8. Training and Schools

1

Introduction

An army should train for the battles it expects to fight. The Royal Artillery was well trained before the war, and the training was indeed matched to the battles that were anticipated. But when the real war proved different from expectations, it was already too late to retrain the artillery, let alone the whole army. It would have been impossible to go back to square one while fighting a war, and nobody tried. Yet artillerymen knew that their 1914 standard was not enough, and they improved by gradual increments, though as rapidly as possible. A major delay to improving the level of training was the huge expansion, far beyond just mobilizing reserves, that lasted into 1917 and required training roughly half a million men. Training, both basic and advanced, was always conducted within the pre-war paradigm that viewed artillery as a supporting arm, not a branch angling for a new combat role. Wartime training anticipated a Second World War comment of Montgomery's—that the artillery must first train itself and then train the infantry to use the artillery properly. [1]

Before the War

Before 1914 the dispersion of the British army across the Empire and the British Isles greatly affected its training. Many posts were small, and brigades were fragmented to save money or support the civil government rather than concentrated for formation or combined arms training. There was an annual training cycle with two seasons. First came individual training, to teach the soldier the specific skills needed to do his job; in the artillery, this included training a gun detachment as a whole. Then, collective training (including firing practice) molded the guns into a battery. Partly because so many units were scattered around the empire, most training time was spent at quite low levels: battery, company, squadron, or battalion. There was some time allotted for brigade-level training, if a full brigade could be assembled. On top of this were maneuvers, but these did not happen every year, nor were all units involved.

Individual training could be done in barracks and on parade grounds, but firing could only take place on the ranges. There were several artillery ranges in the British Isles, but most were only barely large enough for modern artillery. This limited the number of possible firing positions and target areas, so practice camps became ritualized, with targets popping up in the same spots year after year. [2] Commanders learned what the range to the target area was, and over time, since all units would hit the well-remembered targets, the training lost most of its value except to see which unit could open fire first. These problems of utterly fictitious firing conditions were compounded by the fact that no more than six hundred shells were allowed for annual firing, and that counted both those fired in collective training and at practice camps. [3] This meant that a gun would fire only a few rounds per "tactical situation," and it gave the entire proceedings an air of unreality. [4] One step taken at some (but not all) camps was to conduct joint tactical exercises with the infantry, encouraged by the 'affiliation' of infantry and artillery brigades after 1907. [5] But again these could be mere ritual, since the guns had to stop firing just when the infantry reached the crucial moment of assault. [6] The decline in standards of officers and NCOs (particularly battery commanders and Battery Quarter Master Sergeants) was a perennial complaint of senior officers. [7] Yet if prewar tactical ideas quickly went out of date, many of the individual skills did not. These were useful building blocks, but were hardly comprehensive.

These comments cannot be uniformly applied, because there was no tactical uniformity within the Royal Artillery. Batteries trained separately, brigades had different ideas, and

divisions were equally diverse, and to top things off, many batteries were not even assigned to divisions. Even though the CRA's peacetime duties centered around training, they had relatively little discernible input. They could fuss around their brigade commanders, but it certainly did not help that some CRAs were less than impressive to their subordinates. One officer later wrote, phrasing it delicately, that F. D. V. Wing (CRA of the 5th Division) "may have given the impression that he knew little about Gunnery detail." [8] There was no central school for artillery officers or gunners—even though some senior officers wanted one—probably because it would undermine the authority of the division commanders. [9]

5

The Royal Artillery was divided into the Mounted Branch (Royal Horse Artillery and Royal Field Artillery) and Dismounted Branch (Royal Garrison Artillery), and the two had different training. Garrison Artillery had more time for individual training, since their units traveled less and did not have to spend time on stables duties. This may have improved their gun drill, but they had even less firing practice than their colleagues. Moreover, their training was less realistic than the field artillery's because it omitted a crucial target category, the "obstacles" that would be an important wartime target. [10] Some very advanced ideas developed in the RGA, including gun calibration, so that first shots would be more accurate, but here too the lack of a central training authority meant that improved training was the product of an individual crusade by one man, Walter Bland. [11] Siege artillery was specifically criticized for moving and firing slowly, which was unfair judgment since the siege artillery had no assigned horses (civilian carters had to be hired for maneuvers), and since heavy guns always fire more slowly than lighter ones. [12]

Maneuvers should have put the final polish on training, but there were many difficulties. To save money, many units deployed at half strength, and commanders had to balance the need for simulating realistic movements against the bills for crop damage that would result. [3] Maneuvers were the best chance for joint training with infantry and cavalry, but the cooperation was often a one-way street. To the extent that there was ever official criticism of the artillery for their role in joint maneuvers, the artillery bent over backwards to do what the infantry and cavalry officers wanted. [14]

Initial Wartime Problems

After the outbreak of war, the artillery (like the rest of the army) was faced with two problems. The first was expansion—training larger numbers of men than had ever been contemplated. In this regard the artillery, like other technical arms, was worse off than the infantry. [15] Guns and other specialized equipment had to be manufactured before the gunners could learn much more than close-order drill. Second, new techniques were developed during the war and had to be taught to both new and experienced units. Step by step, the Royal Artillery solved its problems, solved the new problems that arose from the original ones, and by the Armistice had produced the most advanced artillery arm of the war.

The first problem posed by expansion was providing equipment for training. Training was hampered by the shell shortage that lasted through 1915, which cut into the amount of firing practice units got, but far more severe was the lack of guns. New Army divisions had very few guns, often well into 1915, months after they were formed. The 13th Division eventually procured one gun per battery, but conversely had "no harness except for a few nearly worn out civilian sets which enabled one battery per brigade to turn out 8 vehicles once a week." [16] The 18th Division did its unit training in England with a very few guns, fired some borrowed guns a few times on Salisbury Plain, and only received its own guns once the unit reached Le Havre. [17] So extreme was the shortage of real guns that wooden dummies were used to teach loading drills, and some captured German guns were sent back to England for the New Armies to practice upon. Artillery also had to be mobile,

[18]

which mainly meant working with horses. While knowledge of horses was far more widespread in 1914 than it is today, there was no guarantee that the army had put men with the right skills in the right place. Horses also had to be procured and given time to work together, and trained to army commands. All these facets caused problems. The supply of horses also caused problems; one division received some 2,000 head, but most of those needed to be cured of ringworm. [19] Rumors circulated about a battery getting a team of trained wagon horses that had pulled a milk cart and did not respond to voice commands—the gunners had to clink two shell cases together to provide a facsimile of the clink of milk bottles.

