

War and Society

Warfare on Land: The Evolution of Army Style & Size

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1 Army Styles

For all the glittering faces of a Versailles or a Sans Souci the governments of Ancien Regime Europe were really giant war-making machines devoting their main efforts to the maintenance of large armed forces.

Michael Duffy¹

Few historians today doubt that the institutional characteristics of a society help determine how its military is organized. Even though the highly competitive environment where societies interact exerts pressure to adopt military technology and organizational forms that have proven superior in war, adaptation (which often takes the form of straightforward imitation of successful models) must be mediated through the particular institutional lenses of each society. Techniques available to one might simply be out of reach for another, sometimes for reasons of size, sometimes for reasons of money, sometimes for reasons of geography, but often also for reasons purely political — when changes threaten to upset the political distribution of benefits and power. In other words, because the army (as opposed to a navy) can also be an effective instrument of internal coercion, a polity's military institutions will reflect the desire to adopt winning technology and organization but will be subject not only to demographic and fiscal limitations, but also to political constraints; in particular to the question of how they will affect the relations between ruling and power elites with respect to the moral hazard problem and the ability to mobilize funds.

Because there is pressure to adapt or go “extinct” (sometimes literally so but more often in political terms), most historians would readily concede that military institutions (composition and organization of armed forces, for example), whose successful imitation can require the adoption of their supporting fiscal and administrative structures, can also have a profound effect on the societies that strive to create them. In areas where societies are in frequent contact with each other, a dual convergence would be evident. Despite regional variations, their militaries of any given age will tend to resemble each other because of imitation of successful models, and over time this in turn pushes these societies to resemble each other institutionally as well. In other words, military, political, and fiscal institutions will tend to co-evolve, with spurts of change often, but not exclusively, driven by warfare and military technology.

It is, of course, one thing to assert such co-evolution, it is quite another to provide a model that can help explain the patterns we observe. We are not directly interested in why some polities adopted particular military institutions. Instead, we wish to relate these institutions to the fiscal and political problems we have examined so far. For our purposes, we need to examine military institutions with respect to the following factors:

1. How expensive was it for the ruler to raise an army: did he have to pay, and if so how (market or non-market wages, land, rights, entitlements)?
2. Was the service obligatory or contractual, and was it *ad hoc* or more permanent?

¹Diffy (1980, 4).

3. What was the military effectiveness of the military force? What was its loyalty to the ruler?
4. What was the relationship between the armed forces and the power elites?

It is important to understand that whereas we shall categorize armies into abstract ideal types for the purposes of highlighting their advantages and disadvantages (from the perspective of the ruling elites), actual armies would be often be a mix of these types, with their various units recruited using various methods available to the ruler. For example, up to 75% of the wartime French army could be foreigners, in the Spanish Army of Flanders the Germans alone outnumbered the Spaniards, anywhere between 38% and 50% of the Prussian army were not nationals. It might also be difficult to estimate the total size of forces in the employ of a ruler.²

The following closely follows the typology developed by Lynn (1996).

1.1 Feudal Armies

The first army style we shall consider (very briefly since it ended well before the period we are concerned with) is the **feudal** one, which existed roughly between the eighth and twelfth centuries.³ In this army, the ruler could call upon other landowners and their retainers who would muster under the terms of their personal feudal obligations (for a specified period of time, and often within a limited geographical area). These forces were supplemented by levies of peasants and townsfolk, whose terms of service were often even more restrictive in that these commoners were really only expected to contribute to their own defense. If the ruler wished to keep the feudal host in the field beyond the customary time frame or deploy it outside the customary area of operation, he would have to pay, provision, and supply it at his own expense, and service would be voluntary. Because of the scarcity of money in this agrarian world, payment would have to be in kind (e.g., plunder) or in the form of a grant of a landed fief. The fief would allow the fief-holder to support himself and his retainers, and enable him to maintain military readiness as stipulated in the feudal agreement (which prescribed precisely how many people the fief-holder was expected to supply and what weapons they would carry).

Feudal armies were small, short-lived, and localized. They were motivated in defense of their own territories, but far less motivated in offense, where the magnates could expect to enlarge their holdings but the commoners could only expect to partake in plunder (if they were lucky to survive the campaign). The nobility were well trained but lacked coordination, and because of their keen status-consciousness it was very difficult to impose unified command. The commoners were part-timers, badly trained, and quite marginal militarily. This made feudal warfare a fairly chaotic undertaking, in which battles often degenerated

²Brewer (1988, 41–2).

³We shall not consider army organizations that did not appear in the West (e.g., the slave armies common in the Middle East and Asia), or that disappeared long before the period we are interested in even though they remained important elsewhere (e.g., the tribal armies of the Mughal and Chinese empires). I should note that the slave armies — troops either purchased abroad or taken as “blood tax” from subject populations — were not as exotic as the name implies. Even though the troops were legally the property of the ruler, in reality they acquired many privileges by virtue of being permanent professional military forces. Rulers who tried to infringe on these privileges did so at their peril.

into personal contests and there was no overarching strategy to the military effort. The focus was often on plunder and on keeping the army together, which further detracted from its military effectiveness. The primitive organization did not demand much administrative capacity, and there was very little possibility to reward followers with offices.

The funding of feudal armies made it impossible for the ruler to maintain large permanent standing forces. The reliance on feudal lords tended to make the ruler closer to being the first among equals when it came to warfare and resource extraction. Without effective control of the army, the ruler was severely constrained in the types of wars he could fight, and as a result the moral hazard problem was quite minimal. Even though the granting of fiefs was not intended to be permanent, the ruler's inability to eject fief-holders from their lands without seriously compromising his own military position tended to result in the permanent alienation of these lands from the royal domain. The resulting fragmentation was further exacerbated when the strains of war compelled the ruler to make further concessions to the feudal lords, who gained privileges and exemptions. Every bargaining round could therefore result in further devolution of authority from the ruler. The Crown could only be reinvigorated by a victorious war of conquest, a dynastic enlargement of its domains, a successful suppression of a rebellion of a fief-holder, or when a wealthy magnate deposed the ruler and brought in his own land-holdings in support.

With the ruler's policy-making so severely constrained by the military institutions themselves, there was very little need to organize representative bodies to manage the interests of the power elites. Even though some consultative organs remained, their use was quite limited and they did not function as preference-aggregation institutions. As authority shifted to the magnates, their regional and local interests began to assert themselves, further weakening the ruler's ability to organize a coherent institutional framework for the entire realm. The larger the territorial extent of the polity, the more diverse these geo-strategic provincial preferences would be, and the more tenuous the ruler's control over the country.

1.2 Stipendiary Armies

The monetization of the economy permitted rulers to take advantage of the feudal in-kind obligations in a way that the magnates and lower-ranked nobles could not match. Although some feudal obligations remained in that rulers could still call upon the local militia for regional defense, most were commuted to monetary payments. This gave rulers an advantage because as overlords to whom these feudal obligations were owed, they gained ready access to money. This increased the cash income of the rulers and gave them more flexibility in choosing when and who to employ to fight. As long as they were paid, the troops in these **stipendiary** armies — which comprised both volunteers and men fulfilling their service obligations — were more reliable, could be kept in the field longer, and could be better organized with some semblance of hierarchical command. The campaigns could be planned better, and with regular warfare some veterans could become professionals and support themselves by wages (and plunder). Even though many magnates also enjoyed feudal rights in their own fiefs, there was a serious asymmetry in their extent in favor of the ruler. The monetary economy provided for the centralization of authority because the rulers were uniquely positioned to exploit the monetization of feudal obligations.

This asymmetry between the ruler and other magnates worsened the moral hazard prob-

lem: with the ruler in command of resources that allowed him to raise armies from people of his own choosing, to deploy them in places of his own interest, and to keep them fighting for the duration of his desire, the elites began losing control over his policies. The rulers began to threaten the privileges and liberties of the elites that had by then become customary (and “ancient”). This made them more resistant to any potential extension of the ruler’s taxation authority, and provided incentives for them to coordinate their responses to his attempts to engage in it. This provided opportunities for the wealthier magnates to extend patronage to lesser ones by offering preferential terms or social ties. The amalgamation or expropriation of the holdings of these lesser lords halted the fragmentation caused by enfeoffment as both rulers and wealthier magnates expanded their territorial control.

Thus, the monetization of feudal obligations had a contradictory effect: the military advantage it gave rulers prompted a countervailing response that balanced it out. In the process, however, the territorial holdings of the ruler and the power elites became more consolidated and the overall forces they could command increased. This contributed to the rising costs of war: the stipendiary troops were more professional but they were also more expensive. Neither rulers nor magnates could provide them with a steady income in peacetime. They would hire troops on an *ad hoc* basis and dismiss them when no longer needed. With income unsteady and unpredictable, the pay rates had to be higher as well. The advantage, however, was that the higher price would only have to be paid when circumstances required the use of military force. This limited the size and duration of campaigns that rulers and magnates could afford, and so the potential for drastic revisions in the distribution of benefits was limited.

1.3 Contract Armies

Although defensive operations could still rely on feudal levies and conscription, offensive actions, especially those over longer distances, had to involve paid troops. As the availability of soldiers became dependent on wages, economic and demographic conditions began to play a larger role. First, recruits were cheaper when there was excess labor supply (during a demographic boom) or when the economy was doing badly (so wages in the nonmilitary sector fell). How affordable an army of any given size was could change from year to year, and rulers could find themselves forced to dismiss troops they could no longer maintain.

Second, cash-strapped rulers who were unable to pay market wages had to resort to disruptive coercive efforts to maintain recruitment. Although the army was always an “employer of last resort” and as such its low wages would attract the least skilled labor, rulers who could not afford even those would at least be able to impress socially undesirable elements into service. The army would forcibly recruit those lacking social protection: vagrants, beggars, criminals, and in some cases those without property. The local communities would usually be glad to be rid of these men, making it unlikely that the impressment would meet organized resistance. The rulers would also attempt to extent conscription, but this was far less popular, and it was consistently resisted both by elites who were afraid of the ruler amassing larger armies based on obligatory service, and by the peasants and townsmen themselves who stood to bear the burden. Even when coercive methods could succeed, the troops they produced were badly motivated, prone to desertion, and untrained. In other words, their military effectiveness was very low. Rulers that wished to remain

competitive would have to increase their income to afford to pay higher wages or get the cooperation of power elites to extend conscription at low pay.

Third, as the sources of wealth diversified, the number of potential employers of soldiers increased. It was not just the wealthy magnates but also the main beneficiaries of a commercial monetary economy — the cities — who could now afford to hire troops. Although territorial rulers could hire from their own “native” populations, the cities — with their smaller populations and aversion to territorial expansion — generally had to find “foreign” troops.

The combination of high wages and volatile employment by any one ruler coupled with the low military efficiency of coercive recruitment and the increased demand for troops from other potential employers led to the emergence of highly trained professional mercenaries. They were not cheap but they could be hired at will. When dismissed, they could seek employment elsewhere and they could expect to be hired because they offered the advantage of skilled labor over *ad hoc* feudal levies or forcibly recruited troops.

