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CONTENTS,

1. Imperial O	ganization. A Lecture delivered at the S.M.E., Chath	am, on 16th
Februa	ry, 1922, by Major A. E. W. SALT, Army Directional Cor	ps 193
2. Bombs Fo Photo)	ind in Bolfast. By Capt. E. T. GRAHAM CARTER,	R.E. (With 208
S. An Outline Gen. S	of the Egyptian and Palestine Campaigns, 1915-1918. ir M. G. E. BOWNAN-MANIFOLD, K.B.E., C.B., C.M.G.,	By Major- p.s.o., <i>p.s.c.</i>
(** ****		····· 211
4. Snow and (With	Flood in North-West Persia. By Capt. C. F. St Photos}	'OEHR, K.E. , 229
5. Memoir. C	ol. EDWARD DICKINSON. By N.L. (With Photo)	236
6. Correspond	ence:Col. G. WALKER	238
8. Notices of 1	Addison, c.m.g., d.s.o., R.E Engazines: - Militär Wechenblatt. By Capt. H. de C. Te Revue Militaire Genérale, By Col. A. R. Re	246 DOGOOD, R.E. 249 YNOLDS 253
· .	CHATHAM: THE INSTITUTION OF ROYAL ENGINEERS. TELEPHONE: CHATHAM, 669. AGENTS AND PRINTERS: W. & J. MACKAY & Co., LT LONDON: Hugh RESS ITD REGENT STREET, S.W.L	D.
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CONTENTS.

1.	IMPERIAL ORGANIZATION. A Lecture delivered at the S.M.E., Chatham on 16th February, 1922, by Major A. E. W. Salt, Army Educationa	PAGE.
	Corps	. 193
2.	BOMBS FOUND IN BELFAST. By Capt. E. T. Graham Carter, R.E. (With Photo)	. 208
3.	AN OUTLINE OF THE ECUPTIAN AND PALESTINE CAMPAIGNS, 1914-1918 By Major-Gen. Sir M. G. E. Bowman-Manifold, K.B.E., C.B., C.M.G. D.S.O., p.s.c. (With Plates) (Continued)	, . 211
4.	SNOW AND FLOOD IN NORTH-WEST PERSIA. By Capt. C. F. Stochr, R.E. (With Photos)	. 228
5.	MEMOIR. Col. Edward Dickinson. By N.L. (With Photo)	236
6.	CORRESPONDENCE : Col. G. Walker	. 238
7.	Reviews :	
	Les Chemins de Fer Français et la Guerre. (Second Notice). Col. H M Sinchie CR GNG GDD	
	Reinforced Concrete. By Capt. A. F. Day, R.E. LtCoi. G. H. Addison, C.M.G., D.S.O., R.E.	239 246
8.	NOTICES OF MAGAZINES :	
	Militär Wochenblatt. By Capt. H. de C. Toogood, R.E.	249
	Revue Militaire Générale. By Col. A. R. Reynolds	253

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IMPERIAL ORGANIZATION.

A Lecture delivered at the S.M.E., Chatham, on 16. 2. 22, by MAJOR A. E. W. SALT, Army Educational Corps.

THE subject of Imperial Organization looms so large in connection with promotion and Staff College examinations in the Army that, merely from an utilitarian standpoint, no apology is necessary for its consideration. While, however, it is easy to lay stress on the need for accurate and comprehensive knowledge, it is to-day even more true than when Burke uttered the words nearly a century and a half ago that " the whole fabric of the Empire is so illogical, so wholly without parallel in history, so impossible to define, so hard to understand or explain, that, to the orderly mind," (as to the unfriendly German eye) " it often appears to be a bundle of sticks with no containing bond except the name."

This diversity at all points and in all phases, a diversity of status and stature, of lands British by settlement, by free-will, by cession, by purchase, by lease, by forcible annexation, of Spheres of Influence and Protectorates, of Crown Colonies of differing denominations, of territories under Mandate and territories under Chartered Company, of Dependencies and Dominions and Free States, of parliaments and democratic assemblies and no legislatures at all, scattered to the four corners of the earth, is the amorphous diversity of the world's greatest empire.

Yet here and there are traces of a containing thread, underlying reasons for apparent anomalies, and always the proud sense of natural growth. "A man casts seed into the ground, and sleeps and rises up night and day, and the seed springs and grows up, he knoweth not how."

Diversity is the very essence of growth on natural lines. The more a plant grows the more it varies from the original seedling. The Empire is natural, not artificial. There may be no common Government, no common legal or fiscal system, no common navy or army or air force, no common political machinery or citizenship, no common race or religion or social conditions, the British Empire may be neither British nor an empire, but it is the greatest illustration of self-growth the world has ever seen.

A few salient facts as to the size, population and power of this wondrous entity may serve as a reminder. In January, 1922, the British Empire covered roughly $12\frac{3}{4}$ million square miles, over one-

1922.]

fifth of the world's total area, and over a quarter of its land surface. It contained some $455\frac{1}{2}$ millions of inhabitants. The largest number of square miles in any continent was $3\frac{3}{4}$ millions in Canada, followed by Africa, Australasia and Asia in the order named, Europe lying far in the rear, and the area of the United Kingdom being less than a hundredth part of the whole.

In population, Asia headed the list by a very long distance, India contributing 70 per cent. of her total. Europe followed, the United Kingdom, with 47 millions of people being responsible for over 10 per cent. of the whole. The continents of Africa, America and Australasia, with the greatest possibilities for human expansion, held the smallest number of human beings. The density varied from nearly 400 people to the square mile in Europe to 160 in Asia, 16 in Africa, 3 in North America (Canada) and barely 2 in Australasia. Curiously enough, the small island of Malta vied with the United Kingdom as one of the most thickly populated portions of the globe.

Tried by test of revenue, Europe—that is the United Kingdom was easily first with over $f_{1,000,000,000}$; Asia, of which India contributed $f_{135,000,000}$; was second with $f_{160,000,000}$; America third with $f_{88,000,000}$; Africa fourth with $f_{80,500,000}$, and Australasia last with $f_{79,000,000}$.

As against this, however, Europe—" the old country "—with its long record of wars and the grievous burden of its most recent struggle, is bearing a weight of national debt amounting to over £7,500,000,000, Australasia, partly because of its gallant borrowings to build up the future, owes £580,000,000, and Africa carries a load slightly less than half that of Australasia. The whole debt of the Empire six times as heavy as in 1914—amounts to the colossal sum of £9,500,000,000.

A more pleasant aspect is the view of the resources of the Empire. She produces 60 per cent. of the world's gold (40 per cent. in the Transvaal) and possesses 40 per cent. of the world's cotton spindles and approximately the same percentage of the world's shipping tonnage (36 per cent. under the flag of the United Kingdom). Further, she has a practical monopoly of tin, nickel, timber and jute.

The nucleus of this stupendous aggregate of people, lands, wealth, and products is the United Kingdom, with an area of slightly over 121,000 square miles and a population bordering on 47 millions, or 72 per cent. of the white population of the Empire.

The nominal ruler of the Empire is a Sovereign King—he is also Emperor of India and Lord of the Dominions over the seas—whose family has, by male and female descent, sat on the throne for well. over a thousand years.

The practical ruler is the Prime Minister, supported by a body of individuals known as the Ministry, all of whom must be in one or other of the two Legislative Houses—the hereditary House or House of Lords or the elected House—the House of Commons. Each of these Ministers functions not only as an adviser to the Prime Minister, and through him to the Sovereign on matters of high policy, but also acts as the executive head of a Department of State. Those in charge of greater departments form a more intimate body of advisers which is known as the Cabinet. Certain departments have a more specific relation to the Empire, or deal solely with overseas questions. Among the former will be found the Home Office, the Admiralty, the War Office and the Board of Trade; among the latter the Colonial Office and the India Office.¹

Even within the limits of the home-country—the sea-girt island, "set in a great pool like a swan's nest "—diversity begins to assert itself.