One field artillery brigade simply decided not to overwhelm its raw recruits, and only taught "so much of the team work required in a battery as will permit the whole work of the battery to carry on." [20] There was also the question of who would teach the new gunners their trade. It was one thing to teach men gun drill—albeit difficult enough in the absence of guns—but another to teach, say, observation of fire, and even more difficult to inculcate artillery-infantry co-operation. This problem was not helped by the artillery commanders of the New Army divisions, almost all of whom were retired officers recalled ("dug-out," in the slang of the day) for the emergency. Ivor Maxse was relatively lucky with the CRA he got for the 18th (Eastern) Division. F. G. Stone was only 57 and had been retired less than a year, but Maxse still wanted officers, even as junior as major, to be sent back from France with their up-to-date experience. [21]

10

Instead of veteran officers and NCOs, a variety of official publications came back from France so that the new divisions at least would not learn the wrong things. [22] These came from the BEF, and then went through the War Office, a step that very likely slowed dissemination. Some of these also tried to explain new techniques, but it is debatable how useful they were to officers still grappling with the rudiments of army life, let alone ballistics. [23] There was also a cottage industry of books and pamphlets written by serving or retired officers, purporting to tell new gunner officers all they needed to know. *A Field Gunner's Catechism* ran to at least nine editions, while almost anything subtitled "a simple explanation" was a commercial success. [24] Of course publishers also reprinted official works, but it would be interesting to know which sold better, *Garrison Artillery Training, vol. II: Siege and Movable Armaments or The Royal Artillery and their Daring Deeds.*

The Territorial Force presented another set of problems. While the men were generally well trained at the individual and battery level, thanks to drill evenings and weekends, they had very little firing experience. Their summer practice camps were short, and a good part of that time was spent in dealing with the horses which, to save money, were only rented. This had led to some interesting experiments with gun tractors instead of horses, but these stopped in 1914. [25] In addition, the Territorial Force's guns were out of date and required different training than the modern ones, and the organization of TF batteries was different from that of the rest of the army. Meanwhile, second-line Territorial divisions, raised in wartime, were as lacking in experience as anyone in the New Armies. Rather than using modern captured German equipment for training, they received some antiquated French black-powder guns that really only taught which end of a gun was which. [26]

The RGA had even more problems, because they had to undergo more technical training, they lacked peacetime experience with horses, and because large guns were slower to make. One siege battery fired only a few shots from obsolete 8-inch muzzle-loading guns before going to France, and well into 1916 at least one cadet school still had only ancient guns. [27] Another battery learned drill "on a howitzer represented by two gunners standing like the fore and hind legs of a pantomime elephant. Other apparatus consisted of a blackboard borrowed from Piershill School, a No.1 director from the RFA, 12 semaphore

flags from the Boy Scouts, and a buzzer from the camp Adjutant." [28] To be fair to the authorities that were struggling to equip the whole army, this was a tongue-in-cheek depiction. Most of the men in this battery had already done individual training in other units before being drafted away to the new unit, and the battery received up-to-date equipment before it embarked for France.

Training Officers

To provide officers, the Royal Military College at Woolwich (the training center for artillery and engineer officers) shortened its training course. But even that was far from enough, and other existing schools were pressed into service. RFA officers went to Shoeburyness, which was originally the school for instructors who would be sent out to spread their knowledge throughout the army. Now the situation was urgent, and Shoeburyness dumbed down its course. Lest we think that leading young lieutenants to knowledge made them think, there were complaints from the young gentlemen that they were being taught old-fashioned mobile warfare, not the latest trench-warfare tactics. [29] RGA officers went on very short courses to Lydd (the pre-war RGA school), but both that school and the RGA were expanding from an even smaller base than the RFA. [30] Quickly, Woolwich, Shoeburyness, and Lydd were all swamped, and ever more officers needed training. Eventually a large number of Officer Candidate Schools were opened, with twenty-five existing at various times, but because these were ephemeral, hostilities-only organizations, virtually no details have survived about the number of schools, the course of instruction, or any other specifics. [31]

Even with the burgeoning training establishment, junior officer training was still identified as deficient even before divisions deployed from the UK to the Western Front. Beginning in the early spring of 1915, extra subalterns were attached to batteries in the line to get two weeks' seasoning. [32] Similarly, a "school training battery" was established near St. Pol in an attempt to fill some educational gaps among officers already in action. [33] The situation persisted throughout the war, with some officers sent to France with only eight months training, which included their Officers' Training Course. [34] Interestingly, when sergeants were granted commissions they were given nearly a year of training. [35] This may have reflected concerns about the social origins of these new officers, or may have been a recognition of the lower educational

15

As ever, men's time and effort were often wasted because the army could not predict the future. For example, A. D. Somervail joined the Territorial Force in January 1915 and was taught about 5-inch howitzers, which were then withdrawn from service, so he was retrained on 4.5-inch howitzers. The army then preferred that he learn about 18-pounders, so he attended two courses about them. He then went on a course vaguely called "Telephone and Artillery Material" before finally going to France in May 1917, relatively well trained for his duties. [36] Staff officers might well be sent to schools to learn facets of their trade, like the Reconnaissance Officer who went to the Survey School, or those staff officers considered for promotion to command units who would go on standard command courses. [37] However cursory an officer's initial training might be, more care was taken with those promoted to be a Battery Commander. They typically went on a course teaching administration and man-management, then another to improve their gunnery skills. [38]

Given the difficulties and wide variations in training, new divisions in France were often given a leavening of Regular artillery troops, or perhaps (and temporarily) a Regular CRA. [39] This helped the new divisions, whose entire firing experience might have been only a few dozen rounds. There was also a program to gently break in new divisions. For instance, in December 1915 the 38th Division (a New Army formation) sent its batteries, one at a time,

to join the Regulars of the 5th Division. [40] Through the spring of 1916, New Army and Territorial Force artillery doubled up with regular units in the line to improve their standard of training. [41] Royal Horse Artillery batteries were specially chosen to train the new units because of the RHA's high standard of drill and discipline; the RHA also supplied many of the demonstration batteries for schools in France. (It is only fair to point out that while the cavalry did not see much action in World War I, the RHA batteries were frequently detached and saw considerable service and action.) The 39th Division arrived in France in March 1916, only ten months after its creation, and within a week the artillery were already attached to divisions in the line. Perhaps this unit was especially backward, but it served two apprenticeships in its first month, sometimes attached to divisions that had only arrived three or four months earlier. It then served three months in a quiet sector and had a further ten days training behind the lines before first entering battle. [42]

But such was the number of semi-trained units that, regardless of the quality of the instructors, they could not learn all they needed to in brief spells in the line. Furthermore, they needed to raise their standard of individual training. At different times, schools trained individuals, units, or both, and the tasks might be spread across different schools or handled at one large school.

To fill the gap, training schools were created on the Western Front. At first there was considerable diversity in schools, whether established by divisions, corps, or armies (sometimes all three), but in early 1916 artillery topics were assigned to the army-level schools. [43] The system was highly variable, and records are scarce since none of the schools had formal establishments. After the 1915 campaigning season, GHQ took the first steps to extend officer training in France. [44] Memos circulated in early October, resulting in each army establishing a school slightly before the War Office officially authorized their creation. [45]

As befitted the decentralized style of command, GHQ only explained the general subjects the schools should teach, leaving the actual syllabus to the armies. Each school had a battery for demonstrations, and plans were to train twenty officers per twelve-day course. The First Army started a week-long course for battery commanders (as well as a scattering of staff officers) late in December 1915. [46] The First Army seem to have been the leaders in formal artillery schools, although artillery was part of the syllabus at the Third Army's less-focused Officers School. When Lieutenant Colonel Tudor gave an evening lecture (apparently an outgrowth of the Officers School) on the lessons of Loos he discussed not only artillery matters but also such details as the advantages of wide communications trenches. [47] The Third Army did have an Artillery School but, lacking guidance from above, in February 1916 it only taught FAT and open-warfare methods. [48] The Second Army started a two-week-long artillery course at roughly the same time and went beyond pure gunnery to tactics and man-management. [49]

20

By the middle of the Somme fighting, the number of gunners needing training was so great that schools had to be expanded to teach sixty officers and sixty NCOs per course, and in March 1917 overcrowded schools in Britain sent half-trained subalterns to France to finish their training at the army schools. The schools ran continuously until more urgent matters intervened, in the form of the German offensives in the spring of 1918. Afterwards there was a gradual re-opening, but due to the pace of operations, some schools were closed; short-handed units could not spare men for extra training and, overall, the need for schools had declined. Attention turned to plans for a central artillery school, thanks largely to the personal involvement of Herbert Uniacke, now the Deputy Inspector General of Training. He won the point, but only on 19 October, and after the Armistice only establishments in Britain were considered for the future school. [50]

There seems to have been very little liaison between the Allies on training. British officers generally noted a higher standard of drill in French units, because the French had many more regulars, even after wartime dilution. The lack of co-ordination largely stemmed from the existence of quite different weapons rather than different techniques. The French placed more reliance upon high-velocity guns, while the British added more and more howitzers. In addition, the French used the metric system, thus many details of their equipment, from fuze-setting machines to breech mechanisms, were different from British equipment and thus cross-training would have been of little benefit. Nor was there much contact with the Americans. American field artillery was equipped with French 75s, but with British heavy pieces (excepting a few railway guns shipped from the U.S.), and the French handled most training. The Americans did approach the BEF for lessons and experience, but these interactions tended to be turned into journal articles for reading in the U.S. rather than for any direct application in France.

