

VEST BUSTER



**The .500 Smith & Wesson Magnum—
The Gun Industry's Latest Challenge to
Law Enforcement Body Armor**

The Violence Policy Center (VPC) is a national non-profit educational organization that conducts research and public education on firearms violence and provides information and analysis to policymakers, journalists, advocates, and the general public. The Center examines the role of firearms in America, analyzes trends and patterns in firearms violence, and works to develop policies to reduce gun-related death and injury.

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- *Cease Fire: A Comprehensive Strategy to Reduce Firearms Violence* (Revised, October 1997)

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—I know what you’re thinking. Did he fire six shots or only five? Well, to tell you the truth, in all this excitement, I’ve kind of lost track myself. But being this is a .44 Magnum, the most powerful handgun in the world, and would blow your head clean off, you’ve got to ask yourself a question. “Do I feel lucky?” Well, do ya, punk?

Fictional San Francisco police inspector “Dirty” Harry Callahan (Clint Eastwood) to Scorpio (Andrew Robinson) in the movie *Dirty Harry* (1971).¹

—Fifty Caliber rifles and handguns “reinforce the insanity of the gun manufacturers to make guns that have no purpose or use other than perpetuating violence.”

Real-life Los Angeles Police Chief William Bratton, supporting a city ordinance banning 50 caliber sniper rifles and 50 caliber handguns (2003).²

Summary

1. In February 2003 Smith & Wesson Corporation introduced its new 50 caliber handgun, the Model 500. Intended to recapture for the company line the title of “the most powerful handgun in the world,” the Model 500 revolver was designed around a new handgun cartridge, the .500 Smith & Wesson Magnum, developed for Smith & Wesson by bullet manufacturer Cor-Bon. (Page 1.)

2. The Model 500 and the extraordinarily powerful round it fires present a serious threat to the lives of law enforcement officers all over the United States. The power of the .500 Smith & Wesson Magnum round substantially exceeds the protection level of the highest grade of concealable body armor normally worn by law enforcement officers in the field, known as Type IIIA. This conclusion is based on: the VPC’s analysis of information published by Smith & Wesson; ballistics test data published by the National Rifle Association’s *American Rifleman* magazine and others; and, federal body armor standards established by the National Institute of Justice (NIJ) of the U.S. Department of Justice, information that is widely accepted in the law enforcement community. The power of this new handgun round raises doubt as to whether Type IIIA body armor can protect officers against it. (Page 17-20.)

3. The threat from the .500 Smith & Wesson Magnum and Model 500 is even more serious in hot, humid climates, where officers may elect to wear Type II body armor. The decision by a law enforcement agency or an individual officer regarding which level of body armor to wear is influenced by the level of threat the officers may face in a given jurisdiction, the typical duty assignment, and the comfort of the armor. Body armor that provides higher levels of protection is bulkier and less comfortable than armor that provides lower levels. According to the NIJ, police departments in hot, humid climates need to carefully evaluate whether to use Type IIIA armor. Officers in such climates may elect not to wear heavier armor because it is too hot. As a result, some agencies choose the next lower level, Type II, which provides even less protection against the .500 Smith & Wesson Magnum round. (Page 11-12.)

4. According to the National Rifle Association’s official magazine, *American Rifleman*, the .500 Smith & Wesson Magnum round is more powerful than some rifle rounds. The Model 500 combines the convenience of a handgun with the power of a rifle, a clear danger to law enforcement personnel. The next higher level of law enforcement protection from the Type IIIA body armor is Type III, which is external armor designed to protect against rifle fire. It is intended only for use in special tactical situations, not for routine patrol. (Page 20.)

5. Law enforcement body armor was developed and introduced in the United States during the 1970s specifically to protect officers from handgun assaults. Body armor is in routine use in the United States, unlike other countries, simply because firearm assaults on law enforcement officers are not as common in other countries. Firearms, and handguns in particular, account for the lion's share of felonious deaths of law enforcement officers. Of the 658 law enforcement officers killed feloniously between the years 1990 and 1999, 610 (92.7 percent) were killed with firearms, and 466 (71 percent) were killed by handguns. (Page 8-10.)

6. Body armor has saved thousands of officers' lives because of its ability to stop handgun rounds, but it cannot stop high-powered rifle rounds. During the 1990 to 1999 period, 20 officers were killed by gunshot wounds as a result of rounds penetrating their body armor. All of these rounds were fired from rifles. However, the .500 Smith & Wesson Magnum takes pistol power to rifle-power level and thus presents a deadly challenge to law enforcement body armor's life-saving record. (Page 19-20.)

7. The .500 Smith & Wesson Magnum round, and the Smith & Wesson Model 500 handgun, are examples of how the gun industry's freedom from product health and safety regulation allows it to recklessly develop and market increasingly lethal products without consideration for their threat to public safety. Following a well-established gun industry pattern of design and price competition, it is likely that other manufacturers will soon develop and market their own versions of handguns chambered for the .500 Smith & Wesson Magnum round. Smith & Wesson has a long history of introducing powerful new handguns and cartridges that other manufacturers quickly copy. This last occurred in 1990, when Smith & Wesson announced the development of a new cartridge, the .40 S&W, and a new handgun chambered for it. Other manufacturers quickly produced handguns in the new caliber, which became so ubiquitous that in 2000 the National Institute of Justice replaced the .357 Magnum cartridge with the .40 S&W cartridge in establishing the protection levels of Type IIA body armor. Thus, if history is a guide, the 500 Smith & Wesson Magnum will proliferate as other manufacturers market copies of the round and handguns chambered for it. Prices will fall and the threat to law enforcement officers will rise. (Page 4-7.)

Section One
**The 500 Smith & Wesson Magnum—“The Most Powerful
Handgun On Earth”**

In February 2003, Smith & Wesson Corporation unveiled a new 50 caliber handgun, the 500 S&W Magnum, declaring it to be “the most powerful production revolver cartridge ever developed.”³ The revolver is chambered for the .500 Smith & Wesson Magnum cartridge, a 50 caliber^a round that Smith & Wesson developed jointly with Cor-Bon, a bullet manufacturing subsidiary of Dakota Ammo, Inc. located in Sturgis, South Dakota.⁴



The 500 Smith & Wesson Magnum 50 Caliber Revolver

Gun Press Praise. After first laying the promotional groundwork with a coterie of friendly gun writers,⁵ Smith & Wesson introduced its new handgun to the public at the gun industry’s annual trade event, the Shooting, Hunting, and Outdoor Trade (SHOT) Show, held in 2003 in Orlando, Florida. True to form,⁶ the gun press dutifully sang the handgun’s praises. For example, the National Rifle Association’s official magazine, *American Rifleman*, wrote that “when it comes to true mass-produced, commercially available handgun cartridges, the new .500 S&W Mag. is *the most powerful* handgun on earth.”⁷ (Italics in original.) *Handguns* magazine declared, “Put simply, the new Smith & Wesson Model 500 revolver is the biggest, most powerful revolver in the world. And the new .500 S&W Magnum cartridge is the biggest, most powerful cartridge ever invented for handgun use.”⁸ The premier trade magazine, *Shooting Industry*, added, “Smith & Wesson once again becomes the undisputed King of Magnum Sixguns....”⁹

^a “Caliber” is a measure in inches of the cross-sectional dimension of a bullet. Thus, a 50 caliber bullet is half an inch (.50) across. Some ammunition is described in the metric system, such as 9mm, which is .357 inches.

The well-orchestrated acclaim was music to Smith & Wesson's ears for three reasons: it announced the recapture of a symbolic but prestigious title; it marked Smith & Wesson's emergence from the gun culture's dog house; and, it helped give the company a badly needed boost in sales. But what neither the company nor the gun press have addressed is the threat the .500 Smith & Wesson Magnum brings to law enforcement officers—an ironic result because the company also markets police equipment and runs a police armorer's school. Yet, according to data published by the company, the gun press, and the federal government, it appears that the .500 Smith & Wesson Magnum is plainly capable of defeating the highest level of police body armor worn in all but SWAT-type situations. It is a vest buster.

