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WAR BY TIMETABLE? THE RAILWAY RACE BEFORE 1914*

The First World War had begun — imposed on the statesmen of Europe by railway timetables. It was an unexpected climax to the railway age.

A. J. P. Taylor¹

A. J. P. Taylor's most provocative legacy was his insistence on the roles of accident and inadvertence in the outbreak of both world wars. If his *The Origins of the Second World War* stated the case for 1939, he disseminated that for 1914 in his best-selling *The First World War: An Illustrated History* and via his lectures and broadcasts, as well as in his *War by Timetable: How the First World War Began*.² No Great Power, he contended, wanted a major war in the summer of 1914, the political points at issue were negotiable, and the fundamental force for conflict was technical, in the shape of the European armies' war plans. Like his friend and adviser, Sir Basil Liddell Hart, Taylor highlighted the inflexibility of the Powers' mobilization arrangements. The imperative of winning if war broke out, he urged, had overwhelmed that of preserving peace. Precautions taken to inhibit war turned out to provoke it.³

Taylor made no secret of his proselytizing purpose. He warned that military deterrence was a fragile basis for international stability. He foresaw the danger of a third war of miscalculation, this time fought with nuclear weapons.⁴ He therefore combined his stress on

* I am indebted to the library of the National Railway Museum, York, for help in preparing this article.

¹ A. J. P. Taylor, *The First World War: An Illustrated History* (Harmondsworth, 1966), 20.

² *Ibid.*; A. J. P. Taylor, *The Origins of the Second World War* (London, 1961); also his *War by Timetable: How the First World War Began* (London, 1969). By 1989, the *Illustrated History* had sold 250,000 copies: Alex Danchev, "'Bunking' and Debunking", in Brian Bond (ed.), *The First World War and British Military History* (Oxford, 1991), 263.

³ Taylor, *First World War*, 16–21; also *War by Timetable*, 15–45, 119–21; B. H. Liddell Hart, *History of the First World War* (London, 1972), 22–7.

⁴ Taylor was a founder member of, and enthusiastic canvasser for, the Campaign for Nuclear Disarmament. Although he eventually became disillusioned with CND, he retained his faith in its intellectual case. Adam Sisman, *A. J. P. Taylor: A Biography* (London, 1994), 274–9, 288, 307–9, 396.

inadvertence with a dash of technological determinism, derived from the centrality of railways in pre-1914 strategy. This was not determinism in a crude or simple sense: he used 'railway timetables' as a shorthand for a planning system that governments themselves had created. None the less, he portrayed the mobilization and deployment programmes of the early twentieth century as foreshadowing the ballistic missile arsenals of his own time.⁵ Indeed, the metaphor of military technology as a runaway train, hurtling humanity to disaster, had surfaced in the 1860s and by the turn of the century was a commonplace.⁶ Yet several recent commentators have questioned whether the 1914 war was 'inadvertent', as have others with reference to that of 1939. On the contrary, Fritz Fischer and his followers have held that Germany's calculated aggression caused the First World War as well as the Second.⁷ Until recently, rival emphases on miscalculation and premeditation have dominated this historical debate.

Railway construction and operation programmes, because of their long lead times and heavy expense, are potentially an excellent test of both the premeditation and the miscalculation approaches. Although historians have intensively researched the diplomatic and strategic aspects of the war plans of the belligerents, they have neglected their technical and logistic underpinnings.⁸ This article seeks to remedy this deficiency and to reappraise the contribution

⁵ Taylor, *War by Timetable*, ch. 1. On technological determinism, see Thomas P. Hughes, 'Technological Momentum', in Merritt Roe Smith and Leo Marx (eds.), *Does Technology Drive History? The Dilemmas of Technological Determinism* (Cambridge, Mass., 1994), 101–3, 112–13. By 'technology', Hughes means socio-technical systems, not simply 'technical' entities such as physical artefacts and software. 'Technological determinism' he defines 'as the belief that technical forces determine social and cultural changes'. He prefers an interactive understanding whereby 'social development both shapes and is shaped by technology . . . A technological system can be both a cause and an effect' (102, 112). My approach is similar.

⁶ Daniel Pick, *War Machine: The Rationalisation of Slaughter in the Modern Age* (New Haven, 1993), 106–10.

⁷ Fritz Fischer, *War of Illusions: German Policies from 1911 to 1914* (London, 1975). Fischer qualified his position in 'Twenty-Five Years: Looking Back at the "Fischer Controversy" and its Consequences', *Central European Hist.*, xxi (1988). On inadvertence, see Marc Trachtenberg, 'The Meaning of Mobilization in 1914', *Internat. Security*, xv (1990–1); Jack S. Levy, 'Preferences, Constraints, and Choices in July 1914', *Internat. Security*, xv (1990–1); cf. David Stevenson, ' Militarization and Diplomacy in Europe before 1914', *Internat. Security*, xxii (1997).

⁸ On war plans, see Gerhard A. Ritter, *The Schlieffen Plan: Critique of a Myth* (London, 1958); Samuel R. Williamson, Jr, *The Politics of Grand Strategy: Britain and France Prepare for War, 1904–1914* (Cambridge, Mass., 1969); Paul M. Kennedy (ed.), *The War Plans of the Great Powers, 1880–1914* (London, 1979); Jack Snyder, *The Ideology of the Offensive: Military Decision Making and the Disasters of 1914*

made by technology to the 1914 tragedy, examining developments over the previous generation as well as at the outbreak of hostilities. It begins with the role assigned to railways in the Great Powers' pre-war preparations. Secondly, it considers how well the railways could perform that role. Thirdly, it analyzes the impact of railway rivalry on the balance of power between the two great European blocs. Finally, it returns to the 1914 crisis and to the controversy between Taylor and his critics.

I

What military planners would have wanted from the railways would have depended upon what sort of conflict they envisaged. In the final pre-1914 years they showed a new awareness that if war came they would still need to supply Europe's factories and cities. In 1912, a sub-committee of the British Committee of Imperial Defence reported that, if the North Sea were closed to shipping, Britain's rail net might be sorely pressed simultaneously to feed London, coal the fleet and convey the British Expeditionary Force (BEF) to the ports. In autumn 1913, representatives of Germany's General Staff and business élite discussed stockpiling to reduce the wartime strain on transport, and the military earmarked trains to deliver coal to key industries and milk to urban dwellers. Early in 1914, the French press reported on contingency plans to feed Paris: partly in reaction, an inter-ministerial conference in Austria-Hungary investigated supplies to Vienna.⁹ All of these initiatives, however, aimed to sustain civilian living standards and essential manufacturing during a

(n. 8 cont.)

(Ithaca, 1984). On railways, the classic work is Edwin A. Pratt, *The Rise of Rail Power in War and Conquest, 1833–1914* (London, 1915); J. N. Westwood, *Railways at War* (London, 1980), is the most valuable subsequent study; see also Alan Mitchell, 'The Great Train Race: Railways and the Franco-German Rivalry before 1914', *Francia*, xix (1993). On the pre-war land arms race generally, see David Stevenson, *Armaments and the Coming of War: Europe, 1904–1914* (Oxford, 1996); David G. Herrmann, *The Arming of Europe and the Making of the First World War* (Princeton, 1996).

⁹Public Record Office, London (hereafter PRO), CAB/38/21/22, report of the Committee of Imperial Defence sub-committee on the internal distribution of supplies in time of war, 20 June 1912; Adolph Sarter, *Die Deutschen Eisenbahnen im Kriege* (Stuttgart, 1930), 44–5; Reichsarchiv, *Der Weltkrieg, 1914 bis 1918*, i, *Das Deutsche Feldeisenbahnwesen* (Berlin, 1928), 22–5; private letter by Saxon Kommerzienrat (commercial counsellor), Berlin, 6 Feb. 1914: Bundesarchiv, Koblenz, Akten der Reichskanzlei (hereafter BA, Rklei), R. 43F/1268, minutes of inter-departmental meeting, 23 Feb. 1914; Finanzarchiv, Vienna, 1914, #433.

brief emergency. Whether the General Staffs really expected a war to end by Christmas,¹⁰ all they planned in detail was the opening campaign. The railways' primary task would be to move as many men, horses and supplies as possible to the designated combat areas in the shortest feasible time.

The pre-planned operations at the outset of war fell into three phases: preparation, mobilization and concentration.¹¹ All of the Powers had initial states of readiness: the 'precautionary stage', in Britain; the *Alarmierung* (Alarm), in Austria-Hungary; the 'period preparatory to war', in Russia; the *Zustand der drohenden Kriegsgefahr* (condition of threatening danger of war), in Germany; and, in France, the 'measures that may be taken in periods of political tension'.¹² Each included setting guards on railway tunnels and bridges: Britain, for example, did so during the Agadir crisis of 1911 and Germany during the First Balkan War of 1912.¹³ In Britain's 'precautionary stage', the army was to communicate its troop movement plans to the railway companies, while both the Russian 'preparatory period' and Germany's *Zustand der drohenden Kriegsgefahr* required rolling stock to be cleared from the border lines.¹⁴ Reinforcing the frontier units to protect mobilization (a procedure known as 'covering' or *couverture*) might ensue. Instituting the *couverture* in France, for example, required 573 special trains between 31 July 1914 and 3 August.¹⁵

¹⁰ Stig Förster, 'Der deutsche Generalstab und die Illusion des kurzen Krieges, 1871–1914: Metakritik eines Mythos', *Militär-geschichtliche Mitteilungen*, liv (1995), questions this assumption. In 1913, the head of the Railway Section of the German General Staff wanted to stockpile up to two years' worth of food supplies: Wilhelm Groener, *Lebenserinnerungen: Jugend — Generalstab — Weltkrieg*, ed. Friedrich Frh. Hiller von Gaertringen (Göttingen, 1957), 135.

¹¹ Taylor, *War by Timetable*, 14, subsumes the three stages under the heading of 'mobilization'. But mobilization and concentration were kept distinct in military texts at the time.

¹² For the *Zustand der drohenden Kriegsgefahr*: BA, R5 Anh. II/18; for France, see Service historique de l'armée de terre, Vincennes (hereafter SHA), 7.N.134, 'Memento des mesures pouvant être prescrites en cas de tension politique', 4 Apr. 1914. For Austria, E. Glaise-Horstenaus (ed.), *Österreich–Ungarns Letzter Krieg, 1914–1918*, 7 vols. (Vienna, 1930–8), i, 17 n; for Russia, Gunther Frantz, *Russlands Eintritt in den Weltkrieg: der Ausbau der russischen Weltmacht und ihr Einsatz beim Kriegsausbruch* (Berlin, 1924), 189–200.