Subject to the Home Office are the three entities of the Channel Islands, the Isle of Man and Ulster; subject to the Colonial Office is the newly-formed Irish Free State. The Isle of Man, as the Channel Islands, only bound by Imperial Laws when definitely mentioned, possesses its own administrative body—the Court of Tynwald—consisting of a Governor, appointed by the Crown, a nominated Legislative Council of Ecclesiastical² and Judicial dignitaries, and a Legislative Assembly—one of the oldest in the world, elected for seven years by municipalities and local divisions ("sheadings"). Moreover, there still remains the primitive custom of ratification of the laws by an island "moot" of all male Manxmen of full age, assembled each year on the sixth of July, the anniversary of Manx independence, in the churchyard of the capital town of Douglas³.

The Channel Islands have also a Crown-appointed Lieutenant-Governor, and, as well, two Bailiffs, one for Jersey and the other for . Guernsey, Alderney and Sark, which is regarded as a dependency of Alderney. Each separate jurisdiction has also its "state," consisting of two classes—" Jurats," elected for life by parish ratepayers, parish rectors, and constables (mayors) of parishes, and " Deputies " elected for three years.

The position of Ulster is unique. By the Government of Ireland Act (1920), "Northern Ireland," comprising the six counties of the

¹ There is no Imperial Parliament with representatives of the Dominions and Colonies as such. The most practical suggestions for its foundation and composition may be found in a recent article by Lord Raglan.—Nineteenth Century and After, August, 1922 (pp. 217-221.)

² The Bishop of Sodor and Man has a seat in this Council, but not in the Imperial House of Lords.

^a Similar "moots" exist in the Swiss cantons of Appenzell, Glarus, Unterwalden and Uri.

27 laws were promulgated by the Tynwald in open "moot" on July 6th, 1922.

province of Ulster with the Parliamentary boroughs of Belfast and Londonderry, was granted a full share of self-government, but allowed to retain her members in the Imperial Parliament. Her own Parliament consists of a Senate of 26 members, 24 of whom are elected by a House of Commons of 52 representatives of the six counties, Queen's University and the borough of Belfast, the Lord Mayor of Belfast and the Mayor of "Derry" becoming senators *ex officio*. Certain reserved powers, such as the making of peace and war and of treaties, coinage, trade-marks, the granting of titles and dignities are retained by the Imperial Government. In all other respects Ulster has the status of a self-governing Dominion wielding executive power over the north of Ireland and controlling Irish service through responsible ministers.

Had the Act of 1920 been adopted in all its provisions, a similar bi-cameral form of government would also have been established in "Southern Ireland" (the rest of the country).

There was, however, already in existence a self-constituted Legislative House ("Dail Eirann"), sitting in Dublin, dominated by one Eamann De Valera and containing, apparently, a majority in favour of separation and an independent Irish Republic. Some of the most vigorous and intellectually alert members of the "Dail" were not, however, satisfied with its unrecognized position, and, after much debate, reasonable and acrimonious, an agreement was reached between representatives of the "Dail" and of the Imperial Cabinet under which Southern Ireland should "take her place in the great association of free nations." In January, 1922, after violent opposition, this agreement was ratified in the "Dail" by a small majority, and a month later the Irish Free State Bill became law. The horizon at the moment of writing is still clouded. The Provisional Government is functioning with some difficulty, but a general election under the new conditions has taken place and there is a recognized legislative assembly other than the "Dail." When the storm lifts. Southern Ireland is to be, not as De Valera and his followers would wish, " an independent and sovereign state," but a dominion such as Australia or Canada, with complete autonomy in taxation and finance-with her own judges and courts of law, with her own armed force for home defence ; with her own constabulary and police, and with entire control over her own postal service, lands, education, housing, labour, transport and trade¹.

Moreover, the six guarantees with which this full and free grant of privileges was accompanied were natural to the intimate geographical and strategical relations of Ireland and Great Britain, and vitally

¹ The disbanding of the R.I.C., the issuance of Irish stamps, and the publication of Irish revenue statistics are recent notable incidents that prove the reality of the Irish Free State.

essential to the safety of the United Kingdom. Failing the constitution of an independent republic, Southern Ireland was bound to accept control of the Irish seaboard by the Imperial Navy, a limitation of the Irish Territorial Force comparable with similar limitation in other parts of the United Kingdom, provision of proper facilities for Imperial defence and air communications and voluntary recruiting in Ireland for the Imperial Forces.

The Irish Free State Bill provides a reasonable, sane and safe settlement of a long-standing problem. When law crystallizes into fact, Southern Ireland will take her place with Canada, Australia, New Zealand, South Africa, Newfoundland, as a self-governing Dominion.

The status of these politically older Dominions is rooted and grounded in History. As soon as Englishmen left the motherland not for casual, impermanent trade, but for permanent settlement they willed to avail themselves of the "ancient rights and liberties" of which they had often been tragically deprived in the land of their upbringing. Representative Institutions were an essential condition of these "rights and liberties" and in Puritan New England, no less than in Royalist Virginia, Englishmen governed themselves on the traditional lines of an assembly elected on a wide franchise.

They were white men living under climatic conditions that support an active white population, and it may be taken as a general rule that where the parallel lics between 10 and 40 degrees, and whites can live and bring up their children, self-government will naturally follow. The rule is not, indeed, absolute-nothing in the scheme of Imperial organization is absolute-for it was adopted in Barbados, which lies between 10 degrees north and the Equator; and the slave population vastly outnumbered the whites, and was not adopted in the Falkland Islands, with a predominant English population under good conditions of living ; but it holds good in South Africa (between 35 and 10 degrees), in New Zealand (between 34 and 48 degrees), in Canada (north of 49 degrees) and in dry, hot, healthy Australia (between II and 30 degrees); and it is yet to be seen whether selfgovernment will work out satisfactorily in Egypt, in Kenya, in India, or in the American colony of the Philippines-tropical homes of coloured races.

Representative Institutions are, however, but one stage in political progress. Canada—by way of example—has not merely selfgovernment, she has responsible government and she is a Dominion. The two territorial divisions of Upper and Lower Canada along the reaches of the St. Lawrence—geographically equivalent to what is now known as Ontario and Quebec, governed themselves from 1791, but they were not united until 1839, until after the publication of the Durham Report—a document which every student of Imperial organization is bound to read—and the system of responsible government was not fully established until 1848. The linking of East and West—the unity of the Maritime Provinces, of Upper and Lower Canada, of the great vast spaces of the Middle West " for which the speech of England hath no name " and of British Columbia into one confederation—the Dominion of Canada—was not achieved until the British North America Act of 1871.

With a diversity of dates and by different ways the same operation is seen in Australia and South Africa. In the former the convict settlement of 1787 threw out shoots which by the middle of the XIXth century had grown into independent states, not to be federated, with the addition of Queensland, as a Commonwealth, until the second year of a new century. The tale of South Africa is one of tangled complexity, but at last, after the bitterness of the South African War, a peace of statesmen culminated in 1909 in the union of the four provinces. Before the end of the XIXth century also New Zealand and Newfoundland had stepped into their birth-right, without fusion of separate colonies or discordant races, and in 1914 the Empire possessed five great self-governing Dominions with their own parliaments and political machinery more democratic than that of the Mother Country.

Each of the five self-governing Dominions has a Governor-General, representing the Crown, an Upper House (Senate or Executive Council) and a Lower House or Legislative Assembly. As in Great Britain, there is also a fully responsible Cabinet.

In the federal Dominions of Australia and Canada each province or state has also representative institutions of a like nature.

The relations between the Federal and the Provincial Governments vary. In South Africa it was not deemed wise to bring the four provinces too closely together, and the term "Union" rightly expresses their loose constitutional relation to one another. In Canada the British North America Act would never have been worked in harmony if the Provinces had not been closely limited in power. In Australasia the states, originally all powerful, retained much of their power under the Commonwealth Act. The distinction between Canada and Australasia and South Africa may be gauged by a comparison of the significance of the words "province" and "state," of "Dominion" and "Union" and "Commonwealth." It is hardened into fact as we compare Federal Control of Railways in Canada with the variation of gauge on the State lines of Australasia, if we remember that only the last decade has witnessed an attempt at an Australasian, as distinct from a State, immigration policy, or run by chance into the jealous guardianship of State rights exercised by Queensland or New South Wales.

This, however, is interesting rather as an illustration of the intricate complexity of the wheels within the wheel. We must now pass on to a consideration of the relation of these self-governing Dominions

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to Great Britain herself, a relation radically altered by the Great War.