The Crown Lost and Restored. Forty-seven years ago, the NRA's magazine, then called *The American Rifleman*, announced that a new Smith & Wesson revolver chambered for the .44 Magnum cartridge was the "Most Powerful Handgun in the World."¹⁰

The Smith & Wesson .44 Magnum revolver (soon designated the Model 29) was well received.^b The revolver enjoyed a "massive burst of popularity" when it was featured in the 1971 Clint Eastwood movie, *Dirty Harry* and the company was "flooded with orders."¹¹ The Model 29—"in effect Eastwood's co-star"—thereafter "commanded premium prices."¹² The movie, and especially the assertion of Eastwood's character, Inspector Harry Callahan, that "this is a .44 Magnum, the most powerful handgun in the world, and would blow your head clean off," put the gun and cartridge "on the map as a cultural icon."¹³ However, the "most powerful handgun" crown slipped from Smith & Wesson's corporate head when other cartridges exceeded the .44 Magnum's power, among them the .454 Casull, the .475 Linebaugh, and the .480 Ruger.¹⁴

Last year, Smith & Wesson's managers decided to regain the lost title by designing and marketing the 500 S&W Magnum revolver and its companion cartridge.¹⁵

Escape from the Dog House. One of the more bizarre events in the history of gun control occurred on March 17, 2000, when the Clinton White House announced the signing of an agreement with Smith & Wesson that supposedly broke new ground in reducing handgun violence. President Clinton praised foreign-owned¹⁶ Smith &

^b The author, in his former days as a "gun nut," owned and often fired a Model 29 revolver, a Model 27 revolver chambered in .357 Magnum, and a Model 25 revolver chambered in .45ACP. He shot the latter handgun in a standard pistol competition course, instead of the more common .45ACP semiautomatic pistol.

Wesson for its “courage and vision” in signing an agreement under which the federal government and several cities agreed to drop lawsuits against the company in exchange for voluntary restraints and changes in the company’s marketing of handguns.¹⁷

In spite of Clinton’s assertion that the agreement was a “major victory for America’s families,” it was in fact wholly illusory.¹⁸ But Smith & Wesson was nevertheless hammered as a traitor by gun-rights advocates, including the National Rifle Association (NRA). Distributors and buyers alike vowed to boycott the company.¹⁹ Within weeks of the signing, Smith & Wesson posted on its website an interpretation that nullified the agreement.²⁰ In the end, the agreement evaporated, but it left Smith & Wesson with a black eye in the gun-buying market. After the company changed hands, and once again became U.S. owned, it actively sought to regain lost ground and the 500 S&W Magnum became a highly-visible part of a successful plan to re-establish Smith & Wesson as an All-American name brand in good standing with the NRA and the gun market.

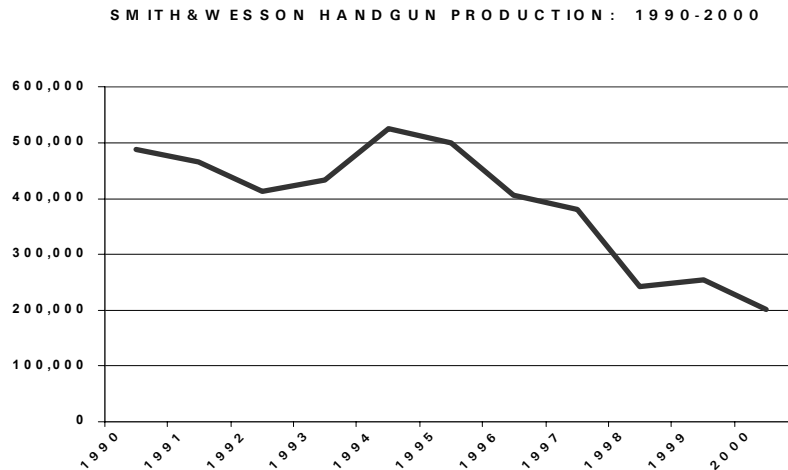
“This gun will get people talking about Smith & Wesson again,” said Steve Comus of Safari Club International.²¹ Gun writer and entrepreneur Massad Ayoob hailed the company’s “return to American ownership and American values.”²² And the NRA sanctified the company’s return to favor with the observation that “Smith & Wesson has re-established itself as an American handgun icon—a status it lost in the backlash of its now infamous agreement with the Clinton administration.”²³

Fifty Caliber Sales Boost. According to a company spokesman, Smith & Wesson’s business declined 40 percent after its aborted deal with the Clinton White House.²⁴ A decline of that order at the time would have hit especially hard. In 2000, Smith & Wesson was already at the bottom end of a long sales slump. Its total handgun production fell from a decade high of 524,765 in 1994 to 200,602 in 2000, the year it signed the illusory agreement with the Clinton White House. (See Table One.)

Smith & Wesson was not alone. According to the *Associated Press*, total handgun production in the United States declined 52 percent between 1993 and 1999.²⁵ In fact, the firearms industry has been in an overall decline for three decades, in spite of occasional boom years such as 1994. The industry’s chronic problem over the last several decades has been figuring out how to deal with saturated or declining markets, in which “more and more guns [are] being purchased by fewer and fewer consumers.”²⁶ The industry’s principal means for addressing its stagnant and declining markets has been innovation, especially the introduction of increasingly lethal products such as semiautomatic assault weapons, highly concealable, high-powered pistols that the industry named “pocket rockets,” and, large caliber handguns.²⁷

The 500 Smith & Wesson Magnum fits precisely into this industry pattern. "The company has a rich history as an industry innovator and we are heading down the same path," Roy C. Cuny, the company's new president and CEO, said of the new revolver.²⁸ According to the company, its recent injection of heightened lethality has worked. "The initial reaction has been even stronger than we had anticipated, so we're ramping up production to meet the demand," said Bob Scott, Smith & Wesson's former chairman.²⁹ And Cuny said introduction of the gun has "resulted in a significant increase in orders."³⁰

TABLE 1—Smith & Wesson: A Company on the Skids



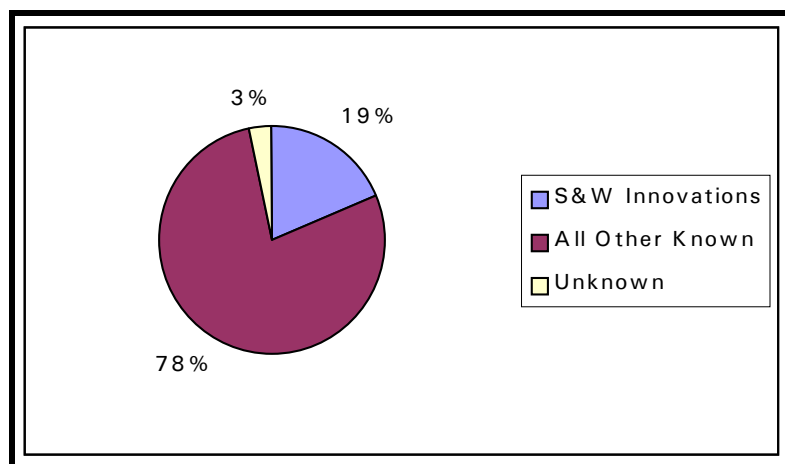
Smith & Wesson was in a slump when it signed a 2000 agreement with the Clinton Administration. A company spokesman said it lost another 40 percent in sales to customers angered by the pact. The new 500 S&W Magnum revolver has helped revive sales.

It seems clear that the 500 Smith & Wesson Magnum will help boost the company's profits. But the public relations blitz surrounding the 50 caliber revolver has obscured the fact that it presents a new order of high-powered threat to the nation's law enforcement officers.

This is business as usual for Smith & Wesson. The 50 caliber revolver is merely the latest entry in a long list of Smith & Wesson innovation in high-powered handguns.

The company’s first handgun was nicknamed “The Volcanic” in 1852 because of “its incredible firepower and its rapid-fire capability.”³¹ Since the 1930s, three Smith & Wesson innovations have ended up in the front ranks of the nation’s cop-killers. For example, 27 out of 144 (nearly one out of every five) law enforcement officers slain with a handgun from 1998 through 2001 were killed with one of three types of handgun and cartridge combinations that were originally designed and introduced by Smith & Wesson and then widely copied by other manufacturers: the .357 Magnum, the .44 Magnum, and the .40 S&W.³² (See Table 2.)