¹³ Stevenson, *Armaments and the Coming of War*, 190, 246, 253.

¹⁴ PRO, WO/106/49A/3, 'Organization and Working of the Military Operations Directorate in Time of Strained Relations and War' (n.d.); Frantz, *Russlands Eintritt in den Weltkrieg*, 192, 197; Reichsarchiv, *Das Deutsche Feld-eisenbahnwesen*, 29.

¹⁵ Marcel Peschaud, *Politique et fonctionnement des transports par chemin de fer pendant la guerre* (Paris, 1926), 69.

The essence of mobilization itself was raising army units from peacetime to wartime strength by calling up reservists and making the units 'mobile', by assigning to them draught animals and supplies. Most European countries had some form of 'territorial' mobilization, whereby draftees reported to units garrisoned in their localities. This meant that many of the men could travel by road or water, while normal civilian rail traffic continued. All the same, because mobilization entailed multifarious short hauls throughout the national territory, it was the most taxing operation for the railways and the hardest to pre-schedule. Even in Britain, the 1912 Committee of Imperial Defence sub-committee learned that mobilization would require over 1,000 trains.¹⁶ In France, in 1914, the figure was over 10,000; in Germany, it was 20,800, moving 2,070,000 men, 118,000 horses (each horse eating ten times as much as one man) and 400,000 tonnes of *matériel*.¹⁷ Moreover, the pressure was exacerbated by simultaneous preparations for the next stage.

The next stage was 'concentration', as it was referred to in English and French (the Austro-German term was *Aufmarsch* and the Russian *sosredotochenie*), which meant conveying the mobilized units from their depots to the frontier railheads, prior to deployment and advance on foot into the zone of operations. Unlike mobilization, concentration comprised long-distance transits that could be timed meticulously, thus maximizing rail transport's advantages. Train movements would be fewer and slower than in peacetime,¹⁸ and would follow a quite different pattern, as civilian traffic halted and troops progressed from the interior to the borders. Concentration planning required interchangeability and therefore uniform speeds and axle lengths: the weakest links in the system governed its overall efficiency. Standard stopping times were set for feeding men and animals, and for fuelling and watering engines; train lengths determined those of sidings and of disembarkation ramps. Germany's Military Travel Plan envisaged trains some 110 axles long and weighing 600 tonnes, reaching a 'basic speed' of 30 km. per hour on straight, level main lines (but averaging less than 20 km. per

¹⁶ PRO, CAB/38/21/22; J. A. B. Hamilton, *Britain's Railways in World War I* (London, 1967), 32.

¹⁷ Peschaud, *Politique et fonctionnement*, 71; Reichsarchiv, *Das Deutsche Feldeisenbahnwesen*, 33–4.

¹⁸ A. Marchand, *Les Chemins de fer de l'Est et la Guerre de 1914–1918* (Paris, 1924), 47.

hour). In France, the axle weight was lighter (480–550 tonnes), but Plan XVII, effective from 1 May 1914, raised the basic speed to 30–5 km. per hour. In contrast, Russian military trains might be only 70 axles in length, and French observers estimated their speeds on double-tracked lines at 18–20 km. per hour and 320 km. per day.¹⁹

When the hour struck in August 1914, some 670 trains conveyed the BEF to the Channel coast; a further 361 delivered it from the French ports to the battle zone. Meanwhile, France's own concentration movement required some 11,500 trains, and Germany's almost as many. At the climax, one train crossed the Hohenzollern bridge at Cologne every ten minutes and, in some French eastern stations, one passed every four.²⁰ Yet France's concentration proceeded almost flawlessly, with very few accidents and with maximum delays of two hours; in Germany, too, although some backlogs were longer, the immense operation was completed on time. Even in Russia, concentration went smoothly. If in Austria-Hungary it did not, this was primarily because the Chief of the General Staff, Franz Conrad von Hötzendorf, committed avoidable errors while it was under way.²¹ With this exception, there was no repeat of the confusion surrounding both sides' concentrations in the Austro-Prussian War of 1866, and France's in the Franco-Prussian War of 1870, although the scale of operations was now far greater. Martin van Creveld has estimated that, in Germany in 1870, 2,580 men per day passed along each trunk line to the front, as compared with 11,530 in 1914. The Germans moved perhaps four times more men and horses

¹⁹ Reichsarchiv, *Das Deutsche Feldeisenbahnwesen*, 9; Marchand, *Chemins de fer de l'Est*, 21; SHA, 7.N.1535, État-major de l'armée (hereafter EMA), 2nd Bureau, 'Note sur l'armée russe', 1 Apr. 1910; SHA, 7.N.1485, report of Lt-Col. Janin to Gen. Vignal, St Petersburg (hereafter Janin reports), 28 May 1911; archives of the Ministère des Finances, Paris, B.31262, report by Edmond Théry [1913].

²⁰ Hamilton, *Britain's Railways*, 33; Peschaud, *Politique et fonctionnement*, 71, 83; Sarter, *Deutschen Eisenbahnen*, 81–2.

²¹ Marchand, *Chemins de fer de l'Est*, 61; SHA, 7.N.1771, note by EMA historical service [1923]; Reichsarchiv, *Das Deutsche Feldeisenbahnwesen*, 40–1; A. L. Sidorov, 'Zheleznodorozhnyi transport Rossii v pervoi mirovoi voine i obostrenie ekonomicheskogo krizisa v strane' [Russia's Railway Transport in the First World War and the Intensification of the Country's Economic Crisis], *Istoricheskie Zapiski*, xxvi (1948); Norman Stone, 'Die Mobilmachung der Österreichisch-Ungarischen Armee 1914', *Militärgeschichtliche Mitteilungen*, xvi (1974); Holger H. Herwig, *The First World War: Germany and Austria-Hungary, 1914–1918* (London, 1997), 54–6.

than in 1870; the French six or seven times as many.²² The precondition for the tremendous 1914 offensives was a silent revolution in transport.

II

The railways' ability to conduct these operations (their 'military capacity', or throughput),²³ depended on three variables: fixed installations, rolling stock, and organization and planning. As regards the first, European track length rose from c.105,000 to c.290,000 km. between 1870 and 1914.²⁴ Since the 1870s, steel had replaced iron rails and longer, more durable rails permitted faster and heavier trains, as did new cuttings and embankments to smooth out curves and gradients, more frequent watering points and the spread of block signalling.²⁵ Although the western and central European trunk lines dated from the mid-nineteenth century, new local lines into provincial backwaters and the border marches further enhanced the networks' potential. Increasingly, the busiest sections became double-, treble-, and quadruple-tracked. In Germany, for instance, whereas a single-tracked line could accommodate one concentration train every forty to sixty minutes, a double-tracked line could accommodate one every twenty. In Russia, a mere fourteen military trains a day could move along single-tracked lines, but thirty-two along double. Only 27 per cent of the Russian railway system was double-tracked in 1914, however, whereas proportions elsewhere varied from 38 per cent in Germany to 43 per cent in France and 56 per cent in Britain.²⁶

²² Martin van Creveld, *Supplying War: Logistics from Wallenstein to Patton* (Cambridge, 1977), 112; comparisons of 1870 and 1914 in Lt-Col. Paquin, 'Acheminements stratégiques par voie ferrée et par route' (1938): BA, R5.Anh.II/64. On the 1870 concentrations, see Michael Howard, *The Franco-Prussian War: The German Invasion of France, 1870-1871* (London, 1961), 57-85.

²³ French planners referred to 'yield' (*le rendement*); Germans and Austrians to the railways' *militärische Leistungsfähigkeit* (military efficiency).

²⁴ Van Creveld, *Supplying War*, 111-12.

²⁵ Under the block system, lines were divided into sections, controlled at each end by signalmen, who communicated by telegraph to inform each other when trains entered and left the 'block': Michael A. Vanns, *Signalling in the Age of Steam* (Shepperton, 1995), 17. From the 1890s, German rail lengths were extended from a 9-metre maximum to 12-15 metres: Deutsche Reichsbahn, *Hundert Jahre Deutsche Eisenbahnen* (n.p., 1935), 78.

²⁶ SHA, 7.N.1485, Janin reports, 17 Mar. 1911; Sidorov, 'Zheleznodorozhnii transport', 5; Reichsarchiv, *Das Deutsche Feldeisenbahnwesen*, 10; Hamilton, *Britain's Railways*, 29; Sarter, *Deutschen Eisenbahnen*, 33.

Developments in rolling stock too were cumulatively impressive. The turn of the century saw the biggest changes since the Stephensons. France and Prussia respectively pioneered compounding and superheating, two innovations much enhancing locomotive efficiency and performance. Compounding saw the steam from the boiler being used twice, first in a high-pressure cylinder and then in a low-pressure one. By 1915, one-third of French locomotives used a four-cylinder compounding system. Superheating was a simpler and cheaper method of achieving similar results. On its way to the cylinder, the steam passed through flues containing hot gases from the firebox, thus raising its temperature and stopping it from condensing. On the Prussian railways compounding, introduced from 1880, enabled 15 per cent energy savings; superheating, which followed after 1897, led to gains of 20–5 per cent.²⁷ Meanwhile, passenger carriages became larger and more comfortable and, (outside Russia) both they and freight cars were equipped with automatic and continuous braking, permitting safe operation at higher speeds.²⁸

As well as being the predominant method of land transport,²⁹ the railways were still a profitable and expanding industry, the milch cow of Russian and German state finances. In the pre-war decade France, Germany and Russia all saw rapid growths in traffic and, in 1910–13, investment in the French system reached record levels.³⁰ The railways' commercial development alone, however, would not have satisfied military requirements without political regulation. The British model of joint-stock companies owning and operating both fixed installations and rolling stock

²⁷ J. N. Westwood, *Locomotive Designers in the Age of Steam* (London, 1977); J. N. Westwood, *The Railway Data Book* (Cambridge, 1983); Lucien Maurice Vilain, *L'Évolution des locomotives à vapeur de la Compagnie des chemins de fer de l'Est, 1853–1938* (Paris, 1980), 7–35; Deutsche Reichsbahn, *Hundert Jahre Deutsche Eisenbahnen*, 147–51.

