gun until repaired.

If the reader has followed the author's meaning—it being difficult to describe mechanical objects—he will now see the difference between the lock-fast and other breech-loaders. But the following illustrations may be yet more explanatory:—Place the palms of your hands together, and rub them semi-circularly upon each other—that is the unimproved gun, if you can suppose some slight check being given to the rubbing motion by a catch upon the wrists. The lock-fast is the hands first brought flatly together, and then having the fingers intersticially locked with one another—a double close fist. Each hand represents the stock and barrels.

Again, taking the barrels as the frame of a door, and the stock as that door, the unimproved gun is as if the door, after being shut, is merely held close by a bar catching it at top or bottom somewhere between the hinges and other transverse extremity. But the lock-fast is as if, having first closed the door, you gave it a second motion, and shoved it sideways into a receiving groove in the solid upright of the frame, causing opening to be impossible until it be again withdrawn from that groove.

The proper mode of handling a breech-loader is to press the stock firmly against the side with the right

elbow, the gun being in a horizontal position. The right hand is left free. The left hand grasps the barrels nearly half-way up. You then half-cock the locks and move the mechanism, of whatever kind it may be, and gently depress the left hand. This motion raises and exposes the rear of the barrels; and the reason why the left hand should be so far extended, is, that it gives you at once better balance and leverage, and so permits the movement to be made without jarring. The right hand, being free, with the elbow pressing the stock to the side, is at your disposal to take the cartridges from the pocket or satchel in which they are carried, and place them in the barrels. On this being done, the left hand, which has all along retained its hold of the barrels, is forcibly but not jerkingly raised; the breech-ends take their proper place, and the lever which fixes the mechanism is acted upon by the right hand. In the lock-fast, with falling lever (as in illustration, for it can be made in three different movements), the closure is instantaneously made by putting the thumb on the upper side of the right barrel, the fore-finger under the lever, and pinching the two together. The power of this pinch is known to every workman that ever handled a tool. The gun is now ready for use, as on page 250.

After firing, the same process is gone through, with the addition of first withdrawing the exploded cartridges. With these properly adapted, no force is

needed for this purpose, still it is as well to know how to avoid any difficulty. Should you have accidentally obtained a supply (say in some foreign or out-of-the-way place) not exactly fitting, they may be rendered useful with some little trouble. If too small, paste a piece of thin paper round them. If too large, dry them well before a fire, and dust them over with powdered French chalk—the same as bootmakers use to cause a new boot to slip on your foot readily, too often deceiving you, and laying the foundation of future woes and pains, (*Vide Limpius de Cor. et Bun., lib. 3, cap. 39*).

The frequent use of the word "cartridge" in the last paragraphs draws forth a remark here. The word is a misnomer; the article is not a cartridge. It is properly a temporary gun-breech, no part going out with the discharge. The French call it a "socket" (DOUILLE). By translating this into "cartridge" we lay the groundwork of confusion, as every gunsmith of extended business must know. We have already "wire-cartridges" and military "rifle-cartridges" specifically, as well as the word generally. Why cause misunderstanding by a complete mistranslation? The word "socket" being too general, by far the best way would be for sportsmen at once to adopt the word "DOUILLE," giving it the English pronunciation, and thus at once give a specific term to an article so widely used. In foreign orders especially, as well as all

others, the author would gladly see used the word thus recommended. Let an order thus run for instance:—"Please send me 1000 douilles," etc. etc., and so on, as the case may be. This may appear a light matter, but is of much more importance than may be at first sight supposed.

There is another unhappy mistake in the nomenclature of these guns. The English and French calibres differ in size. Thus, "16" French is a tight "14" English. The guns first in use here being nearly all of the smaller size, and the *douilles* being entirely imported (before the Messrs Eley began the manufacture), this "16" gauge became a fixed title. When the "12" gauge came into use, it was called, and is stamped as "12," its real size. But the "16" kept its title, whereas it is a tight "14." This has led to considerable trouble, as sportsmen, ordering a gun of "14" bore, and finding their *douilles* marked "16," impute bad faith to the gunsmith. Recently (1865) a few guns have been made of the regular full "14" English gauge, and the best way would be to discard the nominal "16," and make no *douilles* of any size with any mark other than that denoting English calibre. Gentlemen already possessing the narrow bores would meet with little inconvenience, as the chambers could be readily altered. This timely arrangement is all the more desirable, because when we run up to very large bores, say "6," the number stamped is unaccountably

