Cavalry in the Age of the Autarch

The current generation of historians has been much inclined to disparage the role of cavalry in past wars; but this disparagement is pure nonsense. In the west, mounted troops were found extremely valuable from the later days of the Roman Empire to the end of the Indian campaigns. Cavalry was used successfully in the Near East during World War I and on the Russian Front (and astonishingly, in the Philippines) in World War II. Like any other branch of service, cavalry can be misused, as it was by the British (for example) at the Battle of Balaclava. But hurling cavalry at massed artillery is no sillier than hurling infantry at barbed wire and machine guns.

Leaving aside such things as the guarding of supply trains and prisoners, and riding with messages, cavalry has three modes of operation: scouting, rapid transport, and mounted combat.

Scouting by cavalry requires a fluid situation, an open countryside, and an enemy in which few soldiers or none are armed with effective long-range weapons. Cavalry scouting was attempted in Europe during the opening phases of WWI, with disastrous results that might easily have been predicted. Although the situation was fluid at that time, Western Europe was far from being open country in the cavalry sense—it was dotted with villages and small towns, and broken into little fields and orchards—and the infantrymen of both sides were armed with large-calibre bolt-action rifles that were effective well beyond 500 yards.

The earliest known use of cavalry was to facilitate rapid maneuver. It is also the use that has endured longest; the cavalry employed in Russia and the Philippines in WWII was primarily used in this way, the soldiers fighting dismounted. At present, this use has been superseded by faster and more enduring machines—helicopters, armored personnel carriers, and so on. However, if shortage of these machines were to occur, or a shortage of the fuel for them, horses would again prove valuable.

For much of history, mounted combat has been grossly misunderstood. When cavalry was still in general use, many of its commanders seem to have felt that a charge would rout any infantry formation, despite repeated demonstrations to the contrary. Since that time, historians have

often reacted by condemning cavalry charges as virtually useless, and ignoring literally thousands of instances of their successful employment.

The fact is that a charge by mounted troops against infantry is practically a mathematical problem, the chief variables being the numbers on both sides, the speed with which the cavalry can cover the ground (which will be influenced by its condition), the rate of fire of the infantry weapons (influenced by any harassing fire that can be brought to bear, either by the cavalry itself firing from the saddle or from supporting troops), the range of the infantry weapons, and their accuracy.

Suppose that a hundred cavalry are to charge an equal number of infantry. The infantrymen are armed with muskets effective to 100 yards and capable of six shots a minute.

My newspaper tells me that Lets Dont Fight has won the Futurity on a muddy mile track in 1 min. 29.2 sec. Obviously, the average cavalry mount will not be as fast as Lets Dont Fight; but we may assume dry ground instead of mud, and a sprint across a hundred yards is a very different thing from a run of a mile, even for a horse. So under the assumption that our cavalry will charge like Lets Dont Fight, we find that a mile is 1760 yards; and from the time of 89.2 sec. we see that the cavalry should cover the 100-yard range of the infantry weapons in just about five seconds. Since 10 sec. are required to reload, each infantryman will get off only a single shot. If the shooting is 100 percent accurate, no cavalryman will reach the infantry line; if it is only 50 percent accurate, 50 cavalrymen will, and so on. (The conditions I have described are pretty much typical of the American Revolution and the Napoleonic Wars; we see now the reason that so many experienced officers said things like, “Don’t fire until you see the whites of their eyes.”)

Perhaps I should add one additional, unvoiced assumption: we have assumed that the infantrymen are ready, that they know they are about to be charged. If (*when*, historically) they were caught unaware, they would have only five seconds in which to prepare.

Now let’s assume that the same 100 cavalry are to charge a hundred soldiers with WWI bolt action rifles. Let us say that they can see the cavalry at a distance of 500 yards. The infantrymen should be able to get off 10 aimed shots per minute. The cavalry will require about 25 seconds to cover the ground even at race-horse speed, so each cavalryman will have to dodge four shots. The cavalry will be destroyed, just as we would expect. (We see now where Lets Dont Fight got his name.)