The events of the flaming summer of 1914 are too fresh to memory to need repetition. The pact of Empire¹ was faithfully and fully kept. The statement of the Prime Minister—" Every one of our self-governing Dominions, spontaneously and unasked, has already tendered to the utmost limits of their possibilities, both in men and money, every help they can afford to the Empire in a moment of need," was echoed in the Royal message of a month later². " During the past few weeks the peoples of my whole Empire at home and overseas have moved with one purpose," and again ". . . all parts of my overseas Dominions have demonstrated in the most unmistakable manner the fundamental unity of the Empire amidst all its diversity of situation and circumstance."

And as the war went on, as the issues became-more imperative and more clearly defined, more and more did the Empire and the Dominions make the war their own war. The Australian pronouncement," to the last man and the last shilling," accurately and simply expressed the feeling of the back-veldt Boer, the French Canadian habitant, the intransigeant Irishman nearer home. The two alternatives of refusal or neutrality vanished before the most complete, unswerving, unshaken acceptance of Imperial responsibility that the world had ever seen. But it must be remembered—equality of sacrifice has always borne with it sequent equality of right and privilege. Statesmen and publicists before 1914 had played seriously with the theory of constitutional equality within the Empire. The war shattered theory.

In 1911 it was easy to say "the authority for the conduct of foreign policy, the negotiation of treaties, the maintenance of peace, the declaration of war, cannot be shared." To-day, this particular theory—expressed in other words as "governing the Empire from the windows of Downing Street "—has perforce gone to the wall. Even the most casual observer may have gathered from the constitution of the Trianon Conference, the organization of the League of Nations, the make up of the Washington Conference, no less than from an Imperial Cabinet formed in war for war, that "signal partnership of Great Britain and the self-governing Dominions has passed from vision to reality."

But the Great War has brought about other changes equally significant if less obvious. Perhaps the greatest of these was seen in the meeting of the Imperial Premiers in the Imperial Conference of the summer of 1921—the proceedings of which should be read and re-read by anyone who cares to keep himself *au fait* with this

¹" The Empire cannot be at peace and war at the same time." (Sir Wilfred Laurier.)

² September 10th, 1914.

absorbing subject¹. In the first place, this Conference—not of representatives, be it noted, but of Premiers—scrapped once and for all Imperial Federation with all the panoply of a written constitution defining in precise terms the relation between the whole and its parts.

Secondly, the Premiers of the self-governing Dominions were quite clear in their determination to keep an intimate finger on the machinery of Empire by constant and direct communication at least once a week with London. Such a resolve gives Sir Wilfred Laurier's phrase, "The policy of the Empire is to be decided by the Empire as a whole, and not by any part of it " a new meaning. Their decision in so many words amounted to this :-- " All the members of the Great Dominions, as well as the Motherland, have an equal voice in the formulation of foreign and Empire policy. We are full partners of the Empire. We want to know the reasons for policy in Mesopotamia, Palestine, Russia, Egypt, Greece and Turkey." By such a declaration the Foreign Office becomes not a master but a mouthpiece (Mr. Lloyd George prefers the term "instrument"); and if the Foreign Office has declined in power, the Colonial Office has ceased once and for all to operate except by suggestion, it being clearly understood that the Colonial Secretary was present at the Conference solely as the spokesman of the Colonies and Protectorates. And lastly, if Mr. Hughes' proposal bears fruit-Imperial Conferences may meet in the future, not in London, but in Vancouver, and the centre of Empire may be shifted westward even beyond the range of the Downing Street outlook.

To the alarmist, this and other incidents—direct dealing by the League of Nations with South Africa and Australia with regard to mandated territory, the conduct of direct diplomatic negotiations between Wellington and Washington on the position of the Armour Meat Trust in New Zealand, the claim of Canada to independent representation at the Washington Conference and the expressed views of extreme autonomists—furnish a mournful presage of Imperial disintegration, " the subversion of Imperial unity and the end of all projects of co-operation between the Mother Country and the Dominions for common objects and common interests."

The commonsense optimist prefers to trust the words of Mr. Meighen of Canada—" the people expect me to keep in mind the spirit of distinct Canadianism and our sense of national status and responsibility, but Canada expects that every word uttered in her behalf shall be in full comprehension of the common interests of every portion of the Empire, and animated by devotion to the Empire as a whole."²

¹ These decisions were admirably summarized and analysed in the *Round Table* for July, 1921, and successive number.

The official record may be purchased from the Stationery Office for 9d. ² Canada in the Empire, Nuneteenth Century and After, July, 1922. The last thing Britain wants to do to-day is to fuss about details, once this sentiment remains. We once lost colonies because we remembered them too well.

There is, however, one issue on which the Prime Ministers of the self-governing Dominions have not yet been able to join hands with the nominated delegates of India who were also present at the Imperial Conference of 1921. Not yet will Canada and her sister Commonwealths admit Indian citizens to their citizenship on the same lines as white citizens of the Empire. The visit of Mr. Sastri, who was one of the Indian delegates to the Conference, to Australasia may modify the situation. "The spirit in which Mr. Sastri's suggestions have been received has made India confident of a satisfactory solution of *all* questions outstanding between India and Australia and will further strengthen the tics binding the two countries as partners in the Empire."¹

Such limitation must place India in a slightly lower position within the Empire. Acute intelligence, infinite capacity for culture and progress, a well-developed civilization, older than our own; no one denies that to India. But India is, as yet, in a transition stage. The Mutiny is only two generations distant. There have been unpleasant incidents within our own memory.

If it is the declared policy of Parliament to provide for the necessary association of Indians in every branch of administration and to further the gradual development of self-governing institutions with a view to the progressive realization of responsible government in India as an integral part of the British Empire, it is no less the bounden duty of native Indians to show by their attitude towards the Montagu-Chelmsford reforms (consolidated in the Government of India Acts, 1915 to 1921) that they possess the broad political sense essential to the government of so vast and so diverse a country.

To-day native India has its native representatives on the India Council, its Central Legislature of two Chambers, which assists the Secretary of State for India at home, with a native majority in the Lower House or Legislative Assembly; while in the Provincial Governments elected Indian Ministers belonging to a Provincial Legislative Council practically control local self-government, medical administration, public health and sanitation, public works, agriculture, fisheries, co-operative societies, excise, registration, development of industries, adulteration, weights and measures, and religious and charitable endowments.

All this is a radical step forward from the quondam method of sole administration by the Indian Civil Servant. In places it does not satisfy—it is not responsible government. There is still the para-

¹ Telegram from the Earl of Reading, Viceroy of India, to Lord Forster, the Governor-General of Australia—quoted in *Daily Telegraph* of July, 17th, 1922.

mount power of the Governor-General in Council—there is still the large official majority in the Central Council of State in India in the advisory India Council.

"Why," say your extremists, "have you been so kind to Egypt? We also want independence with guarantees." The answer is not so difficult as it appears at first sight. Absence of caste, unity of religion, common origin, a common dialect, the presence of the Englishmen under an "ill-defined and temporary protectorate" made it obvious that, sooner or later, we were bound to step down and out of Egypt. That there is no India as yet—not even in name implies continuance of tenure and slow, if steady, political progress.

Beyond the self-governing Dominions, moreover, only one small island, and this because of the beginnings of our ownership, possesses more political independence than India. Malta, with its insignificant area (r_2 square miles) and dense population, came into our possession by the voluntary will of the Maltese, with the assistance of the British Navy, during the Napoleonic wars, and has been since 1921 under a Dyarchy; local affairs being entirely administered by an elected Senate, while matters of Imperial moment are dealt with by a nominated Executive Council, consisting of the Lieutenant-Governor, a legal adviser and a representative of the three arms of the fighting forces. Perhaps Malta may be said to touch Newfoundland even more closely than India, as, like Newfoundland, despite her political freedom, she does not send her representatives to the Imperial Conference.