Schools mainly trained individuals, but there was still a need to improve the standard of training in entire units. To do this, quite early in the war training areas were established behind the line. [51] Sometimes, quite reasonably, schools were located in these training areas. In November 1915 there was already an "Artillery School Havemas," but unit training only burgeoned the next winter. [52] In January 1917, the "Training Area Calais" was big enough for three field batteries and a heavy artillery group, while the Second Army trained a whole field brigade and VIII Corps exercised two field brigades. [53] It was during this winter that divisional schools faded, replaced by corps schools such as XIV Corps and ANZAC schools, offering two- or three-week courses. [54] But the situation was still fluid enough that some divisional schools were still operating, and even inviting their neighbors to join. [55] This focus on corps schools was the product of GHQ policy laid down in General Staff Circular 29, which encouraged a new uniformity of training and also established shooting ranges for practical instruction. [56] Army-level schools continued their work throughout 1917, with the Second Army attaching enough importance to training (and perhaps the relative rest it entailed) to keep their school open during Third Ypres. [57] The winter of 1917-18 saw no great changes, although now some formations urged training even in the line: conducting individual training was judged possible in the line, while batteries and brigades in reserve could train as complete units. [58] The greater number of units in reserve facilitated training even into 1918, when units earmarked as mobile reserves used their time to train. [59] This was unstated but clearly official policy, and the mobile reserves especially brushed up their mobile training, which was so necessary for the new defensive doctrine and offensive hopes.

What to Teach

Many early schools spent less time teaching a syllabus than bringing officers from the different branches of service together to learn about each others' problems and ideas. GHQ established a course at Aire that produced a variety of good ideas (including a version of the creeping barrage), but no such gathering of officers had the authority to make their findings official army policy. The Aire course's notes were marked "These notes are not official" at the same time that the BEF was relying on GHQ's useful but uninspiring "Tactical Notes" series. [60] Any ideas produced had to go through the General Staff's bulging in-box until mid-1918, when Sir Ivor Maxse was appointed Inspector-General of Training. Maxse interpreted his job to include deciding what should be taught as well as how to teach it.

Without an internal proponent for artillery doctrine, GHQ had to consult the armies for ideas. While this doubtless brought forward many new ideas, when there was disagreement it tended to produce lowest-common-denominator results. [61] By late 1916 schools had become an accepted part of the BEF, and in 1917 and 1918 training syllabi were officially

printed for use across the BEF. The first was "Instructions for the Training of British Armies in France," followed by the "Catechism for Heavy and Siege Artillery Subalterns," later broadened into a "Catechism for Artillery Officers." [62] (Available as Appendix 25.) Whatever the centralizing intentions, the courses of instruction at the various schools differed. Despite the optimism of one instructor that he was teaching his pupils "the latest ideas in gunnery and [giving] them some training in mobile warfare," some pupils simply saw the schools as a break from the front and a chance to "give us a change." [63] Furthermore, regardless of the industry of officers who could take 112 pages of notes during a ten-day course, it was possible for superiors to grumble, "what proportion of Battery Commanders have ever seen a text book of Gunnery?" [64]

25

Yet at the highest levels there was concern about splitting the artillery, separating technical and tactical training. The feeling was that the artillery had swung too far into technical matters of gunnery and was neglecting the development of new tactics to support the combat arms. But these complaints were not coming from infantry or cavalry officers who were feeling abandoned—they came from senior artillery officers. Arthur Holland, himself no stick in the mud about technical gunnery, wrote Birch, "The Siege Schools are also run on the wrong lines. They do not seem to be able to realise that Siege Batteries (the name is misleading) are a portion of the Field Army and must be prepared to act and think quickly without any loss of accuracy...." [65] As the war drew to a close and there was the opportunity to look to the future, Birch himself contemplated how things might be reshaped. He knew the strengths of both garrison and field artillery and wanted to combine their strengths; as a horse artilleryman himself, he may be permitted to think that the garrison artillery had more room for improvement:

> One of the great drawbacks in this war has been the want of any tactical knowledge or training on the part of officers of the Garrison Artillery, and as long as they remain a separate branch this want of knowledge and experience is bound to happen again. Furthermore, the very life of a Garrison Artillery officer in peace tends to mental and bodily deterioration. [66]

That same lament about training shortcomings could have been applied to the pre-war army as well, and it is remarkable how thoroughly technical the BEF became. Before the war, an officer was laughed at for suggesting that a battery carry a thermometer and barometer in the field; even telescopes were not standard equipment, and their use was considered somewhat underhanded. [67] In the very first paragraph of *Modern Artillery in the Field* Henry Bethell dismissed "theoretical subjects" such as ballistics in favor of "such information as will be of practical use." [68] This changed quickly. In 1915, every battery and brigade had a telescope, and slide-rules and anemometers were being issued as well. [69] The most impressive feature of artillery training was that an organization previously so ambivalent about technical gunnery could not only transform itself, but could do this while absorbing enormous numbers of men who knew nothing whatsoever about ballistics or gunnery or tactics or horses.

Furthermore, because the state of the art was constantly improving, it was not just a question of training the new men up to the level of 1914. At the end of June 1915, the Royal Flying Corps offered meteorological data to the artillery, but du Cane, the MGRA at GHQ, had to decline, saying, "we cannot make any use of this information." [70] This response has sometimes been held up for ridicule, suggesting that the Royal Artillery did not want the information, but at the time it was only stating the truth. [71] Sufficient technical proficiency to handle meteorological corrections had not yet arrived. John du Cane was not sticking his head in the sand: in mid-1915 it could not be used, but in 1916 such information had percolated into the artillery, and by 1917 it permeated everything gunners

did. 1915 did see some technical instruction: the Royal Artillery was having to deal with new ammunition, which frequently required laying with a false range (if a shell weighed more or less than the pre-war standard, or had a different length, it threw off the standard range tables), and there were attempts made at calibration for muzzle velocity. [72] Calibration would substantially increase first round accuracy, and thus reduce the waste of shells, a major concern in 1915; the opportunities it brought for surprise attacks would be recognized later. In 1916 the "Artillery Notes" series amplified and superseded much that had gone before, which helped the artillery with its technical training. But the artillery still had to explain itself to the infantry, and so the very first of the new artillery pamphlets explained to the infantry why some shells would always fall short. [73] 1917 built carefully upon the experience of 1916, including one pamphlet aimed directly at all the officers who had been confused by their first "Meteor" telegram (SS149, "Notes on Meteorological Telegrams to the Artillery"). [74] This pamphlet opened soothingly, saying that, "The following Notes are intended to meet difficulties which Artillery Officers have felt and experienced in connection with Meteorological Reports issued to them," and then gently explained what to do. Throughout 1917 and 1918 training became increasingly technical, although never neglecting other duties such as horse- and man- management.

