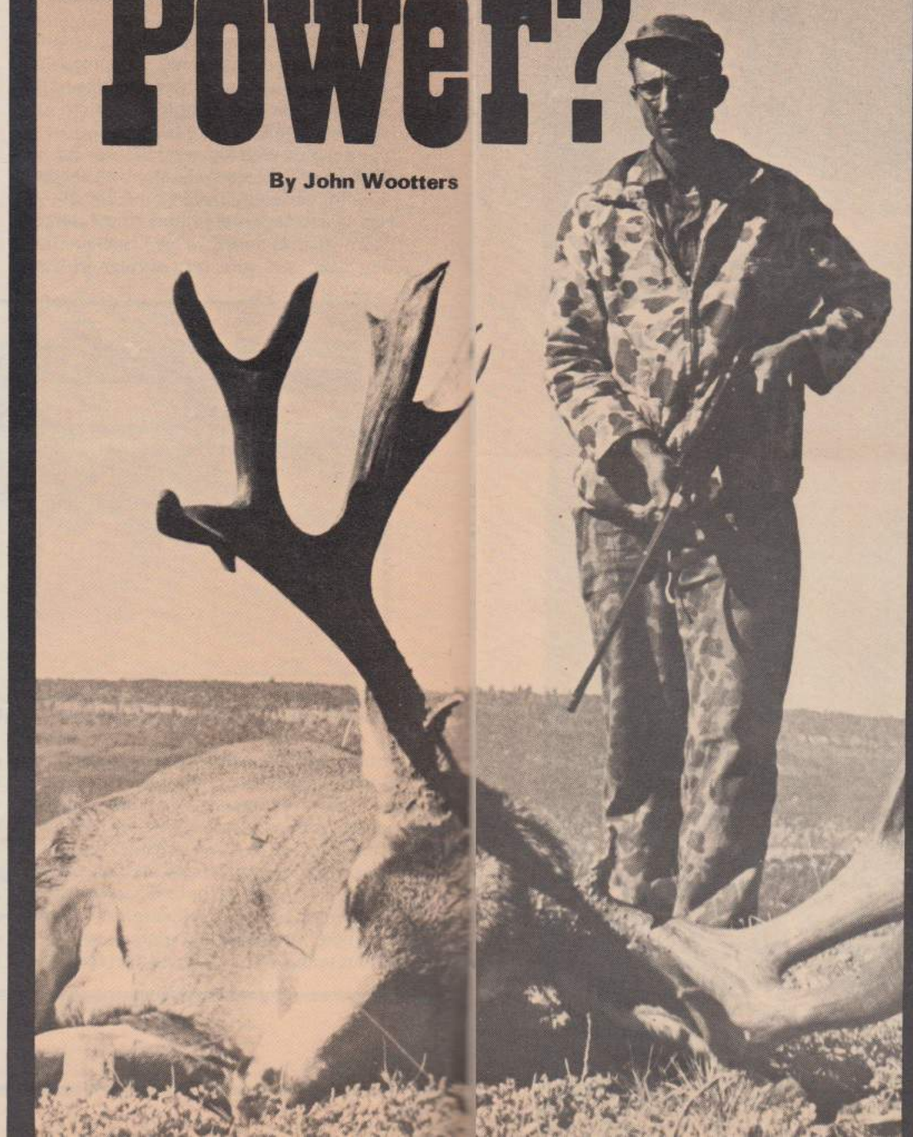
What Is Stopping Power?

Gun experts, big-game hunters, writers, and others have theorized on killing or stopping power for over 100 years—and the debate still goes on. But the experts don't know any more about stopping power than you do. If your present rifle works for you, on your game, in your hunting conditions, stick with it.

By John Wootters



THIS TECHNOLOGICAL society of ours tends to express almost everything in terms of quotients, ratios, coefficients, ratings, or formulas. It's not surprising, then, that ballisticians and hunters have tried for years to develop some sort of mathematical expression of the effectiveness of various cartridges.

Whether billed as ratings of "knockdown power," "stopping power," "knockout values," "killing power," or whatever, the results are intended to describe the lethality of the cartridges on some sort of scale that will permit two dissimilar rounds to be compared reliably without actually firing them.

The most familiar of these systems is *kinetic energy,* the measurement of power that appears in most American ballistic tables. Essentially, this figure is derived by multiplying the weight of the bullet by the velocity *squared,* and perhaps it can be most clearly visualized as the amount of resistance required to stop the moving bullet.

This concept suggests that it takes a big, heavy-bodied animal to stop a bullet with high remaining kinetic energy (or more "power") and, therefore, one should select such a bullet or cartridge for such animals, reserving cartridges with less kinetic energy for smaller animals. Intuitively, we understand that this relationship is roughly correct, but intuition fails to take into account all the possible variables in such a formula—as we shall see.