In the Statesman's Year Book there is a paragraph headed "India, the Dominions, Colonies, Protectorates and Dependencies." This assumes five classes of possessions. We may now turn to the third class. The term "Colony" is an abbreviation of "Colony not possessing responsible government," and is not, therefore, applicable to the self-governing Dominions or Malta. Sometimes "Crown Colonies" is loosely used for "Colonies," but this should properly be restricted to those Colonies such as Hong Kong, in which the Crown retains control of legislation¹, and not given to Colonies with elected legislatures of the type of Cevlon or Cyprus. In all colonies there is a Governor nominated by the Crown, an Executive Council of officials and unofficial Crown nominated members, and a Legislative Council, sometimes of officials, sometimes of officials with a nominated or elected unofficial leaven. When this latter is entirely or mainly non-official and elected, there is generally a reasonably large number of whites of European (not necessarily British) blood within the community, or natives of intelligence and standing (the Maori, the Zulu, the Cingali, may be cited as obvious examples of

¹ As in the "Crown Colony" Department of the Colonial Office. The purest type of a Crown Colony is Gibraltar, where the Governor combines in his own person all executive and legislative functions.

IMPERIAL ORGANIZATION.

this type), or a strong historical tradition of representative government¹.

¹ The following is a summary of the status of the Colonies at the end of 1920. With the march of political ideas it needs constant revision :---

	Executive.	Legislature.
Asia.		-
Ceylon	Official majority.	Elective majority.
Cyprus	Equal numbers of officials and un-	do.
	official members.	
Hong Kong	Official majority.	Official majority
Strait Settlements	Officials only.	do.
AFRICA.	•	
Kenya (held under mandate from the League of	Official majority.	(Elective clement) Official majority.
Nations)	_	
Mauritius	do.	do.
Seychelles	do.	Equal numbers of officials and un-
Minorio	4.0	official members.
Combio	QO, Officiale enler	Omeial majority.
Cold Coost	Oncials only	do.
Siorra Loopa	do.	d0.
AMERICA	ab.	00.
Rormudae	da	Officiala apla (with
Dermadas	d <i>0.</i>	Representative House of Assembly)
Bahamas	do	As Bermudas.
Barbados	do	do
	(and executive com-	
	mittee.)	
Tamaica	As Bahamas.	Unofficial majority
5		(Elective element.)
Leeward Islands	Officials only.	Official majority.
(Federal)	 	(Elective element.)
Antigua	do.	Equal numbers of
0		officials and un-
		official members.
Montserrat	do.	Officials only.
St. Kitts and Nevis	do.	Equal numbers of
(with Anguilla)		officials and un- official members.
Virgin Islands	do.	None.
Dominica	do.	Officials only.
Trinidad	Official majority.	Unofficial majority.
WINDWARD ISLANDS.	,	3
Grenada	None.	do.
St. Vincent	đo.	do.
St. Lucia	Officials only.	Officials only.
Australia,	.	,-
Fiji	Official majority	Official majority. (Elective element.)

1922.]

These, at any rate, are the guiding principles on which the grant of representative institutions is bestowed. But there are apparently outstanding exceptions. The first principle is clearly apparent in Hong Kong and the Gold Coast, where the native population outnumbers the white sixty and forty-fold respectively, it is seemingly violated in Barbados, with its plantations densely crowded with negroes. Here, however, the third rule comes in. Barbados has three centuries of British tradition, Hong Kong and the Gold Coast barely a hundred years. Again, if the Seychelles, French by blood, remains a Crown colony, while Ceylon boasts a more advanced form of government, it is difficult to start building up the nucleus of a selfgoverning dominion in a colony that may depend for its revenue on the sale of its postage-stamps or its annual output of turtles. For it must be remembered, once a political step is granted, there is no going back, unless a repetition of the Jamaican revolution is desired¹.

Moreover, the clamour for representative and responsible government grows louder and more incessant each year. The strong words of Mr. Churchill to Kenya last year—" Democracy implies civilization in an advanced form," are pregnant with counsel, when every colony in the West Indies, from Trinidad, with nearly 400,000 people, to tiny St. Kitts, one-fifth the size of the smallest county borough in England and Wales, is insisting on its constitutional rights.

One solution which has suggested itself as a method of granting responsible government is that certain colonies should be united geographically into a *bloc* under the charge of a High Commissioner. Six of these *blocs* are proposed—Mediterranean, West Indian, West African, East African, Indian Ocean and Australasian; controlled respectively from Valetta (Malta), Port of Spain (Trinidad), Lagos, Nairobi (Uganda), Port Louis (Mauritius), and Suva (Fiji).

The term "High Commissioner" is already familiar as applied to the resident representative in London of the self-governing Dominions and of India. Viewed from the standpoint of administrative reform, the scheme has obviously much in its favour. It would at least lighten the burden of the Colonial Secretary and provide more effectually for common interests; it would tend to organize Imperial trade more closely, and would undoubtedly effect necessary economies. On the other hand, there are certain apparent difficulties, not the least being the political subordination of a great Empire like Malaysia² to a small colony of the type of Mauritius.

¹ Jamaica was granted Representative Council in 1661, but had to be deprived of it in 1866 owing to negro riots.

² In 1860 one white man lived between Bangkok and Singapore. Malaysia now produces one-third of the tin and two-thirds of the plantation rubber of the world. In 1920 its trade—exports and imports combined—amounted to $f_{297,000,000}$, three times that of Greece. The word "Empire" would not seem to be a misnomer. We may now pass to Protectorates. Protectorates are native states under British control. The ruler of a Native State is certainly an aristocrat and often a *sahib*. In most cases he has a long tradition of hereditary kingship, and has accepted British suzerainty after years of honest fighting. He deeply respects us and our rule,¹ but he wishes to be sovereign within his own dominions, to be sure of security of tenure or descent—provided his conduct is satisfactory and to be protected against foreign intrigues and pseudo-democracy. Under these circumstances he does not object to the deprivation of the independent right to make peace or war, or the limitation of his military forces, while on our part we assist him by means of a Resident or Agent. The Resident is the sole representative of a foreign power at his Court, and has a very wide discretion—under instructions from home—in the selection of the next heir to the throne, the education of the royal princes, and the deposition of undesirables.

In certain Protectorates, notably those on the frontiers—" buffer states "—we also grant a substantial subsidy for defence.² It is in India that most of these Native States are found, the largest being Hyderabad with a population of $r_{3\frac{1}{2}}$ millions, and the smallest Seilan, with fewer people than Chatham. Some of these deal directly with the Central Government of India, others of the second class are politically responsible to the Provincial Governments.³.

There are also, in Asia, the Federated Malay States, Sarawak, Brunei on the island of Borneo, and, nearer home, Mesopotamia, or, to give it its modern designation, Iraq. The first-named comprise Perak, Selangor, Negri Sembilan and Penang, and preserve their local autonomy, but consider their common interests—in conjunction with representatives of the tin and rubber interests—in a Federal Council. On the same Peninsula there are also five smaller states not included in the Federation.

Sarawak is in a most peculiar position. The ruler of the native state in this case is not a native but an Englishman—Rajah Chas. Vyner Brooke—great nephew of the original James Brooke, who obtained the first grant of territory from the Sultan of Brunei in 1842. This cession has since been considerably increased, and the whole country saved from barbarism by the wise rule of successive Brookes.

The position of Iraq is at present undefined. In her case the mandate comes from the Supreme Council as the result of the treaty with Turkey. It may be expected to develop into a Protectorate.

¹ The attitude of the Indian Protectorates to Lawrence, or in more recent years, of the Afghan to Sir Henry Dobbs, is typical of this heartfelt respect.

² Baluchistan (Kalut), for instance, receives an annual subsidy of 100,000 rupees.

⁸ The Council of Princes in India, though its views are received with respect, is not a properly constituted constitutional body.

almost an independent Kingdom, under Emir Feisal, a nephew of the ruler of Medina, Feisul being at present the titular ruler, but British troops and civilian and military advisers are still retained, much as in Egypt, while the country remains in an unsettled state.

In Africa, Basutoland also has its Protectorates—in Somaliland, Nyasaland, Zanzibar and Bechuanaland—the two last coming under the immediate control of the Union of South Africa, while in the faroff Pacific, Tonga may be placed in the same category.