The situation at present is quite different. The modern tendency is to arm infantry with fully automatic weapons having very high rates of fire coupled with poor powers of penetration, limited accuracy, and short range. At the same time, the development of Kevlar is bringing about the rapid return of the quilted armor so common in the Middle Ages. (Kevlar is light and thin enough to permit public figures to wear Kevlar vests beneath their shirts, as Ronald Reagan has since he was shot; yet these vests are cheap enough for service station attendants on the south side of Chicago.) Horse-cloths of Kevlar could be made easily, and with horse and rider so protected, scouting by mounted men would not be out of the question, given a theatre of war favorable to it. Of more immediate value, this quilted horse-armor could be used to protect the horses of mounted police during riots.

It may be a while. Although governments now make use of space-age technology, they retain a hideous conservatism and a truly childlike fear of being laughed at. The unmanned, computer-controlled battle tank, a development that has been obvious for at least ten years, is still not being built, although the army is putting billions into the tank it wishes it had in WWII.

Similarly, the obvious place to put MX missiles is in small, wooden (or fiberglass) sailing ships. These ships could be built very cheaply and scattered over the world's oceans, each carrying only a single missile. They could not be located with radar or tracked with sonar. With the help of navigational satellites and an on-board minicomputer, the captain would know his position precisely at any time. To try to knock all of them, or even most of them, out at once would be preposterous; but they will never be built because they are too funny.

Back to cavalry. The pivotal science of the future will not be architectural like that of the Classical Period, nor metaphysical, like that of the Middle Ages, nor alchemical like that of the Renaissance, nor mechanical like that of the recent past, nor electronic like that of the present. It will be biological.

The altering of genetic structure has already begun. Because biological constructs will be able to reproduce themselves in a way that the products of those other sciences could not, its potential is truly infinite. Most of the present effort is focused on altering single-celled organisms so that they will produce metabolic products of medical value, such as insulin. The next step will probably be the elimination of inherited diseases, such as hemophilia. The third is likely to be the improvement

of domestic plants and animals—the production of corn that requires less water, sheep that grow stronger wool, and so forth.

The military aspects of this technology may not be as important at first as we are apt to believe. Deadly new diseases may be produced for use in biological warfare, but they probably will not be used; their chief danger is liable to be to the civilian population of the producing country. (There has already been one case of largescale deaths in the USSR that is thought to have resulted from the accidental release of a biological agent.) Improvements in human soldiers are liable to come slowly, and not many plants and animals have been found useful in war.

To me, horses—or at least riding animals of some type—seem to supply the most interesting exception. Clearly, producing a "horse" that could run substantially faster than present horses would not be as easy as producing a steer that would mature faster than our steers. But I am not certain it would be a great deal more difficult. Biological models exist already: The cheetah is a better sprinter than the horse, and the wolf a more enduring runner.

But it will not be necessary to use these animals merely as models of what the genetic engineers are seeking to achieve. It will be possible to splice gene segments from these and other species into the equine chromosomes—this is precisely what is being done with single-celled organisms now. The result will be a new animal, capable of reproducing its kind and able to carry a man very much faster than any horse.

How fast? Cheetahs are capable of sprinting at 60 miles an hour, and it is a commonplace of zoology that large animals can move faster than small ones of the same general type—horses outrun ponies, greyhounds outrun whippets, and so on. An animal that could run as well as a cheetah and yet was as large as a horse should be able to run at speeds well over 100 mph. As fast as a fast motorcycle, in other words. Once they were developed, such animals would be likely to stick around, even if the society that produced them should lose much of its technology; they could be bred like other animals, and as machines disappeared, they would become increasingly valuable.