TABLE 2—Smith & Wesson Innovation and Law Enforcement Officers Slain by Handguns, 1998-2001



Nearly one in five law enforcement officers slain by a handgun between 1998 and 2001 were killed by one of three high-powered handgun and cartridge designs that were originally introduced by Smith & Wesson, then widely copied by other manufacturers: the .357 Magnum, the .44 Magnum, and the 40 Smith & Wesson.

The .357 Magnum. The .357 Magnum, the first armor-busting handgun developed by Smith & Wesson, was introduced in 1935.³³ According to Smith & Wesson, the .357 Magnum was developed at the request of law enforcement officers, “who were looking for a way to deal with more treacherous and better-armed criminals.”³⁴ Violent gang struggles were going on at the time: “Many of the .45 caliber military automatics found their way into private hands, and the gangsters were even using the Thompson submachine guns (popularly known as the ‘Tommygun’ or ‘Chicago Piano’), which Colt’s began to manufacture in 1920.”³⁵ (Civilian possession of machineguns—fully automatic weapons— was legal at the time.) “Criminals escaping in cars presented a special problem and peace officers needed a handgun and ammunition that would pierce car bodies.”³⁶

Since Smith & Wesson firearms also were included in the gangsters' arsenals,³⁷ this is one of the earliest examples of the now well-established practice of the firearms industry's first marketing to civilians powerful weapons that end up in the hands of criminals, then selling a new round of even more powerful weapons to law enforcement officers, who feel "outgunned" by the first cycle of firearms.³⁸

It [the .357 Magnum] produced the desired effect for use by police: it would penetrate three thicknesses of contemporary "bullet-proof" vests, managed to penetrate duralumin^c plates and, fired through the hood of a car idling at high speed, would both stop and disable its engine.³⁹

The first production model of the .357 Magnum was presented to FBI director J. Edgar Hoover,⁴⁰ another early example of the now common industry practice of promoting firearms for the civilian market by first seeking the endorsement of law enforcement or military organizations. As the company today declares on its Internet website, "The popularity of the .357 Magnum paved the way into the era of Magnums."⁴¹ Other firearm manufacturers picked up on the popularity of the new cartridge and brought out their own versions.

The Smith & Wesson .44 Magnum. As has already been described, Smith & Wesson introduced the .44 Magnum in the 1950s. According to the NRA's expert, retired Major General J. S. Hatcher, the new revolver was nearly twice as powerful as the .357 Magnum,⁴² marking another order of threat. As in the case of the .357 Magnum, other manufacturers quickly began making handguns chambered for the popular .44 Magnum cartridge.

The .40 Smith & Wesson. Smith & Wesson introduced the .40 Smith & Wesson cartridge and semiautomatic pistol in 1990.⁴³ The new package grew out of a 1986 gun battle in Miami between an FBI team and two heavily armed felons that left two FBI agents dead and five more wounded before their assailants were killed. The carnage ignited debate over whether the FBI team was "outgunned" by superior weapons or simply displayed poor tactical judgment.⁴⁴ The two felons were armed with a Ruger Mini-14 223-caliber assault rifle, .357 Magnum revolvers, and a Smith & Wesson Model 3000 riot gun. The agents were armed with a variety of weapons, including then standard-issue Smith & Wesson .357 Magnum revolvers.

The FBI concluded that the major problem was the inadequacy of its agents' firepower. It conducted an exhaustive series of tests, and announced in September

^c Duralumin is an alloy of aluminum, copper, and small amounts of magnesium and manganese, "considerably stronger than elemental aluminium." *Wikipedia*, <http://www.wikipedia.org/wiki/Duralumin>.






1989 that it was converting to 10mm semiautomatic pistols, replacing its long-standard .357 Magnum revolvers with Smith & Wesson Model 1076 pistols. Smith & Wesson then entered into a joint venture with ammunition manufacturer Olin/Winchester to develop an entirely new round—the .40 Smith & Wesson—and a new gun to go with it. “The .40 Smith & Wesson bandwagon started rolling on January 17, 1990 when S&W announced their new cartridge and Model 4006 handgun at a SHOT Show press conference,” *Guns & Ammo* reported in 1990.⁴⁵ Gun writers were predictably enthusiastic:

Compared to 9mm handguns and their best ammunition, a .40 S&W holds almost as many shots, but they’re better, harder-hitting shots. Compared to the .45 ACP, a .40 S&W holds more shots, and they strike with enough gusto as to compare favorably with the legendary old .45 cartridge.⁴⁶

In short, the .40 S&W ratcheted lethality up several notches. Austria-based Glock announced its .40 S&W model within less than two months.⁴⁷ Within one year “every major American ammunition manufacturer had one or more loads either in production or scheduled, and gun companies adding it to their lines were almost too numerous to count.”⁴⁸

The Newest Vest-Buster: A Threat to Law Enforcement. Given the history of Smith & Wesson’s earlier innovations, and the gun industry’s propensity for rushing to market hot new trends, law enforcement officers will very likely soon be confronting the 500 Smith & Wesson Magnum. Unfortunately, by every objective measure, this new weapon is much more powerful than any handgun officers now face. (See Table 3.)

TABLE 3—Smith & Wesson Compares Its New Magnum

					
Caliber	.357 S&W Magnum®	.44 Magnum®	480 Ruger	454 Casull	500 S&W
Muzzle Energy	500 Ft/Lb.	900 Ft/Lb.	1315 Ft/Lb.	1900 Ft/Lb.	2600 Ft/Lb.

This chart from Smith & Wesson’s Internet website documents that the 500 S&W 50-caliber round leaves the gun’s muzzle with five times the energy of the .357 Magnum, and nearly three times the energy of the .44 Magnum.

The remainder of this report discusses in detail the protective capabilities of police body armor and the threat that the new 50 caliber round and handgun present.^d

^d This report does not address an apparent consumer safety problem with the new handgun recently reported in *Handguns* magazine. According to that magazine's question and answer column, the S&W .500 Magnum has a disconcerting tendency to drop its hammer on a second round before the trigger is pulled a second time. This reportedly has sometimes resulted in a "double" – two rounds being fired with only one pull of the trigger – a clear safety hazard and potential evidence of a design defect. *Handguns* reports that Smith & Wesson has taken the problem seriously enough to study the weapon's firing with a high-speed movie camera. Not surprisingly, the company reportedly concluded that the problem is the result of the way the shooter holds the gun, not the gun's design. See, *Handguns*, February/March 2004, 19. Unlike every other consumer product sold in the United States, firearms are not subject to design standards, safety inspection, or recall by any federal agency. Thus, even if the handgun's dangerous tendency were the result of a design defect, no agency has the authority to order a recall of the product, to require corrective action to be taken, or even to require notice be given to current owners.

Section Two

The Silent War—The Rise of Handguns and Law Enforcement Body Armor

The development of law enforcement body armor was a peculiarly American event, spurred by a dramatic rise in officer fatalities in the United States during the 1960s. From 1966 to 1971, the number of law enforcement officers killed each year in the line of duty more than doubled: from 57 to 129.⁴⁹ (See Table 5.)