Further, certain Protectorates, such as Togoland, the Cameroons, Kenya, Tanganyika, South West Africa. New Guinea and Samoa. only remain so long as the League of Nations is satisfied with our government. These possessions are held by Great Britain or a selfgoverning Dominion under mandate. That is to say, they were handed over to be governed as seemed best for the interests of their peoples, and as native rulers exist within their territories, a Protectorate has seemed the most obvious type of government to set up. Kenya, Nauru and Palestine are the only exceptions-Kenya, because of the suitability for white settlement, is partly a colony and partly a Protectorate, the line being drawn where the settlement zone ends. Nauru, on the other hand, a phosphate island in the Pacific, jointly governed by Australia and New Zcaland, is too small and sparsely populated to be classified except as a Dependency, while Palestine possesses no great territorial chieftains, the Arabs are mostly of nomadic habits, and, moreover, demands a strong British hand to keep the peace between the Arabs and the Jews, immigrant or original.

On the edge of a Protectorate—sometimes not quite within the legally defined borders of the Empire are sometimes found nativerulers whom it is our policy to propitiate by annual subsidies or by occasional gifts in order to retain our influence on a critical frontier. Such spheres are bound to exist on our African hinterland, and we have, since the War, created two more in the Hedjaz and in Nejd on the Arabian Peninsula. The reason for this attitude is obvious; if we are to surrender Egypt and yet maintain our route to the East intact we must avoid all possibility of a jumping-off ground for hostile attack in the Indian Ocean and maintain its inviolability as a British lake. Friendship in such a case is none too cheaply bought.

Our estimate of the Empire is almost finished, but it would be incomplete without some appreciation of the constitutional position of Rhodesia and British North Borneo, of Gibraltar and Aden and Ascension, and, lastly, of the New Hebrides.

Rhodesia and British North Borneo are the last of our British possessions to own the sway of a Chartered Company. The names of the Hudson Bay Company and of "John Company" recall much that is glorious and inspiring in our Imperial History. Many a country "where the pavement ends" would not to-day be British but for the enterprise and courage of pioneers who traded before the flag. Only the British North Borneo Company and the British South African Company remain, and the southern portion of Rhodesia is on the point of becoming a Crown Colony or of throwing in her lot with the provinces of the South African Union.²

It is patent that a private firm cannot borrow for the necessary development of a new country on the same security as a Government with the backing of the Empire. The heavy Nigerian loan of 1921 is proof of this, and with limited capital ensues restriction of trade and commerce. A dependency under a Chartered Company stands to lose in competition with the Crown colony of the normal type, and it is probable that both Borneo and Northern Rhodesia may also in time advance a step further in the political sense.

Of Gibraltar, Aden and Ascension little need be said. The two former guard the entrance and exit respectively of the greatest maritime defile in the world and protect our great sea route to the East. They are small but vitally important. Gibraltar is a purely military fortress under the jurisdiction of the War Office; Aden and its hinterland, the entrepôt of trade between East and West is at present subject to the jurisdiction of the Bombay Government of India; Ascension, on the other hand, an essential coaling-station, is regarded as a ship at sea and is controlled by the Admiralty.

New Hebrides—jointly administered by French and British may conclude an homeric catalogue of the component parts of our Weltreich, bound as was said at the outset—by no formal tie.

But there are compensations in the looseness of the chain. The human link counts for more. Loyalty to the Crown—as the flag to the other great possessions of the Anglo-Saxon race—common goodwill—willingness to bear the white man's burden² play their part. But, above all, perhaps, is that unconscious pride in the conquest of disorder, the unspoken sense of what is true, the application to land and peoples of practical commonsense.

It is this practical good sense that handles the diversity of the Empire to co-operation and partnership, to life in its fullest vigour.

¹ The Union has agreed to give Southern Rhodesia the fullest possible measure of self-government as well as the necessary financial guarantees. (*Reuter's* telegram in daily papers of July 25th, 1922.)

²" In these days the power and majesty of Empire do not make the old appeal to men's hearts and emotions. The things written deeply in the history of Britain that we most value are the love of truth, the tradition that a man must keep his word, the obligation that a nation must keep its engagements. Nowhere in modern British history has Britain betrayed an ally or treated a foe ungenerously or provoked war among the nations. There is great civil, Christian value in such a tradition, and it is of high consequence to the world, and particularly to weaker nations and unenfranchised peoples, that such an Empire should endure."

BOMBS FOUND IN BELFAST.

By CAPT. E. T. GRAHAM CARTER, R.E.

Some details of bombs found recently in Belfast, and of one in particular on which considerable ingenuity had been expended, may be of interest to the readers of the R.E. Journal.

It appears that at about 7 a.m. one Monday, two men, who were taken for telephone linemen, as they were "complete with handcart and canvas shelter and screens," started work at a large junctionbox in Arthur Square. After a short time they replaced the manhole cover, remarked to a nearby constable that they would be back soon with some other tools, and walked away, taking the loaded handcart with them.

At about 8 a.m. some real telephone linemen arrived to resume work which had been left on the previous Friday. They removed the cover and saw lying among the cables a large package covered with sacking and raised the alarm of—" a bomb !"

The police thereupon requested the attendance of the Sappers for the purpose of removing the object, and an inspection was made. The Fire Brigade was instructed to flood the manhole, and, after about three hours' soaking, the package and sacking were abstracted. Great care was taken in removing the sacking, as a "booby trap" was possible. Nothing, however, happened except to show that the contents were a large box with a small sliding switch on the outside. The leads to this were cut and the box opened. It contained a petroltin, a cheap American clock, a Ford coil, and a 4-volt "Ever-ready" dry battery (see Photo and wiring Diagram. In the Photo the clock has slipped from its original position). A small contact-plate



had been soldered to the minute-hand and would have touched a contact-plate on the inside of the box before the discovery was made had the clock not stopped; and the reason for the clock stopping was that the layer of the bomb had forgotten to wind it! (This somewhat humorous aspect of the case was not realized until later,







PLATE 2 & 3

when an investigation of the " possible causes of the clock stopping " was made.)

We dismantled the machine at our leisure, and, as neither the construction nor nature of the contents of the petrol-tin were known, it may be imagined that that part of the investigation was undertaken delicately.

The leads led through a screw cap, inside which was soldered an ordinary B.C. lampholder. Unscrewing the cap (has anyone noticed what a number of "one-eighths of a turn " there are before a fullyscrewed-home cap comes off ?) did not help matters, as the leads disappeared into a mass of what appeared to be sand. A small cap covering a filling-hole, about I in. in diameter, in the base was then removed, and a small quantity (about I lb.) of sawdust and a dry greyish-brown powder ran out (or was coaxed out with a pencil) together with a few live rounds of ammunition of varying calibre. As a tin-opener makes no impression on a petrol-tin-and a hammer and chisel were vetoed on account of possible detonators-the can was emptied by the tedious process of scooping with a long gouge. When the "detonators" could be freed, they were removed and the remainder of the can's contents were shaken out. They consisted of about 20 lbs. of "explosive" and 5 lbs. of ballast in the form of live rounds and scrap, mostly the former. The major portion of this explosive was damp, as the screw-cap of the can leaked-bubbles were seen in the manhole during the soak-but an experiment proved that the dry portion would have ignited it none the less. The dry stuff lit easily with a match.

The "detonators," which turned out to be "igniters," consisted of two small glass tubes scaled and bound with insulating-tape and merely contained two copper electrodes (made by cutting a 2-in, copper nail in half) immersed in a magnesium type flash-powder. One was quite dry, the other had got damp, but dried off and was used later.

The impression was therefore formed while dismantling, that the bomb was primarily incendiary (however, *see* below) and was intended to melt and burn all the cables in the box with a view to dislocating the telephone service. Some 1,000 lines—including, I understand, most of the fire brigade lines—pass through that box; little imagination is needed, therefore, to gauge the "general idea" of the incendiaries.

When the "explosive" was dry, a bomb was made up on the lines of the original, but containing no ammunition, and fired by its own flash-powder in conjunction with a No. 14 fuze. It was highly incendiary, burnt with an intense violet flame, and gave off thick clouds of white smoke. Sodium chlorate and sulphur formed the main constituents, it is thought.

A further bomb was made by filling a pint Bass bottle with the

1922.]

powder and inserting a commercial cap and fuze taken from another bomb. The bottle was sunk flush in the ground and the resulting crater was similar to that of an 18-pounder H.E. shell, 2 ft. diameter, and 2 ft. deep; and with blackened sides (*i.e.*, really effective detonation of the "explosive").

In this crater was placed an open tin with a quantity of powder and most of the live rounds mentioned. The mixture was lit and burnt fiercely until the rounds warmed up, when their caps detonated and so detonated the whole, although unenclosed.