In *The Book of the New Sun,* I have called these animals *destriers*, borrowing an old word for war-horses. I've given them clawed feet instead of hoofs because I think the genetic engineers will give them claws too. The horse's hoofs seem to be an evolutionary mistake. To speak in Lamarckian terms, the horse has lengthened its legs by standing on its toes until it has ended up walking on one toenail. It should be noted that when human athletes want to run fast, they do not put on

smooth, hard shoes—they use spikes. Cheetahs, wolves, and greyhounds all have nonretractile claws that serve them as their spikes serve runners and baseball players. Racehorses could not run as fast as they do if they did not wear aluminum or magnesium shoes.

I've also given them large canine teeth, and there, I admit, I am on much shakier ground. The teeth are there largely to signal that destriers are not horses. If you like, they can be defended on the basis that some of the irrelevant characteristics of predatory animals are apt to come along when the predatory genetic material is taken. It should be noted, however, that some swift herbivores have such teeth—the musk deer (*Moschus moschiferus*), for example.

I've also indicated that destriers are at least partly herbivorous by showing them grazing. Their eating grass implies a great deal about their digestive arrangements, of course. The same people who are so fond of telling us the giant can't stand up are almost equally fond of putting limits on the performance of animals whose diets are characterized by low-energy foods like grass. (Some of them have gone so far as to state that large birds must subsist on high-energy foods—meat, fish, or nuts and seeds—in order to fly. These people have never seen a goose except when they were shaving.) There is something in what they say, but not as much as they think.

Although grass is certainly the natural food of horses, racehorses are not fed primarily on grass, but on oats, corn, and so on. Any horseman or horsewoman will tell you that a grass-fed horse cannot run anywhere near as well as a stable-fed horse. When cavalry was still in wide military use, it was routine to carry a quantity of grain to feed the horses together with the other supplies. The historical record also indicates that it is not only possible but easy to persuade horses to accept a certain amount of flesh or dried fish with their fodder. (It is by no means safe to assume that the horses of Diomedes, which were fed upon the flesh of human beings, were entirely legendary.)

On the other hand, deer, whose diet is even lower in energy because so much of it consists of twigs, leaves, and bark—none of which horses will or can eat—are capable of running at high speeds and of running for long distances. Flesh-eating wolves, for example, cannot run as fast as a stag in good condition; and although they can sometimes run such a stag down, they fail more often than they succeed.

The fact is that such performance depends much more on the amount of energy an animal can store in times of repose and draw on in time of stress than on the richness of the diet. A racing camel will outlast a horse

over a long course, although its diet would scarcely support a donkey. (This whole matter of what a certain type of creature could or could not be expected to do under hypothetical circumstances should be approached much more circumspectly than it often is. One used to read every so often that the condor represented the largest—or at least very nearly the largest—flying animal that could be made to "work" on Earth. Then the bones of a type of pterosaur called pteranodon were discovered. A condor has a wingspan of about nine feet. Pteranodon had a wingspan of around 25 ft.)

Back to cavalry. (Have I said that before?) Let us assume, as I did in *The Citadel of the Autarch*, troopers riding genetically engineered mounts capable of running at 100 mph. Let us also assume Kevlar armor on both trooper and mount. Let them be charged against infantry of equal number armed with fully automatic rifles capable of firing 500 rounds per minute and effective to 200 yards.

At 100 mph the cavalry will cover the 200 yards in four seconds. In that time each infantryman will fire 33 rounds; but to stop the charging cavalrymen, at least one of those rounds must strike an unarmored point. Considering the generally poor accuracy of automatic fire and the fact that we are really talking about one long burst fired while the target is whizzing across 200 yards, it seems likely that the great majority of the cavalry will penetrate the infantry line, beyond which it will be able to disrupt communications, raid headquarters and supply depots, and generally raise hell.

Suppose, however, that the infantry commander is ordered to revert to large-calibre rifles firing armor-piercing ammunition (which we will assume capable of penetrating the Kevlar armor). This is pretty much the First World War situation, except that the cavalry will cover the 500-yard range of the rifles in nine seconds instead of 25. Each infantryman will have one and a fraction shots with which to hit his trooper; in other words, he will be in much the same condition as an eighteenth century musketeer. His weapon will be much more accurate, but his target will be much farther off when he fires it, and moving three times faster. (Of course, it's unlikely that the infantry commander would consent to the arming of his soldiers with those powerful but slow-firing rifles anyway, since it would place them at a very serious disadvantage in opposing enemy infantry.)