Communities with excess labor supply could make a tidy profit by hiring out soldiers to various employers. The Swiss pikemen and the German *Landsknechte* were the most famous bands of professional soldiers who found service in the employ of rulers, magnates, and cities. Some princes even developed their economies around this model: the German Landgraviate of Hesse customarily rented out complete military formations for use abroad (for example, the Hessians that fought in the British army during the American Revolutionary Wars), and even the Prussian kings would occasionally rent out regiments as well. It is worth noting that while these troops were mercenaries from the perspective of their employer, they were conscripted domestically, and their pay went to the princes.

These **contract** military formations were different from the stipendiary ones in that they were entirely voluntary (at least until the contract was signed and the bonus was paid, after which the company would assume the contracted obligations), that they were thoroughly professional, and that they could be native or foreign. Armies now came to consist of a mix of native troops serving out feudal or conscription obligations and these paid native or foreign professionals. Since the pros were much more useful militarily (especially for longer campaigns over larger distances), rulers that could afford them tended to prefer the mercenaries.

The “of the shelf” availability of mercenaries also had its downside from the perspective of the ruler because it made it possible for anyone with sufficient resources to raise armies very quickly and expect a high degree of military proficiency. The mercenaries were also only as dependable as their pay was regular. When unpaid, hired troops could passively refuse to fight, mutiny, desert to a higher bidder, and even plunder their employer’s territory. The problem was especially acute when the mercenaries had no ties to the local communities, and so had little compunction extorting or pillaging them or switching to the employ of the opponent. When there was no ready alternative employment available, these soldiers could just as easily turn to brigandage. Since they were, after all, professional fighters, it was very difficult to suppress them. In some cases these unemployed mercenaries ended up running extensive protection rackets until a ruler could muster the resources to buy some of them off to help him get rid of the rest.⁴

⁴This, in fact, is how the French direct tax, the *taille*, came to be. At the end of the Hundred Years

Thus, rulers who wanted to use these professionals had to put their fiscal affairs on sound footing. Rulers engaged in offensive operations could also give them the right to pillage or extract contributions from conquered territories as a form of payment. Rulers engaged in defensive operations and who found themselves unable to pay per the terms of the contract had to borrow, suffer contributions from their own lands, or find themselves defenseless. Cities, with their precocious taxation systems and solid credit, were well-positioned to make use of mercenaries and could offer effective resistance to territorial princes.

The situation began to change with the evolution of military technology. I already mentioned how the development of artillery and the *trace italienne*, discussed in more detail in the next section, contributed to the increase in army size in the fifteenth century. By itself, this may not have posed much of a problem if rulers did not have to maintain these forces for long. The problem was that with the larger forces and better fortifications, warfare became less decisive. It was no longer possible to defeat an opponent in one campaign, especially when that opponent controlled numerous fortified positions (as the now larger territorial units would). Even a relatively large army needed time to take a fortified city. With a *coup de main* (direct assault) impossible and treason unreliable, the only sure method was to invest the city. The siege would then involve simultaneous attempts to reduce the city by starvation or take it by sapping (building trenches to get to the walls and undermine a section). This took time — many months, sometimes even years — and even the techniques developed by Vauban would take up to two months to take a city. This meant that a single siege would not merely require a large army but would consume nearly the entire campaign season (late spring to early fall) and often stretch over several.⁵

The combination of needing a large army and having it “stuck” for months or years in a siege meant that rulers could not field large numbers of troops in other theaters. This made it difficult to defeat opponents and to exploit temporary weaknesses occasioned by battlefield success. Armies often could not exploit the advantage gained from a victory and press toward a decisive conclusion. Wars became longer, and funding demands became more permanent. Rulers could, and did, attempt to shift some of the expense onto the soldiers themselves — by granting them rights to pillage and raise contributions — but their success was limited. The effort to extract contributions detracted from the purpose of the campaign, and further decreased the military effectiveness of the army. Pillaging was also a stop-gap measure, especially for an army involved in a prolonged siege, because it would very quickly exhaust the resources of the immediate surroundings, and the army could not venture too far in search of supplies without breaking the investment and thus compromising the siege itself. In other words, the ruler had to supply and pay the troops himself.

The overall result was that rulers had to pay more soldiers over longer periods of time, which escalated the fiscal demands on the polity. Rulers that acquired large territories (through dynastic luck, shrewd marriages, or inheritance) could afford to engage politically

War, France was full of roaming unemployed mercenaries, who caused a lot of grief and destruction to the communities they pillaged and extorted. Some kings seem to have gone to war abroad simply to get them out of France with the promise of loot. Finally, Charles managed to obtain an agreement from the merchants to levy a special tax, the *taille des gens de guerre*, to suppress them. This tax was to become permanent by the end of the 15th century, and was the foundation of royal finances. See Howard (1976, 18).

⁵Tallet (1992, 51–2).

isolated cities, smaller rebellious provinces, or rulers with significantly smaller holdings. However, when it came to conflict between such rulers or between coalitions of rulers, the enormous fiscal demands quickly outstripped the revenue they could raise with their decentralized collection apparatus and pervasive moral hazard problems.

This helps explain the emergence of large-scale private contractors during the seventeenth century. The model outlined above suggests that once monetization of the economy transformed feudal armies into stipendiary ones, and the accumulation of capital permitted the emergence of contract armies, the latter should have lasted only as long as they were “optimal” for war; that is, as long as the size of armies did not have to be large and the military technology did not lead to protracted wars. In the early seventeenth century both of these conditions no longer held, and yet this was the century in which contract armies had their heyday. During the Thirty Years War, all sides deployed hitherto unimaginable forces, most of them employed under contracts.

What happened was that the needs to field larger armies outstripped the fiscal capacity of many rulers. The problem for the Austrian Habsburgs was that they had to fight a coalition of Protestant German princes who were getting outside help from England, France, and the Dutch. When the Catholic forces gained the upper hand, the Danes intervened, and when they were defeated, the Swedes invaded in turn. The Swedes, who had a reliable system of peasant conscription, could not induce their native recruits to fight abroad without paying them, and so they ended hiring mercenaries all across Germany. France, which was just emerging from a period of civil disturbances, was in no condition to intervene directly, so it instead sent money to the Swedes so that they can pay their mercenaries. The Austrians had to call onto the senior branch of the family that ruled Spain for help, and the Spaniards did help as much as they could. However, their own resources were already stretched thin since they were still fighting the rebellious Dutch. In the end, despite his alliance with the rich Bavarians, the Habsburg Emperor simply ran out of resources. Unwilling to admit defeat but in need of a drastic expansion of the army, he had to induce someone else to shoulder the burden. The expedient was to call upon one of his successful commanders, Albrecht von Wallenstein, who had acquired large tracts of land by confiscating it from the Protestants. In exchange for more land and titles, Wallenstein raised enormous armies for the Emperor (anywhere between 50,000 and 100,000) and loaned him money. He perfected the system of contributions — essentially taxes levied in occupied territories, friend and foe alike — to make war pay for itself.⁶ He then made a tidy profit acting as a supplier for these troops, and using the Emperor’s money to pay himself. In the end, his success undid him: as rumors grew that he might defect to the opponents, he was assassinated with Emperor’s approval.

Wallenstein was the greatest, but not the only major contractor who fought during the Thirty Years War. The war was inflicting grievous costs in Germany but the ruin of the economy made it easier to recruit soldiers. The supply of funds by “outsiders” and the ability to extort more once the large armies were in place made it possible to continue the war. In the end, however, the war endured because of the need to make it pay for itself (so military operations would be directed toward extracting contributions or denying them to the opponent) and because of the need to pay these hired soldiers (all belligerents were

⁶The *bellum se ipsum alet* principle, according to which one uses the resources of occupied territories to fund his armies.

in arrears to their troops, and hoped that the peace settlement would provide them with enough money to meet their contractual obligations). This war seemed to come closest to what Clausewitz said war was not (supposed to be): “a complete, untrammled, absolute manifestation of violence. . . [that] would of its own independent will usurp the place of policy. . . [and] drive policy out of office and rule by the laws of its own nature.”⁷ It also revealed, in stark terms, the serious disadvantages of relying on contract armies.

1.4 Standing Armies: Conscripts and Volunteers

Rulers facing higher expenses not merely periodically but more or less constantly had to respond by attempting to expand fiscal capacity and figuring out ways of reducing expenses. Since the high contract wages were driven by market forces and volatile employment, one obvious approach would be to provide secure employment. If rulers could afford to keep the troops during peacetime instead of dismissing them, they could induce recruits to accept lower wages. Rulers could relieve some of the pressure on the treasury by allowing soldiers to earn money while not fighting: working on road repair, in workshops, and even on their own farms. This made natives more convenient than foreigners because they were better positioned to integrate in the economic life at the places they were stationed.⁸ (In small numbers even foreign mercenaries could be integrated when the long employment provided them with incentives to go native by learning the language, marrying locally, and developing social ties with the community.) Rulers could thus reduce wages by promising steady employment and allowing peacetime work.

Providing longer terms of service also allowed rulers to overcome the problem of military inefficiency inherent in *ad hoc* formations with non-professional recruits. Fresh conscripts and new volunteers could be better trained, which allowed for improved coordination and command. Rulers could set the standards for recruitment, training, and equipment, which allowed for standardization of weapons and uniforms, and so permitted economies of scale.

When it came to natives, another factor strongly pushed toward the provision of permanent employment. Veterans — conscripts and volunteers alike — acquired military experience in the longer campaigns, and became socialized in the military way of life. Dismissing them at the end of their contractual or obligatory terms of service posed significant risks and costs if there was no other employer ready to take them on. First, the sudden influx of these men into society could depress wages, increase unemployment, and cause social discontent. Second, unemployed men with military training posed a risk to domestic law and order. Large-scale wars were particularly problematic because the depressed economy often could not absorb many of these soldiers, the exhaustion of the war showed no prospect for employment in the short term, and the all too common fiscal collapse of rulers often left them in deep arrears to the troops with no hope of repayment. These wars ended with many professional soldiers having nowhere to go and no money to live on, which turned them into bandits. Third, this destabilizing element could become politically dangerous if these men coalesced around a leader who could challenge the ruler. Fourth, it was simply inefficient to waste this expertise: these soldiers might be needed in the future themselves or they could train others. Unemployed foreign mercenaries could, of course, also become

⁷Clausewitz, *On War*, p. 87.

⁸For Prussia, see Wilson (2009, 118).

roving marauders, but their lack of social ties to the native communities made them less dangerous as the ruler could expect to get local cooperation in their suppression.

Natives also formed a more convenient foundation for permanent armies insofar as they were subject to obligatory military service. The wages for those serving out their obligations could be set below market rates if the opportunity costs of service were decreased or the benefits of service were increased. For example, the service obligation could be sweetened by non-monetary rewards like more prestigious social standing, access to a separate judicial system, or the grant of special status (conscripted serfs could be granted their freedom). Alternatively, when recruiting from the peasantry, the ruler could require that the community from which the recruit came take care of his land during his absence. This income could then go toward the soldier's wages or to support his family. Rulers could also allow the communities to decide how to fulfill their conscription quotas within some general set of guidelines as to the physical condition of the recruits they supplied.