wrong *in the other direction*, "4," a contradiction which would be most annoying were these large guns in common use. As it is, being mostly in request for Africa and India, where correspondence is slow, and its accuracy of consequence, these guns should always be ordered and described as of English calibre. It should be remembered that breech-loaders are quite a novelty, and that every exertion should be made to fix a proper nomenclature for them and their appendages. This is at present easy. For instance, a useful instrument, to be described further on, is already only known by its French term "ramoneur," so that the shade of Mrs Montagu may rejoice in knowing that the antitype of her sooty protégés is carried in the pocket of that noble specimen of mankind—the British sportsman.

HOW TO LOAD THE DOUILLES.

An essential to good shooting from breech-loaders is correct loading. It may be generally assumed that these guns require an ample supply of powder—that the powder be coarse in grain, and that a thick wadding be put over the powder, and a thin one over the shot. It should also be distinctly understood that the *douille* should be of such exact length as that, when charged, only one-eighth of an inch of the paper extend over the shot wadding, and that when the muzzle is closed and inverted with the turning-over tool,

this inverted part rests solidly on the wadding. Some little practice only is required to gain the knack of doing this without too much pressure, which would bulge out the *douille* and also raise ridges on its surface. It is enough that the wadding is seen to be well rested upon by the inverted paper, and that the whole do not rattle when shaken.

The most easy way of loading is to fill one common earthenware bowl with powder, and another with shot. The grain of powder to be No. 3 for average fowling-pieces, No. 4 for heavy guns, and Nos. 5 and 6 for all rifles. Three drachms and $1\frac{1}{8}$ oz. No. 6 shot is an excellent charge, but for a good shot 1 oz. is ample. The larger the grain of powder the gun will shoot more steadily, and with less recoil or vibration. No. 1 or No. 2 gunpowder is not to be used, and many gentlemen have been disappointed in breech-loaders through this mistake. Their ignition and action are too sharp; the gun will kick and scatter.

Having arranged his materials, the loader should proceed to charge, say 50 *douilles*, with powder. Let him then put in with his fingers only the thick wadding, and when all are so provided, let him take them up *seriatim*, insert the short wooden rammer, and strike each *douille* firmly with one good blow on the table and no more. He will then proceed to fill in the shot and upper thin wadding, merely placing the latter gently upon the shot. If the paper be now too long,

he will use the scissors with the disc, placing the latter on the wadding. The disc's thickness is the proper length of paper to be left, so that he has only to cut quickly without further adjustment, continuing all the while to press the disc firmly against the wadding. Were all wads of one thickness, the *douilles* could be cut to the required length before beginning to load. The closing tool is now used, and by a little practice he will be able to give the screw the exact amount of twist to effect a proper closure. By so loading in batches of 50 or 100 the work will be done in every way better than by one at a time.

When a fixed table loader is used, the system is necessarily different, the loading of each *douille* being separately completed.

APPENDAGES TO BREECH-LOADERS.

There are a few articles forming the equipment of a breech-loader which may be referred to with the wish to explain their use to sportsmen who may be residing abroad. The "*douille*" is, *par excellence*, entitled to the first notice. This, as already mentioned, is the temporary breech of the gun. It is a cylinder of pasteboard, with a thick piece of the same material closing up the rear. In the middle of this thick piece is a small recess, in which lies a percussion cap. This rear end is fortified outside by a metallic cup, into which the paper is most closely fitted. Perpendicularly

through this cup and upper side of the thick piece of pasteboard, passes a pin of hard brass wire, pointed at the inner end, this point resting in the percussion cap. The outer end projects above the barrel, as in page 250, and receives the blow of the hammer exactly as the nipple does in a muzzle-loader. This is the regular form, and although other systems have been tried none has equal advantages. The French and Belgian gunmakers, who, though excelled by the British in soundness of workmanship, are the best judges of the various systems of ignition, prefer this form to every other, a conclusion with which the author cordially agrees. On this account he so constructed the lock-fast gun, although various modes of ignition were open to him, and every day brings fresh proof that he was right in so doing. The cap in the Lefaucheux *douilles* being exactly in the centre, upsets at once the ludicrous claims for superiority so pertinaciously made for inferior systems. The pretended objections to the pin, on the score of its getting bent and being dangerous in carrying, and so on, are best met by asking for one single proof of such being the fact.