Obviously, a return to the conditions of the First World War does not exhaust the options of the army whose infantry is being attacked. One of the most attractive would be in the use of heavy automatic weapons

(heavy machine guns, in other words) capable of firing armor-piercing ammunition. Several such weapons brought to bear on the cavalry should do the same thing the Russian guns did to the Light Brigade at Balaclava. However, in a fluid situation, the number of such machine guns would be limited—they are heavy and costly, and they burn up a great deal of heavy, costly ammunition. Let's take the U.S. .50 calibre machine gun as our model and assume that each such weapon can be opposed by 300 cavalrymen.

The machine gun will fire 450 rounds per minute. If we again assume that the charging cavalry becomes visible to the gunners at 500 yards, the gun will fire 67 rounds before the cavalry has overwhelmed its position. If the accuracy of its fire is 50 percent (which is highly unlikely), about 10 percent of the cavalry will be killed, wounded, or dismounted. Of course, if the gunner is having a cigarette when the charge begins, he may lose three seconds or so before he gets off his first shot; in which case he will only get to fire 45 of them.

There are many other possibilities. The rate of fire of each machine gun might be increased. The cavalry might employ a smokescreen, greatly reducing the distance over which it could be seen. Almost certainly, the infantry would soon be supported by cavalry of its own. And so on and so forth.

The one I have chosen to explore in *The Book of the New Sun* is the use of pyrotechnic weapons. A continuous jet represents the highest rate of fire (excuse the word) that can be achieved. At the same time, flame provides an alternate means of decreasing the effectiveness of armor. Having "invented" these flame weapons in my head, I have provided them to the cavalry as well as the infantry. In this discussion so far, I've said very little about suppressing fire delivered by the cavalry as it charged, because of the difficulty of estimating its effect. But it seems almost certain that its effect would be considerable and that it would be used. (In the later historical periods, such suppressing fire was very little used because of the difficulty of discharging a firearm with its muzzle almost at the horse's ears. What was needed was a shooting, repeating lance with its muzzle three or four feet in front of the horse's nose. But by the time repeating firearms were available, the age of the cavalry charge was nearly over.) Since the cavalry's firing time is at least as brief as the infantry's, and cavalry has no monopoly on the use of armor, I have given my troopers pyrotechnic lances.

If the cavalry charge is due for a revival, as I think it is, the resumption of cavalry scouting is even more likely. Let's examine its

rivals. Scouting by infantry patrols will always be with us, I think, but its range is very limited. Helicopter scouting was much used by U.S. forces in Viet Nam, but helicopters are extremely vulnerable to ground-to-air missiles, as the Soviets are discovering in Afghanistan. Drones carrying TV cameras will be better, but if the information is returned by broadcasts, they can be jammed; and if it is taped for examination after the drone has landed, shooting the drone down will prevent it from reporting. Jeeps and trucks were used for scouting in the North African Campaign (and elsewhere) during the Second World War with great success. There seems to be no reason they could not be used again, with similar success, if another war were to be fought in a similar area; although except for their cost, fast, lightly-armored scout cars would be better.

But if "destriers" with more speed than off-road vehicles can be developed, and I think they soon will be, a Kevlar-protected rider on a Kevlar-protected destrier would be better still—faster, harder to see, less likely to break down, less dependent on fuel, and so forth. In the same way, troops on destriers could maneuver even faster than modern armored infantry while presenting a much less concentrated target.

Thus we have a return to full-fledged cavalry warfare, with dragoons, scouts, and charges. If it sounds fantastic, it should not; it is merely a revival of military techniques that have been in abeyance for scarcely a hundred years. Wait until genetic engineering really gets going and someone questions the need for separable mounts and riders. Fighting centaurs! (Sometimes it almost seems as if the Greeks …)