John "Pondoro" Taylor, probably the most knowledgeable of all the great African hunters, developed a system of rating cartridges for heavy game according to what he called "knockout values." He was less concerned about actually producing death in a charging buffalo or elephant than about instantaneous immobilization of the beast.

His system, first promulgated in 1948, did not include a description of the mathematical process he used to arrive at his "knockout values", but he placed great store by them, claiming they matched his experience against hundreds of dangerous African animals more closely than any others with which he was familiar.

Another effort to pin down a bullet's effectiveness on game was made even earlier, when a formula was published in *Field & Stream* and adopted by Elmer Keith in a book entitled *Rifles For Large Game,* published in 1946. He called it "pounds-feet," but it is essentially what physicists know as momentum, and is arrived at by multiplying the weight of the bullet by the velocity. Notice that it varies from kinetic energy in that the KE equation multiplies by the velocity *squared.*

Thus, a fan of high-velocity small bores has to like the kinetic-energy principle, while disciples of Keith will naturally favor the pounds-feet theory.

This theory has been resurrected more recently in a gun magazine under the title of "potence," expressed in different units but the same thing nonetheless.

Still another effort to rate cartridges according to their effectiveness upon impact was made by Gen. Julian Hatcher years ago. His tables dealt only with handgun cartridges and purported to rank these rounds according to their "relative stopping power," or RSP.

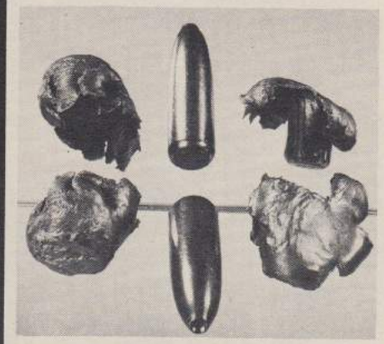
Of interest mainly to military and police ballisticians, the Hatcher formula is highly regarded by many experts in those fields even today. It is mentioned here because it is the only one of the systems to attempt to deal with the *shape* of the bullet (he assumed nonexpanding bullets in all calculations) as a factor in stopping power.

If momentum theory were correct, this rifle would be a more deadly missile than bullet!

Pondoro Taylor, however, did relate his knockout values to the use of "proper" bullets, recognizing that the wrong bullet in a given cartridge for the task at hand could knock his theories into a cocked hat.

These are only a few of the better known attempts to codify stopping power in sporting firearms. There have been many others, some of them ingenious and some presenting different approaches, but none contributing anything really new to the controversy.

The fact that such efforts continue is proof that none of the theories so far propounded can be made to agree reliably with our experience in the game fields. There must be one or more factors as yet unrecognized in the equation, because we cannot yet exactly describe stopping power in mathematical terms.



Two expanded .375 Bitterroots are shown flanking unfired specimen before a mirror.

One problem with many or most of the efforts is that they assume that all bullets are essentially alike in their expansion or penetration qualities, and this is several miles from the truth.

Another is that they assume identical hits on game, which cannot be.

The problems are vastly complicated by the facts that bullet performance is not the same at long and short range, that the anatomical structures of animals may be in motion when the slug arrives, and that different species of animals react very differently to wounding.

For example, certain animals such as the big cats, the moose, the various wild cattle, the African sable, and others, seem almost impervious to what we call "shock," while others frequently die very quickly of wounds that may even appear superficial. An ideal equation, then, might have to have a different factor for every animal or group of game species.

The question of bullet rotation has often been examined, both theoretically and practically. The fact that a bullet may be spinning at rates as high as 100,000 rpm, or even higher, has fascinated some experimenters. This can be shown, however, to contribute no more than four or five foot-pounds of kinetic energy to the impact on the game. On the other hand, it must have a major effect upon the *rate* of expansion of a softnosed slug, because of the tremendous centrifugal forces created on the bullet.

Some writers suggest that the common kinetic energy formula is misleading because it places too much emphasis on sheer velocity, saying that velocity changes rapidly over the bullet's flight, whereas weight remains constant. Indeed, a casual reading of ballistic tables does reveal some distortions of what we sense takes place when a game animal is shot.

For example, the muzzle energy of the .22-250 Remington with its 55-grain pill exceeds that of the factory-loaded .45-70 with its 405-grain slug. This means that a real die-hard kinetic-energy man is forced to defend the .22-250 as a better all-around game cartridge than the .45-70. Admittedly, neither is a true all-around cartridge, but which would you prefer in facing, for example, an African lion?

Cape buffalo require more stopping power than any other animal except, possibly, elephants.