Without the invidiousness of naming any one system, it is enough to state that the cap or other arrangement, being in these placed horizontally, has not sufficient resistance to insure ignition. The cap (which is not struck by the hammer itself) is apt to be

merely driven forward—hence the most delicate adjustment is needed. If the detonating powder be too subtle, loading is dangerous. If the detonating powder be safely slow in ignition, mis-fires occur; and in hot, humid climates, where rapid chemical changes take place, the results are obvious.* The "pin" *douille*, on the other hand, has the blow given perpendicularly to the barrel, the lower side of which of course resists the pressure, and ignition is as certain as from a muzzle-

* It may not be out of place (in a work the aim of which is really to convey instruction, and not to serve as a business advertisement) to advert to the nature of fulminating compounds. As wine improves by age, these compounds increase in subtlety in like manner. As the ingredients thoroughly amalgamate the igniting capability is developed, up to the point of spontaneous combustion. It was by such spontaneous combustion that the talented chemist, Mr Hennel, of the Apothecaries' Hall, lost his valuable life. Probably gun-cotton possesses the same dangerous property. Gunpowder is free from it, from obvious reasons. Percussion caps placed on a nipple are not in danger. In a breech-loader the cap should be so placed as to present a resisting surface in loading, for to obtain good shooting the powder must be well struck home. This resistance is best obtained by the cap presenting its side to the blow, as in the Lefaucheux, and although it is most industriously attempted to depreciate the merits of this system, it is incalculably the best and safest. To give a practical application to this note, the author may state a case within his knowledge. Circumstances caused a gentleman, his particular friend, and himself an inventor and patentee in fire-arms, to lay aside his "Lefaucheux" for seven years. Resuming its use last autumn, he found that he had an ample supply of *douilles* beside him, all which had also lain over. The subtlety of ignition in these was so increased that at every discharge of one barrel the second was also discharged by the mere concussion! The British Government will make a serious blunder if ever they adopt a military rifle carrying a cartridge containing its own ignition. With territories extending over every variety of climate, hot, cold, humid, and dry, the most serious consequences will arise from the uncertain and detrimental chemical action going on; and every degree of mishap, from mis-fires on the one side, to spontaneous combustion on the other, is certainly looked for.

loader. Besides, all guns should show appearance of being loaded, otherwise accidents must occur, through innocently handling an apparently empty weapon. From these reasons, the Continental gunmakers have stuck closely to the "pin" system as the best; and it would not be too much to say that 999 out of every 1000 breech-loaders are and will be so constructed. Besides, the driven-in pin always shows by its appearance whether or not it has been discharged, and there is no sportsman, however cool and experienced, but has in the flurry of sudden excitement in shooting forgotten which trigger he has pulled. With muzzle-guns the length of operation in reloading keeps him right. He mechanically half-cocks his breech-loader after firing, thus removing that proof of the discharge, and no one need be ashamed to own forgetting that he has fired both barrels. The author certainly is not. On one occasion he fired his second barrel to make sure of a black-cock he had struck hard with his right, and only loaded the latter, leaving the left discharged *douille* remaining in the breech, his yet untrained eye being deceived by observing its outer presence, although wanting its inner quality. Having been in quest of an old, cunning roe-buck, as indeed he had almost daily been for five weeks—he was using No. 6 in the right barrel, and heavy shot in the left. Ten minutes afterwards his dogs stumbled, as it were, on this almost mythical buck, which suddenly leapt up from