The Rise of Handguns. This increase in officer fatalities was not a coincidence. It closely tracked the explosion of handguns in America. (See Table 4.) As the gun industry began to heavily market handguns to compensate for stagnation in traditional sporting markets, handgun production increased from 475,000 in 1960 to 1,394,000 in 1970. Taking into account imports and exports, the total annual number of handguns available for sale in the United States increased from 546,000 in 1960 to a decade-high of 2,367,000 in 1968, then declined to 1,533,000 in 1970.^e Handguns represented 27 percent of the *total* firearms market in 1960, 47 percent in 1968, and 36 percent in 1970. An instructive comparison is 1950, when handguns represented a mere eight percent of the total firearms market.⁵⁰

Law enforcement officers paid with their lives for the gun industry's handgun marketing campaign, as Table 5 demonstrates. Since then, the proportion of handguns in the total firearms market has continued to grow. In the decade from 1990 to 1999, handguns accounted for 45 percent of the domestic manufacture of firearms, and 45 percent of firearms available for sale in the civilian market.⁵¹ The result has been peril for law enforcement officers. According to the National Institute of Justice:

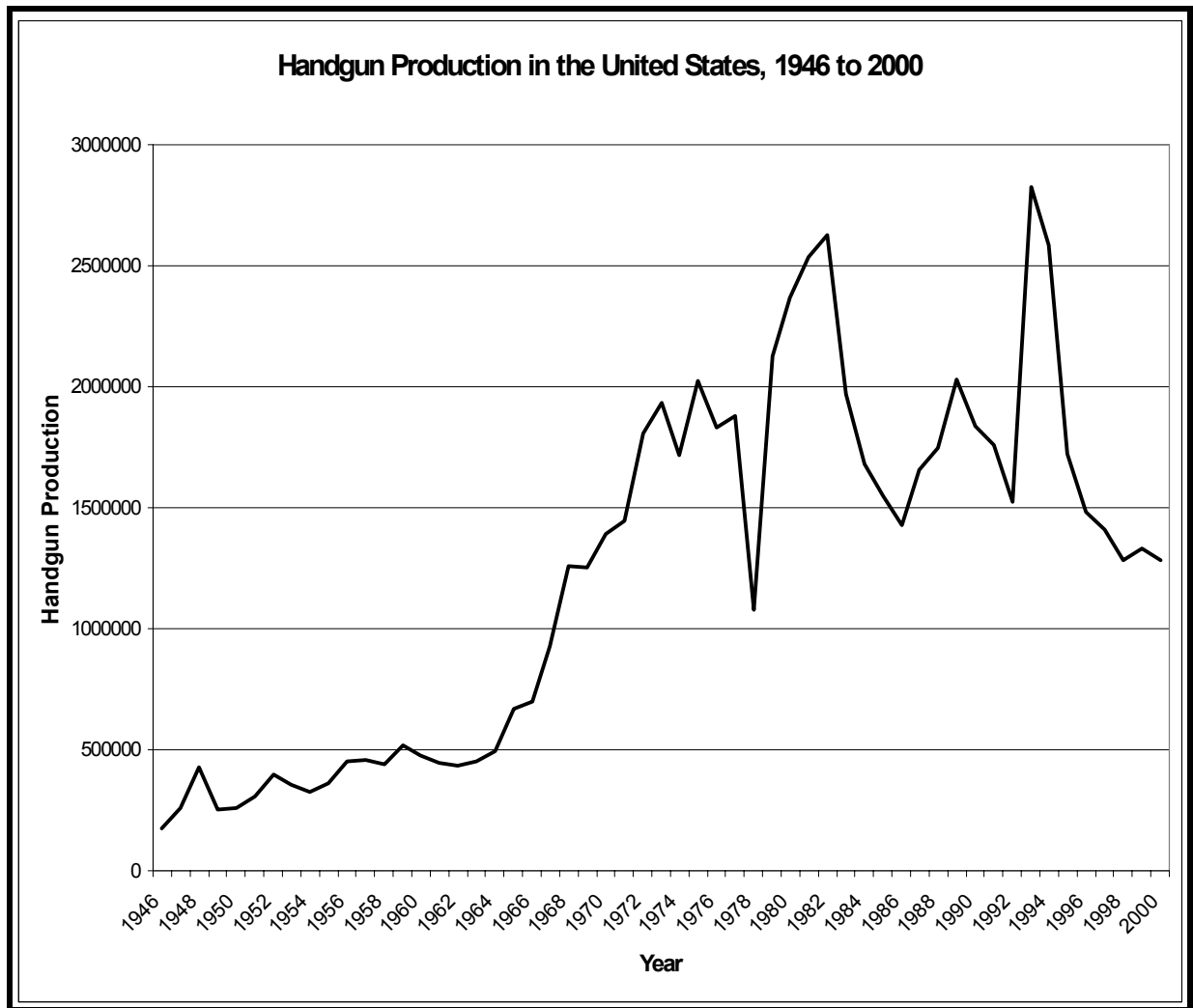
The use of weapons of all types, particularly handguns, by those with criminal intent, poses a constant threat to police officers, whether they are responding to a domestic quarrel or to an armed robbery. All too frequently, a domestic disturbance erupts into violence when family members redirect their anger toward the officer attempting to effect a peaceful resolution. Similarly, a routine traffic stop can result in an unexpected armed confrontation.⁵²

One Indiana country sheriff who recently required all of his deputies to wear body armor put the matter this way, "You never know when a little old grandma could panic and do something stupid, and kaboom something might happen."⁵³

^e The decade's peak year of 1968 was strongly influenced by a flood of foreign imports by importers seeking to beat the deadline of import standards imposed by the Gun Control Act of 1968.

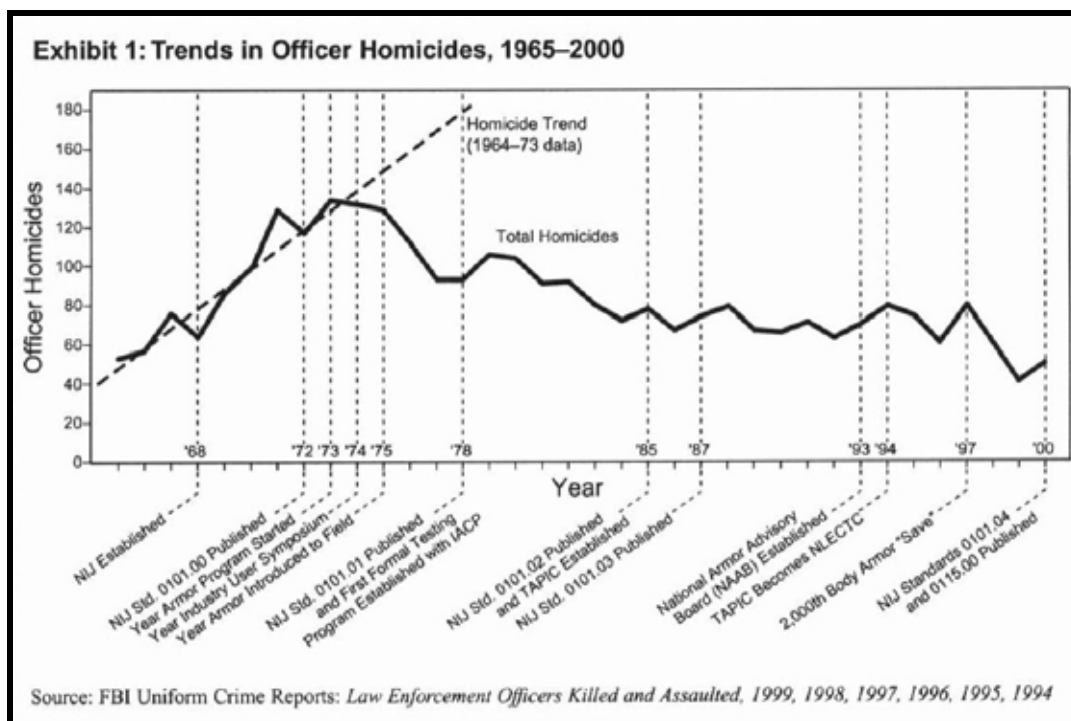
The Development of Body Armor. Law enforcement body armor was developed specifically to meet the handgun threat.⁵⁴ As Table 5 shows, the introduction of body armor dramatically altered the trend in law enforcement officer deaths. (Until the recently increased terrorism threat, body armor was not widely used by law enforcement officers in other countries because “assault by firearms on law enforcement officers in other countries was not as common.”⁵⁵) Many more officers would almost certainly have died had body armor not been introduced.

TABLE 4 – Handguns in America



The gun industry’s heavy marketing of handguns in the 1960s, clearly seen in this table, triggered a steep increase in handgun killings of law enforcement officers. (See Table Five.)