Finally, a permanent army provided for career opportunities and patronage possibilities. The ruler could dispense commissions to members of the power elite, which would increase their influence in the military, and so help alleviate some of the moral hazard. The ruler could also sell these commissions, which would not merely result in immediate profits but tie wealthy members of the elite to the state apparatus. This practice, of course, meant that one would become an officer on the basis of social rank or wealth, not on military ability. Rulers who indulged in that practice risked creating armies with bloated and ineffective officer corps. This particular problem could be alleviated by providing opportunities for career advancement based on ability, which meant that promotions from within could permit particularly capable soldiers to gain commissions. Rulers could also sweeten the value of the commissions by endowing them with high social status, and even permitting their holders to be elevated in rank.

Jointly, these factors strongly suggest that rulers would try to create a **standing army**, preferably composed of natives, and those preferably conscripted, as soon as their finances allowed. As usual, the fiscal constraint proved to be binding. Although cheaper man-for-man compared to an *ad hoc* mercenary army in war, the permanent army was more expensive in the long term because it required significant expenditures in peace as well. Whereas a ruler could raise an expensive but temporary force by borrowing, maintaining a standing army on debt was unsustainable. Only rulers who could develop relatively effective systems of taxation that could provide them with stable income outside of emergencies (i.e., those with large "ordinary" income) could contemplate the creation of standing army.

The problem, of course, is that creating such a system requires the cooperation of the power elites. Some cooperation can be secured by integrating the elites into the armed forces and the state apparatus. The army could then be used to exert pressure on those whose taxes the ruler and the power elites wish to extract. As we have seen, however, this type of arrangement is limited in the revenue it can raise. The more effective solution, especially in the long term, is to reduce the moral hazard problem through the power of the purse exercised by a representative body. In other words, on one hand the ruler needed more money but on the other the power elites were unwilling to provide if the ruler was effectively unconstrained. The stage was set first for the provision of selective benefits and then for the emergence of representative bodies that could negotiate the preservation of privileges of these elites.

It should not be surprising that the first state to develop a large standing army was the Dutch Republic whose federal system endowed the power elites with the power of the purse. As we shall see, it was this precocious development, that allowed the Dutch to punch far above their weight and become a republic “formidable to the whole world” as the Swedish King Gustav Adolf remarked.⁹ As its rather more populous neighbors began to reform, however, the Republic would find it increasingly harder to defend itself.

The most dangerous land rival was France, where the Crown prevailed in the internal disturbances that prevented its entry during the first phase of the Thirty Years’ War. After having bested Spain in a war that ended in 1659, France embarked on a series of administrative reforms that centralized tax collection and established a bureaucracy to manage the army. Even though regiments were still raised and paid by colonels and supplied by private victualers, these private agents were now extensively supervised by state officials who ensured that standards of drill and equipment were being followed, and who scrutinized all contracts to ensure that money paid to the contractors did not merely stick to their fingers. In addition, the colonels were now **commissioned** by the state, and could be cashiered if found delinquent in their duties. The much-improved cash-flow coupled with the efficiency resulting from these reforms enabled Louis XIV to field nearly 300,000 soldiers by 1680.

Once a state as large as France moved toward a standing army, the rest of Europe had to follow. Rulers with inadequate finances would have to rely on temporary contract forces. This would tend to place them at a disadvantage relative to rulers with standing armies during a war. Because their forces were cheaper man-for-man than the mercenaries, rulers with standing forces could keep them in the field longer, and even use the difference to augment their armies with mercenaries for the duration of the war.

A state as disjoint and poor as Prussia could not hope to raise enough revenue to pay a standing army: the numerous regional estates often could not be induced to contribute to the defense of far-flung regions, and the economy itself could not provide enough income to sustain many soldiers on a regular basis. The situation started to change during the Thirty Years’ War when the Swedes imposed contributions on Prussia in the form of taxes that the estates were obliged to raise on pain of having their lands devastated. When the Swedes left, the King used this revealed capacity to pay and continued the taxes (mostly excise). He used the mosaic structure of his state against the estates and bargained separately with each using a combination of threats and promises. The estates that refused to comply were reduced using the income generated from other parts of the country, until Prussia settled into a system whereby the nobility got exclusive access to the officer corps, the Crown guaranteed its privileges, and both cooperated in imposing the taxes on the peasants and the commercial elites. Since the tax administration was so intimately involved with the army, the collection apparatus itself was administered by the military as well, achieving simultaneous bureaucratization of the armed forces and the “civilian” administrations. The peasants were conscripted to serve in proportion to the local population, while the town elite were exempt in order to generate the income from excise on which the state so heavily depended. Prussia also moved toward a standing army although its system was somewhat different from that of the French, who still relied on private civilians for most of their operations. Until the demise of “old Prussia” in 1806, the country would retain this state-

⁹Cited in Glete (2002, 118).

commissioned army with exclusively noble officer corps and mostly peasant conscripts that would be augmented by mercenaries during emergencies, with extra income coming from contributions from allies and occupied territories.

1.5 Reserve Armies

By the eighteenth century, Europe settled into a system of states whose rulers maintained standing armies of professional soldiers, staffed by state-commissioned officers, and funded by permanent taxation. According to our fiscal-military model, this system would be disrupted by some technological change that drives up the size of armies beyond the fiscal limits imposed by these institutions. In the event, however, the initial disrupting factor came from a different source — Revolutionary France — although, as we shall see, its effects were temporary, and lasting changes had to await the technological breakthroughs of the steam engine and the railway.

Consider the model in the abstract. Since the available technology limits the size of forces that can be deployed during war while retaining their military use, there is an “optimal” size, beyond which it would be wasteful for armies to grow. This size then determines the necessary funds to keep a professional standing army in peace — including, of course, not merely the income from taxation but the other expedients such as letting soldiers perform non-military work when not fighting. This army could be expanded, within limits, by hiring other units either by borrowing or by extraordinary grants. If contract armies were too expensive for protracted wars, professional standing armies were too precious to squander in battles, leading yet again to indecisive warfare focused on maneuvers and sieges.

The first break with the system occurred when the Revolution in France toppled the monarchy and provoked wars with Austria (over French counter-revolutionary activity in the Austrian Netherlands) and Prussia. With the army disintegrating and half the officers of dubious loyalty, the National Convention called for volunteers, and the combined forces of these men delivered the first victory at Valmy in September 1792. Within a few months, however, France was at war not merely with Prussia and Austria, but also with Spain, Britain, Piedmont, and the Dutch Republic. The attempts to extend the national levy provoked a civil war in the Vendée. It was in these desperate circumstances that the National Convention passed the decree on August 23, 1793 that instituted the **levée en masse** (mass levy) that requisitioned all able-bodied men between the ages of 18 and 25 into immediate military service in defense of the Republic. The size of the army nearly tripled, and this, combined with the severe internal repression of the Terror, turned the tide of the war and saved the Revolution.

With so many men under arms and the economy in disarray because of their absence, because of the war, and because of the internal violence, France faced a serious problem: its only advantage over the coalition of monarchies lay in the number of soldiers it could field, but its weak economy meant that it could not sustain this for long. The revolutionary government resorted to outright coercion and ruthlessly requisitioned everything that could be useful for the war. Evasion and black-marketeering were both punishable by death. When the government of Terror and Virtue collapsed, however, so did this extraordinary totalitarian effort. Supply reverted to private entrepreneurs who made immense fortunes on the war, but who could not possibly sustain such gargantuan armies. France made a virtue

out of necessity: if the country could not feed the armies of the Republic, then someone else must. The Revolutionary armies invaded Spain, occupied the Rhineland, and after taking the Austrian Netherlands (Belgium), they did something that neither the Spaniards nor the Germans had managed to do: they conquered the Dutch Republic. The Directory sent French armies into Italy and Austria, anywhere really as long as they did not remain on French soil. With Napoleon so successful in Italy, the army was prepared to follow him: he promised both loot and the hope of promotion based on performance in the field.¹⁰

Like the belligerents during the Thirty Years' War, the French armies were fighting under the *bellum se ipsum alet* principle. But unlike the indecisive matches of the 17th century, Napoleon's tactics produced crushing victories as he first dispersed his vast armies so that his opponents could not predict where he would strike, and then concentrated them to deliver battle at the most convenient place. He used the mobility of his armies to capture enemy magazines and then he used its size to compel the captured territories to support them. Even then, the armies could not remain in one place for very long: there was simply not enough food to feed their vast numbers. They had to move, and as they entered less fertile territories which stretched their supply train, the armies became vulnerable. The secret of Wellington's success in the Iberian peninsula and Kutuzov's in Russia was in exploiting this weakness of the French armies. Unable to supply the troops and fight a decisive battle to compel the enemy to surrender, Napoleon had to see his troops melt away from starvation, cold, desertion, and the hit-and-run tactics of his opponents. As the reservoir of seasoned troops got depleted, the inferior quality of the fresh recruits began to assert itself in battles with the professionals his opponents were fielding.

Despite their stunning successes, the French armies of the Revolutionary and Napoleonic eras did not cause a major shift in the military institutions. In Prussia, the catastrophe of 1806 when its army was decisively defeated by the French at Jena-Auerstedt and the Kingdom was subjugated to France, led to serious inspection of its military. The reformers concluded that Prussia's principal failure lay in its political institutions that did not permit mobilization on such a large scale. The country had to liberalize for the government to gain access to the full potential of the nation. In the shock of defeat, the reformers were able to institute some changes designed to replace the professional conscript army with people willing to fight in defense of something larger than the monarchy. Since the required liberalization clearly threatened both the monarchy and the privileged status of the noble officer corps, the reforms could not go far enough. (This is what caused Clausewitz to give up and join the Russians.) Still, in 1813 the king authorized the creation of a national force, the *Landwehr*, consisting of conscripts who elected their own officers. Service was compulsory for men who had not been called into the army. The troops in the standing army would serve for three years, and stay in the reserve for two, whereas those in the *Landwehr* would serve for a few weeks annually for seven years. Corporal punishment — which was pervasive in the army — was abolished. Since the Treaty of Tilsit limited the Prussian army to 42,000 men, the new system involved rotating groups in and out of training so that this number would not be exceeded. It was this new Prussian army that together with the British defeated Napoleon at Waterloo.

These Prussian reforms laid the foundation for the new military institution of a **mass-**

¹⁰Howard (1976, 81–3).

reserve army. This is a combination of standing army composed of permanently employed professionals and a large pool of reservists, who are trained periodically, and who are then available for service during national emergencies.

The impetus behind the Prussian reforms highlights the advantages of such a system. First, it allows the state to drastically increase the size of the army in a relatively short amount of time. Whereas a standing army without reserves would have to recruit and train new personnel, the reservists are already trained, and they often have “war arrangements” that prescribe what they are to do if called in an emergency. Second, even though in some standing armies soldiers were allowed to engage in economically productive activities, their ability to do so was limited relative to reservists who only expected to be called infrequently. The peacetime costs of a mass-reserve army would be a fraction of standing army of the same size. Third, because the conditions of service and the number of reservists are already set in law, the emergency expansion of the armed forces is not likely to cause political difficulties of the type that would attend either extraordinary funding for volunteers or coercion for fresh conscripts.