These, combined with schools, training areas, and front-line experience, had their effect. The artillery reached an adequate technical standard and, given all they were trying to do, 'adequate' really meant 'high.' By 1917 there had been a huge increase in the technical skills of the artillery. A battery would be assigned a target, and the battery officers would calculate the basic range and bearing, and some weather-related adjustments. The officers then passed that information to the individual gun detachments. The Number 1 of each gun, a sergeant, would then factor in the muzzle velocity of his particular gun, charge temperature, remaining weather effects (like air temperature, barometric pressure, and wind direction and velocity), and the effects of non-standard propellant and shell weights. [75] This was a 180-degree change from the artillery of 1914, which preferred to open fire and see where the shells hit, then adjust the fire by guesswork. Another indication of the permeation of technical gunnery skills was appearance of a standard army form to record individual ranges and fuse settings for each lift and switch for each gun in a barrage (Army Form W3981, "Barrage Table for No_ Gun)." [76]

30

By 1918, the range of courses burgeoned to include exotic subjects like using captured German guns. [77] This was in addition to the usual range of classes on technical training and scientific gunnery, subjects that so dominated syllabi that complaints arose that officers were becoming better technicians than tacticians. [78] After the appointment of the Inspector-General of Training (IGT), artillery training became still more systematized, although it would be difficult to say that it improved markedly. The standard was already very good, and the time available to the IGT was too limited to make much difference. However, several suggestions were adopted which did result in improved training after World War I.

Artillery training was the province of Herbert Uniacke, an efficient organizer and Deputy Inspector General of Training. He did not greatly change programs of training, but having an IGT made for quicker reactions to the changing circumstances of war. Thus a school instructor could write:

> We were concentrating chiefly on open warfare tactics and tried to make young officers realize that FAT, the gunner's Bible, was still as correct and up-to-date as the day on which it was written. No easy matter trying to dispel the clinging miasma of siege warfare conditions. General Uniacke spent much of his time at the school, and under his guidance you may be sure that the instruction was thorough and up-to-date. [Uniacke] has long been desirous of starting one great

> central school for Colonels and Battery Commanders in which every Artillery subject is taught, and also a Northern and Southern School for junior officers. By doing away with Army Schools, uniformity of instruction would at last be secured, and that is greatly needed. Only too often instructors will not stick to THE BOOK, but teach fancy systems of their own—very fancy they often are, and confusing to young officers going from one school to another. 79

In 1918, a larger percentage of the BEF than hitherto was in training, and Uniacke made sure that the latest artillery ideas were circulated rapidly, not even waiting to produce full SS pamphlets but instead reviving "Notes on Recent Fighting." 80 While these were inadequate in 1914 and 1915 (it would have been better teaching teach raw artillerymen gunnery rather than leapfrogging to tactics), by 1918 the army had enough experience to add new levels of sophistication. Frequently the IGT urged the use of *Field Service Regulations or Field Artillery Training* to deal with mobile fighting; the repetition of this theme suggests the lesson was not always getting through. 81 By September, Uniacke was so vexed that he proposed a school solely to teach open warfare to battery and brigade commanders alike. 82 Armies urged the teaching of mobile warfare tactics, but it could sound extraordinarily old-fashioned, as when the Third Army encouraged "the inculcation of the old Regimental system." 83 IGT and GHQ spent considerable time and effort probing the experiences of the fighting units, something that to the recipients must have looked mightily like badgering. 84

Another strand of training in 1918 was the continuing stream of technical information sent to all units. As with the "Notes on Recent Fighting," the BEF was now sufficiently experienced to absorb these details within the division. There was no need for entire units to go to a school, as the gradual turnover of personnel was sufficient. Reinforcing this picture of a thoroughly trained artillery, when the 52nd (Lowland) Division was transferred from Palestine to the more complex theater of the Western Front, the whole division was put through nine weeks of training. This was a longer training period than that given to the remnants of divisions chewed up during the German spring offensives, because those battered divisions had a higher training level than the troops in Palestine. 85

35

Thus in 1918 the schools were less important, largely because they had already done their work. In previous years the schools had been closed during the campaigning season, but in 1918 they stayed open to continue training personnel. However, just as much instruction was done by the batteries themselves (while they were in reserve), based on GHQ and IGT pamphlets. The level of training of battery officers and NCOs had reached the point where they could absorb improvements quickly and on their own rather than needing everything to be demonstrated at schools. IGT built on a solid foundation, and primarily encouraged, standardized, and fine-tuned already existing training methods.

Larkhill

The most important single school was not even part of the BEF, but was located at Larkhill in Wiltshire. 86 At the beginning of the war Larkhill was not even a school but simply a series of practice ranges that had been established in 1899. The ranges remained in use, and many New Army gunners would fire their first rounds at Larkhill a few days before embarking for France. Over the winter of 1914-15, various Dominion units quartered on Salisbury Plain trained at Larkhill, which led to the first buildings being erected and may also have contributed to the unusual name it received, the "Overseas Artillery School." The first step in creating something more substantial was a February 1915 Army Council order that foresaw the eventual move of the School of Gunnery from Shoeburyness to Larkhill, especially as the Shoeburyness school already migrated to Larkhill for the summer practice season. But in the interim Shoeburyness continued to operate while the new school opened

at Larkhill; doubtless the volume of students to be trained necessitated using both. [87] The faculty was quite small—only seven men—and the course was more demonstrations than hands-on practice for the students. (Because it was only a demonstration course, the faculty never expanded.) [88]

It ran two courses, one for men to be promoted to battery commander, the other for lieutenant colonels who were prospective brigade commanders. The battery commanders had a week's lectures at Shoeburyness and then a week at Larkhill, but the lieutenant colonels spent all their time at Larkhill. [89]

Larkhill's staff was of a high caliber, a feature that would remain true throughout the war. The first Chief Instructor was Lieutenant Colonel (later Brigadier-General) Walter Ellershaw, transferred a few miles from Netheravon where he was commanding a school for air-artillery co-operation. He had commanded a battery early in the war, and would rise to command the heavy artillery of three different corps. [90] The first director of experiments (a post officially established only in 1918) had been CRA of two divisions and would return to a third, and the camp's first commandant would move on to be the CRA of two divisions. [91] Perhaps the strongest indication of the importance attached to Larkhill was the commandant during the second winter of its existence. [92] Brigadier-General Bertram Kirwan had been an instructor at the School of Horse and Field Artillery before the war, then an artillery staff officer at GHQ, a CRA during the Somme fighting, and immediately after his winter at Larkhill he returned to France to command XV Corps' artillery until the end of the war, earning Haig's approbation. [93] Larkhill was important enough that Kirwan was relieved a month before the school received its first pupils, as he had to assemble instructors and revise the syllabus. Kirwan wrote a syllabus, which suggests that the previous winter's courses had been unimaginative and old-fashioned; he apparently also had to co-ordinate the split course with Lydd. Kirwan took his duties seriously, and mid-way through his posting at Larkhill he toured the Western Front with his chief instructor, explaining his work and asking for advice. Perhaps because of this profile-raising tour, various CRAs, CHAs, and BGRAs turned up to watch for a few days. [94]

Kirwan made Larkhill a 'center of excellence,' testing various methods of ranging, wire-cutting, and creeping barrages, although some observers dryly noted that school results were better than those experienced under field conditions. [95] Even demonstration barrages would become 'ragged' after only twenty minutes, which suggests that the infantry were frequently right when complaining about short rounds. But Larkhill's experiments worked to improve this, and the range tables were revised so gunners could trust them rather than having to guess what changes they needed to make to handle new propellants and new shells. Better data let the artillery in the field do a better job. The technical work Kirwan did at Larkhill was the basis for GHQ's first series of Artillery Circulars, and after his promotion to XV Corps Kirwan kept at his technical work, circulating calibration statistics worked out from practical experience. [96] The importance of Larkhill to technical gunnery is apparent through the cycle of the "Artillery Circulars." These publications appeared during Larkhill's second season, disappeared during the summer of 1917, and returned when the school resumed; the series then lapsed again until the IGT revived it. While Kirwan was researching and publishing, he found that the troops in the field were not necessarily absorbing his work. Doubtless many gave the Circulars the standard reception for apparently unnecessary paperwork.