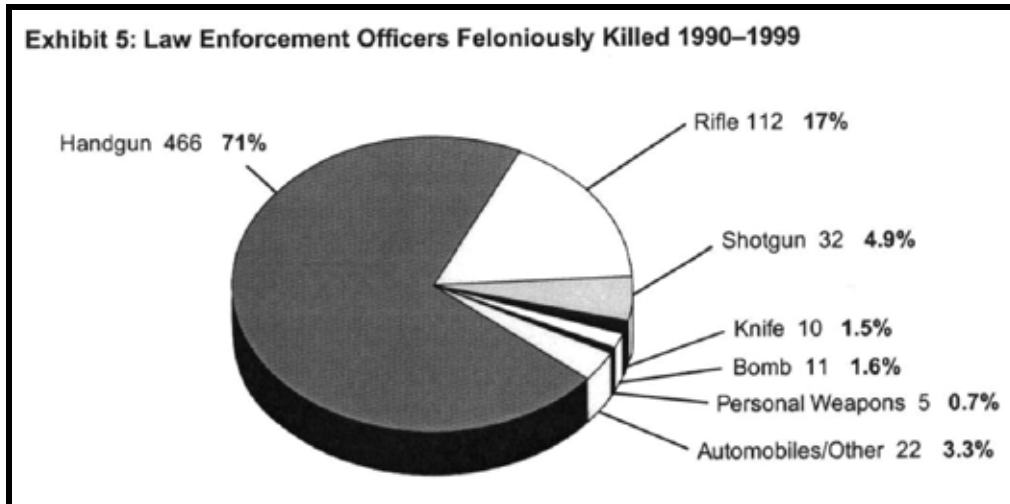
TABLE 5—Trend In Law Enforcement Officer Homicides



The sharp spike in law enforcement officer homicides shown here tracked the proliferation of handguns in America. (Compare to Table 4.) The introduction of body armor reversed the trend in officer slayings. But handguns still accounted for more than 70 percent of law enforcement homicides over the last decade.

The Handgun Threat Continues. The continuing threat to law enforcement officers from handguns is clearly shown in the most recent decade’s homicide statistics. Of 658 officers feloniously killed in the 1990-1999 decade, 610 or 92.7 percent were killed with firearms and, of these, 466 or 71 percent were killed with handguns.⁵⁶ (See Table 6.) In addition to flooding the country with handguns, gun industry marketing trends also affect the specific types of handguns that officers face on the street. For example, the 9mm semiautomatic pistol has now surpassed the 38-caliber handgun as the most common handgun threat.⁵⁷ This occurrence reflects the gun industry’s heavy marketing of high-capacity 9mm pistols—the so-called “wondernine”—in the late 1980s and early-1990s.⁵⁸

TABLE 6—How Law Enforcement Officers Are Murdered



Handguns accounted for more than two thirds of the felonious homicides of law enforcement officers in the period 1990-1999.

In spite of these grim facts, many law enforcement officers still do not wear body armor, although the proportion who do is growing. According to the federal Bureau of Justice Statistics, in 2000 56 percent of local police departments, employing 57 percent of all officers, required all field officers to wear protective body armor, compared to 24 percent and 25 percent respectively in 1990.⁵⁹ In the same year, 52 percent of sheriffs' offices, employing 53 percent of all sworn personnel, required all field offices to wear protective body armor, compared to 21 percent and 23 percent in 1990.⁶⁰

The Problem of Comfort Versus Security. Since officers who do not wear body armor remain highly vulnerable to a lethal handgun assault, the logical question is, why don't they wear armor? There are a variety of answers, according to the National Institute of Justice (NIJ). The main reason is the "weight and bulk of body armor can increase significantly as greater threat protection is demanded,"⁶¹ and those who do not wear armor "usually claim that the bulk and weight of armor make it uncomfortable."⁶² A 1992 Congressional report explained, "Wearers (and, especially, nonwearers) commonly describe their armor as 'hot,' 'heavy,' 'stiff,' 'chafing,' and the like," and cited a year-long survey that concluded: "the strongest influence on wear rate (of those considered) was the Temperature-Humidity Index (THI)."⁶³

"The problem we have in Florida is finding a vest that can be tolerable in the heat," said a captain in the Orange County Sheriff's Office. "If it's not comfortable,

they're not going to put them on even if it could save their life."⁶⁴ The problem is not restricted to the South. The police chief of Northbridge, Massachusetts, said his department does not require officers to wear vests while on duty. "They are heavy and hot. We have people that walk the beat in the summertime or are on bike patrol, and they can be hot and uncomfortable." He said that even new, lighter vests can also be uncomfortable to wear.⁶⁵

What this means in sum is that there is a practical limit to what law enforcement officers are likely to wear in order to protect themselves, even from acknowledged threats. The ultimate consequence of the reckless behavior of companies like Smith & Wesson who continue to develop more and more powerful handguns is that law enforcement officers will be stripped as a practical matter of their protection.

The Arms Race. This brief history of law enforcement body armor illustrates that a quiet but nevertheless classic arms race between offense and defense is going on in America between the gun industry and law enforcement. As the industry has rolled out more lethal products, law enforcement has had to respond with more effective means to defend its members from assault by weapons that inevitably become ubiquitous in American society. The threat from new industry products lurks not only in encounters with felonies in progress, but in every traffic stop and domestic disturbance to which an officer is called.

Section Three

Body Armor Standard Levels of Protection

Types of Body Armor. Although body armor is sometimes referred to as a “bulletproof vest,” there is no such thing. Virtually all armor can be penetrated by a weapon of some type (such as the 50-caliber sniper rifles that are freely sold in America with less restrictions than handguns^f). The following summary from a Congressional report helps explain the types of body armor worn by law enforcement officers:

Two types of armor are worn by police: soft armor and hard armor. *Soft armor*, designed to stop handgun bullets, is worn routinely by many officers. It is often worn in a sleeveless undergarment called a “vest”... but is sometimes incorporated into the lining of a jacket or other outer garment. It is designed to be inconspicuous, although a person intent on detecting it might discern it under light clothing at close range in daylight.

Hard armor is donned, often over soft armor, by police on special assignments expecting an unusual risk of rifle fire or stabbing. It may be inconspicuous but is often quite distinctive: television viewers recognize it as the armor worn by SWAT (Special Weapons and Tactics) teams.... Police call it “tactical armor” and generally find it too hot, heavy, or conspicuous for routine wear. It may include panels of sheet steel or titanium, perhaps coated or tiled with ceramic.⁶⁶

How Body Armor Works. Body armor is made of materials woven from very strong fibers. When a bullet strikes the armor, it is caught in a “web” of fibers that absorb and disperse the impact energy, and cause the bullet to flatten or “mushroom.” Energy continues to be absorbed by succeeding layers of material until the bullet is stopped.⁶⁷ The effectiveness of the armor depends not only on its design and materials, but also on the shape and caliber of the bullet impacting it. According to the NIJ, “The ballistic threat posed by a bullet depends, among other things, on its composition, shape, caliber, mass, angle of incidence, and impact velocity....For example, an armor that prevents complete penetration by a 40 S&W test round may or may not defeat a 40 S&W round with higher velocity.”⁶⁸ Thus a given body armor that stops a bullet of a given caliber, shape, mass, and velocity may not stop another bullet of the same caliber with a different shape, mass, or impact velocity.⁶⁹

^f See, Violence Policy Center, *Voting from the Rooftops—How the Gun Industry Armed Osama bin Laden, Other Foreign and Domestic Terrorists, and Common Criminals with 50 Caliber Sniper Rifles* (Washington, DC: October 2001).

Blunt Trauma. Even if the fabric stops the bullet, however, NIJ notes that there is another source of potential injury—“blunt trauma” from the impact:

If...the armor that covers the torso deforms from the bullet impact, the surface of the armor against the body at the point of impact will be forced against or into the skin. Unlike a penetrating wound, in which the skin is broken and the bullet tears through the body, the deformation of armor from bullet impact results in blunt trauma. This type of nonpenetrating injury can cause severe contusions (bruises) or internal damage and can even result in death.⁷⁰

Body armor users must therefore also take into account the capabilities of their armor to prevent injury from blunt trauma, even if the bullet does not actually penetrate the vest. The force of the blow transmitted through the vest could kill or seriously injure the wearer even if he or she does not suffer a penetrating wound.