Just like the evolution from contract to standing armies seems inevitable given the fiscal demands of warfare resulting from changes in military technology, so does the progress from standing armies to mass-reserve ones. That change, however, was gradual and uneven, and the reason for that was political. While reserve forces made military sense and economic sense, they often met with the determined resistance emanating from elites benefitting from existing institutions. With the monarchy restored in France in 1815, the need to counter the vast armies of the Revolution or the Empire had receded, and as a result the victorious rulers quickly moved to buttress the institutions shaken by the war. Even in Prussia the reforms were eroded by the nobility and the army who were suspicious of the democratic elements inherent in the *Landwehr*. Training so many men in the military arts and then releasing them back into society while simultaneously persisting in denying them a voice was a recipe for disaster.

The restored system managed to maintain peace in Europe among the great powers for nearly fifty years: their professional standing armies were busy suppressing internal discontent caused from the rapid industrialization and the dissemination of the political ideas of the French Revolution. Even during the widespread revolutions of 1848, the power elites managed to assert their control. Even though some, like the Prussian King, initially lost their nerve and caved in to constitutional reforms, the power elites retained the obedience of the armies, and suppressed the rebellions in just a few short months. It was a vindication of the conservative idea that the masses should have no role to play in the military or in a war.

What changed all this was another advance although this time it was not of purely military technology: the advent of the railway on land and the steam engine on sea. The railway system was, of course, useful for trade and commerce, but it proved also quite useful for transporting large numbers of troops to quell domestic disturbances. However, the rail’s military value in international wars quickly became apparent in 1859 when the French deployed 120,000 troops to Italy in just eleven days over a distance that would have normally taken two months to cover by march. To this speed of movement, the railways also added staying power of an army in the field: instead of relying on magazines and laboriously prepared stock-piles along the route, an army could be supplied from the rear by rail. If the

country was linked in a railway system, its entire economy could be marshalled in support of the army. To this vastly expanded capability, the railways also added quality: instead of getting exhausted by months of marches, the troops arrived fresh and ready for battle. Instead of dying in makeshift hospitals along the front line, the wounded could now be transported back to real hospitals. Instead of having to find more money to keep troops in the field when the war got longer than expected, the soldiers could be given leave to go back home with fit replacements standing by.

Even though some of the limits of keeping large armies in the field were loosened by the French Revolutionary model, the practice of living off the country was unsustainable both politically and militarily. The railways represented the real breakthrough because now the size of the army was only limited by the number of men the state could effectively put in arms: the ones it could conscript or induce to volunteer given its administrative and fiscal capacity without ruining its economy in the process.

Everybody watched the 1859 war very closely, but it turned out that the Prussians drew the most relevant lessons. The conscription system introduced in 1814 was revitalized as the distinction between army and *Landwehr* was abolished. Now every male of military age was to serve three years on active duty, then another four in the reserve, and then pass into the *Landwehr* where he was liable for reserve service. To administer the railways, the supplies, the training and the equipment of so many people, the army developed a General Staff — perhaps one of the greatest innovations in military institutions whose success is evident in that it was copied by every other army very soon. These officers were not merely bureaucrats but among the military elite; their advice carried weight in policy-making. This system was vindicated by the brilliant performance of the Prussian army in 1864 when it triumphed in alliance with Austria over the Danes, in 1866 when it defeated its erstwhile ally in seven weeks, and finally in 1870–71 when it crushed the French in just a few months, besieged and took Paris, and made the Hohenzollerns emperors of the Second German Empire.

The competition took care of the rest: within a few years of this victory, most European states introduced reforms to imitate the Prussian model, with its careful railway planning, mobilization plans, conscription, and General Staff. In some sense, their reforms were even easier to implement because unlike the aristocratic and exclusive officer corps of the Prussians, the French and Russian officers were of middle-class origins already. How could the Germans expand their officer corps without admitting radical elements from the non-represented elites? The proved innovative here as well — the loyalty of an army based on long service can be encouraged in exactly the same way as the militancy of labor unions can be pacified: with the provision of consistent benefits to remedy some of their economic disadvantages. Thus, it was the Germans that pioneered the welfare state: pensions, accident and unemployment insurance, socialized medical care. The care for disabled veterans was famously introduced on a large scale by Louis XIV who created *hôpital des invalides*, the first hospital for aged and sick soldiers in 1676. The German government, however, took this to an unprecedented level, and in doing so blunted the Socialist call for political reforms. It was a massive scheme of selective benefits designed to enhance the commitment of those who were entering the armed forces and reduce the tensions with the workers.

All these reforms ensured that when the next war came, it would be a clash of nations: with millions under arms and the entire economies dedicated to a total war. It was also the

mass-reserve army model that would spread around the world and persist to this day.

1.6 All-Volunteer Armies

In 1973, however, the United States abolished conscription and moved to an all-volunteer army that relies on the massive firepower guaranteed by the country's advanced technology. The engine for change was yet again technological: the increasingly sophisticated weapons systems demanded fewer but far more capable troops. Conscription is not particularly good at producing quality, at least not nearly as good as a system that relies on well-paid motivated volunteers. It should not be surprising that it was the most technologically advanced nations (that also happen to be the wealthiest) that have taken the lead in this shift. At the dawn of the 21st century, most European states have followed suit, and many of those that still maintain it also offer alternative non-military service.¹¹

1.7 The Co-Evolution of Military and Political Institutions

The evolution of military institutions is closely linked with that of political and fiscal institutions: both show a trend from highly decentralized contractual interactions toward a centrally administered system, in which expanding obligations are compensated for with selective credible benefits or with the provision of political voice through representation. Moreover, as the European influence spread globally, often at gun point, their military advantage started to decline as non-Europeans began to imitate the military institutions. These societies could not simply adopt the European military model without importing western social, economic, and political institutions. They could copy the technology and they could produce weapons of similar quality, both of which they did. And yet they would still lose to a European army if they did not also adopt its superior organization, discipline, and training. To support and equip these armies, they had to import manufacturing and commercial practices as well. With these went cultural influence, and the social levelling produced by conscription and mass education. As these polities began to resemble the European in their basic institutions, their armies began to be as formidable as well.¹²

2 The Growth of Armies

Although the size of armies fluctuated depending on the fortunes of war and fiscal solvency, there is no doubt that there was a secular increase (at least when it comes to the major powers), often quite dramatic, in the number of people that governments could effectively mobilize, deploy, and maintain in the field.

Consider France whose army size for 1494–1945 is shown in Figure A.¹³ The monarchy had nearly gone bankrupt in the early 16th century when it had fielded about 40,000 troops in its Italian Wars, but by the middle of that century it was sustaining armies three times that

¹¹The CIA maintains an updated list online. Central Intelligence Agency. 2013. *The World Factbook*. <http://www.cia.gov/library/publications/the-world-factbook/fields/2024.html>, accessed February 24, 2013.

¹²Ralston (1996).

¹³This section is based on data in Lynn (1990, 1999, 2006). The plot interpolates numbers for years for which no data is available.

size. When the civil wars debilitated the government, Henry IV had trouble maintaining an active force of 50,000 even inside France. In the first decades of the seventeenth century, however, Richelieu's reforms allowed Mazarin to enter the Thirty Years War in 1635 with nearly 160,000 troops. The monarchy was even able to increase this to a peak of 180,000 in 1639, although eventually the effort to maintain such a vast force did exhaust it and provoked internal rebellions.

When Louis XIV embarked on his first war, he *started* with an army 134,000 strong (1667–68), and when his 1672 attack on the Dutch eventually provoked a coalition against him, he increased this to 280,000 by 1678. Even before the even more extravagant effort in the Nine Years War (1688-96), which would see the number of troops in the French army soar to 438,000 men, a number not seen in Europe since the height of the Roman Empire, the Sun King was keeping a *peacetime* force of about 145,000 on average. Given the gargantuan effort the king had expended in that war and the economic crisis that hit France in the interim, he was not able to sustain such a large army in the most desperate, and last, war of his reign (the War of the Spanish Succession, 1701–14) when he faced another pan-European coalition. Even then, the French army had a paper strength of over 370,000 and even the deflated figure of about 255,000 made it still twice the size of the largest forces that had been deployed during the Thirty Years War.

Louis XIV may have bequeathed an expanded France to his successors, but they also inherited increasingly dysfunctional fiscal institutions, unsustainable debt, and mounting pressure to reform. Consequently, they followed less belligerent policies, but France still intervened in the the War of Polish Succession (1733–38), which did not require a major effort although the army still hit a respectable 205,000. The more intense War of Austrian Succession saw the numbers soar to 390,000 in 1744. The ultimately disastrous involvement in the Seven Years War (1756–63) was still substantial, with about 330,000 troops.

When the monarchy collapsed in the Revolution, the new regime was confronted with a full-scale counter-revolution at home and invasions from abroad. Instead of collapsing, the Republic of Virtue instituted mass conscription, which allowed it to raise the unprecedented (and not soon to be repeated) million troops in 1794. Given the chaotic state of fiscal, administrative, and economic affairs even the massive coercion could not sustain such an extraordinary level, and the numbers dropped to 382,000 by 1797. The consular and then imperial policies of Napoleon pushed up the numbers again, to anywhere between 600,000 and 650,000 in wartime.

With the exception of the Crimean War in 1854 (when it mobilized about 645,000 men) and a brief involvement in the War of Italian Unification in 1859 (with 540,000), France did not fight a major war until its encounter with Prussia in 1870. The peacetime strength of the army, however, started at about 224,000 soon after the Napoleonic Wars and increased to 412,000 during the Second Empire. In 1870, the failure of the military reforms became all too clear when France managed to mobilize fewer than 570,000 against the invading Prussians who came with over a million!

The peacetime strength of the Third Republic hovered between 500,000 and 600,000 to the end of the century, and then it climbed over 600,000 in the years prior to the First World War. The mobilization for the Great War outstripped anything ever seen before: from the “low” 789,000 in 1914, France mobilized to a “high” of 5,277,000 in 1918. These levels of mobilizations have not been exceeded since: even when France fought Hitler in 1940, it

had mobilized “only” 5 million men, and then only for less than a year. The annual strength of the postwar army was about 580,000, which increased to 745,000 in 1954, and again to 1,025,000 in 1960 before it returned to the regular level of about 560,000 between 1965 and 1992, after which it entered a period of steady decline. By 2007, the French army had been reduced to 255,000 men: such a low number has not been seen since the days of the *ancien régime*.

One might wonder how typical the French army growth (and recent contraction) really is. The numbers for the other great powers do show a similar secular increase even if the scale might not quite match that of the French.