²⁸ For example, R. Godfernaux, *Aperçu de l'évolution des chemins de fer français de 1878 à 1928* (Paris, 1928). Automatic braking was remotely controlled; continuous braking could be applied simultaneously to every vehicle of the train. Most countries outside the British empire adopted the Westinghouse air brake, invented in 1872. Westwood, *Railway Data Book*, 164–5.

²⁹ Lorry transport was secondary. The French army subsidized private lorries for use in wartime, but only 1,818 such vehicles were available in 1913: Bayerische Hauptstaatsarchiv, Munich — Kriegsarchiv (hereafter KAM), MKr 992, German General Staff annual report on French army for 1913, 15 Feb. 1914. The German army used 4,000 lorries for its 1914 western offensive, 60 per cent of which broke down: Herwig, *First World War: Germany and Austria-Hungary*, 100.

³⁰ Patrick O'Brien (ed.), *Railways and the Economic Development of Western Europe, 1830–1914* (London, 1983), 32–3, 35, 132.

lacked Continental emulators. In France the state had granted leases of ninety years or more, renewed in 1883, to six private companies, one of which was nationalized in 1908. But it owned the roadbed, regulated tariffs and levels of service, and monitored construction in return for subsidies.³¹ In Germany, Bismarck nationalized most of the Prussian railways after 1879, better co-ordination with the military being one motive. Similarly, between 1892 and 1905 the state took over the principal lines in the Austrian half of the Habsburg Monarchy, partly because private enterprise found strategic improvements too costly.³² Finally, in Russia, nationalization proceeded in the 1890s, one cause being disappointment with the railways' performance in the 1877–8 Turkish war. In 1912, the tsarist government took over the Russian section of the Warsaw–Vienna line in order to convert it to the broader five-foot gauge, thereby diminishing its potential as a conduit for invasion.³³ From Calais to the Urals, strategic imperatives encouraged state control.

The railways' military performance depended less on ownership, however, than on thorough preparation and on co-operation between their managements and the planners in the armies. Again, Britain was exceptional in that until the turn of the century such liaison hardly existed. The 1871 Regulation of the Forces Act allowed the government to take control of the railways on mobilization, and the National Defence Act of 1888 gave naval and military shipments precedence over civil traffic. An Army Railway Council, set up in 1896 (renamed the War Railway Council in 1903), gave the companies the information needed to begin timetabling. Yet, until as late as 1911, the War Office did not consult them about transporting the BEF to the Continent and had no influence on their construction plans.

In the rest of Europe, in contrast, Germany set the norm.³⁴ The 1871 constitution gave the military a standing right to

³¹ Alan Mitchell, 'Private Enterprise or Public Service? The Eastern Railway Company and the French State in the Nineteenth Century', *Jl Mod. Hist.*, xlix (1997).

³² Gerhard Geyer, 'Der Ausbau des nordöstlichen Eisenbahnnetzes der Österreich-Ungarischen Monarchie unter Berücksichtigung von Krisenzeiten' (Univ. of Vienna Ph.D. thesis, 1954), 118–20.

³³ J. N. Westwood, *A History of Russian Railways* (London, 1964), 74–6, 144; Consul-Gen. Bruck to Theobald von Bethmann Hollweg, Warsaw, 18 July 1912: Politisches Archiv des Auswärtigen Amtes, Bonn (hereafter PAAA), R.11011; SHA, 7.N.1540, report of Consul-Gen. Velten to French Foreign Ministry, Warsaw, 29 Mar. 1913.

³⁴ Arden Bucholz, *Moltke, Schlieffen, and Prussian War Planning* (New York, 1991).

supervise railway building, equipment and operations in the interests of national defence; in addition, the Reich financed strategic improvements.³⁵ The Imperial Railway Office (*Reichseisenbahnamt*) oversaw the implementation of these provisions. Germany's railways were divided into Line Commands (*Linienkommandaturen*): in 1914, there were twenty-six, labelled from A to Z. Each Line Command was headed by a military and a railway management representative, who ensured that the track in their area was ready. At the apex of the system, the Railway Section (*Eisenbahnabteilung*) of the Prussian Great General Staff in Berlin, comprising some eighty officers in 1914, planned for the whole of the empire except Bavaria. Headed from 1911 by Wilhelm Groener, it was the General Staff's hardest working division, sometimes busy from 9 a.m. to 1 a.m. Groener later recounted his arduous apprenticeship, drawing up schedules with his newly married wife for the lines round Frankfurt-am-Main.³⁶ Both mobilization and concentration plans were annually revised, the new regulations coming in to force each 1 April.³⁷ The Line Commands drafted the mobilization schedules, but the Berlin centre dealt with concentration, in the light of changing railway capacities and intelligence about the enemy and of the Chief of the General Staff's wishes. Once the task was completed, the chief of the *Eisenbahnabteilung* locked the concentration schedules in iron cabinets in his office, ready for printing and distribution if the time came. Annual manoeuvres tested the arrangements: some 1,988 special train movements, for example, taking place in 1911.³⁸ Like Helmuth von Moltke the elder and Alfred von Schlieffen, successively Chiefs of the General Staff in 1857–88 and 1891–1905, Helmuth von Moltke the younger, Chief of the General Staff in 1906–14, well understood railway planning's centrality. At the outset of each cycle he told the officials responsible that only the most rigorous

³⁵ For example, the military discouraged electrification, especially of trunk and frontier lines, as it would disturb the unity of the system and be more vulnerable to disruption: Reichsarchiv, *Das Deutsche Feldeisenbahnwesen*, 4. In practice 'strategic' railways might be hard to differentiate from commercial ones. But the categorization was widely used.

³⁶ *Ibid.*, 288; Groener, *Lebenserinnerungen*, ed. von Gaertringen, 70–1.

³⁷ To refer to the pre-war German war plans as 'The Schlieffen Plan' creates a misleading impression of rigidity. They were continuously reviewed and modified.

³⁸ Bundesarchiv — Militärarchiv, Freiburg-im-Breisgau, Nachlass Moltke (Jgr.) N.78/25, 'Notizen für den 30. Januar 1912'.

advance preparation would ensure that the railways performed their tasks.³⁹

Germany's principal ally, Austria-Hungary, was likewise divided into railway commands (eighteen in 1913).⁴⁰ The counterpart of Groener's bureau was the seventh section of the General Staff in Vienna, which drew up annual concentration schedules in conjunction with Department 24 of the Austrian Railway Ministry. In 1914, it came under Colonel Johann Straub.⁴¹ In France, military liaison with the six big companies operated through network commissions (*commissions de réseau*), comprising the company managing director and a staff officer, and through a consultative commission of railway chiefs and interdepartmental representatives in the War Ministry. Legislation in 1873 confirmed that the companies must place their resources at the state's disposal for military movements. The 4th (railway) Bureau of the General Staff (*État-major de l'armée* — EMA) rivalled the Germans' Railway Section in ability, greatly impressing the British officers who dealt with it.⁴² There was also a railway section in the Russian General Staff, headed by General Dobrychin, and nineteen territorial subdivisions throughout the empire, each under military command even in peacetime.⁴³ By 1914, institutional systems forged in the light of nineteenth-century experience had had more than a generation in which to perfect their plans.

III

Moltke the elder had enjoined his countrymen to 'build no more fortresses, build railways', and the French General Derrécagaix

³⁹ *Ibid.*, minutes of conferences between commanders and railway authorities, Jan. 1912.

⁴⁰ Eisenbahnbüro to Alexander von Krobatin (War Minister), Vienna, 22 Jan. 1913: Österreichisches Staatsarchiv — Kriegsarchiv, Vienna (hereafter KAW), KM Prä. (1913), file 37-3.

⁴¹ Herta Peball, 'Die Kriegspläne des k.u.k. Generalstabes und die k.k. Eisenbahnbehörden, 1906-1914' (Univ. of Vienna Diploma, 1984); Ferdinand Käs, 'Versuch einer Zusammenfassten Darstellung der Tätigkeit des Österreichisch-Ungarischen Generalstabes in der Zeit von 1906 bis 1914: Unter Besonderer Berücksichtigung der Aufmarschplänen und Mobilmachungen' (Univ. of Vienna Ph.D. thesis, 1962); Graydon Tunstall, Jr, *Planning for War against Russia and Serbia: Austro-Hungarian and German Military Strategies, 1871-1914* (New York, 1993); Bruno Enderes and Emil Ratzenhofer, *Verkehrswesen im Kriege: Die Österreichischen Eisenbahnen* (Vienna, 1931).

⁴² Peschaud, *Politique et fonctionnement*, 53-61; Maj.-Gen. Sir Percy de Radcliffe, 'History of the Growth of the Scheme' (n.d.): PRO, WO/106/49A.

⁴³ SHA, 7.N.1485, Janin reports, 10 June 1911.

wrote in 1885 that a nation's first concern must be 'to cover its territory with a network of railways which will ensure the most rapid possible concentration'.⁴⁴ Railway capacity was crucial to the military balance and a prime intelligence target. The French 2nd (intelligence) Bureau began regular surveillance of Belgium's railways in 1909 and, in 1911, it initiated exchanges with Britain about German construction; similarly, Germany and Austria-Hungary compared notes on Russia.⁴⁵ The big trend in strategic railway development in the pre-1914 decades (and one well understood by both sides) was a shift in favour of the Triple Entente of Britain, France and Russia, and against the Triple Alliance of Italy, Austria-Hungary and Germany. This trend, which intensified as war approached, can best be demonstrated by taking each bloc in turn.

Britain had one of the densest rail networks in Europe and many more locomotives and carriages available per hundred route-miles than did Germany or France.⁴⁶ The approaches to Southampton were the only significant bottleneck for military purposes and the pre-war Liberal government covertly committed public funds there to increase capacity. Rather than new construction, however, it was the administrative energies of Sir Henry Wilson, the War Office's Director of Military Operations after 1910, that made the difference by 1914. Although discussions with the French about sending the BEF to the Continent dated back to 1906, when Wilson took over the necessary mobilization and concentration schedules were still lacking. In March 1911, he persuaded the prime minister, Herbert Asquith, to speed up the deployment and to authorize consultation of the railway companies, whose directors met secretly from November 1912 onwards as the Railway Executive Committee.⁴⁷ The London and South-Western Railway Company, which acted as the 'secretary railway', handling communications with the War Office, would run up to seventy concentration trains a day into Southampton docks, selected by Wilson as the main embarkation point. The 1911 Agadir crisis enabled him to work more closely with the

⁴⁴ Stephen Kern, *The Culture of Time and Space, 1900-1918* (London, 1983), 269.