his dry bed of ferns. The author, with an exclamation of "Poor thing, caught at last!" quietly drew the left trigger, aiming at the neck. Click! no report. What a leap the gallant little deer gave! then away like the wind! Why torment him by an unavailing discharge of small shot at his then range! This was literally the last hour of five weeks' sojourn among the hills, and the largest and most cunning roe he had ever seen went off unscathed, and lives yet for aught he knows. It certainly deserves to live for unequalled size and caution. If, then, this could happen to an experienced, or, you may term him, professional sportsman, with even the pin—breech-loaders being then new to him—how much more likely will it be when you are deprived of the most prominent outward proof of discharge? For every good reason, therefore, every gun should show whether it be loaded or not, and a better system than that of the brass pin has yet to be invented. It has firmly maintained its pre-eminence for a quarter of a century, and no other system has had or is having more than an exceptional support, even with the most unwarrantable claims for superiority and assumption of unchallengeable improvement. British sportsmen should know that systems newly introduced here have long enjoyed anything but a good Continental reputation. The escape of gas from a properly-constructed "pin" gun is not nearly equal to that from the nipple of a muzzle-loader (which is never complained of),

and has been diligently exaggerated for commercial purposes.

THE RAMMER,

Used in loading, is a simple piece of hard wood, a few inches in length. The only remark called for, is, that it exactly fit the interior of the *douille*, as if too thin it may not press the wadding squarely down.

THE SCISSORS

Differ from the same implement in common use, in so much as that one blade is concave on the cutting edge and the other is quite circular. This circular blade or disc is of the exact thickness needed to leave sufficient length of paper extending beyond the shot wadding. (See page 259.) There are other cutting instruments, but the scissors is the best.

THE TURNING-OVER TOOL OR CLOSER

Is made in various shapes, in all a rotatory motion inverting the muzzle of the *douille*, and pressing it down on the wadding over shot. Some are made for affixing to a table; and those made by the leading Sheffield houses—Messrs Dixon & Son, Messrs Hawksley, and Messrs Bartram & Co.—are all good of their kinds. That table machine will always be the best which permits the left hand to regulate the pressure, the

right giving the rotatory motion. A most ingenious instrument has been invented and patented by Major Munn. He terms it the "*Multum in parvo*," and were the Sheffield makers once induced to adopt and make it properly, it would be most useful. Taking little space, it loads, extracts the wire to reload, and recaps the *douille*, performing all the operations of other separate instruments. Where space and weight are desirably small, as in travelling, this would be a good instrument, even if only for a reserve.

THE RECAPPER.

Good *douilles* may be used several times, of course requiring a new percussion cap for each reload. To place this cap in its seat, a most ingenious instrument is made in Sheffield—as usual, a great improvement on the French. How is it that two nations, so nearly situated, should have such remarkable difference in capability? The French invent, but leave the invention imperfect. The British take it up, slowly at first, look at it, turn it about, raise objections by the score, begin to ask, "Will it pay?" and then go at it and perfect it with all their heart and soul. In using the recapper, which cannot be described in words, all that is necessary is to take care to press the *douille perpendicularly*, and without disturbance. When you hear a click, press the wire firmly home. It is proper, in reloading, to entirely withdraw the wire each time

and wipe it with an oiled rag, removing the glut arising from the last discharge.

THE EXTRACTOR

Is of various forms, all embodying an orifice in which the wire of the exploded *douille* is caught. The best is that with a wheel affixed. This wheel, revolving against the rear of and between the barrels, when a strain is put on to withdraw the *douille*, necessarily keeps the latter in the axis of the barrel, so that there is no lateral pressure. The author suggested to the Sheffield makers that this tool should have an orifice on either side of the wheel, so that after a double shot its position need not be reversed for the left barrel, which has been generally adopted. The extractor is seldom required. It is, however, well to be provided against all difficulties, and, indeed, many prudent sportsmen carry a piece of cylindrical lead freely entering the *douille*, when, should the latter prove refractory, they drop the lead down the muzzle and drive it out. When this unpleasantness does occur, it will generally be found that the paper has been left too long, and been caught at its muzzle in the narrower part of the barrel. In rifles this should be particularly provided against.