It will thus be seen that considerable damage to Arthur Square was intended, as 20 lbs. or so of explosive would have made a fairsized crater, and the road is pavé.

Old 18-pounder shells are another favourite type of container, and these have been mostly used in picture-houses. (A Diagram of the usual filling is attached. "A" is the usual powder, but finely divided and compressed on the lines of a gun-cotton primer and about twice the size. "B" is the usual coarse powder). For various reasons, "wind up" being the most likely, whoever laid them was not always successful in lighting the fuze; four "duds" in as many days finding their way into our "dump" at one period. On the other side of the picture is the fact that the general populace was on such tenterhooks that on one occasion an officer was summoned to a cinema to remove a much-soaked "bomb," which proved to be an empty film box that a careless operator had left outside the projection-room door.

What could only be described as a "mine" rather than a bomb, was found under a pile of timber against a wall on the other side of which was a garage petrol store. It consisted of a 5-gallon oil drum filled with concrete, with a 10-lb. paint drum embedded in it concentrically. The latter was filled with the same old explosive, and a commercial cap and safety fuze completed the business. The fuze was protected by a length of brass curtain-rod and passed through a hole in the lid, which was about 2 in. below the top of the large drum. The whole had been cemented over, leaving a dome about 2 in. high from which the curtain rod protruded very slightly.

Another type of "land-mine" 'recently found near Armagh consisted of hollow concrete blocks, 9 in. by 9 in. by 9 in., "reinforced" by scrap, the walls being about 2 in. thick.

These could either be sunk flush in the road, or left on the side, where they would resemble marking-stones. They would be fired electrically, hold a charge of about 5[°]lbs. of explosive, and would have an effective range of about 300 yards.

"Ours is a nice 'ouse, ours is !"

1922.]

AN OUTLINE OF THE EGYPTIAN AND PALESTINE CAMPAIGNS, 1914-1918.

By MAJOR-GENERAL SIR M. G. E. BOWMAN-MANIFOLD, K.B.E., C.B., C.M.G., D.S.O., *p.s.c.*

(Continued).

CHAPTER VII.

THE PURSUIT ACROSS PHILISTIA AND THROUGH THE JUDEAN HILLS. BATTLE OF NEBI SAMWIL. CAPTURE AND DEFENCE OF JERUSALEM.—Description of the Plain of Philistia—Orders to the Desert Mounted Corps—Pursuit by the XXIst Corps— The Battle for Junction Station—Action of 6th Mounted Brigade at El Mughar— Separation of VIIth and VIIIth Turkish Armies—First advance on Jerusalem— Battle of Nebi Samwil—Second advance and occupation of Jerusalem.

THE PURSUIT ACROSS PHILISTIA AND THROUGH THE JUDEAN HILLS. BATTLE OF NEBI SAMWIL. CAPTURE AND DEFENCE OF JERUSALEM.

(Plates VI, * VII, * VIII, IX, X.-Sketch Maps II and III, El Mughar).

The Plain of Philistia.—The ground now to be traversed by the army, except for the sand dunes fringing the coast, may be compared to Salisbury Plain. The belt passable by all arms was 15 to 18 miles wide to the foothills of the Shepaleh.

The Plain of Philistia is open country—a few cactus hedges are met with near villages—otherwise, the serious obstacles are the large water-courses, all running east to west. (Wadis Hesi, Sukerier, Surar, etc.)

These Wadis have steep banks, and are difficult for vehicles to cross. The soil is very hard when dry, but absorbs water greedily; and after rain quickly becomes a sticky morass impassable for motors, and difficult to march over.

The "former" rains begin in November, and last only a few days. The "latter" rains, and the real winter, set in about mid-December. Torrents of rain fall for three days at a time, then follows a week of fine weather. Cold wind, frost at night. Snow in the hills.

Sir Edmund Allenby's force was using the Turks' metalled road and their light railway for supplies; but lorries were having some trouble, as the "former" rains had begun.

The Pursuit through Palestine.—The pursuit depended less on manœuvre than on supply. The fewer the troops to be maintained beyond railhead, the further they could go. The XXth Corps had for the moment shot its bolt. The transport columns hitherto working for it now had to carry on for the XXIst Corps. The roth,

* Plates VI and VII were published in the R.E. Journal for September.

74th, and later the 60th Divisions were sent back into the Deir el Belah area to refit. The 54th Division was deprived of all its transport, and left in Gaza with a dump of rations to subsist on.

The Desert Mounted Corps, now three divisions again, supported by the 52nd and 75th Divisions, followed up the Turkish VIIIth Army.

On 9th November, at o800 hours, G.H.Q. sent out the following order to Desert Mounted Corps at Huj, by wireless, and confirmed it by aeroplane.

" O.A.T. 245. 9. AAA.

Press on by shortest route with all available forces to TINE-BEIT AAA. 60th Division will remain at HUJ and revert DURAS. to command of XXth Corps. AAA. XXIst Corps will get troops forward towards JULIS-MEJDEL in support, and form pivot of manœuvre for you as soon as they can. AAA. Meanwhile press enemy relentlessly .--- G.H.Q."

The Desert Mounted Corps' objectives, on this order, were as follows :---

Australian Mounted Division, E. Tine-Kustine, inclusive, and to reconnoitre Junction Station :

Australian and New Zcaland Mounted Division, Kustine (exclusive) to Beit Duras, reconnoitre Esdud, and gain touch with

XXIst Corps; Yeomanry Mounted Division, in Corps Reserve, on the railway east of Faluje;

D.M.C. Report Centre, to Huleikat. (Plate VI).

The Turks in front of General Mott withdrew to Hebron and Daheriyeh, while the 53rd Division concentrated about Beersheba. Indications of a projected Turkish counter-attack, from Hebron against our right, were received on 9th November; but the VIIth Turkish Army were known to be so disorganized, and to have lost so much transport, that Sir Edmund Allenby disregarded this threat. Except that, the Imperial Camel Corps were moved up to Tel el Nejile in support of the Yeomanry Division. Khamsin weather prevailed for the next two days.

On 11th November, the Ycomanry Mounted Division was diverted from the foothills of the Shepaleh to Mejdel. All three mounted divisions were in action on 11th and 12th November, they advanced some 20 miles and took Esdud and Nahr Sukerier, an important place for landing sea-borne supplies.

The Battle for Junction Station (Plate VII) .- On 13th November, the Turks were standing to face the British on a lightly-entrenched front of 20 miles, from Beit Jibrin to El Kubeibe. Their right was five miles in front of the Ludd-Junction Station railway; their left was in the foot-hills.

212

1922.] EGYPTIAN AND PALESTINE CAMPAIGNS, 1914-1918. 213

The position was taken by the Australian and New Zealand, and the Yeomanry, Mounted Divisions which turned the right flank of the Turks, and the 52nd and the 75th Divisions which stormed the centre and seized the Jerusalem railway.

El Mughar. (Sketch Maps II and III).—A remarkable cavalry action took place during this battle. The 6th Mounted Brigade were co-operating on the left flank of the 52nd Division, when that formation was checked by a strong Turkish position at El Mughar. About 1230 hours the Bucks, Berks and Dorset Yeomanry, Berks R.H.A. Battery and the 17th Machine-gun Squadron were assembling in the Wadi Jamus, a deep cleft in the plain. Brig.-General Godwin received instructions to take El Mughar, and at once reconnoitred the approaches.

At 1500 hours the Brigade emerged from the *wadi*, and covered by the R.H.A. and its own machine-guns, charged across 3,000 yards of open ground, through a zone of machine-gun and artilleryfire, on to the Turkish infantry. The Bucks and Dorset Yeomanry attacked in columns of squadrons extended to four yards' interval. The Dorset Yeomanry had furthest to go, their horses were exhausted, and one squadron which dismounted suffered severe casualties. The Berkshire Yeomanry mopped up, and their R.H.A. battery fired 200 rounds at 3,200 yards' range in support of the charge. The 6th Mounted Brigade captured two guns, twelve machine-guns, and 1,100 prisoners; and enabled the infantry of the 52nd Division to push home their own attack. The casualties of the brigade were 16 men killed, 113 wounded, and 265 horses killed besides.