⁴⁵ SHA, 7.N.1771, EMA, 2nd Bureau memo, 11 Mar. 1909; Lt-Col. Pellé to French War Minister, Berlin, 24 Apr., 30 May 1911: SHA, 7.N.1110; Franz Conrad von Hötzendorf to Count Alfred von Waldersee, Vienna, 4 Oct. 1913: KAW, Gstb Operationsbüro, 737.

⁴⁶ Godfrey, *Britain's Railways*, 29.

⁴⁷ Board of Trade to railway companies, London, 31 Oct. 1912: PRO, BT.13-52/3.

EMA 4th Bureau, which would be responsible for the BEF's movement from Le Havre, Rouen and Boulogne to the deployment area east of Amiens. Early in 1914 British officers attended French entrainment exercises, and in mid-July the cross-Channel schedules were completed. The concentration was notable for its flexibility and could be modified every twenty-four hours while under way. In the event it went so smoothly that the Expeditionary Force was deploying before the Germans knew that it had disembarked.⁴⁸

France's own mobilization and concentration plans reproduced these characteristics of speed and suppleness. In the generation after the battle of Sedan, France came to rival Germany in logistical prowess. In 1870, the Germans had nine through lines to the common border: the French, four. But by 1886, whereas Germany still had nine lines, France had twelve; and, by 1913 Germany had risen to thirteen, but France had sixteen.⁴⁹ Each French line was double-tracked and could operate as an independent transport current, junction lines (*raccordements*) being inserted to bypass loops and stations and to minimize intersections. Each of the main lines would convey two (by 1914, three) army corps in succession to a regulating station (*gare régulatrice*) in the rear of the deployment area. Beyond it units could detrain further forward or backward as circumstances dictated. The combination of independent transport currents with regulating stations gave the concentration great adaptability, enhanced by two ring lines round Paris and two transverse lines running parallel to the frontier.⁵⁰ Moreover, after the framework was established, incremental improvements continued. Gradients were smoothed; more junction lines, detraining ramps and special sidings were added; extra watering points were introduced; signalling was improved; and congested sections were multiple-tracked.⁵¹

⁴⁸ On Britain, see Godfrey, *Britain's Railways*, chs. 1, 3; Maj.-Gen. Sir Percy de Radcliffe, 'History of the Growth of the Scheme' (n.d.): PRO, WO/106/49A; [anon.], 'Study of the Growth of the Scheme' (Sept. 1913): PRO, WO/106/49C; Charles E. Callwell (ed.), *Field-Marshal Sir Henry Wilson: His Life and Diaries*, 2 vols. (London, 1927), i, ch. 6. For French planning for the BEF, see SHA, 7.N.1782.

⁴⁹ Groener testimony to Reichstag Budget Commission, reported by von Graevenitz to Karl Frh. von Weiszäcker, Berlin, 25 Apr. 1913: Hauptstaatsarchiv, Stuttgart — Militäarchiv, M.10/41.

⁵⁰ SHA, 7.N.2029, EMA, 4th Bureau, 30 May 1888.

⁵¹ Col. le Hénaff and Capitaine Henri Bornecque, *Les Chemins de fer français et la guerre* (Paris, 1922), 22–6. For French spending on the block system, see note on defence expenditure from 1 Jan. 1905: SHA, 7.N.134; KAM, Mkr 991, German General Staff annual report on French army for 1911, Feb. 1912.

The EMA drew on the system's versatility in its Plan XVI of 1909, which envisaged waiting to discern the axis of the expected German invasion before using the transverse lines to move up a manoeuvre force for a counter-stroke.⁵² When Joseph Joffre, an engineer and railway expert, took over as Chief of the General Staff in 1911, however, he believed that the network was still not being fully exploited and wanted as flexible a concentration as he supposed Germany to possess.⁵³ He ordered the preparation of what became Plan XVII. At this point the EMA believed that by investing 11m. francs over three years in watering, signalling and sidings, and by reorganizing communication lines, it could shorten concentration by between one and two days.⁵⁴ In fact, Plan XVII saw throughput rise from forty-eight to fifty-six *marches* (daily train passages) on the eastern trunk lines, but the need to transport more units and heavy artillery prevented a faster deployment. Joffre did, however, gain more flexibility.⁵⁵ In contrast to Plan XVI, Plan XVII not only allowed him to attack as soon as possible with all available forces, but also allowed him during concentration to shift the detraining point of each army corps forwards, backwards, and even sideways, along the transverse lines. He would indeed alter four corps' detraining points on 3 and 14 August 1914.⁵⁶ The plan did not oblige him to attack, and it included contingency arrangements for a retreat, which proved to be just as well.

Although the EMA expected Britain to intervene, Plan XVII did not assume that it would, and could run equally well in the BEF's absence. Russia preoccupied Joffre much more. The EMA was poorly informed about Germany's concentration, but correctly inferred from its information about German railway building that in a two-front war the enemy would strike first to the west, invading France via Belgium and Luxemburg.⁵⁷ Hence the

⁵² SHA, 1.N.10, minutes of Conseil supérieur de la guerre, 15 Feb. 1908.

⁵³ Joseph Jules-Césaire Joffre, *Mémoires du Maréchal Joffre, 1910-1917*, 2 vols. (Paris, 1932), i, 112-13, 144-6, 201.

⁵⁴ SHA, 7.N.1538, unsigned note, 5 July 1912; SHA, 7.N.29, EMA, 4th Bureau note on communication lines, 4 Oct. 1912; SHA, 1.N.11, EMA, 3rd Bureau, 'Plan XVII: bases du plan' (c.Apr. 1913).

⁵⁵ SHA, 7.N.29, EMA, 4th Bureau, 15 July 1914; SHA, 7.N. 1774, EMA, 3rd Bureau, 'Compte-rendu du Plan XVII' (n.d.).

⁵⁶ Marchand, *Chemins de fer de l'Est*, 60, 67.

⁵⁷ SHA, 7.N. 672, EMA, 2nd Bureau notes on German railways (Dec. 1910) and concentration (updated Aug. 1911); SHA, 7.N.1774, EMA, 3rd Bureau appraisal of the European Powers (probably June 1914). The EMA misjudged the size of the German sweep through Belgium, because it failed to foresee how extensively Germany

long-standing French concerns to see Russia concentrate as early as possible, against Germany rather than against Austria-Hungary, and in a forward deployment west of the river Vistula. The French could not impose their wishes on their ally, however, and they faced many obstacles. The Russian railway net, even west of the Urals, was much less dense than those elsewhere in Europe. Building stone was in short supply and the lines had been laid cheaply. Light rails and wooden bridges restricted speeds and axle weights; watering points were few; and block signalling and double-tracking rare. Locomotives tended to be old and poorly maintained by an unskilled and unmotivated workforce. Many were wood-burning. Moreover, after hectic construction in the 1890s, building and rolling-stock orders had slackened off in the years of depression and social unrest between 1900 and 1908. The government and the private companies had less money for new investment, and such state building as did take place was mostly in Asia.⁵⁸ Even the Russian military leaders attached little urgency to European construction;⁵⁹ the Finance and Communications Ministries were more interested in commercial links between central Russia and the Ukraine and Caucasus. It was symptomatic that in 1910 the Russian army implemented a fundamental reorganization without consulting its French ally. It accelerated its call-up by adopting a largely territorial mobilization system, but henceforth mobilization would take place in the interior rather than in the advanced salient formed by Russian Poland. The new concentration would likewise proceed at a greater distance from the enemy, along the salient's eastern edge.⁶⁰

At first the reorganization bewildered the French, although they soon came to see it as benefitting them. Conversely, initially it reassured Berlin, but by 1911 anxiety there was growing.

(n. 57 cont.)

would use reservists as front-line troops: Jan Karl Tannenbaum, 'French Estimates of Germany's Operational War Plans', in Ernest R. May (ed.), *Knowing One's Enemies: Intelligence Assessment before the Two World Wars* (Princeton, 1984).

⁵⁸ For surveys, see SHA, 7.N.1535, memo on Russian army by Capt. Wehrlin, June 1912; SHA, 7.N.1485, Janin reports, 3 Mar., 9, 24 May, 10, 23 June, 5 July 1911; Edmond Théry to French Minister of Public Works, Paris, 28 Sept. 1913: archives of the Ministère de finances, B. 31262; Sidorov, 'Zheleznodorozhnyi transport'; Westwood, *Russian Railways*; J. Nurminen and F. M. Page, *Russian Locomotives*, i, 1905-1914 (n. pl., 1991).

⁵⁹ Lt-Col. Matton to French War Ministry, St Petersburg, 21 Feb., 15 Apr. 1910; also note by Commandant (1910; later Capt.) Wehrlin, Apr. 1910: SHA, 7.N.1535.

⁶⁰ Stevenson, *Armaments and the Coming of War*, 151-9.

Foreign observers agreed that everything would depend upon whether Russia followed up the reform with new concentration routes to move the faster mobilized units more quickly to the western marches.⁶¹ Already a French loan of 1901 had financed the Bologoe–Siedlce line, opened in 1907–8, which ran from midway between St Petersburg and Moscow to east of Warsaw. Most of it was double-tracked, and it made a very substantial difference.⁶² According to the British military attaché, by 1910 ten lines linked central Russia to the western frontier, six of them double-tracked; twenty years earlier the figures had been just six and two.⁶³ By the winter of 1911–12 the German military estimated that Russia's concentration time on Germany's border had halved in the previous five years.⁶⁴ Yet, for the EMA this was merely a beginning, and from 1909 the French began to contemplate demanding still more building as the condition of approving further tsarist bond issues.⁶⁵

Only after the 1910 reorganization, however, did Paris achieve a breakthrough. This was due less to French financial leverage than to Russia's reviving economic growth and military confidence, and its worsening relations with the Central Powers. In 1911, Tsar Nicholas II's Chief of the General Staff had committed himself to attack Germany on Day 15 after mobilization and when the French Prime Minister, Raymond Poincaré, visited Russia for talks in August 1912 Joffre picked out railway improvements as the single military item for the agenda. The outcome was a September 1912 agreement for 900 km. of extra track, mostly in

⁶¹ SHA, 7.N.1485, Janin reports, 29 Mar. 1911; British Embassy annual report on Russia for 1910, 22 Mar. 1911, in *British Documents on Foreign Affairs: Reports and Papers from the Foreign Office Confidential Print*, ser. IA, *Russia, 1859–1914*, ed. D. C. B. Lieven (Frederick, 1983), vi, doc. 62, 142.