Prussia’s case is quite extraordinary. Brandenburg was so devastated during the Thirty Years War, that the entire population of the Electorate did not exceed 600,000 by much in 1848. The country slowly recovered (in part by generous immigration policies designed to attract skilled Huguenots from France), and by 1740, it was about 2.3 million. The conquest of Silesia and the partitions of Poland swelled the numbers to 9.7 million in 1806 but a year later Prussia had been conquered by France and reduced to a third-rate power with barely 4.9 million. The 1815 Congress of Vienna restored Prussia to first-rank status, and even added more territories to it, giving a total of about 10.3 million in 1816. On the eve of the Austro-Prussian War (after having gobbled up a few medium-sized German states), Prussia had 19.2 million (although Austria still had over 36 million), and it was about 24.7 million in 1871, right before it created the Second Reich (whose total population was 41.1 million and would grow to 67 million by the beginning of World War I).

The army size fluctuated with the fortunes of the state, but its growth was inexorable. From a mere 700 men in 1648, it went to 77,000 in 1740, then to 217,000 in 1806. After the disastrous defeat by France, the army went down to 42,000 but it quickly rebounded to 130,000 in 1816. Prussia entered the 1866 war with 214,000 troops, and the 1870 war with over 1 million. The German Reich maintained a standing army of about 450,000 in the 1880s, 550,000 in the 1890s, and 650,000 in the first decade of the 20th century. It might be easier to visualize this by looking at Figure B. It is worth noting that the spectacular increase in the size of the army during the 18th century occurred while population basically remained flat under 6 million.¹⁴

We shall discuss the (mostly unique) Prussian case later, but for now it suffices to say that while the population was a serious constraint on what the Hohenzollerns could do, their achievement — especially in the 18th century — was quite remarkable.¹⁵ The basic point here, however, is that that Prussian army was so out of proportion with its population — it was ranked 13th in population (10th in land) in 1786 but had the 3rd largest army — that Georg Heinrich Berenhort, an adjutant to Frederick the Great, remarked that Prussia was not a state with an army, but an army with a state, “in which it was merely quartered, so to speak.” Part of the reason for this focus on military might is undoubtedly the very precarious

¹⁴Army sizes from Wilson (1999, 2009), Carsten (1954, 269–71) before 1816, and the *Correlates of War* after. Population figures compiled by Örjan Martinsson from various sources, and available online at <http://www.tacitus.nu/historical-atlas/population/>, accessed April 7, 2014.

¹⁵This, in fact, is the central point of the recent history of Prussia by Clark (2006), who notes that since this rise depended so much on the skills of the governing family, Prussia’s fortunes experienced serious swings that varied with the gifts of particular rulers. Moreover, because Prussia lacked the resources to maintain itself in the face of great adversity, it experienced “perilous weakness” amid periods of “precocious strength.”

position that Prussia occupied: nearly devoid of useful resources, without easy access to trade routes, and not particularly blessed with neighbors that tended to be larger and more powerful. The fact is that the state came to the brink of extinction three times: during the Thirty Years War when it lay defenseless against both Swedish and Imperial forces, during the Seven Years War when it had to defend itself against every other state on the continent, and during the Napoleonic Wars (Second Coalition) when it was dismembered. Thus, the state needed the army to protect itself but one must also acknowledge that some of these misfortunes were the result of having such an army — the perilous position Frederick the Great found himself in during Seven Years War would not have happened but for his own, highly unusual in its boldness, land grab of Silesia during the preceding War of Austrian Succession that he had started.

3 Why Did the Armies Grow?

We shall have occasion to explore the reasons for such dramatic growth in more detail later, but a few points are in order here.

3.1 A Military Revolution?

There has been a lively debate among historians about the effects of changing military technology on the growth of armies and, through the resulting expansion of warfare and fiscal pressures, the consolidation of centralized states.¹⁶ Most of this debate focuses on when said revolution occurred, and what, exactly, it constituted: change in tactics, change in the role of the infantry, or change in fortifications. For our purposes, the most relevant is the latter one, due to Parker (1996). Advances in artillery in the late 14th century gradually made existing fortifications obsolete, and by the 16th century the Italians, who had been on the receiving end of these advances, had evolved ways to improve the defenses. These changes made it much more difficult to take cities, necessitating larger armies and longer sieges, which in turn put severe strain on the fiscal capacity of governments, and led, more or less directly, to their efforts to improve their administration and centralize it.

During the medieval period, siege weapons did not have enough firepower to breach stone walls that were sometimes up to 20 ft thick. To protect against direct assault and scaling, the walls were built as perpendicular and as high as possible (often, a moat was dug out to increase the effective height; this also had the added benefit of making undermining the wall much more difficult, and virtually impossible if the moat was filled with water). The walls of most fortresses were further enhanced with round towers which gave defenders additional angles to shoot at attacking forces, especially those attempting to ram the gate. The problem with round towers is that they created “dead ground” — areas that were not visible to defenders because the curvature of the wall hid them from fire directed from other towers — which gave the attackers an opportunity to scale the wall or undermine it unmolested as long as they could get to these areas.

With the development of gunpowder and the increasing use of cannon, these protective features turned into serious liabilities.¹⁷ High vertical masonry walls proved especially vul-

¹⁶See Rogers (1995) for an excellent collection of articles from all sides of the debate.

¹⁷See Duffy (1975) for an accessible treatment of the star forts, including construction and siege techniques.

nerable to the far more powerful cannon fire. Engineers began constructing much flatter structures: even thicker but much lower walls, sometimes built out of earth instead of masonry (cheaper to construct but requiring extensive maintenance). The walls were also no longer perpendicular to the ground but sloping so that the energy of an impacting cannonball would be at least partially deflected. The problem with low sloping walls, of course, was that they were much easier to climb, so it became necessary to improve passive defenses. The first to go were the round towers, replaced with four-sided angular *bastions* that eliminated the dead ground and ensured that attackers were everywhere exposed to defensive fire (Figure 1).

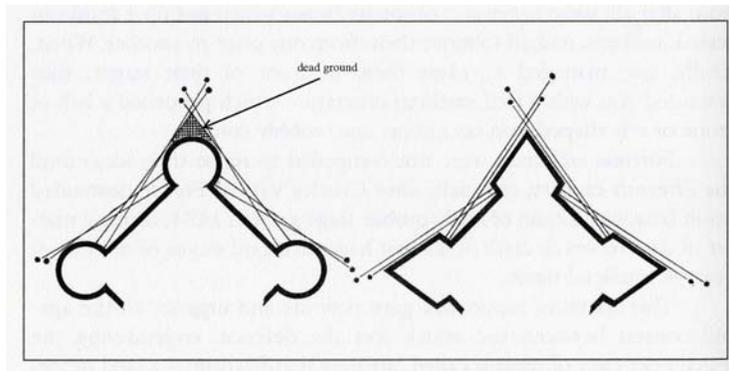


Figure 1: The medieval castle had round towers that left dead ground that was not covered by defensive fire (the shaded area). The four-sided angular bastions of the Italian ground plan eliminated that problem. Source: Duffy (1975, 10).

Next, the defenses were extended in depth. Since any troops that got close enough to the wall would enjoy some protection simply from the fact that defenders had to shoot at them from a high angle, engineers began constructing *glacis*, low-grade slopes inclined toward the wall on the outer side of the ditch (and often also adjacent to the wall), such that the attackers climbing it will always be in direct line of sight. The outworks also started to include *ravelins*, triangular structures pointing toward the attackers designed to force them to split their forces and to protect the curtain wall if it is breached. The ravelins were also totally exposed toward the fortress so that attackers who managed to take them could not use them as shelters. Figure 2 shows the main elements of the defenses in depth. The common name for these star forts is *trace italienne* (Italian ground-plan), but they were perfected by the French engineer Vauban, who also devoted considerable attention to overcoming them, something that his employer, King Louis XIV, was far more interested in.

The resulting fortifications could become quite extensive, as the map of Geneva in 1841 shows (Figure C), and were quite difficult to take. Armies could no longer batter down walls effectively, so they needed to besiege these fortifications, and either starve them into submission or dig trenches to protect their advance to a point where they could undermine the walls. The process was quite involved. The attacker would have to begin the investment by constructing *countervallation*, a defensive line that included a ditch and curtains, designed to protect his forces against sorties of the garrison. Thus, not only did the siege works had to be held against that garrison but a large portion of the army had to be engaged

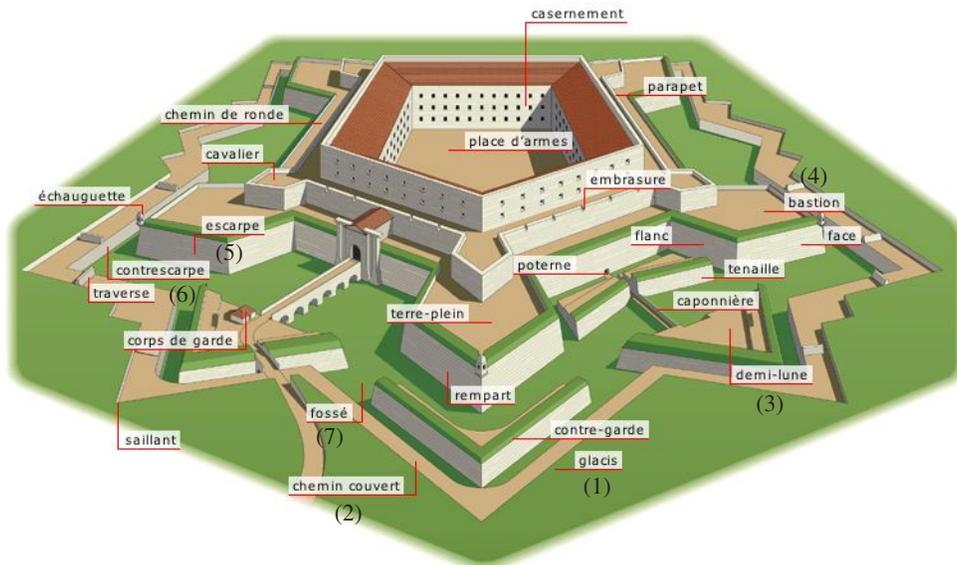


Figure 2: Vauban Fortifications: (1) glacis, (2) covered way, (3) ravelin, (4) bastion, (5) scarp, (6) counterscarp, (7) moat.

in digging and construction, making it necessary to assemble large forces. As the sieges got longer, the likelihood that a relief force would arrive to help the garrison increased, and this necessitated yet more work since the attackers now had to construct powerful lines of *circumvallation* designed to help them repel such a relief army. If the attackers could conscript local peasants, both lines could be built in under two weeks. This further increased the number of soldiers required to invest a city.

If the city could not be taken by surprise or by bombardment (which still worked for fortifications that had not been upgraded, usually due to exorbitant costs involved), a formal siege began. This meant a lot of digging as the attackers constructed a series of trenches, some parallel (for support) and others zigzags (for approach). The “opening of the trenches” (meaning the first parallel) came to define the formal start of a siege. The zigzag trenches would allow the besiegers to come closer to the fortress, where they could establish a second parallel, about 300 meters from the *chemin couvert*. All of this was done under murderous defensive fire, which was quite effective at such a close range. If morale did not collapse, the attackers would construct a third parallel at the foot of the *glacis*.