40

Larkhill seems to have gone into suspended animation during the campaigning seasons of 1916 and 1917, but again during the winter of 1917-18 it returned to life with field trials, especially in wire-cutting. [97] One subject Kirwan wanted to study was shell effectiveness—, things like blast patterns, lethal radii, relative lethality, and the like. This would allow

officers designing bombardments and barrages to know what shells to pick for different purposes, including the tricky question of the creeping barrage. Opinion differed because it had to perform two tasks: kill or suppress the Germans, but not kill or suppress the British infantryman who were almost as close. It appears this was too ambitious a topic, since no pamphlet on the topic appeared in contemporary publication lists. The closest that anyone came was GHQ keeping a file on the topic, and that was started after Kirwan raised the subject at Larkhill. 98

After Kirwan's season, Larkhill declined in importance, but largely because he had done so much valuable work. 99 The next commandant, Brigadier-General Sydney Metcalfe, 100 drummed up less publicity for the school (and himself), but very probably the number of students did not fall from the 1,900 recorded over the winter 1916-17. 101 (Kirwan had squeezed in 58 percent more than the 1,200 planned.) GHQ wanted as many officers as possible taught at Larkhill, although the Passchendaele battles kept many officers in Flanders over a month longer than expected. 102 The War Office now believed in the good work Larkhill was doing and wanted to keep it open throughout the campaigning season of 1918, although with fewer students than during the winter lulls, but the pace of the fighting made this impossible. In light of the decision to finally create a central artillery school, Larkhill was revived after the Armistice for the same courses, but only for officers intending to stay in the army. 103

Larkhill was also important in the early development of sound ranging, although independent innovators in France had made the key breakthrough. 104 Once the method had been perfected, its operating limits were determined by experiments at Larkhill and then circulated through the BEF. Kirwan seems to have been the first to spot the possibility of using sound ranging equipment to calibrate guns, a critical innovation. 105 Other technical developments were tested at Larkhill, perhaps the most notable being smoke shells, the first batches of which were fired at Larkhill in the summer of 1916. The school's commander was effectively given responsibility to decide from the various experimental batches what the army would use. 106

Experimentation was a fairly common activity at some of the permanent installations in Britain. Early in the war some field tests were done in France, mainly testing munitions that were performing badly. When the new "Amatol" high explosive filling was tried, many "blinds" (duds) and premature explosions (either in the barrel of the gun or behind friendly lines) were reported, which led to trials outside Calais that confirmed the problem. Results were then relayed back to the Master General of the Ordnance (MGO) in London. 107 Anything done in France, or even at a school, was outside the "usual channels" of the Ordnance Committee, but the MGO (Major-General Stanley von Donop) realized the urgency of the situation and operated flexibly. Officers in the field forwarded their complaints through GHQ to the MGO, where the reports were collated as a first step toward determining the problem. Then over 8,000 shells (no small number during the shell shortage) were fired at Shoeburyness to determine the causes of the premature explosions. 108 The problems were found to be with the fuses and gaines (boosters to amplify the fuze's explosion and detonate the main charge), and the results were reported to GHQ as well as the War Office.

Another area where schools tried to integrate existing technologies was with aeroplanes. Almost immediately after the fighting began, gunners realized aeroplanes could provide observation and correction for artillery fire, but co-ordination of this activity was sketchy. Many called for the use of wireless telegraphy, 109 but the earliest tests were with simpler methods, such as light signals and pyrotechnics, and took place around Larkhill in early November 1914. 110 (There was also a special artillery-aircraft co-operation school at

Netheravon early in the war.) The rapid pace of developments in aeroplanes, wireless equipment, and artillery technique meant that most experimentation took place at the front, but results and methods were frequently circulated to the artillery and the army as a whole. Indeed, over twenty specific pamphlets and notes were issued by the General Staff regarding aerial co-operation in addition to mentions in more general publications. By the end of the war almost all artillery publications dealt with aeroplanes in some fashion.

Within the System

45

Had there been an official intention to change the fundamental principles of the British army, or the Royal Artillery as part of the British army, then it would have involved training and schools. Simply put, troops would have required retraining. Furthermore, if the artillery had its own agenda to change its role in the army it would have had to do so via re-training men and units. That did not happen, even while training methods and content changed substantially. Instead, the training program worked to make the artillery as efficient as possible regardless of the tactical plans, leaving improvement on tactics for later. It was under Haig's command that GHQ recast training, and therefore the responsibility was his.

Before the war Haig had overseen the writing of *Field Service Regulations,* which was meant to be the keystone of army doctrine, drawing together the various component arms and branches into a coherent whole greater than the sum of its parts. During the conference that decided on *FSR's* acceptance, one member of the Army Council made great fun of the proposals, picking out problems here and there. This enraged Haig, who sensibly retorted that a system was needed and if the proposals proved inadequate they could be improved upon, but that without a system everything would be haphazard. [111] In implementing a system, however imperfect, Haig was living up to his training as a staff officer. During the first years of the war the doctrinal system languished mainly because Sir John French was not a trained staff officer and did not create the mechanisms needed to benefit from experience.

The New Army and Territorial Force divisions training in Britain were most in need of guidance, but they were only fed scraps. The idealistic flower of British manhood had an immense fund of respect for the Regular Army. They willingly accepted the chaotic conditions of training, the lack of equipment, and assorted discomforts of military life in order to 'do their bit.' They avidly followed any news of the war and threw themselves into following whatever orders the often aged and decrepit instructors gave. However, this was a nation in arms and it was better-educated and more intelligent than previous British armies. While generally trusting that their training was appropriate, they yearned to be taught what they saw as the most up-to-date subject, trench warfare. It did not really enter their minds that the Regular Army had no understanding of trench warfare. A shortage of official ideas led to a flowering of unofficial material on the 'new' warfare. Unfortunately, much of what was coming back from France described trench warfare in terms of how it differed from *Field Service Regulations, Infantry Training,* or *Field Artillery Training,* and since the troops in Britain had not mastered those manuals they could hardly grasp the ways that trench warfare was different. Ideally a training program would have either focused on pre-war methods as a basis for later advanced training or trained the home forces for trench warfare. Because French's GHQ never grasped this dichotomy, training was a hodgepodge.

The unofficial manuals only sprang up because the army provided nothing. Trench warfare was as exotic as any of the adaptations to 'normal' rules required by colonial campaigns, the "small wars" that had their own rules. [112] Some officers grappled with the very concept 'trench warfare,' wondering if it were perhaps really a siege writ large (and therefore soluble through siege techniques), or it were perhaps not so different from normal warfare that a mix of perseverance and adaptation would see through, instead of a new form of warfare that would require entirely new methods. Combined with the immense organizational

changes required by a constantly growing army, the BEF lacked disciplined thinking at its head. It muddled through 1915 without reaching a conscious decision, and this indecision hampered training.

With higher headquarters providing no guidance about how the war should be fought, Regular Army units also suffered from the lack of central direction. Trench warfare became an excuse for every unit to do things differently; after all, the official line effectively encouraged local initiatives. What advice did percolate back from GHQ, via the War Office, to units training in England was about the minutiae of trench warfare: reliefs, sentries, bombing parties, and sapping. It did not address how artillery and infantry should work together or how artillery should handle semi-independent operations.