⁶² D. N. Collins, 'The Franco-Russian Alliance and Russian Railways, 1891–1914', *Hist. J.*, xvi (1973); cf. SHA, 1.N.9, Conseil supérieur de la guerre, 8 Apr. 1905; KAM, Gstb 207, German General Staff I. Abt., annual report for 1907, 19 Dec. 1907; SHA, 7.N.1537, note on Russian concentration, 28 Oct. 1908. In 1908, the Russians completed a double-tracked ring railway round Moscow: Consul Kohlhaas to Bernhard von Bülow, Moscow, 8 July 1908: PAAA, R.11010.

⁶³ Col. Wyndham to Sir Arthur Nicolson, St Petersburg, 6 Apr. 1910, in *British Documents on Foreign Affairs*, ser. IA, *Russia, 1859–1914*, ed. Lieven, vi, doc. 14, 22–3.

⁶⁴ Helmuth von Moltke the younger to Theobald von Bethmann Hollweg, Berlin, 2 Dec. 1911: PAAA, R.789; Josias von Heeringen to Theobald von Bethmann Hollweg, Berlin, 22 Mar. 1912: BA, Rklei, R.43/953.

⁶⁵ SHA, 7.N.1538, EMA, 2nd Bureau notes, 10 Feb. 1910; SHA, 7.N.1535, EMA, 2nd Bureau notes, 30 May 1910; Stephen Pichon to Adml Touchard, Paris, 23 Jan. 1909: Archives du Ministère des Affaires Étrangères, Paris (hereafter AMAE), new ser., Russie 58.

Poland. After it was signed a former French Foreign Minister, Théophile Delcassé, arrived as a heavyweight ambassador in St Petersburg, with railways among his top priorities. He won the Tsar's co-operation and, by summer 1913, most of the work specified in 1912 was in progress or had been completed.⁶⁶

The 1912 agreement failed, however, to address the larger need for additional long-distance links to the interior. On 24 April 1913 the Russian War Minister, Vladimir Sukhomlinov, warned the Premier, Vladimir Kokovtsov, that the mobilized units would have to wait for days before being transported and that railway inadequacies were the principal drag on concentration. He wanted over 4,000 new locomotives and 6,244 km. of track.⁶⁷ A second Franco-Russian agreement concluded in December promised him much of what he asked for. Russia would add 5,330 km. of strategic lines over the four years 1914–18, including two brand new lines from the heartland to the western border. It would also modernize its rolling stock and try to raise the basic concentration speed. Furthermore, it would add 270,000 men to its standing army by 1917.⁶⁸ The quid pro quo was French approval for bonds worth 2,500m. francs, to be issued on the Paris capital market by private Russian railway companies, in tranches of 500m. each over five years. This aspect of the deal was its primary attraction for Kokovtsov, who believed that new commercial building was essential to sustain Russia's economic boom. Indeed, he appears initially to have accepted the offer of a loan, believing France would require only the 1912 construction programme in exchange, and, when he realized that Paris wanted much more,

⁶⁶ Joseph Joffre to Maurice Paléologue, Paris, 30 July 1912: AMAE, new ser., Russie 41; SHA, 7.N.1538, notes by EMA, 2nd Bureau, 8 July 1912; also notes by EMA, 3rd Bureau, 3 Aug. 1912; 'Théophile Delcassé to Stephen Pichon, St Petersburg, 24, 26 Mar. 1913', in Commission de publication des documents relatifs aux origines de la guerre de 1914, *Documents diplomatiques français, 1871–1914*, 41 vols. (Paris, 1929–59), 3rd ser., vi, docs. 59, 68, pp. 81–2, 98; also their letters, 1, 2 Aug. 1913, *ibid.*, vii, docs. 513, 521, pp. 555, 563–4; SHA, 7.N.1540, Foreign Ministry report, 6 Aug. 1913.

⁶⁷ Sidorov, 'Zheleznodorozhnii transport', 14–16; Gen. de Laguiche to French War Ministry, St Petersburg, 1 Apr. 1913: SHA, 7.N.1535. For reports to the French War Ministry from St Petersburg by Capt. Wehrin (hereafter Wehrin reports), 17 June, 6 Nov. 1913, and Gen. de Laguiche (hereafter de Laguiche report), 26 June 1913, see SHA, 7.N.1478.

⁶⁸ *Documents diplomatiques français, 1871–1914*, 3rd ser., viii, docs. 453, 485, 698. The Russians also agreed to consider introducing automatic brakes, which the French believed essential for a faster concentration speed: SHA, 7.N.1485, EMA, 2nd Bureau note, 7 Apr. 1914.

he tried unsuccessfully for a more elastic wording. In the end the French — whose representatives saw the agreement precisely as an opportunity to commit the Russians to a definite schedule⁶⁹ — succeeded in tying him down, not only because they shared their aims with the Russian military but probably also because the Liman von Sanders crisis over the Turkish Straits in the winter of 1913–14 strengthened anti-German feeling in St Petersburg.⁷⁰ Early in the new year the Russians floated their first tranche of bonds (raised at their request to 600m. francs), and work on the military lines began. French representatives still sensed a lack of urgency and suspected that St Petersburg wished to spread strategic construction over eight years down to 1922, rather than over four years to 1918.⁷¹ But after a decade of hesitation Russia was finally set to expand enormously its concentration capacity.

IV

By July 1914 the BEF concentration schedule was ready, Plan XVII was in place and the Russians had completed their reorganization of 1910 and building programme of 1912. A new equipment credit approved on 15 July allocated 21.4m. francs for further strategic improvements to France's network.⁷² Major investments in transport would accompany the strengthening of the French army by the three-year service law of 1913, that of the Russian army by the 'Great Programme' approved in 1914, and the adoption of offensive war plans by both countries.⁷³ Yet, although in 1912–14 Austria-Hungary and Germany also increased their recruitment and their army budgets, in the railway race domestic political obstacles hobbled them.

Italy was bound to Austria-Hungary and Germany by the 1882

⁶⁹ 'De Verneuil to Stephen Pichon, Paris, 17 Sept. 1913', in *Documents diplomatiques français, 1871–1914*, 3rd ser., viii, doc. 156; SHA, 7.N.1478, Wehrlin reports, 6, 8 Nov. 1913; de Laguiche report, 3 Dec. 1913.

⁷⁰ Gerd Krumeich, *Armaments and Politics in France on the Eve of the First World War: The Introduction of Three-Year Conscription, 1913–1914*, trans. Stephen Conn (Leamington Spa, 1984), 124.

⁷¹ Bibliothèque nationale, Paris, n.a.fr., 16026, Raymond Poincaré diary, 11 Jan. 1914; SHA, 7.N.1478, Wehrlin reports, 28 Mar., 25 Apr., 6 June 1914; AMAE, new ser., Russie 42.

⁷² 'Defence Credit Law, 15 July 1914', in *Bulletin des lois de la République française: année 1914*, pt 1, vi, doc. 7325, p. 1911.

⁷³ Stevenson, *Armaments and the Coming of War*, 301–26; Snyder, *Ideology of the Offensive*, chs. 2–3, 6–7.

Triple Alliance. It had four trunk lines from south to north, although the coastal location of two of them made them potentially vulnerable to bombardment.⁷⁴ Its railways lagged behind western European technical norms and, in addition, alone among the Powers, it stuck to the complications and delays of a non-territorial mobilization.⁷⁵ In any case, it had directed most of its recent strategic building against its nominal Austrian ally, in the Trentino and Veneto, and its war in Libya in 1911–12 had forced construction to a standstill.⁷⁶ Although tripartite arrangements were concluded in 1913–14 to transport three Italian army corps across Austria to campaign alongside Germany on the Upper Rhine,⁷⁷ Italy's politicians knew their country was ill-prepared for hostilities. They had little wish to fight in alliance with Austria-Hungary and none at all to take on the Royal Navy.

If relations with Italy offered Germany's General Staff some crumbs of comfort, Austria-Hungary's worsening predicament more than offset them. The Austrian portion of the Habsburg monarchy's railway network was relatively modern and well maintained, despite the mountainous terrain. But, as 1914 approached, the shortcomings of the transport system for operations against the dual monarchy's multiple enemies were becoming glaring.⁷⁸ After the Balkan crises of the 1870s and 1880s, the focal point was the north. Between 1876 and 1909 Austria-Hungary constructed five trunk lines through the Carpathians to Galicia and, for a while, it could concentrate faster than Russia. But after the turn of the century it lost its advantage. It continued to improve its Polish network by laying heavier rails, enlarging

⁷⁴ Col. Julian to French War Ministry, Rome, 28 Feb. 1908: SHA, 7.N.1369.

⁷⁵ Stefano Fenoaltea, 'Italy', in O'Brien (ed.), *Railways and the Economic Development of Western Europe*; John Gooch, 'Italy before 1915: The Quandary of the Vulnerable', in May (ed.), *Knowing One's Enemies*. Each Italian regiment contained men from at least two regions of the country, and was stationed in a third.

⁷⁶ Franz von Schönaich to Alois, Count Lexa von Aehrenthal, Vienna, 15 Jan. 1910: KAW, KM Prä. (1910), file 76–51; Franz Conrad von Hötzendorf to Franz von Schönaich, Vienna, 26 Mar. 1911: KAW, KM Prä. (1911), file 76–72; KAW, Gstb Operationsbüro, 820, Evidenzbüro annual report on Italy for 1913, Dec. 1913.

⁷⁷ M. Palumbo, 'German-Italian Military Relations on the Eve of World War I', *Central European Hist.*, xii (1979), 351–2.