THE RAMONEUR

Is very useful. Although far the principal part of the

residuum of the explosion is left in the *douille*, still a gun-barrel cannot be kept too clean. The ramoneur is a piece of cord, with a metallic bottle at one end, and a brush or mop at the other. In the bottle is carried oil, but spirit of turpentine is better. If the barrels foul in a hard day's shooting, the brush is moistened with the turpentine, and the bottle, acting as a plummet, is dropped through the barrel *from the breech-end*, and the brush drawn through. This repeatedly done soon cleans the barrel out, and is indeed one of the numerous advantages of breech-loaders. At all times in cleaning breech-loading barrels they should never be rested upon any hard substance. In this respect they are much more easily injured than muzzle-loading barrels, the case-hardened breeches of which protect them while being washed out. All the parts about the action should always be well cleaned and oiled, but the locks need be very seldom removed. The barrels need never be washed out with water. If there be hardened residuum adhering to them, pass a rod with tow well saturated with spirit of turpentine repeatedly through them, and lay them aside for an hour. The penetrating effect of the turpentine soon detaches the residuum, and it is said that it will even remove "leading." The latter is not to the author's own knowledge, however, but he was the first to adopt and recommend the use of turpentine. Very probably this fluid may insinuate itself

between the iron and the lead, and detach the latter so far that a few passes of the cleaning rod take it away altogether.

THE COMPARATIVE COST OF AMMUNITION, Breech *versus* muzzle-loaders, is a common subject of discussion. A fair decision may be that the breech ammunition is the dearer in the first instance, but that the whole cost of shooting is not enhanced. There are several reasons for this. In the first place, there are no ramrods or nipples to be broken, no powder-flasks or shot-pouches to be lost, neither is the tear and wear of the locks so great. It is rare that a hammer or mainspring breaks in use, as the brass-wire pin receives the blow with less sudden resistance than a steel nipple. But, besides this, what you buy and pay for you really consume. You need not lose one ounce of powder or shot, or one wadding, in a season. You need never fire off shots to empty your gun, or in any other manner throw away your ammunition. On the contrary, how much powder and shot are spilled in filling flasks and pouches, how many percussion caps and wadding are dropped in loading? and if to this we add the greater facilities for killing game, there can be no question as to the general superior economy of the breech-loader. There is much discussion and competition on the prices of loaded *douilles*. It is but fair to the respectable tradesman

that sportsmen should know that there is an equal range in the prime cost of the materials and wages for loading. Loaded *douilles* are advertised at prices much under the prime cost of the raw materials if of the best quality, irrespectively of wages and profit. Saving here is bad economy.

BREECH-LOADING RIFLES.

This is delicate ground. After Lieutenant Forsyth's work on "Sporting Rifles and Projectiles," he will be a bold man who shall pretend to teach his own theories. In the present instance there is so little, if any, difference of opinion, that the author would prefer referring the reader to Lieutenant Forsyth's work for enlightenment. A few general remarks, however, may not be out of place, and without being supposed to write a mere trade or advertising paragraph, it is impossible to write truthfully otherwise than that if lock-fast smooth bores are good, the rifles on that principle are still better. The solid grasp—the impossibility of perpendicular or lateral play of the barrels in the stock—and the power of adapting the ball so exactly to the calibre of barrel, give every advantage in constructing and regulating these rifles. The author would not be misunderstood, or be supposed to overpraise his workmanship. He always reluctantly uses his long-continued general connection with the press for professional purposes. He has even against

pressure and solicitation allowed this little book to be for years out of print, and has repeatedly refused the most tempting terms for sporting articles. What he has written has not been for selfish purposes or from a *cacoethes scribendi*, and he gladly avails himself of the opportunity for this explanation on a matter affecting his professional merits and position, his technical writings not amounting to one tithe of his anonymous on other subjects. His guns rest on their own merits, and not on being "written up." Had he ever been inclined to use undue means to cultivate any branch of his business, it certainly should not have been that of rifles. The strain upon the energies to produce these weapons, and overcome difficulties in adjusting their shooting, is almost incredible, and in many cases hardly any price likely to be obtained will be remunerative. Of course double-barrelled rifles are meant. Still, there is a certain pleasure in turning out a fine rifle; it is something of a higher grade, something more scientific than a smooth bore.

If this has been the general position hitherto, the difficulty is now increased. By adapting the charge and bullet to suit a gun's peculiarities, in former years Mahomet was sent to the mountain; but, on Mr Forsyth's system, and it is the correct one, the mountain must be brought to Mahomet. There is a certain charge of powder you must use—there is a certain bullet you must use—there is a certain

degree of spiral in the rifling you must use. Well, what then? Why, the gun must alone be dealt with—the mountain must be moved. The sportsman gains, the gunsmith suffers. This is all right enough, and he must have little *esprit de métier* who will not rise to the occasion.