Part of the problem is that all these formulas depend upon absolutes—absolute kinetic energy, absolute momentum, or whatever. Much depends, however, on the *rate* at which energy is given up by the bullet as it passes through the animal's body, rather than the total energy load it was carrying when it struck.

A light, high-speed slug yields up its energy relatively quickly, while a plodding heavyweight slug tends to

punch more deeply, giving up its energy more grudgingly. It is more likely to reach vitals, especially if it must break heavy bone on the way.

Therefore, the momentum (potence, pounds-feet, etc.) theory is right, right? Wrong, although in many ways it does appear to correspond more closely to actual experiences. Without going into the arithmetic, let me point out that it's possible to prove that if the momentum of a projectile is directly related to its deadliness, the rifle itself, in recoiling, is deadlier than the bullet leaving the muzzle, since the rifle has more momentum!

How about the veteran Taylor's knockout values? As published, they appear reasonably true, but they tell us nothing that practical experience doesn't. Taylor himself, in fact, rather apologetically declared that the .375 Holland & Holland Magnum was much more effective on living game than its knockout values would indicate, and, in his book *Big Game and Big Game Rifles,* he refused to even give a knockout value for the .375.

Since even one drastic distortion in any of these theories casts doubt upon the entire system, it must be acknowledged that not one of those so far presented can be depended upon to give us a reliable ranking of hunting cartridges according to their lethality on game.

So the next time your hunting buddy pins you down with an accumulation of figures and formulas showing how much more "stopping power" his rifle has than yours, don't run out and trade off your time-proven old pet for something with better numbers. So far, we have not even managed an adequate *definition* of the phrase "stopping power," much less a numerical description of it.

There is one other hypothesis, stoutly defended by Jack O'Connor and others, and it is that differences in this elusive quality among commonly used hunting cartridges exist largely in the imagination of the users. There is *no* discernible, practical difference in lethality on appropriate game species between, let's say, the 7x57mm Mauser, .280 Remington, 7mm Remington Magnum, .30-06, and others, assuming good bullets and correct bullet placement on target.

To put it another way, if you've had good results with your 7x57mm and have developed confidence in it, and in your ability with it, you'll gain exactly nothing by going up to the 7mm Magnum or one of the .300 Magnums on the same game species.

There's undoubtedly something to that, but like all the other theories, it suffers if stretched too far. At least one authority says that he could detect no difference in stopping power between the .30-06 and the .338 Winchester Magnum on an African safari. I know another veteran African hunter who actually believes the .338 is inferior to the old ought-six. Well, maybe so; my own experience with the .338 on game is much too limited to be used as a basis for argument.

But I'm very much inclined to believe that neither of these gentlemen has given the big-belted .33 enough trial. Certainly, neither has used or seen used the .338 on even a fraction as many game animals as they have the .30-06. I love the latter and I'm not very fond of the .338, but there must be a point in game size and toughness at which the .338 Magnum becomes a better, more reliable killer than the Springfield.

Another major point revolves around how and where the animal is hit. Surely, an elephant can be killed neatly with the little .256 Mannlicher-Schoenauer; W.D.M. Bell did it, year after year. But he placed his bullets like a surgeon places his scalpel. A whitetail hit in the heart-lung area with a .270 is just as dead as one hit there with a .375 H&H. But such shots cannot be absolutely counted on, and even the best of us—if we'll admit it—are occasionally forced to make something less than a classic shot.

The old saw that a leg-shot deer is a leg-shot deer, whether with a .257 Roberts or a .458 Magnum is true enough, but it's a red herring. What