This was a critical position because it would enable the attackers to take the covered way, which in itself could prove one of the costliest actions of the siege. Taking the *chemin couvert* was critical because it would permit the attackers to bring their cannon or the miners within reach of the ramparts. This is why the defenders would usually fiercely contest it by digging counter-approaches in their own *glacis* to prevent the establishment of the third parallel and, when that failed, in closed-quarter fighting. After securing the outworks, the laborious process of breaching the ramparts began. If cannon proved ineffective, mining was the only option. The defenders would counter this by throwing ditch-grenades into the

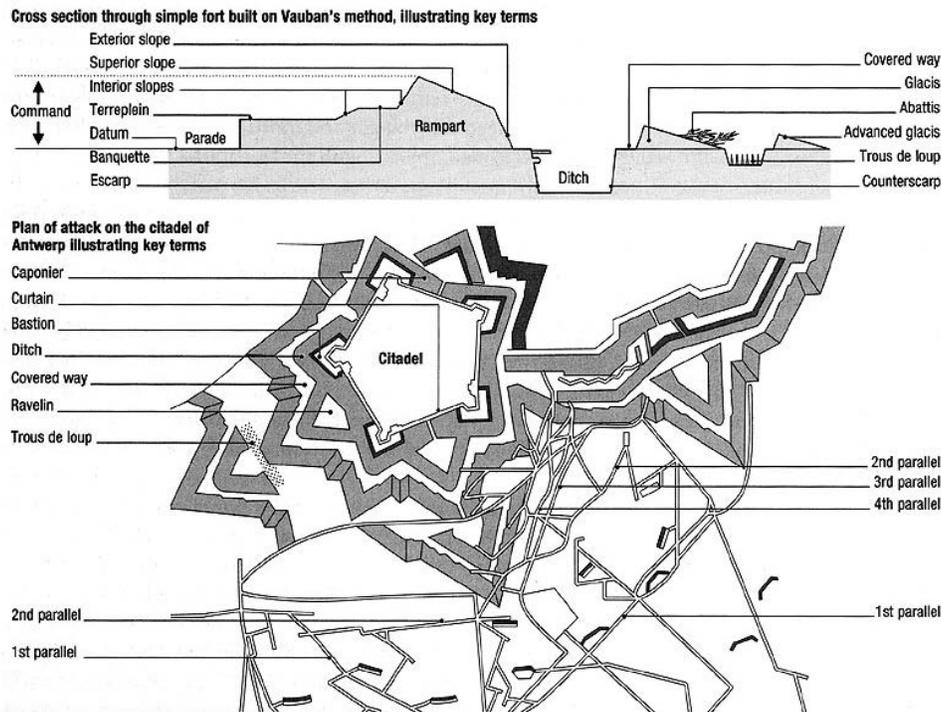


Figure 3: Plan of attack on the Antwerp citadel using Vauban's method. Source: Holmes (2001, 310).

miners' den or digging a tunnel to meet the miners in full-blown underground warfare.

Of course, even when the miners or the gunners succeeded in creating an opening in the ramparts, the attacking army still had to get to it, and that meant crossing the ditch and the counterscarp. If the ditch was filled with water, then a causeway would have to be built, and this meant filling the ditch by hand with stones. If this succeeded, the attacker could finally storm the breach, which would often be done at daybreak to take advantage of the cover of the night to assemble the forces. The defenders would usually throw everything they had in the defense of the breach, so this could become a particularly murderous operation especially if there were serious defensive works inside (e.g., a citadel). The attacking army would often simply try to establish its hold on the breach in the hope that this would convince the garrison to surrender instead of mounting a last-ditch effort and inflicting further casualties.

Short of being rescued by a relief army, defenders did not really have much hope once the storming forces established a foothold inside a breach. But timing was critical for surrender. If the garrison capitulated very soon, then the attackers could be quite benevolent, sparing not only the town and the population, but often allowing the garrison to leave with full military honors. But if this capitulation was premature — that is, if it did not force the attacker to expend time and resources, and at least some blood — then the garrison was liable to be punished by its side after rejoining it. If, on the other hand, it held out too long, then the attacker was liable to reject any terms, and put not only the garrison but the

entire city to the sword. The general agreement was that once the glacis, but especially the covered way, was secured by the attackers, the garrison could beat the *chamade* or wave a white flag, and expect honorable treatment at capitulation.

The famous siege of Lille during the War of the Spanish Succession took 120 days (from mid-August until early December, 1708).¹⁸ As we shall see, this was a critical juncture in the allied war effort as they were now beginning to invade France itself. The besieging force numbered around 90,000 (not including numerous allied troops in the area that were also engaged in harassing the French), with about 90 siege guns. The French defenders had a garrison 16,000 strong and a relieving army of about 110,000. The allies invested the city on August 12, completed the lines of countervallation and circumvallation ten days later, and opened the trenches on the 22nd. The French relieving force started moving on the 29th, and in early September they forced the allies to cover them with nearly all their available forces (about 70,000 were detached). The defenders tried a sortie against the weakened besiegers, but they failed. On September 7, Eugène assaulted the counterscarp and captured the *chemin couvert* at the cost of 3,000 men. Two weeks later, he was wounded during an attempt to secure the false bray (a smaller rampart in front of the main one), which cost the allies another 1,000 casualties. By this time, however, Marlborough had succeeded in forcing the relieving army to retreat, so he could assume command of the siege. On October 22, the allies breached the walls. Boufflers, the defending commander, surrendered the town and retreated to the citadel, forcing the allies to begin its formal siege. The French made several more attempts to relieve Boufflers or at least provide his garrison with supplies, but they all failed, and their army went into winter quarters. On December 9th the garrison capitulated, and was allowed to march out with full honors on the following day. The allies had lost 15,000 men (many to sickness).

Thus, the Vauban-style fortifications did not make it impossible to take a city: a force large enough, committed enough, and supplied enough would be able to do it given enough time.¹⁹ But that, precisely, was the point: a successful siege required “enough” men, supplies, and money. The besieging army would not only have to be large enough to man its own defensive works but to dig and mine toward the fortifications. It would have to bring with it enough artillery, and then defend the batteries once they got in close range. It would have to commit forces to defending against a relief army, as well as to conscripting local labor and foraging for supplies. The duration of a siege, which could be measured not just in weeks, but months and, in some cases, years, also meant that the army would have to be kept in the field longer, possibly outside campaigning season, straining the ruler’s finances even more. When a territory was heavily urbanized, and densely dotted with cities fortified using the latest techniques — like the Netherlands tended to be — it would require vast resources in manpower, material, and finance to conquer it.

Most states, however, were not as rich as the Dutch and did not really have the wherewithal to upgrade their existing fortifications on a grand scale, let alone construct brand new ones. Many cities continued using their obsolete medieval defenses while making piecemeal updates whenever they could. As a result, many fortified towns could still be taken

¹⁸See Figure D in the appendix.

¹⁹See Figure E for another map of a formal siege and Figure F for an artist’s rendering of what such a siege would have looked like.

by storm without the elaborate formal sieges described above. Moreover, the Netherlands was also quite unique (with the possible exception of northern Italy) in the high density of urbanization that made it imperative to take fortresses or risk exposing one's supply lines. Most other territories in Europe lagged far behind and the important cities were scattered with vast stretches of countryside to separate them. This meant that an invading army did not really have to take them unless it required plunder; it could simply bypass them, leaving covering forces to ensure that the garrison did not sally forth to disrupt the logistical train. These cities could also be isolated more easily and either starved into submission or blackmailed into paying off the invaders. Thus, while the Spaniards had to invest one Dutch city after the next during the Thirty Years War to the point that the two sides hardly ever fought a pitched battle, there were very few sieges in Germany, where the opposing sides engaged in large-scale battles that could drastically alter the fortunes of belligerents with a single stroke.

And yet, even without the upward pressure of the formal siege, the field armies in Germany reached quite astounding sizes. In 1632, the Protestant alliance managed to muster 140,000 to put at the disposal of the Swedish King Gustavus Adolphus, and when France entered the war it could bring in up to 95,000. (At this point, however, the Protestant alliance had collapsed and the forces under Swedish command had dwindled quite drastically.) The Catholics were no slouches either. At his peak in 1630, Albrecht von Wallenstein was maintaining close to 150,000 troops for the Emperor. Forces of these sizes had nothing to do with either supposed tactical innovations or developments in fortifications.²⁰

3.2 Choices and Constraints

The German experience shows that the military revolution was not a necessary condition for the growth of armies, and the fact that little or no such growth occurred in the urbanized Italian north further points to the fact that it was not a sufficient condition either. In the end, the *trace italienne* may make larger armies more desirable, but this in itself cannot account for their growth. After all, the escalating costs could dissuade monarchs from sieges instead of encouraging them to spend more. In fact, monarchs differed in their choices on that matter. Moreover, since they could also choose to maintain vast armies without the siege rationale, we can safely conclude that the most important determinant of army size was monarchical *choice*; that is, his or her *political or strategic goals*. A ruler who has his heart set on some piece of territory could strive mightily to acquire it, and could subject his territory to strains that other rulers would not even contemplate.

This is not to say that such choices were made absent any constraints. In fact, the demographic, economic, institutional, fiscal, and international contexts could themselves largely determine the limits of what any given monarch could achieve. For instance, *population growth*, either through natural causes or through the acquisition of territory, would increase the manpower pool on which the monarch could draw upon for recruitment and taxation. For example, Austria's population nearly tripled from about 8 million in 1705 (the middle of the War of Spanish Succession) to about 23 million in 1786 (right before the Austro-Turkish

²⁰Truth be told, their ability declined precipitously in the second half of the war when everybody was getting fiscally exhausted, and when the country had been plundered so much that it could no longer sustain so many people in arms.

War), mostly from territorial gains. The army sizes at these endpoints were 135,000 and 313,804, respectively.²¹

Figure A and Figure B plot not only the sizes of the armies of France and Prussia, but also the percentage of the total population that these armies represented. These figures clearly show the drastic expansion of armies. Consider France, whose armies averaged about a quarter of a percent before the 17th century and topped out at less than half percent during the last Habsburg-Valois War (1551–59). During the Thirty Years War and the continuing Franco-Spanish War (1635–59), the proportion more than tripled to over 0.80%, even reaching as high as 0.92% in 1639. The long wars of Louis XIV saw more increases with the army steadily being over 1% of the population, and sometimes reaching well over 1.5%. Although such massive numbers could not be sustained until the War of Austrian Succession, the French army again became over 1.5% of the population then and fairly close to that during the Seven Years War. The Revolutionary and Napoleonic Wars almost doubled that again to 2.6% but they were exceptional. The steady state of the 19th century saw even the peacetime army hover over 1% of the population until the disastrous Franco-Prussian War (which at this point had tripled in comparison to the first period we examined), but even the Third Republic maintained a peacetime army of over 1.5% of the population. The stupendous effort during the First World War mobilized nearly 10% of the population, and even the short burst in 1940 resulted in the mobilization of about 7% of the population. The Suez Crisis and Algerian War (1954–62) forced the Fourth and Fifth Republics to keep the army at over 2% of the population, but the end of the Cold War has seen the size drop to under 0.5%, a proportion not seen as a steady state since the early years of the reign of Louis XIII.