The 8th Mounted Brigade meanwhile had galloped into Yebna. Junction Station was occupied at 1700 hours on 14th November ; and, next day, the Desert Mounted Corps took Jaffa, Ramleh and Ludd. Another gallant charge occurred on this day at Abu Shusheh, just south of Ramleh, when the Dorset and Bucks Yeomanry rode against a strong rocky position held by 4,000 Turks, of whom 400 were killed in the encounter.

Sir Edmund Allenby had now secured a port for supplies, and a metalled lateral road to bring them along by. Meanwhile, the 54th Division was hurrying up the coast to rejoin its Corps.

The Turks then broke up into two distinct masses, widely separated by the physical formation of the country. The VIIIth Army (XXth and XXIInd Corps, four damaged and one fresh division) retired into the Plain of Sharon behind the Nahr-Auja—a real river. This mass was based on the Afule-Tulkeram railway.

The remnants of the VIIth Army (IIIrd and XVth Corps), of six shattered divisions, and the 3rd Cavalry Division, had only a *cul-desac* railway from Jerusalem; and really were based on railhead at Nablus, 50 miles away by road. The only means of cross-communications between these two masses was through Nablus and Tulkeram, about 75 miles round by road

The Commander-in-Chief decided to contain the VIIIth Turkish Army, to wheel our forces to the right, pivoting on Junction Station, attack the VIIth Army and occupy Jerusalem, but he wished to avoid fighting in or close to the Holy City.

The First Advance on Jerusalem.—Battle of Nebi Samwil.—(Plate VIII).—The west side of the Judean ridge consists of a series of spurs, running east and west, separated from one another by narrow precipitous valleys. On the intended line of the British advance was only one real road, the Jaffa-Jerusalem-Jericho railway.

This ancient road traversed east of Latron a narrow defile for four miles. It then zigzagged over the mountains in a succession of hairpin corners, and it had been effectively damaged by the enemy. The other so-called roads were mere goat tracks, up the hillsides, or along the boulder-strewn *wadi* beds, and quite impassable in their existing state for wheeled transport.

The plan of attack was to move the Yeomanry Mounted Division (Major-General Barrow), supported by infantry of 52nd Division, through the Judean Hills, by the tracks, three to five miles north of the main highway, and break out on to the main Jerusalem-Nablus highroad and so to cut off the Turks in Jerusalem. The 75th Division, in the centre, was to seize the Bab el Wad defile, and the roth Australian Light Horse advanced by the defile further south, through which the railway went up.

The Yeomanry Division moved off on 17th November through Shilta, near Ludd, and reached Beit ur el Tahta on 18th November. The 52nd Division passed Beit Likia on the 19th, and with great efforts, double-horsed and man-handled, took three sections of artillery along with them.

The Yeomanry were held up in front and tried to work round the right of the Turks, who were now being reinforced by the fresh troops of the Yilderim Army diverted from Mesopotamia. On the main road, on 20th November, the 75th Division was strongly opposed by entrenched troops about Saris. The weather broke, and this helped our troops, who, at 1700 hours, stormed the heights of Kuret el Enab, in the fog and mist, and cleared the summit of the pass, 3,000 ft. up. There they bivouaced, in their summer clothing, through a pouring night.

Next day, the 75th Division captured the commanding spur of Nebi Samwil, the furthest point to which Richard Cœur de Lion advanced. This strong eminence overlooks Jerusalem, and is only three miles from the Nablus road. (After this achievement, the 75th Division set up the "Key" as their Divisional sign.) The 52nd Division made progress, but the Yeomanry were in most difficult

1922.] EGYPTIAN AND PALESTINE CAMPAIGNS, 1914-1918. 215

ground. Although heavily opposed, they got nearly to Beitunia and Ram Allah, two miles from the Nablus road. But their mountain artillery was outranged, and the mounted brigades were obliged to relinquish their gains.

On 22nd November, the Turks tried three times, in vain, to retake Nebi Samwil; and, during the next three days, the 52nd and 75th Divisions unsuccessfully tried to advance. The British line was only four or five miles from Jerusalem, which was in sight; but cold and casualties had, for the moment, enabled the Turks to stem the advance. The offensive was suspended until communications could be improved, fresh troops brought up, and supplies and ammunition assured.

The feature to observe in this phase is that the enemy again was given no breathing time. He had been hurried up the plain, hit at hard when he turned to stand; and now he was hustled through the mountains past the ground where, if he had been able to organize his defences, he might have held up the pursuers indefinitely. These narrow passes from the plains have seldom been forced, and have proved fatal to many invaders. But, in one uninterrupted rush, the whole British force had advanced 50 to 60 miles, had secured Jaffa, had divided the Turkish Armies, and was at the gates of Jerusalem.

The Second Advance and Occupation of Jerusalem (Plate IX).— On 22nd November, the headquarters, XXth Corps, were set up at Junction Station, and the 10th, 60th and 74th Divisions, fresh and refitted, were all hot-foot across Philistia. The 53rd Division was preparing to move along the Hebron road. The plan for the next move was that the XXth Corps should advance on Jerusalem from the south-west and west.

During the interval of preparation, especially road-making, the Turks delivered several counter-attacks.

On the left of the British, on November 25th, the VIIIth Turkish Army pressed back the thin screen across the Auja, and re-established their line overlooking Jaffa.

On 26th and 27th November, the 52nd and 75th Divisions were being moved over to the coastal plain. Next day, the XXth Corps took over the Jerusalem front and the XXIst Corps the Ludd-Jaffa front.

The Yeomanry, in the right centre, continued to be heavily pressed, until they were relieved by the 74th Division, and went into reserve south of Jaffa.

The pressure of the new attack from the south-west was now developed. On 1st December, General Mott with the 53rd Division began to move on Hebron, and by the 6th December he was four miles south of Bethlehem and in touch with the 10th Australian Light Horse Regiment in Wadi Surar.

The six weak divisions of Turks were now holding a line covering Bethlehem from the south, then turning to the north across the railway, and along the formidable ridge overlooking the Upper Wadi Surar, then east of Nebi Samwil, and thence bearing north-west towards Nalin.

The British line was: 53rd Division opposite Bethlehem, 60th Division south of the Jaffa-Jerusalem road, 74th Division by Nebi Samwil, 10th Division at Beit Sira; and the Australian Mounted Division filling the space between the XXth and XXIst Corps.

As a preliminary to the main attack from the west, the 179th Brigade, 60th Division, (Brig.-General Edwards) crossed the Wadi Surar on the night 7th-8th December and seized the heights south of Ain Karim.

The main attack began at dawn, in wet weather, and was supported by both heavy and mountain artillery. On the east, the 6oth and 74th Divisions captured the heights east of Wadi Surar by 0700 hours. The 6oth had afterwards a very difficult task, as the high road was enfiladed from the north by formidable entrenchments. The 74th Division took Beit Iksa, but also were strongly opposed. The 53rd passed Beit Jala by Bethlehem. At nightfall the attack was suspended, and the British line was consolidated. The Turks now were fighting on a line parallel to and close to their line of supply and retreat, the Nablus road.

On Sunday morning, 9th December, the Worcester Yeomanry crossed the front of the 53rd Division, and got astride the Jerusalem-Jericho road, closing that exit to the Turks. By 0830 hours, the 53rd Division were within two and a half miles of Jerusalem; and at that moment the Mayor with a flag of truce was meeting the advanced troops of the 60th Division to arrange for the surrender of the city.

During the night, the Turks had evacuated the city, and retired about three miles north-east, astride of and along the Nablus road. It was intended to remove the civilian population, but they could not do this in the time.

The 60th and 74th Divisions were now wheeled to the north, pivotted on Nebi Samwil; and on 9th December they cleared the Nablus road north of Tel el Ful and Shafat, while the 53rd Division occupied the Mount of Olives, and all high ground east of it from which the Turks could observe Jerusalem.

Sir Edmund Allenby made his official entry into Jerusalem on 11th December.

For the next ten days the XXth Corps were busy consolidating positions, improving communications, and accumulating supplies. The coastal area again became the centre of interest.

CHAPTER VIII.

THE CROSSING OF THE AUJA RIVER; 20th to 22nd DECEMBER, 1917.—Description of the country north and east of Jaffa—Plan for forcing the crossing and its execution —The Turkish attempt to retake Jerusalem—Observations on the operations, Beersheba-Jerusalem.