50

Upon Haig's promotion to command of the entire BEF he began remedying the situation. The Army Printing Services began printing thousands upon thousands of copies of pamphlets covering not just these details of military life and organization, but looking beyond, to the army's actual purpose—fighting. Compared with the sophisticated planning guides and tactical instructions that came later, the first generation of pamphlets was distinctly amateur. Some officers later sneered at this first generation, but probably did not stop and think how much they improved upon the status quo. Even by mid-1916, at the start of the Somme offensive, most divisions in the BEF had not yet fought in a major battle. Green divisions arrived on the Western Front even into 1917. If this force were to be brought to any level of inter-operability they had to have a common base of knowledge beyond *Infantry Training.* As Haig had said, it was better to have a perfectible system than no system at all.

Until mid-1918, when the IGT took control, these pamphlets were the product of the General Staff. The various arms were in charge of their own detailed training, but each focused on what they needed to know in order to fit into a greater whole. Artillery learned how to improve, for instance, their accuracy, but at the same time they were told how best to use that accuracy to aid the combat troops.

The multitude of CDS and SS (here standing for nothing more sinister than Stationary Services) pamphlets should be seen in this light. The great bulk of these were, either specifically or broadly, for training purposes, and the rest were mainly intelligence material, primarily translations of German documents. At the beginning of the war there was little differentiation among the pamphlets, which simply contained whatever tactical details had been learned in the time it took to fill a few pages. These were clearly intended for home consumption. The title was "Notes from the Front," and at the time the British front was small enough that the whole BEF was experiencing the same conditions and did not need to be kept abreast of events in other sectors of the line. [113] However, units at home needed to learn the differences between war as described in *Field Service Regulations* and the new reality. Later new weapons sparked flurries of pamphlets: first came explanations of the new technology, then tactical suggestions were relayed after the initial use, and eventually the tactics were refined. [114]

As the war settled down and the BEF expanded, not just in numbers but in frontage as well, there were new pressures. First, the BEF was no longer homogenous. Territorial Force divisions, the Indian Corps, Dominion units, and eventually the Kitchener Armies all had different levels of training and equipment, and all had to be fitted into the BEF. Second, the state of the art was constantly changing, not only as armies grappled with the surprises of trench warfare but also as trench warfare itself evolved. Third, as the British front lengthened the differences along the front increased. Different tactics evolved in different areas, but since only part of the BEF would be engaged at any one time there was also a need to spread lessons within the BEF. There was a quest for ideas from the French, but these were generally more abstract operational or strategic concepts, as the BEF trusted to

its own tactical lessons. [115] Gradually, there appeared specialist pamphlets for most of the combat arms, the cores of which would be extracted for further pamphlets advising the staff how best to plan operations. As an example, the 1916 artillery pamphlets were essentially stand-alone publications, but in 1917 the first words of "Artillery in Offensive Operations" said that that manual should be studied together with infantry manuals, and many sections were derived from the divisional (combined-arms) manual.

As the BEF learned the business of trench warfare, the nature of SS pamphlets changed. Not until 1916 did a comprehensive set explain the most advanced British ideas throughout the entire BEF, and many units treated these as advice rather than instructions. In 1917 and 1918 there was far more assertiveness from above, because the Somme offensive had shown the need for greater uniformity of training. Yet GHQ matched the quest for uniform training with a desire to seek new ideas (at least at the tactical level) that could then be spread across the BEF.

Conclusion

55

Artillery training followed a course parallel to developments within the whole army. The first priority was training the men, and every effort went into meeting it. This led to remedial work once partially trained units arrived at the front, pulled there by the political and strategic need to deploy as fully and as quickly as possible. Gradually the quality of training improved, and kept up with the increasing technological sophistication of the artilleryman's trade. Schools served both to train individuals and to push the bounds of technology. This was not the role that was intended for them, but brighter lights saw what was happening and enthusiastically encouraged it. Once the men were trained—not really until well into 1917—it was time to train whole units. Unit training stressed mobile operations, seemingly a backward step during trench warfare. Yet the gunners already knew most of the technical questions of gunnery, and also trench-warfare methods; their main weakness was mobility. By the end of the war this too was improving, and the infrastructure that had built a large, well-trained force was retained. Through the entire war training emphasized the artillery playing a supporting role relative to the combat arms. Overall, however, this was more due to simple omission than to any explicit effort; the Royal Artillery never tried to revolutionize tactics. There were many cases where the artillery was told to cooperate with the infantry, as in "Artillery in Offensive Operations." The Royal Artillery's first priority was improving its technical abilities so it could fulfill the goals that had been set for it. Once it reached that goal, artillerymen began suggesting better ways for the artillery to help the combined-arms team, but always from the standpoint of a supporting player.

Notes:

Note 1: Quoted in Bidwell, *Gunners at War,* 134. Back.

Note 2: S. C. M. Archibald papers, IWM, 69. Back.

Note 3: At one point, 60-pounder batteries were pleased to see a reduction in their allowance, because it meant replacing feeble practice shells with the real thing. Headlam, History, vol. II, 220. Back.

Note 4: Bingham "1913 Practice Camps," 482. Back.

Note 5: *Headlam, History,* vol. II, 168. Back.

Note 6: F. R. Bingham "Practice Camps, 1912, and the lessons to be learned from them," *JRA* 39:11 (1913): 422; Haig to Kiggell, 15 June 1911, Kiggell Papers 1/14, LHC. Back.

Note 7: See Anstey galley proofs, 193-4, for Birch's laments. Back.

Note 8: R. H. Towell to Edmonds, no date, CAB45/199. Back.

Note 9: E.g., Herbert Uniacke. Anstey Papers, RAI, letter Birch to Horne, 30 October 1918. Back.

Note 10: *Headlam, History,* vol. II,249. Back.

Note 11: R. P. Benson to Edmonds, CAB45/116. Back.

Note 12: "Memorandum on Army Training during the Collective Training Period, 1913." I am grateful to Mr. Nick Evans for bringing this and several other related Memoranda to my attention. Back.

Note 13: Sir Aylmer Hunter-Weston papers, NAM 6503-39-18, "Remarks on 1912 manoeuvres." Back.

Note 14: "Memorandum on Army Training, 1912." Back.

Note 15: Peter Simkins' excellent *Kitchener's Army: The Raising of the New Armies 1914-16* (Manchester: Manchester University Press, 1988) unfortunately does not cover artillery training in detail. Back.

Note 16: Sir Webb Gillman papers, RAI military document 1161, box 2, file 11. Back.

Note 17: H. H. Hemming papers, IWM. Back.

Note 18: Director of Ordnance Services, 31 October 1914, WO95/58. Back.

Note 19: H. W. Wiebkin, *A Short History of the 39th (Deptford) Divisional Artillery, 1915-1918* (London: E. G. Berryman, 1923), 5-6. Back.

Note 20: O. C. Williamson Oswald, *Sixty-One, or how some wheels went Round* (London: H. J. Drane, n.d.), 51. Back.

Note 21: Maxse papers, IWM, file 11/1. Stone was also a trained staff officer. Some CRAs were in their sixties. See file 11/2 for examples of artillery training in the 18th Division, which seems to have been largely dominated by Maxse rather than Stone, who may have been wise to get out of the way of his boss, a fire-and-brimstone trainer of men. Back.

Note 22: See *Notes on Artillery in the Present War,* October 1914; and *Further Notes on Artillery in the Present War,* November 1914. Helps papers, IWM. Back.

Note 23: E.g. "Co-operation of Aeroplanes with Artillery," December 1914, WO158/681. Back.