⁷⁸ R. A. Whitehead, *Austrian Steam Locomotives, 1837–1981* (Tonbridge, 1982); Herwig, *First World War: Germany and Austria-Hungary*, 55–6. Tunstall, *Planning for War*, and Enderes and Ratzenhofer, *Verkehrswesen im Kriege*, have the fullest discussions.

stations and introducing more powerful locomotives,⁷⁹ but in 1906–9 the tension with Italy made the Alps the General Staff's priority. Thereafter, strategic building ceased almost completely.⁸⁰ French observers judged that the Carpathian lines (most of which were single-tracked) were 'mediocre':⁸¹ by 1912, the Russians could move 250 trains per day into the Polish border area against Austria-Hungary's 153, and, from September 1914, they would be able to move 360. Faced by this imbalance, in spring 1914 Conrad envisaged concentrating further back from the frontier, although the necessary re-scheduling remained unfinished when war broke out.⁸²

As war approached not only had the Habsburgs lost their advantage in Poland, but Italy was also reviving its anti-Austrian construction.⁸³ Conrad now viewed Vienna's previous ally, Romania, as a potential adversary against whom he might require new lines.⁸⁴ Nor had the Habsburgs improved the connections to their south-eastern border, despite intensifying conflict with Belgrade. Of the proceeds of a Franco-German loan to Serbia in 1906, 56m. francs were for railways and rolling stock. Much of the Serbian building planned or in progress was on the Austrian border.⁸⁵ Against this Austria-Hungary revealed its vulnerability in 1908–9, when its annexation of Bosnia and Herzegovina provoked a military confrontation with Serbia and Montenegro. Four trunk lines ran from the interior to the annexed territories, but only one narrow-gauge track continued beyond that, leaving the Habsburg garrison exposed (so Conrad warned) to surprise attack.⁸⁶ After the crisis two new lines through Bosnia and

⁷⁹ Geyer, 'Der Ausbau des nordöstlichen Eisenbahnnetzes der Österreich-Ungarischen Monarchie', 123–4; SHA, 7.N.1485, Janin reports, 17 Mar., 28 Apr., 5 July 1911.

⁸⁰ Peball, 'Die Kriegspläne des k.u.k. Generalstabes und die k.k. Eisenbahnbehörden', 19–20; Franz Conrad von Hötzendorf to Franz Joseph, Vienna, 21 Feb. 1910: KAW, Gstb Operationsbüro, 742; Franz Conrad von Hötzendorf to Moritz von Auffenberg, Vienna, 11 Nov. 1911: KAW, KM Präs. (1911), file 49–50.

⁸¹ SHA, 7.N.1538, EMA, 2nd Bureau report, Oct. 1908.

⁸² Stone, 'Die Mobilmachung der Österreich-Ungarischen Armee 1914', 75–6.

⁸³ KAW, KM Präs. (1913), file 56–6/2, Evidenzbüro annual report on Italy for 1912, 25 Jan. 1913; SHA, 7.N.1370, Commandant de Gondrecourt to French War Ministry, Rome, 8 Mar. 1913.

⁸⁴ Franz Conrad von Hötzendorf, *Aus meiner Dienstzeit, 1906–1918*, 5 vols. (Vienna, 1921–5), iii, 494, 554.

⁸⁵ AMAE, new ser., Serbie 8, Foreign Affairs Ministry note, (n.d., but Nov. 1909), 'Emprunt serbe et commandes militaires'; KAW, KM Präs. (1908), file 51–7, reports from Belgrade consulate on Serbian railways, 12 May, (?) June 1908.

⁸⁶ Conrad, *Aus meiner Dienstzeit*, i, 100–3.

Herzegovina (at least one normal-gauge) became a top military demand. But it made no headway in the Joint Council of Ministers. As neither the Austro-Hungarian common budget nor that of the Bosnian-Herzegovinan authorities could meet the estimated cost of some 250m. crowns, the two governments of the Austrian and Hungarian halves of the empire would have to provide most of the money. Both were severely pressed and neither wanted to subsidize projects that would advantage the other's economy.⁸⁷ As a result of this impasse, during the First Balkan War in 1912–13 the Bosnian border was again endangered and again Vienna had to send in costly reinforcements. Only then was the issue addressed more urgently. In late 1912 the Austrian and Hungarian governments agreed on prospective routes, but in June 1913 the common War Ministry pleaded with Emperor Franz Joseph that Serbia was spending 60m. francs and building up to the frontier, while the Habsburg monarchy looked likely to waste yet another year. The Foreign Minister told the Joint Council that the lack of railways obliged 'extraordinary military preparations . . . with every worsening of the situation' and was gravely handicapping his diplomacy. Now the obstacle was the Austrian parliament, which the Austrian premier expected to refuse funding unless he approved a swathe of other local lines that he could ill afford. Ministers agreed that work could start regardless, as soon as the Hungarian parliament consented, but by July 1914 nothing had been done.⁸⁸ Conrad's plans to attack in Poland and the Balkans would rely respectively on an outdated network and no network at all.

The German General Staff knew how crucial its railway superiority had been in 1870,⁸⁹ and had reason for foreboding. While Austria-Hungary was losing its advantage against the Russians, Germany had already done so against the French. Compared with France it had more mountains and north-south rivers, such as the Rhine and Vistula; its population was less evenly distributed;

⁸⁷ Hasu-, Hof-, and Staatsarchiv, Vienna (hereafter HHStA), PA XL 310, minutes of Joint Council of Ministers, 26 Feb., 28 Oct. 1911, 14 Apr., 6 May 1912; see also correspondence in KAW, KM Prä. (1911), file 81–11; P. Mechtler, 'Dalmatien und die Österreichische Eisenbahnpolitik', *Mitteilungen des Österreichischen Staatsarchivs*, xxiii (1970).

⁸⁸ HHStA, PA XL 310, minutes of Joint Council of Ministers, 16, 28 Oct., 8 Nov. 1912; HHStA, PA XL 311, minutes of Joint Council of Ministers, 10 Nov., 14 Dec. 1913.

⁸⁹ Helmuth von Moltke the younger to Theobald von Bethmann Hollweg, Berlin, 9 Mar. 1914: BA, Rklei R.43.F/107.

and its average concentration distances were longer.⁹⁰ Yet in 1877 and 1886 the elder Moltke had warned Chancellor Bismarck in vain about France's building programme, and, as recently as 1906, when Moltke the younger and War Minister Karl von Einem listed their equipment needs, they had not included railways among them.⁹¹ The Germans forfeited a key component of their nineteenth-century victories because of deliberate choices, whose consequences they tried vainly on the eve of war to avert.

It was not that the Germans had been inactive. On the contrary, they expended some 280m. marks on strategic building between 1887 and 1909: probably more than double the over 60m. francs committed by France between 1874 and 1911.⁹² From the 1870s until the early 1890s they focused on Alsace-Lorraine and the Saar. They built two lines parallel to the new post-1871 border, with branches to fortresses and detraining ramps.⁹³ But developments thereafter made the railway balance with France seem less relevant. Alfred von Tirpitz's naval programme squeezed the rest of the Reich budget, whose growth was capped by disagreements between the empire and the member states (as well as between the Reichstag political parties) over how to expand revenue.⁹⁴ After 1906, fear of British invasion diverted strategic railway expenditure towards improving connections to the North Sea and the Baltic coast.⁹⁵ However, the principal new trend in Germany's spending was a shift from the Upper to the Lower Rhine, following the decision taken in the 1890s to wheel westwards through

⁹⁰ Gen. Ritter von Wenninger to Bavarian War Minister, Berlin, 25 Apr. 1913: KAM, Militärbevollmächtigter, i; von Graevenitz to Karl Frh. von Weizsäcker, Berlin, 25 Apr. 1913: Hauptstaatsarchiv, Stuttgart — Militärarchiv, M.10/41.

⁹¹ Helmuth von Moltke the younger to Theobald von Bethmann Hollweg, Berlin, 9 Mar. 1914: BA, Rklei R.43.F/107; also Karl von Einem to Helmuth von Moltke the younger, Berlin, 18 June 1906; Helmuth von Moltke the younger to Heinrich von Tschirschky, Berlin, 9 Oct. 1906: PAAA, R.794.

⁹² Adolf Wermuth to Theobald von Bethmann Hollweg, Berlin, 30 Nov. 1909: BA, Rklei R.43.F/107; SHA, 7.N.1538, unsigned note, 5 July 1912. Pre-1914 exchange rates: £1 = 25.221 lire = 20.429 marks = 9.45 roubles = 25.22 francs = 24.02 Austrian crowns: R. L. Bidwell, *Currency Conversion Tables: A Hundred Years of Change* (London, 1970). For German strategic building, see Pratt, *Rise of Rail Power*, ch. 18; Reichsarchiv, *Das Deutsche Feldeisenbahnwesen*, 1–3. For reports by EMA, 2nd Bureau, Dec. 1909, 1910, see SHA, 7.N.672.

⁹³ Vauquesal Papin, *Un Siècle de chemin de fer en Alsace et en Lorraine (1839–1938)* (Paris, 1980).

⁹⁴ Niall Ferguson, 'Public Finance and National Security: The Domestic Origins of the First World War Revisited', *Past and Present*, no. 142 (Feb. 1994).

⁹⁵ Bernhard von Bülow to Wilhelm II, Berlin, 9 Jan. 1906: BA, Rklei R.43.F/107.

the Low Countries in the event of war.⁹⁶ A new line was opened on the left bank of the Moselle, and building was intensified on the heights of the Eifel opposite Belgium. The EMA scrutinized these new developments and Paris remonstrated when Brussels permitted a Malmédy–Stavelot connection that would shorten the journey from Aachen and the German encampment at Elsenborn to the Belgian fortresses at Liège and Namur.⁹⁷ None the less, the line was opened in 1913. Yet the Belgians too were anxious and, in 1912–13, German construction encouraged Prime Minister Charles de Broqueville to seek a massive army reinforcement.⁹⁸

By this time the Germans no longer felt that building opposite Belgium was adequate. In 1909 Moltke and Josias von Heeringen, Einem's successor as War Minister, took a stand against further reductions in the railway budget.⁹⁹ The 1910 Russian reorganization highlighted the threat to Germany's eastern border, as did Russia's troop build-up in Poland during the First Balkan War in the winter of 1912. The Agadir crisis suggested that Paris was recovering confidence and, if France no longer intended to stay on the defensive but instead to advance into Germany, its advantage in concentration would be harder to tolerate. Despite this, during 1911–13 German strategic railway work continued in the piecemeal pattern of previous years.¹⁰⁰ Operationally, in contrast, under the supervision of the Prussian Minister of Public Works, Paul von Breitenbach, the Prussian railways had reached new performance peaks,¹⁰¹ and, when Groener took over at the *Eisenbahnabteilung* in 1911, he hoped (like Joffre) to heighten

⁹⁶ The dense and accessible Belgian railway network (planned on commercial rather than strategic principles to maximize traffic between Belgium and its neighbours) attracted Schlieffen: Bucholz, *Moltke, Schlieffen, and Prussian War Planning*, 176; Michel Laffut, 'Belgium', in O'Brien (ed), *Railways and the Economic Development of Western Europe*, 203.