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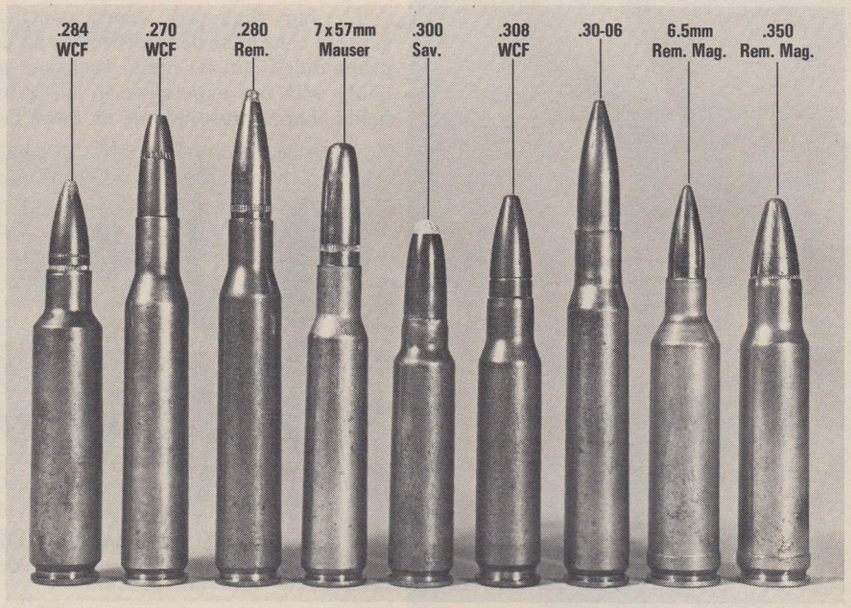
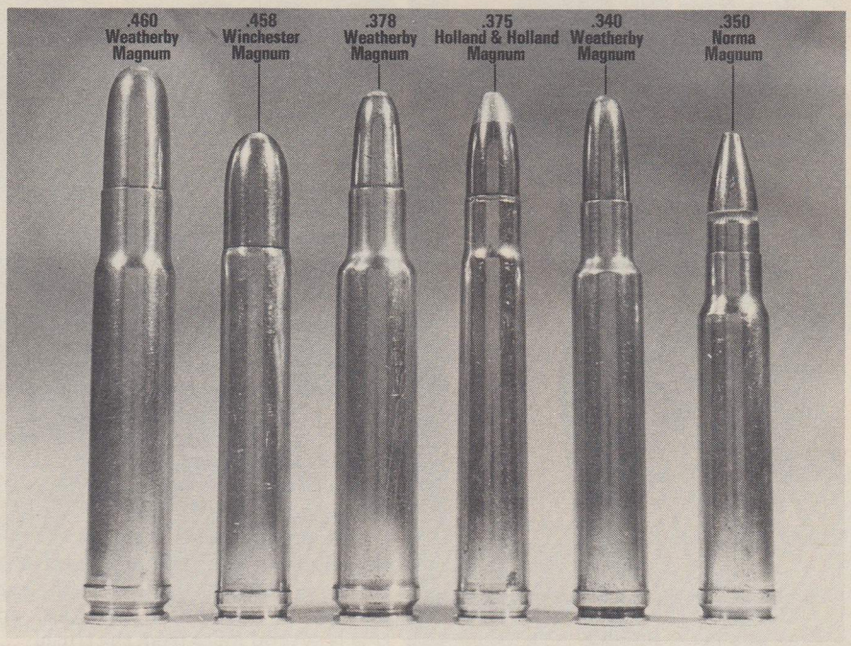


One theory holds that under certain conditions these cartridges have the same killing power.



These six cartridges emit enormous quantities of killing power, however they're measured.

Stopping Power

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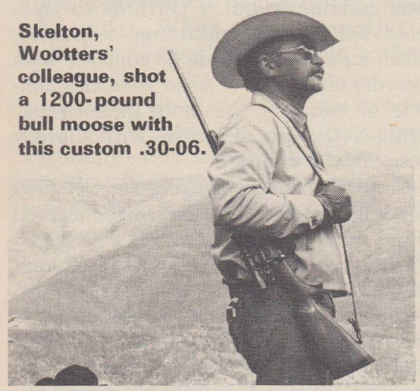
matters is how well a cartridge-bullet combination anchors game with those hits that are not quite perfect, but still not bad. I mean the shot that gets only one lung instead of both, or that strays back into the liver. In such cases, a little extra power is a better thing to have than a bit too little. In such cases, on appropriate game, I'd much prefer the .338 to the .30-06, for example.



Skelton, Wootters' colleague, shot a 1200-pound bull moose with this custom .30-06.

I know that Cape buffalo can be, and have been, killed neatly with such rounds as the little 7mm Mauser, but that's hardly justification for recommending this cartridge for that sort of game. On *mbogo,* I'd trade all the 7mm Mausers ever built for a good .375 Magnum.

Why? Not because of some mystical mathematical equation that gives the Holland cartridge an edge over the Mauser cartridge in terms of foot-pounds, pounds-feet, potence, RSP, knockout values, or *millframmuses,* but because experience, logic, intuition, instinct, or whatever else you want to call it assures me that the .375 is far deadlier on game of that size and temperament.

And that's really what it boils down to, even in the Space Age. We don't know exactly what "stopping power" is, but we know it when we see it. For a hundred years, the relative stopping power of various cartridges has been a meaty bone of contention among champions of high velocity, hydrostatic shock, heavy bullets, etc. And no doubt it will remain such a source of controversy for another century—at least, I hope so.

But don't let somebody with a slide rule and a sheaf of formulas and hyperdecimalized numbers snow you. He may have a pet theory, but he really doesn't know anything more about stopping power than you do.

If your present pet hunting rifle works for you, on your game and in your hunting conditions, stick with it; it will do just as well in the future as it has in the past. And that's not theory —that's fact!