The NIJ Standards Program. There were 17,784 full-time state and local police agencies in the United States as of June 2000, employing 708,022 full-time sworn personnel and 43,000 part-time sworn personnel.⁷¹ More than 80 manufacturers make body armor.⁷² However, according to a Congressional study, “the ability of armor to stop bullets—its ‘ballistic resistance’—cannot be discerned by inspection; it must be inferred from the results of tests in which sample armor is shot.”⁷³ Because body armor is literally a matter of life and death, the need for uniform standards and testing thus became clear early on. Otherwise, law enforcement agencies and officers would be at the mercy of manufacturers’ claims. The NIJ has been setting uniform body armor standards for more than 28 years, operating a voluntary testing program, and publishing a list of body armor products that meet the standards. The ballistic body armor standard has gone through four revisions to date.⁷⁴ (A separate, relatively new standard evaluates the ability of body armor products to resist stabbing.)

The NIJ’s Seven Standard Levels of Protection. The NIJ classifies body armor into seven standard levels of ballistic performance, designated as “types.” (See Appendix A for a complete listing and description of the seven types.)

Soft body armor suitable for full-time wear throughout an entire shift of duty is available in four types—Types I, IIA, II, and IIIA—which provide increasing levels of protection from handgun threats. According to the NIJ:

Type I body armor, which was first issued during the NIJ demonstration project in 1975, is the minimum level of protection that any officer should have. Officers seeking protection from lower velocity 9mm and 40 S&W ammunition typically wear Type IIA body armor. For protection

against high velocity 357 Magnum and higher velocity 9 mm ammunition, officers traditionally select Type II body armor. Type IIIA body armor provides the highest level of protection available in concealable body armor and provides protection from high velocity 9 mm and 44 Magnum ammunition.⁷⁵

NIJ added Type IIIA, the highest level for full-time officer wear, in March 1985, "in response to concerns from the law enforcement community about the need for protection from high-velocity and high-energy handgun rounds such as the submachine gun 9mm and .44 Magnum."⁷⁶

The next two higher levels, Types III and IV, are hard armor designed to protect against high-powered rifle rounds. They are "clearly intended for use only in tactical situations when the threat warrants such protection."⁷⁷ Body armor at these levels "is of either semirigid or rigid construction, typically incorporating hard materials such as ceramics and metals. Because of its weight and bulkiness, it is impractical for routine use by uniformed patrol officers and is reserved for use in tactical situations, where it is worn externally for short periods of time when confronted with higher threat levels."⁷⁸

The seventh level is a "special type" reserved for custom protection needs not covered by any of the other types. The next section compares the published ballistics of the 500 Smith & Wesson Magnum revolver and cartridge with the protection levels established by the NIJ.

Section Four

The 500 Smith & Wesson Magnum—A Vest Buster

The Smith & Wesson .357 Magnum was a vest-busting handgun when it was introduced in 1935, as documented in Section One. The question now is whether the Smith & Wesson 500 Magnum is capable of penetrating present day law enforcement body armor. Data published by Smith & Wesson, the National Rifle Association, and others indicates quite conclusively that the power of the Smith & Wesson 500 Magnum exceeds the known limits of soft body armor. The NRA and firearms expert Massad Ayoob also have stated that the power of the new revolver is greater than that of several rifle rounds which, as we have seen, soft body armor is neither intended nor designed to protect against. Finally, calculations of the striking power of the .500 S&W Magnum round indicate that it hits targets with up to two and a half times the energy of the .44 Magnum. The less powerful .44 Magnum is the force against which the highest level of soft body armor is tested as safe.

Measuring the Danger. Ballistics is the science of a projectile's motion, and terminal ballistics is the study of the penetration of solids by the missile.⁷⁹ The common unit of measurement in the United States for the energy that a bullet carries is "foot-pounds of energy."⁸⁰ The relationship among the variables involved is explained as follows:

A moving projectile, by virtue of its movement, possesses kinetic energy. For a bullet, this energy is determined by its weight and velocity:

$$\text{K.E.} = WV^2/2g$$

where g is gravitational acceleration, W is the weight of the bullet, and V is the velocity.

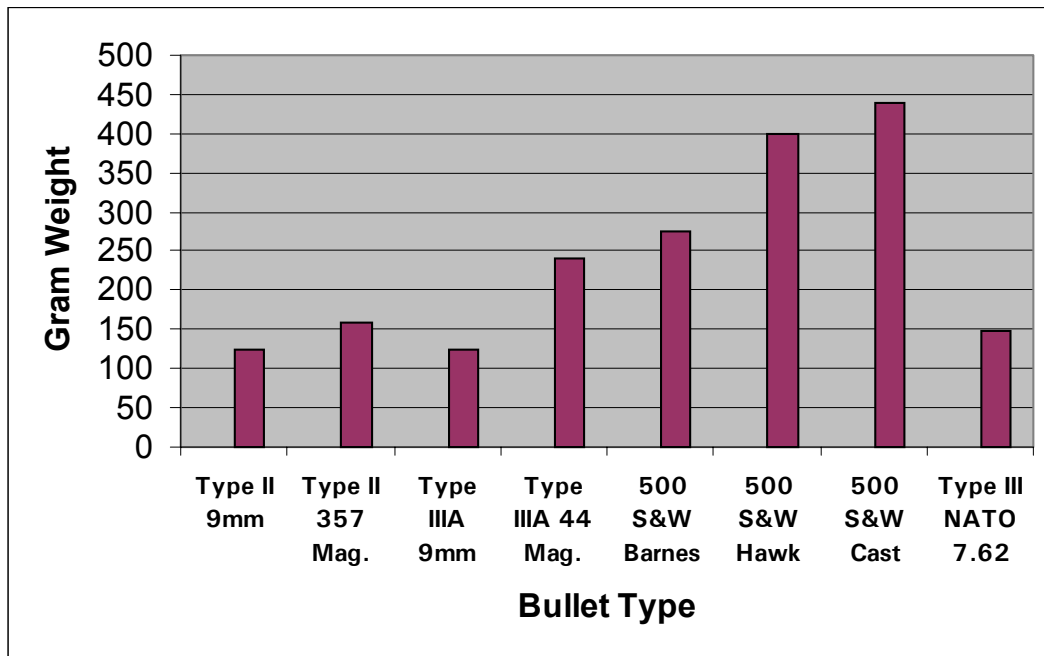
From this formula, it can be seen that velocity plays a greater role in determining the amount of kinetic energy possessed by a bullet than does weight. Doubling the weight doubles the kinetic energy, but doubling the velocity quadruples the kinetic energy.⁸¹

The Threat Measured. Given this relationship, the striking power of bullets fired from different rounds of ammunition can be objectively compared. If we know the weights and the velocity at which the bullets strike their targets, we can compute the kinetic energy that each delivers on impact.⁹

⁹ Bullet weights are typically expressed in "grains," abbreviated gr., and velocity in feet per second.

Bullet weights compared. Table 7 shows the bullet weights of the rounds against which three levels of body armor protection are tested by NIJ, and the weights of the bullets in the three commercial cartridges available for the .500 Smith & Wesson Magnum. This table is derived from data published by NIJ and the NRA. It is provided in more detail in Appendix B.