The numbers for Prussia merely bring this point out even more starkly. The largest lasting increases in army sizes were far and above any population increases (and indeed, sometimes occurred despite population losses).

It is true that some countries experienced a marked improvement in administrative capacity, which increased their ability to manage large and complex organizations like armies and navies. France, where royal intendants inspected the organization and supply of troops quickly eliminated the major abuses that armies commanded by officers who traditionally bought their commissions (and made fat profits from inflating numbers of men in their service or overcharging for supplies) were prone to. The vast armies of the Sun King could only be sustained by establishing a complicated system of depots across any territory they had to march through. New standards of training improved discipline and standardization of equipment and clothing began to incur economies of scale. The introduction of barracks and military hospitals further involved the state directly and increased the bureaucratic apparatus necessary to manage these commitments.

All of this did make management more efficient, but this did not cause armies to grow. In fact, the sequence of events suggests that it was the need to manage the larger armies, a need that existing institutions proved inadequate to satisfy, was what spurred the development of a more efficient centralized administrative apparatus. In other words, the bureaucracy grew because of the larger armies, not vice versa.²²

²¹ Population numbers from Corvisier (1979, 113), who gives slightly lower numbers for the army than the updated ones in Hochedlinger (2003, 300), which are used here.

²² Kennedy (1989, 75–6) dismisses military and organizational factors as the underlying causes for a coun-

As we shall see, sound finances could sustain large armies, enabling some countries (e.g., the Dutch Republic) to punch considerably above their weight, but they were neither necessary — as the Spanish and French experience showed — nor sufficient — as the decline of the Republic itself showed — for that. In the final analysis, it is always two factors that are absolutely essential: the *political goals* of the monarchs or governments, and the *military competition among states*. The preference for an expansionary foreign policy that some rulers, like Louis XIV, repeatedly exhibited caused them to harness the military potential of their polities and create formidable war machines. In doing so they became existential threats to polities around them, which in turn spurred their efforts to neutralize that threat. Thus, the factors we considered here made larger armies necessary for military success and feasible to maintain — providing the kindling, but it was policy preferences and the competitive context that provided the spark. The fundamental causes of this expansion were thus as old as warfare itself; they just operated in a new context and thus found a new expression.

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try's success as a great power as well. He singles out finances and geo-strategic position, but both are constraints that shape political choices. See Lynn (1990, 10–13) for an analogous point.

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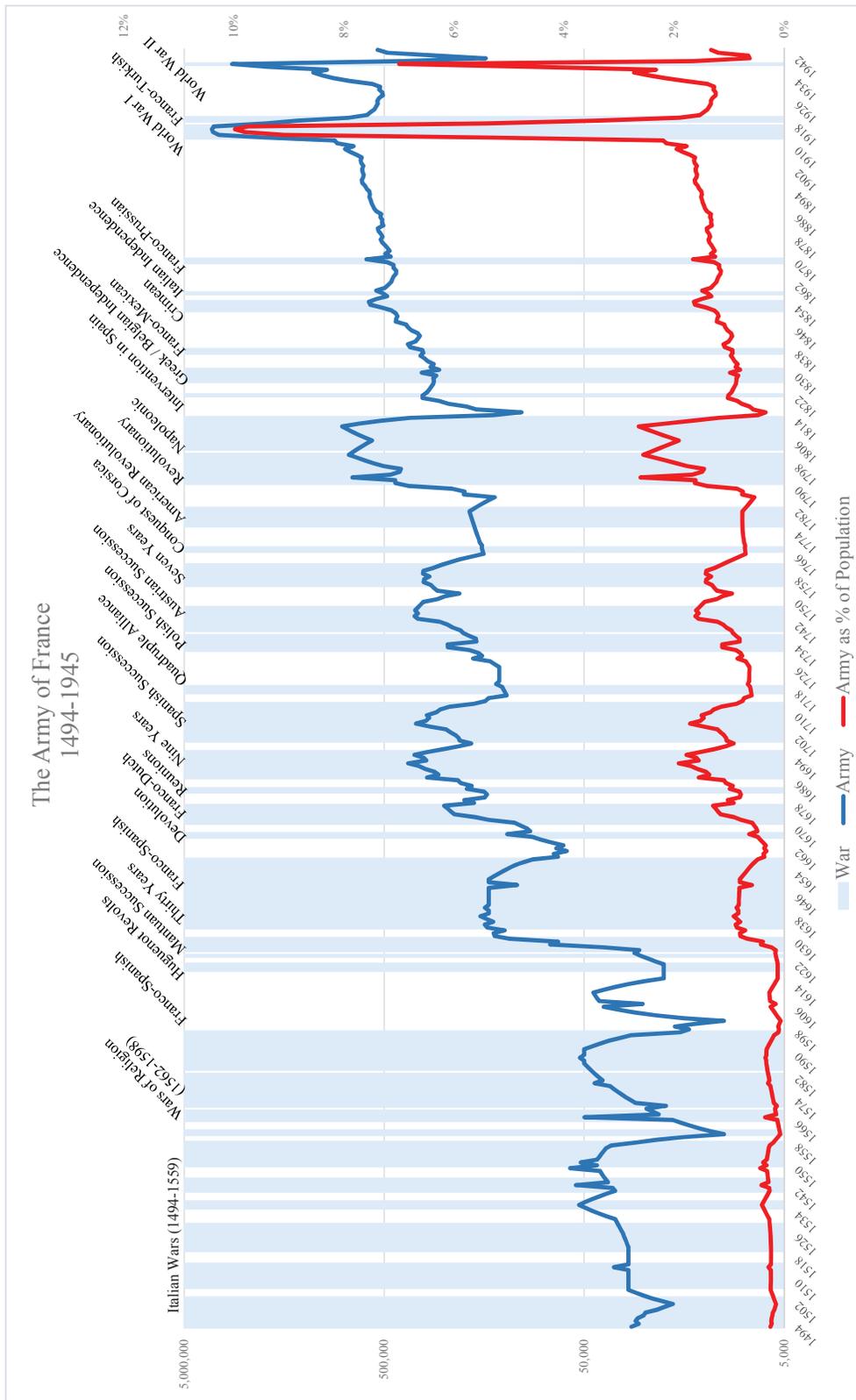


Figure A: Army size and army as percent of population for France, 1494–1945.

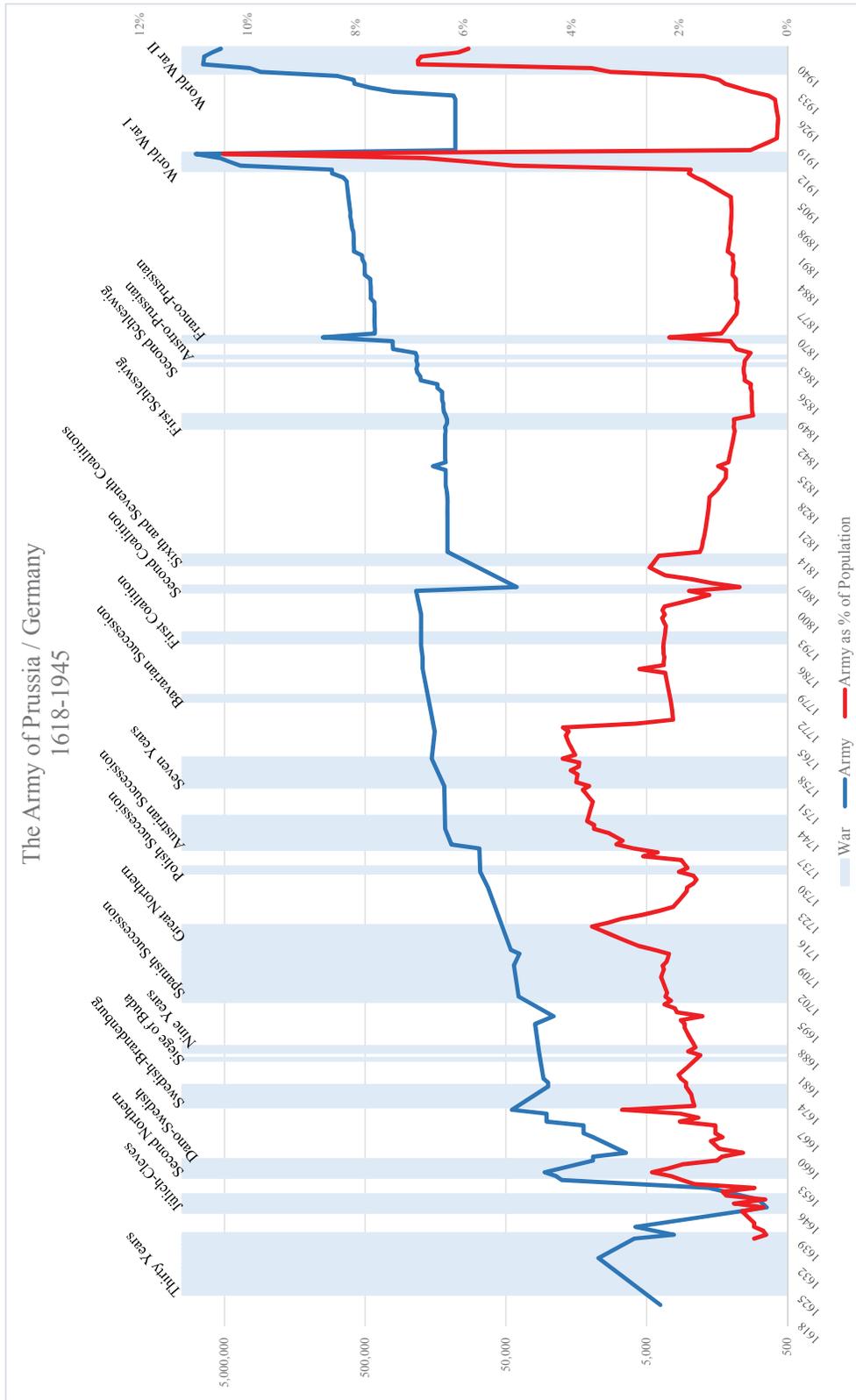


Figure B: Army size and army as percent of population for Prussia, 1618–1870 and Germany, 1871–1945.