⁹⁷ Pratt, *Rise of Rail Power*, 290–1; see also correspondence in Archives du Ministère des Affaires Étrangères, Brussels, Neutralité: Indépendance: Défense militaire de la Belgique, ix.

⁹⁸ Louis de Lichtervelde, *Avant l'orage (1911–1914)* (Brussels, 1938), 52–3; Archives générales du royaume, Brussels, Fonds Broqueville #304, note by Charles de Broqueville's military cabinet, 'Situation à notre frontière de l'est'; SHA, 7.N.1158, maps of railways on Belgian borders annexed to Bus de Warnaffe report to Belgian Chamber, in report by Commandant Génie, 22 Feb. 1913.

⁹⁹ Helmuth von Moltke the younger and Josias von Heeringen to Theobald von Bethmann Hollweg, Berlin, 21 Dec. 1909, 12 Jan. 1910: BA, Rklei R.43.F/107.

¹⁰⁰ KAM, Gstb 576, German General Staff annual reports for 1911 (n.d.), 1912 (14 Jan. 1913), 1913 (1 Dec. 1913).

¹⁰¹ Paul von Breitenbach, 'Mein Lebensbuch' (n.d.): BA, Kl. Erw. Nr.382.

concentration speed and make the railways more responsive to the High Command's wishes. By 1914 his technicians could adjust the concentration while it was in progress, although he had yet to initiate the army commanders into the new possibilities. In addition, his agency was preparing a new military travel plan that would double speeds on the main lines, although as this project was still incomplete Germany used the existing plan in August 1914.¹⁰²

Operating improvements would not suffice. Groener had long believed that only new construction could eliminate France's lead,¹⁰³ and Germany's worsening circumstances won him an audience. In spring 1913 Moltke sent memoranda to Heeringen and Bethmann, documenting France's two-day advantage and Russia's growing capabilities, and proposing to accelerate German building. Groener testified to the Reichstag Budget Committee and Bethmann asked the governments of the German states how far their plans would satisfy the needs of the General Staff. There matters rested, however, until in January 1914 Moltke wrote again to Bethmann, and now at last provoked a rapid response.¹⁰⁴ What made the difference was the Franco-Russian loan.

Moltke described the loan as 'one of the most sensitive strategic blows that France has dealt to us since the war of 1870/71' and foresaw 'a decisive turning point to Germany's disadvantage' if the French and Russian concentrations became more simultaneous.¹⁰⁵ According to the German General Staff, Russia in 1914 could deploy 23½ army corps on the western frontier by Day 13, but its new building programme meant that by 1922 the figure would be 30; as of Day 18 the comparative totals would be 31½ corps and 46½. In short, by Day 13 two-thirds instead of half of the Russian army would be ready and, by Day 18, all of it instead of two-thirds.¹⁰⁶ Not only this, but the Russians were also improving their railways' efficiency and planning heavy invest-

¹⁰² Groener, *Lebenserinnerungen*, ed. von Gaertringen, 133–4; Reichsarchiv, *Das Deutsche Feld Eisenbahnwesen*, 5–6, 10, 22; Sarter, *Deutschen Eisenbahnen*, 42–3.

¹⁰³ Groener, *Lebenserinnerungen*, ed. von Gaertringen, 131–2.

¹⁰⁴ Bundesarchiv — Militärarchiv, Groener Nachlass N.47/77, undated memo, 'Abschrift: Überblick über den Akten-Inhalt'. For Groener's Reichstag testimony, see n. 89 above.

¹⁰⁵ Helmuth von Moltke the younger to Theobald von Bethmann Hollweg, Berlin, 1 Jan., 8 Mar. 1914: BA, Rklei R.43.F/107.

¹⁰⁶ Helmuth von Moltke the younger to Theobald von Bethmann Hollweg, Berlin, 15 Dec. 1913, 11 July 1914: PAAA, R.11011; Georg von Waldersee to Arthur Zimmermann, Berlin, 4 July 1914: PAAA, R. 996.

ment in rolling stock, as well as massively enlarging and re-equipping their standing army.¹⁰⁷ Their spokesmen side-stepped criticism by saying that the French loan was for commercial purposes, but Moltke considered it a disguised strategic subsidy and, anyway, judged that Russian private building also contributed to military requirements. Wilhelm II discounted Russian assurances and was deeply concerned.¹⁰⁸ Besides the emperor and Bethmann, Moltke briefed the new State Secretary, Gottlieb von Jagow, who later cited Russian railway building as one justification for Germany's actions in July 1914.¹⁰⁹ In March, a Russo-German press war focused public attention on German fears that once Russia was ready hostilities would be imminent.

The Franco-Russian loan was one of several developments in 1913–14 that encouraged the leaders in Berlin to consider preventive war. In the first half of 1914, however, their minds were focused on the General Staff's proposals for a crash programme of strategic railway building to equalize the military balance. According to Moltke and Groener, Germany had fifteen Rhine bridges and thirteen double-tracked concentration lines in the west, as well as four double-tracked transverse routes, two on each side of the Rhine. And yet, they now alleged, France could concentrate as much as five days faster if both sides proclaimed mobilization at the same time.¹¹⁰ In the east, four double-tracked lines ran to the Vistula, but only two double-tracked lines beyond it into East Prussia, one of which was dangerously close to the

¹⁰⁷ KAM, Gstb 925, German General Staff reports, 'Die Kriegsbereitschaft Russlands', 26 Feb. 1914; PAAA, R.996, 'Die wachsende Macht Russlands', 4 July 1914. Helmuth von Moltke the younger also expected improvements in the French railways: Helmuth von Moltke the younger to Gen. Ritter von Wenninger, Berlin, 18 Feb. 1914: KAM, MKr 992.

¹⁰⁸ Helmuth von Moltke the younger to Theobald von Bethmann Hollweg, Berlin, 15 Dec. 1913: PAAA, R.11011; Helmuth von Moltke the younger to Gen. Ritter von Wenninger, Berlin, 26 Feb. 1914: KAM, MKr 992; Vladimir N. Kokovtsov, *Out of my Past: The Memoirs of Count Kokovtsov* (Stanford, 1935), 390–1; Count Friedrich von Pourtales to Theobald von Bethmann Hollweg, St Petersburg, 19 Mar. 1914, in *Die Grosse Politik der Europäischen Kabinette, 1871–1914*, ed. J. Lepsius et al., 40 vols. (Berlin, 1922–7), xxxix, doc. 15,854, pp. 567–9.

¹⁰⁹ 'Gottlieb von Jagow to Prince Karl Max Lichnowsky, Berlin, 18 July 1914', in *July 1914: The Outbreak of the First World War: Selected Documents*, ed. Immanuel Geiss (New York, 1974), 123.

¹¹⁰ Reichsarchiv, *Das Deutsche Feldeisenbahnenwesen*, 4; Helmuth von Moltke the younger to Theobald von Bethmann Hollweg, Berlin, 9 Mar. 1914: BA, Rk1 R.43.F/107. This figure (which had grown from an estimate of two days in 1913) much exaggerated the threat, and it seems unlikely that von Moltke and Groener believed it.

border. No trunk lines at all ran into Posen, and Germany was poorly equipped to fight alongside its Austrian ally. It may be partly for these reasons that in 1913 the General Staff suspended work on an alternative concentration for a primary offensive in the east.¹¹¹

Groener and Moltke proposed a three-part remedy. Three new Rhine crossings by 1 April 1917 were their top priority; their second, a new line along the right bank of the Moselle; and, a third line east of the Vistula, both to be ready by 1 April 1918. The remainder of the programme was to be finished by 1 April 1920. The aim was twenty independent concentration lines running to the west, each with its own Rhine crossing, in order to equal or even outpace Joffre. In the interior, double-, triple- and quadruple-tracking would enable Moltke to shuttle his troops eastwards more speedily after a victorious western campaign. The General Staff wanted as far as possible to carry out this work in secret: a condition that lent the scheme an air of fantasy. But both extraordinary concealment and exceptional urgency characterized the top-level discussions that ensued.¹¹²

An interdepartmental meeting on 15 January costed the army proposals at 500m. marks. The Reich Finance Office immediately protested that it had no money even to service a loan for this sum. The capital levy passed by parliament with socialist support to finance the 1913 army bill had brought in less than expected, and Bethmann ruled out new Reich taxes.¹¹³ He therefore turned to the state governments, but even the Bingen Rhine bridge opened in 1909 had required long preliminary haggling, and two-thirds of previous strategic building had been Reich-financed. Avoiding a special conference as too conspicuous, he toured the state capitals. He found the Prussians willing to start work quickly, though not to bear all of the cost. The Bavarians and Saxons were reluctant to contribute appreciably. By May, Bethmann had conceded that the Reich must bear some expense, although the Finance Office warned that the earliest it could do

¹¹¹ Helmuth von Moltke the younger to Theobald von Bethmann Hollweg, Berlin, 9 Mar. 1914: BA, Rk1ei R.43.F/107. French intelligence estimated Germany had only 125 detraining ramps along its 1,000 km. border with Russia, against 170 along a 350 km. front in the west: SHA, 7.N.1535, EMA, 2nd Bureau memorandum, May 1914.

¹¹² President of Reichseisenbahnamt to Theobald von Bethmann Hollweg, Berlin, 6 Mar. 1914: BA, Rk1ei R.43.F/107.

¹¹³ *Ibid.*; see also Stevenson, *Armaments and the Coming of War*, 340, 362–3.

so was 1916.¹¹⁴ None the less, in June the General Staff sent out emissaries to brief the state war ministries in confidence.¹¹⁵ On 20 July the Prussian War Minister, Erich von Falkenhayn, noted that all the Reich and Prussian authorities were agreed on the programme's absolute priority,¹¹⁶ although they had still to overcome the politico-financial obstacles to it when the July Crisis intervened.

V

This nascent railway race must be seen in the context of the land arms race as a whole. After twenty years of quiescence since the 1890s, rivalry between the Austro-German and Franco-Russian blocs intensified following Russia's 1910 reorganization and the Agadir crisis, and intensified further after the First Balkan War. At first the competition affected the railways mainly with regard to planning and organization, via Wilson's, Joffre's, and Groener's efforts to accelerate concentration. However, France and Russia embarked on new construction after 1912, and, if the arms race had continued beyond July 1914, competitive railway building would have been fundamental to it. France had approved a big new railway credit and Russian strategic building was gathering pace, while Austria-Hungary in Bosnia and Germany with the Groener plan aimed to start work within a year.