TABLE 7—Comparison of Weights of Bullets in Cor-Bon .500 S&W Magnum Cartridges and Weights of Bullets Used in NIJ Types II, IIIA, and III Body Armor Protection Level Tests



Cor-Bon .500 Smith & Wesson Bullets Are Bigger Than NIJ Test Bullets

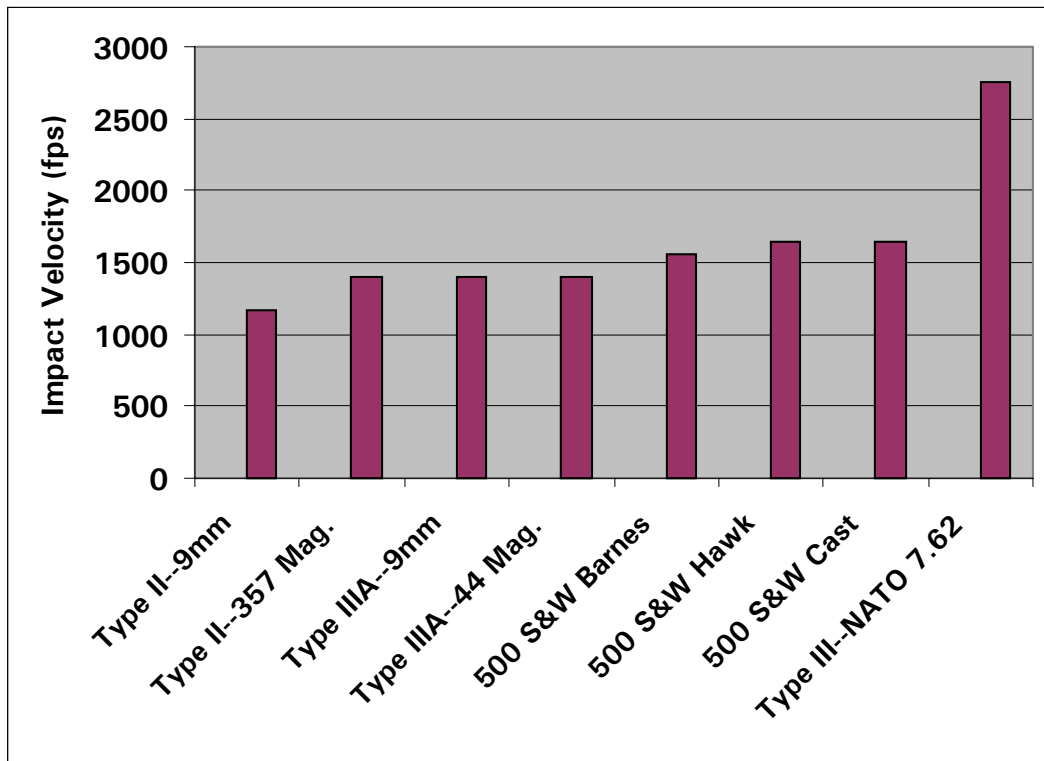
It is clear from simple inspection of this chart that all three of the types of bullets that the .500 Smith & Wesson Magnum delivers are bigger—and two are considerably bigger—than the .44 Magnum round, the largest of the bullets against which NIJ tests body armor. (See Appendix B for the exact bullet weights and NIJ test categories.)

Velocity at comparable points of impact compared. Velocity, the other variable used to compute the striking power or kinetic energy of a bullet, is also available from data published by NIJ and the NRA. (The NRA’s velocity measurements were taken

at a slightly shorter distance than the NIJ's, i.e. 15.0 feet versus 16.4 feet. See Appendix B for details.)

Table 8 compares the velocity of the .500 Smith & Wesson Magnum rounds and the NIJ test rounds, measured at comparable distances.

TABLE 8—Comparison of Velocity of Bullets in Cor-Bon .500 S&W Magnum Cartridges and Weights of Bullets Used in NIJ Types II, IIIA, and III Body Armor Protection Level Tests

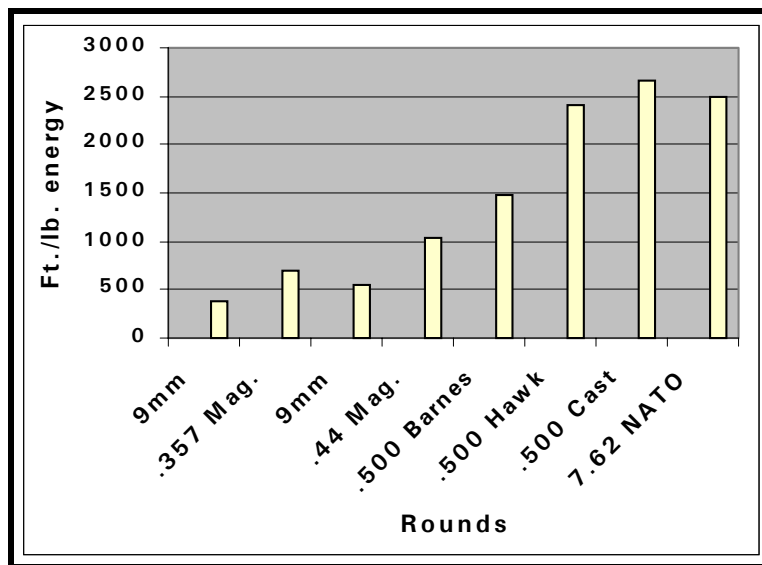


Again, simple inspection of Table 8 demonstrates that, at comparable distances, the .500 Smith & Wesson Magnum rounds travel at a greater velocity than all of the rounds tested by NIJ, except the NATO 7.62 rifle round against which Type III external tactical armor is tested.

These differences in velocity are not as great as the differences in bullet weight. However, the velocity of a bullet has a much greater effect on its kinetic energy than its weight. This is reflected in the formula described earlier, in which velocity is squared.

Striking Power—Kinetic Energy—Compared. Given the known bullet weights and velocities shown in Tables 7 and 8, the comparison in striking power among the .500 Smith & Wesson Magnum rounds and the NIJ test rounds can be made precisely. Using an online “Foot-Pounds Energy Calculator” provided by Beartooth Bullets (a maker of hand-cast bullets), the VPC was able to calculate the striking power—kinetic energy expressed in ft./lbs—of the NIJ and S&W rounds. The results are shown in Table 9.

TABLE 9—Comparative Striking Power (Kinetic Energy) of Cor-Bon .500 S&W Magnum Bullets and NIJ Types II (9mm and 357 Mag.), IIIA (9mm and 44 Mag.), and III (NATO 7.62) Body Armor Test Bullets

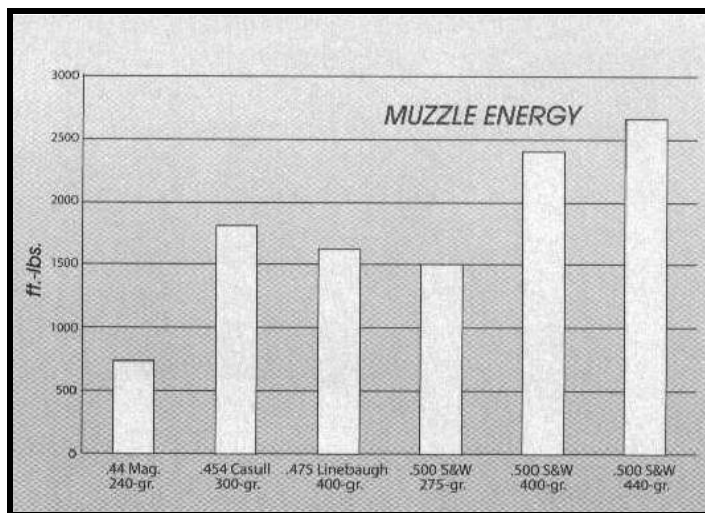


The .500 Smith & Wesson Magnum round delivers impact energy much greater than the rounds against which law enforcement body armor is tested. The largest .500 Smith & Wesson round strikes with greater kinetic energy at 15 feet than a 7.62 NATO (.308 Winchester) rifle round fired at 50 feet.

Table 9 shows that the combined size and velocity of each of the three .500 S&W Magnum rounds yields vastly more striking energy than does the .44 Magnum against which the Type IIIA standard tests. In fact, the 440 gr. Cast Performance 50 caliber bullet strikes at 15 feet with more energy than even the 7.62mm NATO rifle round against which the Type III tactical armor is tested at 50 feet. (The underlying data is presented in more detail in Appendix C.)

The results of these calculations are consistent with information published in gun magazine reviews of the new handgun's performance. Table 10, for example, is a chart from the NRA's *American Rifleman* magazine comparing the muzzle energy of the .500 Smith & Wesson Magnum with other handgun rounds, including the .44 Magnum.