There are two great things desirable in sporting rifles over and above the proper accuracy in throwing the ball—namely, a low trajectory and great velocity. In addition to these there is to be desired a wide calibre, for the immediate effect of a bullet striking an animal is in proportion to the area of the blow. The "long-range" mania of late years has led many astray in the selection and manufacture of sporting rifles. Narrow bores have come much into use; and although by very fine adjustments such guns can be made with a low trajectory, still they are not desirable weapons. In the hands of a first-rate shot, who can place his ball in the eye of a tiger, or drive it right through the heart of a red-deer, they are all well enough. Or it may luckily happen that the point of one of these long projectiles touches a rib, so as to cause it to deviate and pass through the animal with a whirling and lacerating motion. But this is all skill or good fortune. Lieutenant Forsyth, therefore, wisely adopts a spherical ball, that of "12" gauge (1½ oz.), being the best average weight, driven by a heavy charge of powder. The author can

only say that in all his experience he never saw such effect from fire-arms. With three drachms of powder these spherical balls, from a lock-fast, are literally smashed to atoms on a target at 100 yards. No part of the lead of any dimensions (save occasionally one only, the size of a sixpence) is to be found. This occasional small piece a trained eye at once recognises to be the extreme rear of the bullet, saved from annihilation by the general bulk coming between it and the target. The metal seems to be literally melted and dispersed in liquid drops. More powder (4, even 5, drachms) is demanded in India. Is not this superfluous? is not the highest available velocity for bullets composed of soft lead only already developed? The question is put in all sincerity. The author has never shot ferocious animals, and can only reason by analogy; but to him it would appear that 3 drachms of powder will burn equally *availably* with a larger quantity. He has no prejudices, sets up no contradirections, and, in a word, obeys orders so long as there be nothing actually contradictory in these orders; but he cannot help deeming 3 drachms of powder an effective charge for a "12" bore rifle. Of course he refers to pure lead only. If the bullets can be effectually hardened, then gain a greater velocity by all means. For any but the very heaviest animals greater penetration will not produce, however, equally sudden life-destroying powers with those of the softer but

more telling lead. He grants, however, through the most recent experiments, that with 4 drachms a still flatter trajectory can be attained, gaining a point-blank range hitherto supposed to be impossible.

A letter received from India, just as this is going through the press, reminds the author of two most essential points in loading *douilles* with the spherical bullet. These are, that the paper do not reach the narrower part of the barrel, and that on no account the muzzle of the *douille* be turned down. The bullet need have no patch (although some rifles shoot the better for it), be simply pressed down upon the wadding, and be kept in its place by having some grease, properly adjusted to the climate, poured down over it.

There is a common belief that a breech-loading rifle can only take one charge of powder. This is not the case. The difference in space in the *douille* is filled up with felt wadding, and in wide bores this difference is not great. There are some very nice points in making rifles, and from obvious reasons they will not be entered upon. They are entirely technical, and experience in them is so dearly purchased that there can be no blame in keeping them to one's self.

Having long embarked in this most ticklish branch of business, conquered every difficulty, and achieved success, and being daily employed in it, the author will depart from the common strain of this treatise, and ask the support of those sportsmen who wish to

possess rifles of such power. He does not attempt to make a low-priced gun; and indeed he is fully employed already: but the more extended a business becomes, the greater are the means of securing delicate adjustments, and the purchaser can be the better served. A large business can afford greater facilities, better appliances, and all the general advantages which ample returns alone can give. As it is, his expenditure on the trials and regulation of guns amounts to a large annual sum, having found that it is in vain to entrust these to any but highly paid and trustworthy men—with himself or his son in Glasgow personally shooting every gun when an unusual difficulty occurs. All these increased expenses the author willingly disburses, being confident that by so doing he acts wisely and well, preferring the growth of the oak to that of the larch. Hence the unparalleled reputation of his guns—a reputation which no expenditure of pains or money will be wanting to more than maintain. Having the soundest mechanical basis to build upon, with theoretical and practical knowledge, it will go hard but that on every order "he will better his instructions."