Note 24: A. T. Anderson's *Field Gunner's Catechism,* ninth edition (London: Gale & Polden, 1916); L. E. S. Jackson *The "Why and Wherefore" of Indirect Laying: a simple explanation for Officers, NCOs, and Men* (London: Forester Groom, 1915 and 1916). Anderson was not pleased when, in 1918, the War Office prohibited unofficial handbooks, although the market was drying up and he had already made several hundred pounds, at three pence royalty per copy, which suggests sales in the thousands. A. T. Anderson diary, RAI military document 1301. Back.

Note 25: See Philip Ventham and David Fletcher, *Moving the Guns: The Mechanisation of the Royal Artillery, 1854-1939* (London: HMSO, 1990). Back.

Note 26: Becke, *Order of Battle,* part 2B, (London: HMSO, 1937), appendix 3. Back.

Note 27: M. E. S. Laws, interview 490/6, IWM; C. G. Dennys interview 9876/13, IWM. Well into 1916 Lydd Camp had a training battery of muzzle-loaders and 9.45-inch howitzers left over from the Boer War, the only guns in the Royal Artillery whose breeches opened to the right. Neither was ideal for teaching gun-drill. Anon., *Diary of Eleventh Siege Battery RGA, now Eleventh Howitzer Battery RGA* (Birmingham: n.p., n.d.); Anon., 133 Siege Battery (London: n.p., n.d.); L. F. Penstone, *The History of 76 Siege Battery RGA* (London: S. Tinsley & Co, c. 1938); Anon., *History of 88th Siege Battery Royal Garrison Artillery, December 1 1915 to July 5 1919* (n.p., n.d.). Back.

Note 28: Anon., *14th Heavy Battery RGA War Diary and Roll of Honour* (London: Robert Scott, 1919), p. 4. Back.

Note 29: H. H. Hemming papers, IWM; A. J. W. Harvey, "The School of Artillery," Army Quarterly 68:2 (July 1954): 198. Back.

Note 30: M. E. S. Laws, interview 490/6, IWM. Back.

Note 31: J. Ashley, interview 6831/2, IWM. Back.

Note 32: Sandys Diary, February-April 1915. Back.

Note 33: T. W. Dove, interview 4082/C/A, IWM. Back.

Note 34: T. H. W. Armstrong, interview 9758/3, IWM. Back.

Note 35: G. Parker, interview 5047/1, IWM. Back.

Note 36: I am grateful to Mr. P. L. Somervail for this information about his grandfather. Back.

Note 37: XIX Corps CHA diary (WO95/968) February 1917; XV Corps BGRA diary (WO95/925) February 1918, XIII Corps BGRA diary (WO95/901) October 1916. Back.

Note 38: K. H. Cousland, "A Former Gunner of the First World War looks back," LHC. Back.

Note 39: The First World War Letters of Lieutenant Colonel V. M. Fergusson, IWM, 12 and 13 May 1915, 6 October 1915. In at least one case, the CRA of a new division went to the front before his division, to refresh his knowledge, having been wounded earlier in the year (R. G. Ouseley, of the 59th Division). Hussey Diary, RAI, 14 December 1916. Back.

Note 40: Hussey Diary, RAI. Back.

Note 41: R. MacLeod papers, 1/1, LHC. Back.

Note 42: Wiebkin, *39th Divisional Artillery,* 10-14. Back.

Note 43: Later corps schools taught some artillery topics. Weber, "Mobile Artillery," 53. Back.

Note 44: The system of training for infantry officers was reformed at the same time. I am indebted to Dr. Gary Sheffield for this information. Back.

Note 45: *Rawlins, History,* 245, memos of 8 and 16 October 1915; Headlam Papers 183/2, RAI, 21 October 1915. War Office approval came on 9 November 1915. Virtually all non-anecdotal information on army schools comes from Rawlins. Back.

Note 46: Headlam Papers, conferences, 26 December 1915. Back.

Note 47: Tudor Diary, 12 September 1915; Fraser-Tytler, *Field Guns in France,* c. 6 January 1916. Lectures would again play a role in the winter of 1916-17, now supplementing schools, e.g. E. W. Alexander's lecture on counter-battery work in December 1916. XVII Corps CHA diary (WO95/942); Headlam, conferences, 27 November 1916. Back.

Note 48: Headlam, conferences, 18 February 1916. Back.

Note 49: R. Smith Diary, 1915-1917, LHC. Back.

Note 50: *Rawlins, History,* 254. Back.

Note 51: As these were not proper units, no official diaries survive, only anecdotal material. Back.

Note 52: XIII Corps BGRA diary (WO95/901) November 1915. Back.

Note 53: IX Corps BGRA diary, WO95/841, ANZAC CHA diary, WO95/1034, VIII Corps BGRA diary, WO95/824. Back.

Note 54: XIV Corps BGRA diary (WO95/915) December 1916. Back.

Note 55: The 6th Division kept theirs open: No. 2 HARG diary (WO95/87) November 1915. Back.

Note 56: It has not been possible to trace General Staff Circular 29 from the one reference found. It was detailed enough to prompt ANZAC to establish a "Programme of Training for Heavy Artillery, Divisional Artillery Brigades, Sections of Divisional Artillery Columns, and Trench Mortar Batteries out of the Line." ANZAC BGRA diary (WO95/993) December 1916. Back.

Note 57: IX Corps BGRA diary (WO95/841) July 1917. Back.

Note 58: ANZAC BGRA diary (WO95/994) November 1917. Back.

Note 59: XIII Corps BGRA diary (WO95/902) June 1918. Back.

Note 60: WO33/756, of which only 200 copies were printed, further limiting dissemination. It is available as Appendix 14. "Tactical Notes" also apparently went into remission later in 1915; the last edition seen (WO33/721) is August 1915. Back.

Note 61: Headlam, conferences, 2, 24, and 31 December 1915, 10 March 1916. Later divisions and corps could write directly to GHQ, expanding the base of experience to draw from and presumably hastening the spread of new methods. Also, suggested changes had to be sent in 'privately,' to avoid admitting that senior officers had no monopoly on wisdom, which must have stifled discussion. Back.

Note 62: SS152 (June 1917 and January 1918); SS592 (October 1917 and March 1918). The RGA preserved their separate training pamphlet, SS614, "Training Instructions for Siege Artillery" (March and July 1918). Back.

Note 63: S. C. M. Archibald papers, IWM, p. 132; J. Ashley, interview 6831/2, IWM. Back.

Note 64: E. G. Angus papers, IWM; S. R. Wason, "Sums in the Field," JRA 45:6 (1918): 189. Back.

Note 65: Holland to Birch, 29 December 1916, Anstey Papers, RAI. Back.

Note 66: Birch to Horne, 21 October 1918, Anstey Papers, RAI. Birch was adamant about supporting the combat arms, but was flexible about how to do it. After the war, as Master-General of the Ordnance (MGO), he supported tanks and developed the 'Birch Gun' to work with them. I am grateful to the late Mr. Philip Annis of the RAI for these observations. Back.

Note 67: Bingham, "1913 Practice Camps," 495. The officer laughed at was Major H. Rowan-Robinson, RGA, who had passed Staff College and was an instructor at Woolwich; those laughing were presumably mostly from the field artillery. Back.

Note 68: Bethell, *Modern Artillery in the Field,* v. Back.

Note 69: Director of Ordnance Services (WO95/58), 2 and 28 May 1915; 28 June 1915; 9 August 1915. Back.

Note 70: Quoted in Farndale, Western Front, 372. Back.