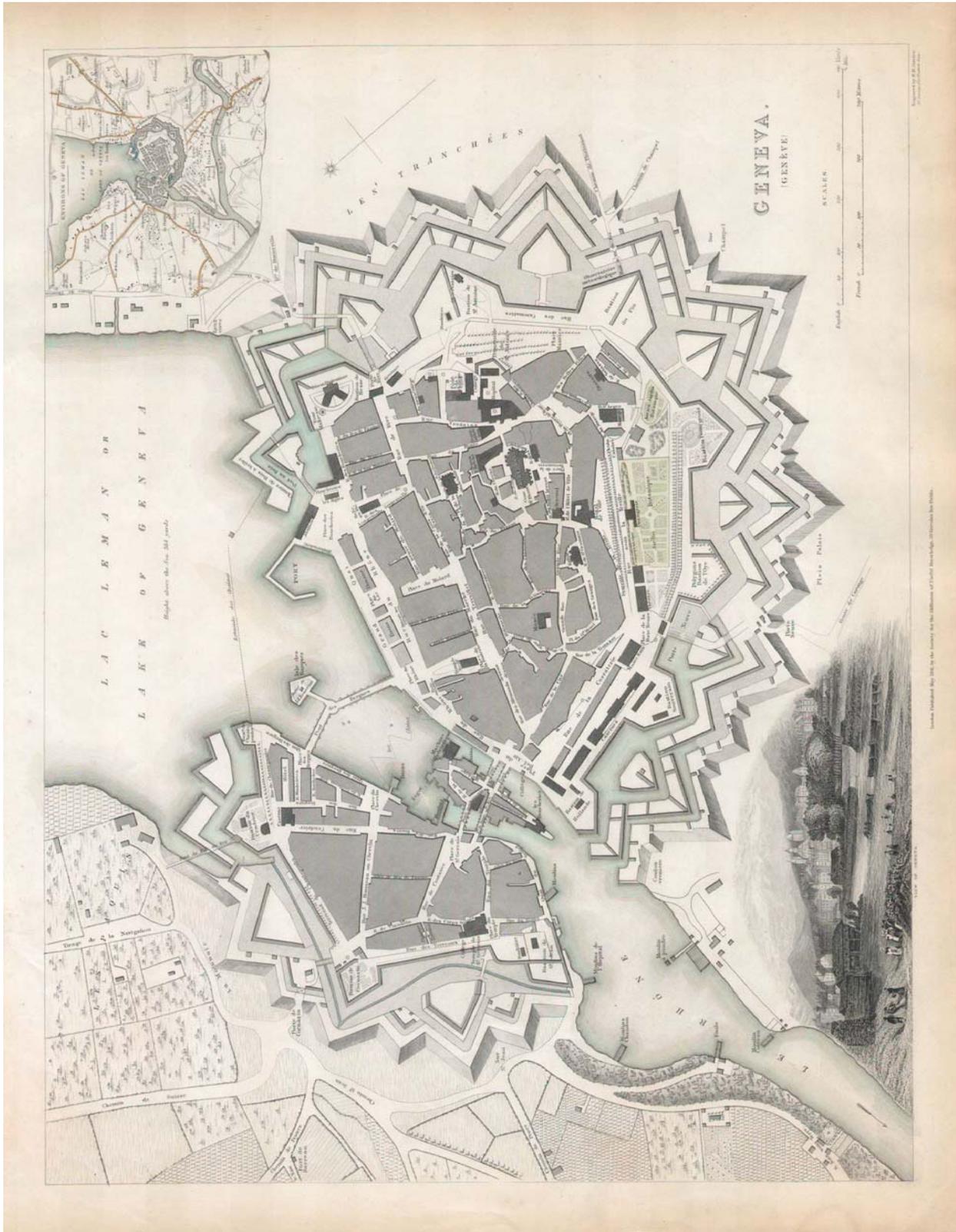


Figure C: Geneva in 1841 (SDUK P19, <http://www.atlassen.info/kaarten/algemeen/sduk/sdukp.html>).

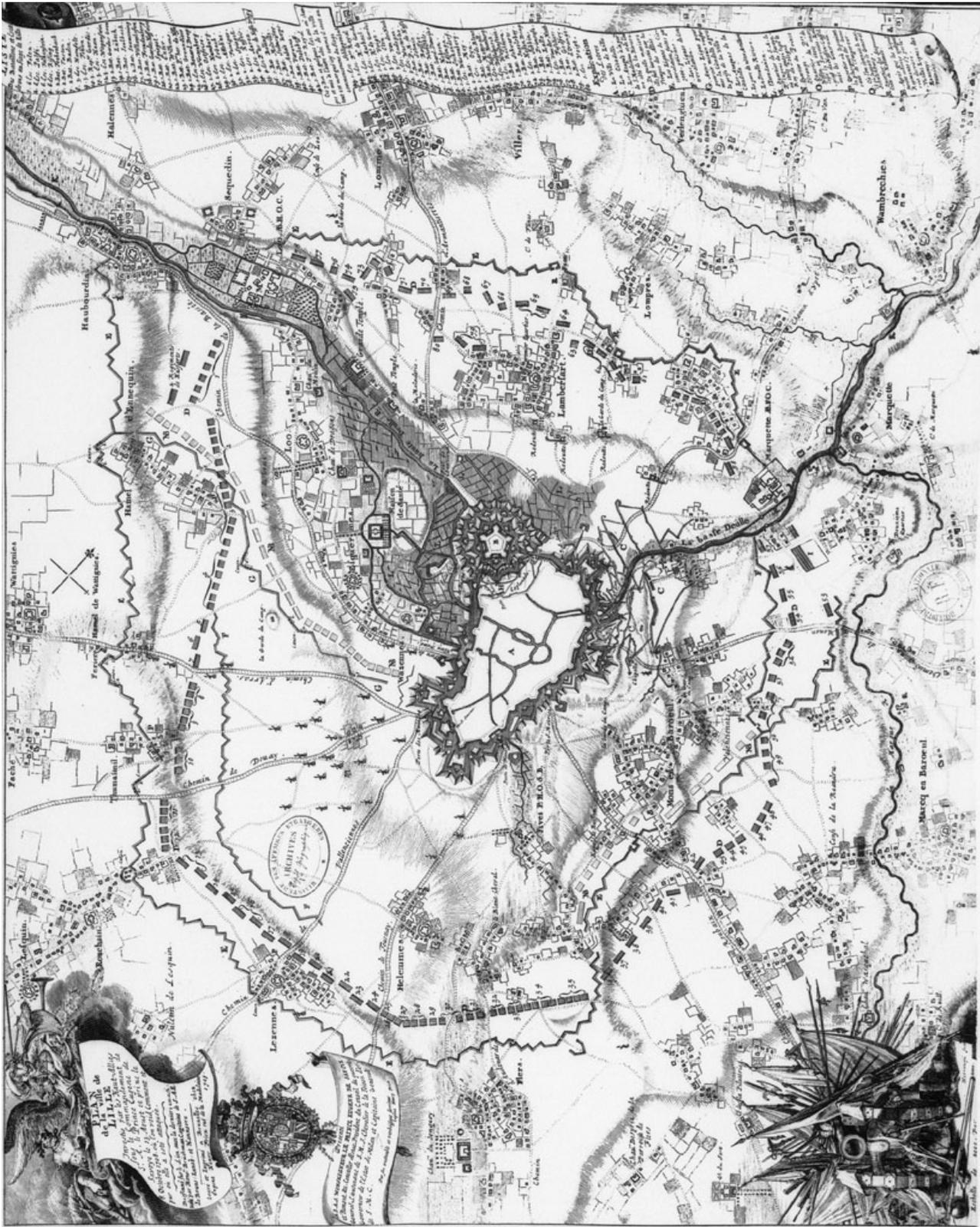


Figure D: Siege of Lille, 1708. Note the extensive lines of circumvallation.

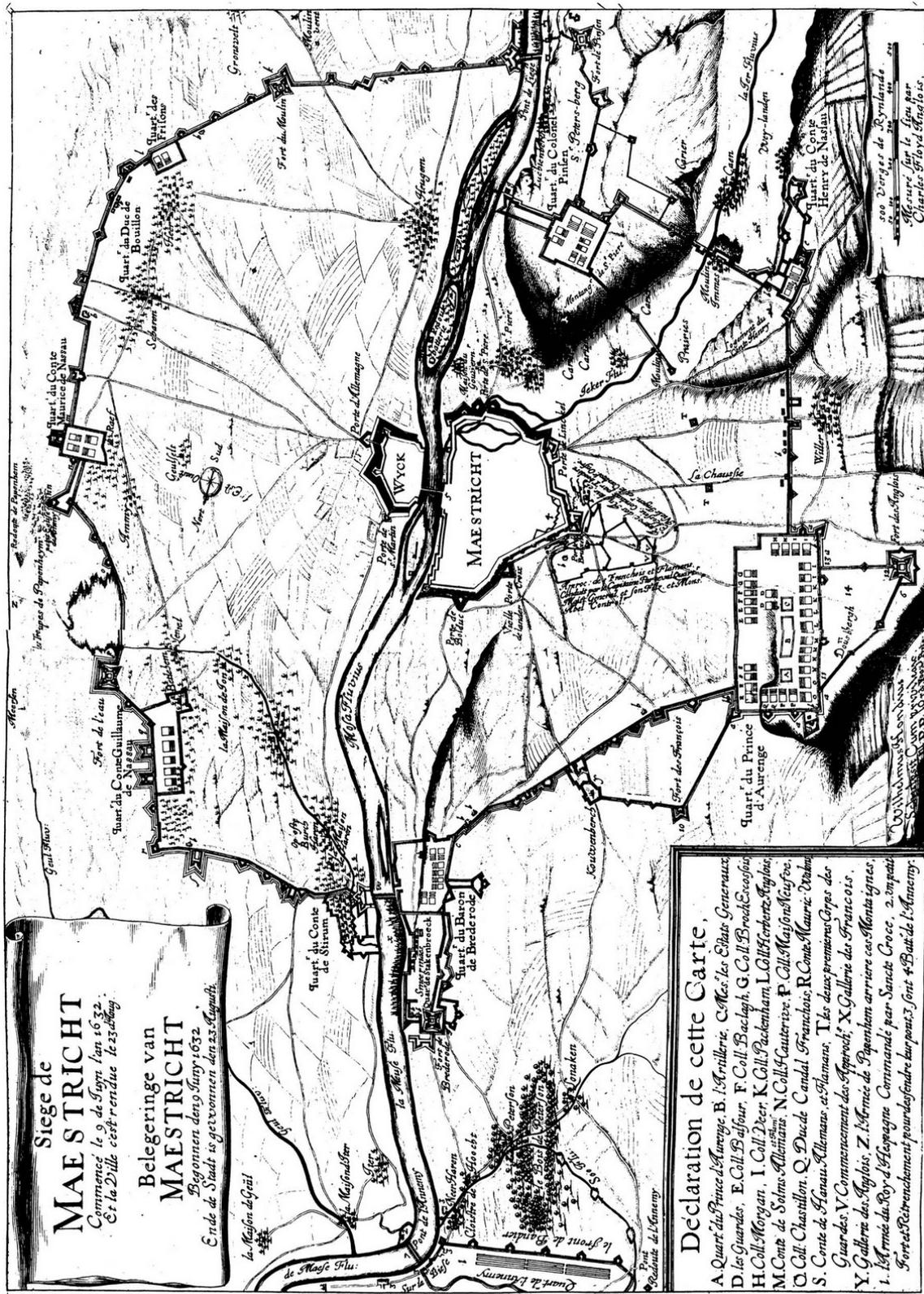


Figure E: Siege of Maastricht, 1632.



Figure F: Siege of Julich, 1621–22.