TABLE 10—The NRA's *American Rifleman* Magazine Compares .500 S&W Muzzle Energy With Other Big Bore Handguns



The VPC's conclusion that the .500 S&W Magnum is more powerful than some rifle rounds is also confirmed by the opinions of leading gun experts. For example, Scott E. Mayer, shooting editor of the NRA's *American Rifleman* magazine, wrote of the 400 gr. Hawk, "This .50-cal. bullet leaves the muzzle of the 8 3/8" barrel at a cataloged 1675 f.p.s., but the greater bullet weight puts its muzzle energy ahead of even 300-gr. .45-70 Gov't loads *from a rifle.*" (Italics in original.)⁸² Mayer also wrote about the 440 gr. Cast Performance bullet, "It has 2580 ft.-lbs. of muzzle energy—more than the 147-gr. 7.62 NATO round...."⁸³ *Gun Week* Contributing Editor Massad Ayoob similarly wrote of the .500 S&W Magnum that it is "more powerful than a .45/70 rifle with some of its loads."⁸⁴

Conclusion

The development and introduction of the .500 S&W Magnum handgun and round recklessly endangers the lives of law enforcement officers everywhere. At least one law enforcement officer has been slain with a lesser-powered 50 caliber handgun round, the 50 Action Express. Given the history of the modern gun industry—and in particular its demonstrated record of quickly following Smith & Wesson's lead in innovation—there is every reason to believe that revolvers chambered in the .500 S&W Magnum caliber will, within a few years, join the ranks of other cop-killing Smith & Wesson handgun innovations.

This is the predictable and inevitable result of an industry out of control. The firearms industry is the only consumer product industry in America that is free of even the most basic health and safety regulation. Until the firearms industry is subjected to that oversight, we can only look forward to round after round of unscrupulous companies seeking, developing, and marketing ever greater firepower in pursuit of profit. Moreover, the current federal ban on armor-piercing handgun ammunition does not affect the .500 S&W because the law only restricts ammunition consisting of certain specified component metals. Although proposals have been made to update the armor-piercing ammo ban to incorporate a performance-based standard (i.e. any round that in fact can penetrate a vest), such efforts have been stymied by gun lobby opposition.

Appendix A
Levels of Protection Afforded by National Institute of Justice (NIJ)
Body Armor Type

Type I (22 LR; 380 ACP)

This armor protects against 22-caliber Long Rifle Lead Round Nose (LR LRN) bullets, with nominal masses of 2.6 g (40 gr) impacting at a minimum velocity of 320 m/s (1050 ft/s) or less, and 380 ACP Full Metal Jacketed Round Nose (FMJ RN) bullets, with nominal masses of 6.2 g (95 gr) impacting at a minimum velocity of 312 m/s (1025 ft/s) or less.

Type IIA (9 mm; 40 S&W)

This armor protects against 9mm Full Metal Jacketed Round Nose (FMJ RN) bullets, with nominal masses of 8.0 g (124 gr) impacting at a minimum velocity of 332 m/s (1090 ft/s) or less, and 40 S&W caliber Full Metal Jacketed (FMJ) bullets, with nominal masses of 11.7 g (180 gr) impacting at a minimum velocity of 312 m/s (1025 ft/s) or less. It also provides protection against the threats mentioned in Type I.

Type II (9 mm; 357 Magnum)

This armor protects against 9mm Full Metal Jacketed Round Nose (FMJ RN) bullets, with nominal masses of 8.0 g (124 gr) impacting at a minimum velocity of 358 m/s (1175 ft/s) or less, and 357 Magnum Jacketed Soft Point (JSP) bullets, with nominal masses of 10.2 g (158 gr) impacting at a minimum velocity of 427 m/s (1400 ft/s) or less. It also provides protection against the threats mentioned in Type I and Type IIA.

Type IIIA (High Velocity 9 mm; 44 Magnum)

This armor protects against 9mm Full Metal Jacketed Round Nose (FMJ RN) bullets, with nominal masses of 8.0 g (124 gr) impacting at a minimum velocity of 427 m/s (1400 ft/s) or less, and 44 Magnum Semi Jacketed Hollow Point (SJHP) bullets, with nominal masses of 15.6 g (240 gr) impacting at a minimum velocity of 427 m/s (1400 ft/s) or less. It also provides protection against most handgun threats, as well as the threats mentioned in Type I, Type IIA, and Type II.

Type III (Rifles)

This armor protects against 7.62mm Full Metal Jacketed (FMJ) bullets (U.S. Military designation M80), with nominal masses of 9.6 g (148 gr) impacting at a

minimum velocity of 838 m/s (2750 ft/s) or less. It also provides protection against the threats mentioned in Type I, Type IIA, Type II, and Type IIIA.

Appendix B
Comparative Ballistics of Cor-Bon .500 S&W Magnum Rounds
and Rounds Used in NIJ Types II, IIIA, and III Body Armor Protection
Level Tests

	Caliber & Bullet Weight	Terminal Velocity	Distance At Which Velocity Measured
NIJ Type II	9mm 124 gr.	1175 ft./sec.	16.4 ft. (5 meter)
NIJ Type II	.357 Magnum 158 gr.	1400 ft./sec.	16.4 ft. (5 meters)
NIJ Type IIIA	9mm 124 gr.	1400 ft./sec.	16.4 ft. (5 meters)
NIJ Type IIIA	.44 Magnum 240 gr.	1400 ft./sec.	16.4 ft. (5 meters)
.500 S&W Magnum Barnes	.500 S&W Magnum 275 gr.	1561 ft./sec.	15.0 ft.
.500 S&W Magnum Hawk	.500 S&W Magnum 400 gr.	1646 ft./sec.	15.0 ft.
.500 S&W Magnum Cast Performance	.500 S&W Magnum 440 gr.	1651 ft./sec.	15.0 ft.
NIJ Type III (Rifles) (external armor for tactical use)	7.62mm NATO (.308) 148 gr.	2,750 ft./sec.	49.21 ft. (15 meters)

Sources: Data from National Institute of Justice, U.S. Department of Justice, *Ballistic Resistance of Personal Body Armor, NIJ Standard—0101.04*, Sections 2.0 (overall characteristics), 2.3 (Type II caliber and velocity), 2.4 (Type IIIA caliber and velocity), 2.5 (Type III [Rifles] caliber and velocity), 5.12.3 (Types II and IIIA distance), 5.13.3 (Type III distance); .500 S&W Magnum data from National Rifle Association, "'Do You Feel Lucky...'" the .500 S&W Magnum," *American Rifleman* (May 2003), p. 54, 57 (table, "Shooting Results").

Appendix C

Comparative Striking Power (Kinetic Energy) of Cor-Bon .500 S&W Magnum Rounds and NIJ Types II, IIIA, and III Body Armor Test Rounds

Round of Ammunition	Ft./lbs of Energy Delivered
NIJ Type II 9mm 124 gr.	380
NIJ Type II .357 Magnum 158 gr.	688
NIJ Type IIIA 9mm 124 gr.	540
NIJ Type IIIA .44 Magnum 240 gr.	1,045
.500 S&W Magnum Barnes 275 gr.	1,488
.500 S&W Magnum Hawk 400 gr.	2,407
.500 S&W Magnum Cast Performance 440 gr.	2,664
NIJ Type III (Rifles) 7.62mm NATO (.308) 148 gr.	2,486

Sources: NIJ Data from National Institute of Justice, U.S. Department of Justice, *Ballistic Resistance of Personal Body Armor, NIJ Standard—0101.04*, Sections 2.3 (Type II caliber and velocity), 2.4 (Type IIIA caliber and velocity), 2.5 (Type III [Rifles] caliber and velocity); .500 S&W Magnum data from National Rifle Association, "'Do You Feel Lucky...'" the .500 S&W Magnum, *American Rifleman*, May 2003, 54, 57 (table, "Shooting Results"); energy calculation done June 18, 2003, using Beartooth Bullets online calculator at www.beartoothbullets.com.

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12. Dean K. Boorman, *The History of Smith & Wesson Firearms* (Guilford, CT: The Lyons Press, 2002), 67; "Exploded Views: Smith & Wesson Model 29," *The American Rifleman*, September 1987, 58.

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