Note 71: Tim Travers, *The Killing Ground: The British Army, the Western Front & the Emergence of Modern Warfare, 1900-1918* (London: Routledge, 1987), 162. Back.

Note 72: E.g. CDS49 (September 1915), "18pr Correction Scale" for use with the new marks of ammunition. Back.

Note 73: CDS98/1 (January 1916), "Close Shooting in the Field," superseded CDS30-32, which I have not been able to trace. Similarly, CDS98/2 (January 1916), "Field Artillery Ammunition," brought all the related pamphlets from 1915 together. Back.

Note 74: Issued in March 1917. Back.

Note 75: NAM document 6410-42, F.(?) C. Hocking. Hocking's life was saved because he made these calculations in a muddy hole instead of at his gun. Back.

Note 76: Copies in J. Batten Papers, RAI Military Document 1348. Back.

Note 77: Headlam papers, file 58; Nicholson, *Canadian Gunners,* 342. Practical advice included filling buffers with soapy water if the Germans had drained the oil. Back.

Note 78: E.g. the lament of the Third Army's MGRA in June 1918, letter RA/3259, WO95/374. Back.

Note 79: Fraser-Tytler, *Field Guns in France,* 24 April 1918. Fraser-Tytler taught at the Fifth Army Artillery School. When the Fifth Army was disbanded, Uniacke delayed the Fourth Army from stealing his old school, but lost it when his back was turned during a brief trip home. Uniacke Diary 1918, RAI. Back.

Note 80: There were eventually nineteen Notes, not all concerned with artillery. Back.

Note 81: See Uniacke papers, U/I and U/II, RAI. Back.

Note 82: Uniacke papers, U/I/8. Back.

Note 83: Third Army letter RA/3259, 17 June 1918, WO95/374. It would have been a challenge for the many officers who had never experienced the "old Regimental system" to inculcate it. Back.

Note 84: Uniacke papers, RAI, U/III. Some of these reports were collected before the IGT was established, presumably by GHQ. Back.

Note 85: E. A. James Papers, IWM. I am obliged to Mr. Andy Simpson for

this material. Back.

Note 86: Larkhill's history is well covered in N. D. G. James, *Gunners at Larkhill: A History of the Royal School of Artillery* (Henley-on-Thames: Gresham Books, 1983), but I am pleased also to thank Lieutenant Colonel (ret.) "John" Payne, lately of what is now the Royal School of Artillery, Larkhill. Back.

Note 87: Army Council Instruction 20 (12 February 1915); King's Regulations ¶767. Back.

Note 88: James, *Larkhill,* 47, 51. Back.

Note 89: E. G. Angus papers, IWM; James, Larkhill, 47-8. Back.

Note 90: Ellershaw was with I Corps from February 1917-February 1918, VIII Corps from February-June 1918, and VI Corps from then to the Armistice. Larkhill had an attached RFC flight for the rest of the war, perhaps due to Ellershaw's connections. Back.

Note 91: The men are W. B. Browell and W. G. Thompson. There is considerable confusion in the early command structure, and establishing a full chronology of commanders is difficult; the name of the school is also rendered with almost every possible variation, often by the same source. Back.

Note 92: Much of this section is drawn from SS157 (May 1917), "Report on the Overseas Artillery School, Salisbury Plain, November 1916-March 1917," available as Appendix 21. Back.

Note 93: Haig Diary, 11 Jun 1917. Back.

Note 94: Sandys Diary, RAI, 21 January 1917, 18-23 February 1917. Sandys himself went to Larkhill upon being promoted to BGRA in February 1917. Back.

Note 95: Headlam papers, conferences, 28 December 1916 and files 67-76, 177; Bland papers, RAI, letter, C. W. Scott to Bland, 3 April 1917. Back.

Note 96: Headlam papers, file 70, "Calibration: Statistics prepared by R. A. XV Corps to determine Muzzle Velocity from wear measurements," and file 177 with letters and reports on gun performance, shells, training, and tactics; R. H. Chapman, *A Treatise by Major RH Chapman on the calibration of guns and howitzers by the direct measurement of muzzle velocity, as carried out at Shoots of Artillery in France and England (Chapperton Down) 1917 and 1918;* RAI Military Document 2021. There were also wire-cutting tests in December 1917, February and March 1918; Headlam papers, files 100 and 104. Back.

Note 97: Headlam papers, files 100, 104. Back.

Note 98: Headlam papers, RAI, file 67. Back.

Note 99: Another indication of Kirwan's dynamism is that he apparently provoked the school at Shoeburyness to produce its own pamphlet "Notes on Trench Warfare for Field Artillery compiled at the School of Instruction RH & RFA." After Kirwan's return to France, Shoeburyness returned to its slumbers. Back.

Note 100: Metcalfe had been CRA of the 18th (Eastern) Division until July 1917, BGRA of XVII Corps until September 1917, was then relieved to organize Larkhill's season, returning as BGRA XI Corps in April 1918; this pattern was similar to Kirwan's. Back.

Note 101: 5 were prospective brigade commanders, 1815 battery commanders: SS157. *Rawlins, History,* 249. Back.

Note 102: *Rawlins, History,* 251-2. Back.

Note 103: Ibid., 254-5. Back.

Note 104: Geographical Section, *General Staff Report on Survey on the Western Front, 1914-1918* (London: HMSO, 1920), 108; J. R. Innes, *Flash Spotters and Sound Rangers* (London: Allen & Unwin, 1935), 150; Sir Lawrence Bragg, A. H. Dowson, and H. H. Hemming, *Artillery Survey in the First World War* (London: Field Survey Association, 1971), 38. Bragg et al seem unaware of work done at Larkhill, work that, however, was fruitless. Back.

Note 105: SS552, "Sound Ranging," March 1917; Geographical Section, Survey Report, 177. Back.

Note 106: Anstey galley proofs, 194. Back.

Note 107: von Donop Papers, IWM. Unfortunately he gives no dates for this, but it was clearly in the early days of Amatol, probably between April and June 1915. Back.

Note 108: Ibid. The tests were probably done in August and September 1915. Back.

Note 109: In 1914, Henry Horne was already calling for "wireless aeroplanes." Horne Papers, IWM, "Notes on artillery during the attacks of 13th and 14th [September, 1914] and subsequent operations on the Aisne," 2. Back.

Note 110: Tests were conducted on the 3 November 1914, with one aeroplane working with each battery. "Further Notes on Artillery in the Present War, November 1914," Helps Papers, IWM. It may have been this system of which GHQ had 10,000 copies printed; it was already described as the "old" system. WO158/681. Back.

Note 111: Reminiscence of General H. de Pree, quoted in John Terraine, *Douglas Haig: The Educated Soldier* (London: Hutchinson, 1963), 42-3. Back.

Note 112: Col. C. E. Callwell, *Small Wars: Their Principles and Practice* (London: HMSO, 1896). Back.

Note 113: CDS2-4 and 53; CDS2 was GHQ reprinting III Corps' "Tactical Notes" of September-October 1914. Back.

Note 114: E.g. with gas: SS134 (December 1916, March 1918), "Instructions for the use of Lethal and Lachrymatory Shell." There were revisions immediately after the Germans introduced mustard gas: see penciled draft at the IWM. In 1917 SS139/4 "Artillery in Offensive Operations" included details on gas far more advanced than 1916's CDS98/4. Back.

Note 115: CDS24, "Object and Conditions of Combined Offensive Action (translated from the French)" (June 1915), while the next month GHQ published CDS50, "Tactical Notes" (31 July 1915), explaining how the British army should fight. These are available as Appendix 8 and Appendix 9. Back.

"The Infantry cannot do with a gun less": The Place of the Artillery in the British Expeditionary Force, 1914-1918