The only Medal awarded to any Breech-Loader for "Principle of Construction,"

AT THE INTERNATIONAL EXHIBITION, 1862.

From the "TIMES," 11*th October*, 1864.

WHILE the great story of the guns has been narrated from day to day, and Armstrong and Whitworth, like the principal heroes of a drama, have held possession of the stage, an underplot has been advancing, *pari passu*, and in the opinion of very many of quite as much interest. Ten years ago the English fowling-piece and rifle were looked upon as the acme of perfection, and yet in less than seven years a revolution in these arms has occurred as rapid and complete as the triumph of the percussion cap over the flint. During these seven years many patents have been taken out for improvements in firearms, chiefly for breech-loaders, some of which have enjoyed an ephemeral reputation, but none of which have acquired among men of experience the slowly, surely, but soundly-earned approval. Mr Dougall, who had long enjoyed considerable celebrity

not only as a gunsmith, but as an able writer on fire-arms and the art of shooting, in the year 1859 had his attention drawn to the insufficiency of the French breech-loaders for the exigencies of British sportsmen. The superior strength of our gunpowder and the heavy charges used, not only here, but for heavy game in India, demanded a solidity not possessed by any breech-loaders then extant. The absence of an interlocking of barrels and false breech was painfully apparent. At every discharge of the gun the breech rose, recoiling off the upper surface of the bed in which it lay—or "action," as it is technically termed. For every degree the breech so rose, the muzzle dipped some thirty-fold, and this rising had also the certain effect of loosening and weakening the whole fittings and jointing of the gun. To remedy this defect, Mr Dougall chose a most simple and effective means. The hinge upon which the barrels play to expose the breech end for the insertion of the cartridge had hitherto been a fixture, permitting no longitudinal play of the barrels; but by converting this fixture into an eccentric rod, he gained at once a stronger hinge, and the means of opening and shutting the barrels directly upon the face of the false breech, instead of these merely meeting as flat surfaces upon each other. Of this direct impingement upon each other he was not slow to take advantage. He had gained the means of completely sealing up the rear end of the barrels before firing the gun; whereas formerly a mere piece of grit would have prevented the closing of the barrels, he had it now in his power to fit on the face of the false breech projecting discs, one of which, and exactly fitting it, enters each barrel, or, to write more correctly, the barrels retire on the discs, thus

not only closing up their rear, but of necessity preventing any of the dipping of the muzzle and other insufficient grip formerly complained of. Thus, with much less mechanism, Mr Dougall has gained greater results, and produced a breech-loader that appears as solid as any muzzle-loader. The locking power is certainly over 1200 lb., and this can be increased for heavy guns at pleasure. The cartridge used is Eley's, which has its advantages, and is much safer against accidents. Those conversant with fire-arms are aware of the fact that in breech-loaders the base of the cartridge is rarely if ever in contact with the face of the false breech, so that on being fired "cushioning" and great consequent loss of power takes place. In Mr Dougall's gun this "cushioning" is prevented, the above locking power being equally exerted upon the cartridge. The superior results in shooting powers are theoretically an immediate consequence, and, practically, we have been at the trouble to ascertain, is a matter of fact, the experience of five shooting seasons—a sufficient test for any gun whatever—having proved the "lock-fast" to possess extraordinary powers. From the velocity with which it discharges its projectiles, and its perfect solidity, the gun has consequently been adopted by many experienced Indian sportsmen, and we believe that several of these guns will be the chief prizes at the meeting of the Northern Indian Rifle Association in December next. To produce a breech as strong as a muzzle-loader, and capable of firing either explosive shells or solid conical balls, with heavy charges of powder, is no mean triumph. Whether or not the lock-fast gun be adapted for military purpose is an open question. For cavalry it is probably an avail-

able arm, and Mr Dougall was lately requested by the military authorities of a foreign Government to send in his estimate for 20,000 of these guns, all double-barrelled, and adapted for firing explosive shells, made to burst with frightful effect on striking an object. If to put an end to war by making it annihilation be desirable, in such weapons and projectiles we have a means to an end.

GLASGOW: PRINTED BY THOMAS MURRAY AND SON.

219503