What bearing had the railway race on the outbreak of war? The essential question about 1914 is why a Balkan clash between Austria-Hungary and Serbia grew into a Continental and ultimately a global conflagration. The first key development in this process came on 5–6 July when Germany offered to Austria-Hungary the so-called 'Potsdam blank cheque', urging it to profit from the Sarajevo assassinations by attacking Serbia and assuring it of German military backing if Russia intervened. After the Austrians sent a deliberately unacceptable ultimatum and declared war on Serbia on 28 July, Russia responded three days later by

¹¹⁴ Stevenson, *Armaments and the Coming of War*, 340, 362–3.

¹¹⁵ Gen. Ritter von Wenninger to Bavarian War Minister, Berlin, 16 June 1914: KAM, MKr 41. Wenninger reported the German General Staff's intention to brief the War Ministers of the states orally about strategic railways, in order to avoid written communication. This was in accordance with the strict secrecy that had cloaked discussion of the issue since January.

¹¹⁶ Erich von Falkenhayn to Theobald von Bethmann Hollweg, Berlin, 20 July 1914: BA, Rklei R.43.F/107.

ordering general mobilization against both Austria-Hungary and Germany. Germany's concentration plan, however, envisaged winning a two-front war via a flanking movement through Belgium and Luxemburg that would circumvent France's eastern fortresses and envelop Paris before the slowly concentrating Russians could endanger Berlin. As Russia's general mobilization mortally imperilled this strategy, Germany sent ultimatums to Russia to desist and to France to pledge neutrality in a Russo-German conflict. When both refused to comply, Germany declared war on them, while its ultimatum to Belgium to allow the passage of German troops gave Britain the necessary pretext to intervene and to dispatch the BEF as Wilson had prepared.

Had it not been for the railway construction and planning executed over previous decades Germany could not have contemplated risking a war on two fronts and France could not have contemplated risking a re-run of the 1870 disaster. In this basic sense railway development was a precondition for the outbreak of war. In the 1919 peace negotiations the French drew the logical inference, insisting that Germany must forfeit control of its infrastructure of bridges, tracks and unloading ramps along the Rhine and the river's left bank.¹¹⁷ More difficult to resolve is the question of whether possessing the capability to launch offensive blows also constituted an incentive to do so: whether railway capacity was not simply a passive precondition for hostilities but actively promoted them.¹¹⁸ In theory it might either (as Fischer argued) have encouraged a war of premeditated aggression or (to follow Taylor's interpretation) a war of inadvertence. But the picture presented above yields little comfort for either thesis.

It has long been known that Russian railway building encouraged Berlin to consider a preventive war, and this article has provided further support for that view. If, however, there was a premeditated decision to strike out in 1914 (perhaps taken in the so-called Potsdam 'War Council' of 8 December 1912), one would expect to find evidence of corresponding railway preparations. Yet the attention the Germans gave the Groener programme

¹¹⁷ AMAE, Tardieu MSS 1946, versement 44, 18 bis, maps submitted by French delegation, 31 Mar. 1919.

¹¹⁸ Cf. Daniel R. Headrick, 'The Tools of Empire: Technology and the Expansion of European Colonial Empires in the Nineteenth Century', *Jl Mod. Hist.*, li (1979), which raises the possibility that 'the innovation which suddenly made it easy and cheap to conquer whole nations had in fact stimulated those motivations' [i.e., to partition Africa].

suggests that they were still considering several options before the Sarajevo assassinations and at no time prior to them had they committed themselves to launching a European conflict. In the end they took the plunge before even the new military travel plan had been finalized.¹¹⁹ Similarly, by 1914, Austria-Hungary had failed to build an infrastructure for aggression against Serbia, despite years of urging by Conrad. It is true that in 1913 most of the Habsburg monarchy's political leaders seem to have become convinced that war with Belgrade was inevitable, and this may help explain why they finally treated the Bosnian-Herzegovinan railways urgently, yet even so the monarchy went to war before construction started. It acted, moreover, when it had lost its previous advantage against Russia, although this would have mattered less if Moltke could have dealt with both the French and Russians, as in May 1914 he assured Conrad he could.¹²⁰ Nor did the Entente Powers have good reason, to judge from their railway building plans, to force a showdown. Transport improvements made the EMA more confident after 1912 about the Franco-Russian alliance's military prospects. But by 1914 Plan XVII had not yielded the accelerated concentration Paris had hoped for. The three-year delay that would precede any big increase in Russia's capacity more than outweighed the benefit from arrangements with the British, and the tsarist military wanted time to consolidate.¹²¹

If premeditation theories are difficult to substantiate, what about those of inadvertent war? New work since Taylor wrote has weakened them also. Norman Stone has denied that Conrad's actions in the July Crisis were determined by logistic rigidities. The Austro-Hungarian rail network and its planners were more versatile than Conrad's memoirs gave them credit for, and his driving concern was the political one of forcing war with Serbia even at the risk of unpreparedness against Russia.¹²² As for Germany, the crucial point is that both Wilhelm II and Bethmann Hollweg understood there was a danger of Russian intervention

¹¹⁹ A point first made by Ulrich Trumpener, 'War Premeditated? German Intelligence Operations in July 1914', *Central European Hist.*, ix (1976), 84.

¹²⁰ Conrad, *Aus meiner Dienstzeit*, iii, 669–73, though Helmuth von Moltke the younger also said that he was not superior to the French.

¹²¹ S. Dobrorolsky, 'La Mobilisation de l'armée russe en 1914', *Revue d'histoire de la guerre mondiale*, i (1923), 63.

¹²² Stone, 'Die Mobilmachung der Österreich-Ungarischen Armee 1914', 72, 83–4, 88, 93–4; Tunstall, *Planning for War*, ch. 7.

when they gave the blank cheque (although they underestimated its likelihood), and they accepted that if Russia mobilized Germany must do likewise.¹²³ Even before he declared war Bethmann began accusing Russian military measures of sabotaging mediation, but this formed part of a stratagem of blaming St Petersburg for the conflict in order to obscure his own responsibility. The so-called 'misunderstanding' that occurred on 1 August when the Germans were wrongly informed that Britain and France might stay neutral was remarkable because Wilhelm rode roughshod over Moltke's objections and halted the march to the west until it was clear that the report was unfounded.¹²⁴ Far from demonstrating the unstoppable momentum of the military plans, the episode showed that German mobilization was not synonymous with war and, according to Groener, his agency could have improvised an alternative concentration against Russia without a disastrous delay.¹²⁵ On the Entente side, Taylor's contention that the Russian Foreign Minister, Sergei Sazonov, initially envisaged a partial mobilization before learning from his military that only a general one was feasible misses the point. Both Sazonov and Nicholas II understood when they approved general mobilization that European war was the almost certain consequence: but by this point they were determined to protect Serbia and believed that as Germany was set on war whatever they did their only course was to prepare for it without further ado.¹²⁶ The French government at first refrained from large-scale troop movements by rail, in order to avoid an unintended spiral of reciprocal escalatory measures, and later delayed authorizing both the *couverture* and mobilization despite Joffre's entreaties.¹²⁷ Finally, the British Cabinet resolved for war only after previously agreeing that it would not send the BEF to the Continent. Although its War Committee subsequently decided to dispatch the troops after all, Asquith so postponed their departure that

¹²³ So Wilhelm told Gustav Krupp von Bohlen und Halbach on 6 July: Fischer, *War of Illusions*, 478.

¹²⁴ Trachtenberg, 'Meaning of Mobilization in 1914', 137–46.

¹²⁵ Groener, *Lebenserinnerungen*, ed. von Gaertringen, 145–6; John H. Maurer, *The Outbreak of the First World War: Strategic Planning, Crisis Decision Making, and Deterrence Failure* (Westport, Conn., 1996), 94, supports Groener's view.

¹²⁶ Taylor, *War by Timetable*, 89–96; Trachtenberg, 'Meaning of Mobilization in 1914', 128–9, 145–7.

¹²⁷ Stevenson, *Armaments and the Coming of War*, 389–92.

the General Staff had to rewrite the orders for every unit and railway line.¹²⁸

Ideas of unintended war and war by premeditation both oversimplify the reality. The leaders of the European blocs were indeed readier in 1914 than in previous crises to risk a general military conflict rather than compromise on their objectives, but such a conflict was not their preferred outcome. They foresaw and accepted the eventuality of one, and from the start the crisis was unlikely to end peacefully, but the decisions to fight came after and not before Sarajevo. It is true that as war loomed politicians had to take military considerations into account, but these considerations were more flexible and less compelling for decision-makers than Taylor suggested. Belgium's 1914 concentration was wholly improvised; the BEF's deployment could be fine-tuned every twenty-four hours; Joffre could choose when and where he concentrated and whether to attack or not. In Berlin the political assumption that France would fight alongside Russia was more crucial than were the dictates of the concentration plan, as in St Petersburg was the assessment that Germany was determined to provoke a confrontation.

If this investigation has questioned the importance of logistical considerations in the dynamics of the July Crisis itself, it has highlighted their significance among the predisposing factors that inclined the Great Powers to brinkmanship. It is also relevant to what followed. During the war the German network successfully handled major deployments to the east in 1915 and in 1916. But in the crucial western campaign before the battle of the Marne, sabotage denied Moltke access to the Belgian lines, while Joffre used the French system more intensively prior to his September 1914 counterstroke than he had during the concentration of August.¹²⁹ French rail superiority contributed powerfully to denying Germany victory in a short war. In the long one that resulted, all of the Great Powers' railway networks sustained intensive economic mobilization, as well as giving the armies operational support, but in the second half of the conflict British and American technicians and locomotives helped to keep France's system functioning while first Russia's and then Austria's

¹²⁸ General Mance, 'Recollections of the First Days of Mobilization': PRO, 30/66/9. I am indebted to David French for this reference.

¹²⁹ Creveld, *Supplying War*, ch. 4; Marchand, *Chemins de fer de l'Est*, 513; Maurer, *Outbreak of the First World War*, 94.

and Germany's disintegrated. Transport history can therefore teach us much not only about the origins of the Austro-German military gamble, but also about its outcome. In 1914 the Central Powers snatched at what they thought to be a fast-receding opportunity to escape from their security dilemmas by re-enacting Bismarck's victories. In reality, that opportunity had probably already long since passed them by.

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