THE CROSSING OF THE AUJA RIVER.

THE presence of the Turks on the high ground near the coast, north of the Auja, and at Bald Hill and Mulebbis south of it, and further east, rendered Jaffa insecure for shipping and threatened the one lateral road, Jaffa-Ramleh-Latron-Jerusalem. The XXIst Corps were directed to drive the Turks north and to occupy the line Rantieh-El Jelil. (See Sketch Map IV).

The river Auja was from 40 to 60 yards wide, averaged 10 ft. deep, with few fords, it ran at about three miles per hour, and was subject to heavy floods in the winter rains. In winter, the river was fordable only at the bar formed just where it enters to sca, and there the depth was about 3 ft. 6 in. The Turks had an entrenched post to cover this ford, and also kept it under frequent bursts of The Jaffa-Tulkeram road crossed the machine-gun fire at night. Auja at Hadrah by a stone bridge, which also was a mill dam ; but the Turks had blown this in. East of Stone Bridge, the ground on the south and left bank was marshy. Generally, the banks of the river were low and muddy, but small groves and belts of trees between Stone Bridge and Jerisheh afforded some cover on both banks. The Nahr Burdieh joined the Auja just below Sheikh Muannis. A belt of sand dunes ran up the coast and, from Tel el Rekkit, low cliffs extended northwards.

Inland, north of the Auja, the country consisted of a downland of sandy hills, with a little cultivation west of Sheikh Muannis. South of the river, there were low grassy hills, thin scrub and some orange groves. Besides Mulebbis, on the left bank, the Turks had a strong position at Sheikh Muannis situated on a ridge, about half a mile north of the river and one and a half miles inland.

The forcing of a passage was entrusted to the 52nd Lowland Division (Major-General John Hill). The river front was carefully examined. A particularly bold reconnaissance was made by two officers who swam out to sea, landed on the Turkish side, came back through their lines undetected, and plumbed the ford as they came.

General Hill proposed to effect the passage by night, and by surprise, without any particular artillery support until after the crossings had been secured. After that, his plan was to proceed covered by a barrage worked to a time-table. But, in order to lull the enemy into a false security, he was to be put under a drill, as

[October

regards artillery-fire, and to be given a regular dose of night bombardment each evening; so that, when the real attack came, there would be no abnormal artillery action to alarm him.

Broadly, the plan was to take across a small covering force, if possible undetected; then to pass the three brigades over at three points (the Ford, below Muannis, and at Stone Bridge), and also to demonstrate further east in order to confuse the Turks. The navy were to cover the left flank, and harass the Turks near the coast.

Subsequently, the Turks were to be pressed back until beyond range of Jaffa; and the 54th Division on the right also were to move northwards.

The covering troops were to cross first, at point X, on rafts made up from 2,300-gallon canvas tanks. Each raft carried 16 men. Then light bridges were to be put across on piers of similar rafts, to take infantry and pack animals. Subsequently, pontoon and barrel-pier bridges were to be built, and the Stone Bridge repaired. Timber was obtained by pulling down houses and sheds. A pontoon bridge was sent up from the Suez Canal. The rafts were put together under the trees in the German Colony of Sarona. The infantry practised embarking and disembarking in a large irrigation tank at night, and also rehearsed cutting through cactus hedges in the dark.

The operation was fixed to begin on the evening of December 20th, at 2000 hours.

The first troops to cross were to be the 1/7th Highland Light Infantry battalion of 157th Brigade, and its task was to swing left and take the Turkish trenches guarding the Ford at the river mouth. It was to be followed by one battalion 156th Brigade which was to move simultaneously on B (Slag Heap Farm), while a company was told off to bomb the stone wall at C. It was hoped that the enemy would be confused, and would wait to clear up the situation before launching a counter-attack, which would then be too late. Two other battalions of 156th Brigade were to take Muannis, and roll up the trenches at D, respectively. The rest of 157th Brigade were to cross at the ford and move on Tel el Rekkit. The 155th Brigade were to demonstrate at G, and later in the night, cross at H and secure Hadrah and the Stone Bridge.

The 19th and 20th December were very wet days. The Auja rose alarmingly, the valley became water-logged, and the approaches to the crossing place (at X) were so soft that at the last moment 200 yards of corduroy road had to be laid to enable the rafts to be taken to the river. There was a young quarter moon, the night was uncomfortably light, very cold and sounds travelled amazingly.

The intercommunication was very complete, and cables from Divisional Headquarters to brigades and to the artillery were all duplicated.

The operations commenced to time, and in six minutes four rafts

were affoat at X; half an hour later, half the covering party were across undetected, and the leading pontoon raft was at the water's edge by 2035 hours.

By 2200 hours the light bridges were three-quarters completed, the second battalion was crossing, but the bridging parties were experiencing difficulty with the current and soft banks, and in getting the last bay into place. All times were now put back half an hour. By 2230 hours, two battalions were across, and still all was quiet.

At 2300 hours the first bridge was across and in use. By midnight the whole of 156th Brigade was across, and by dawn they had secured their objectives and were well dug in.

The assault started at 0025 hours on 21st December. The 7th Highland Light Infantry completely surprised the Turks and took the trenches for 1,000 yards north of the ford.

The 1/4th Royal Scots took Slag Heap Farm.

The 1/7th Royal Scots took Sheikh Muannis by 0300 hours.

The 8th Scottish Rifles cleared the ground at D, south of Muannis. The 1st Scottish Rifles (brigade reserve) put the long wall, C, into

a state of defence and had formed a dump of 50,000 rounds, S.A.A. Meanwhile, at 50 minutes after midnight, the remainder of 157th

Brigade began to ford the river—the 1/6th Highland Light Infantry leading.

The ford had not been marked by pickets, owing to the river's swollen state, but the Commanding Officer found it, and the battalion crossed, the men in fours with arms linked, while the Royal Engineers put up the pickets as they went. There were 30 casualties from shell-fire. All went according to plan. By 0200 hours the 157th Brigade was across, and they had secured all objectives by 0548 hours and were dug in.

On the right, the 155th Brigade began its demonstration about 2315 hours, and its covering party at H got across unobserved by 2325 hours. This ground was so boggy they could not launch their bridge piers, and so the troops had to ferry over in rafts, and so lost time; and at 0235 hours, they were 30 minutes late in the programme. But, by 0340 hours two battalions were across, two hours later the 5th Royal Scots Fusiliers had taken Hadrah; and after stubborn fighting Stone Bridge was in our hands at 0540 hours.

At o600 hours, two batteries were ordered to cross the ford, to support 157th Brigade, and the Navy were informed that all objectives had been taken. It seems that the Turks had expected an attack for some days, but when the artillery-fire proved to be the normal evening shelling, they regarded the attack as merely local demonstrations. They considered the only feasible crossing to be at Stone Bridge, and that elsewhere was impossible in the existing state of the river.

In daylight, the 52nd Division crossed over its divisional artillery only one howitzer stuck in the ford—and got ready for another bound forward.

The weather cleared. Three light bridges were finished. A heavy pontoon bridge, and a barrel pier bridge (piers floated down the Nahr Burdieh) were commenced. Stone Bridge could not yet be repaired. The Turks kept it constantly under shell-fire.

On 22nd December the N.Z.M.R. Brigade was crossed over. The 157th Brigade took Jelil, and then occupied the high ground at Arsuf. The mounted troops captured Tel el Nurvieh.

That evening, the 54th Division captured Bald Hill, and during the next day, the line of the XXIst Corps was advanced so as to give ten miles clear between Jaffa, and our lateral road, and the Turks.

The Turkish Attempt to retake Jerusalem. 27th to 30th December. (Plate X).—The winter had now set in, and the line held by the British was suitable everywhere, except just north of Jerusalem, to which the enemy was still too close. Preparations to push him back to the line Beitin–Nalin, some 12 miles north, were in hand; but on 24th December news from a reliable source came in to the XXth Corps that the Turks intended to attack on Christmas Day, advancing on both sides of the Nablus–Jerusalem road.

All formations were warned, and the arrangements already planned for the advance were to be put in force as soon as the Turks became sufficiently involved.

The Turkish attack was late, but on December 25th the 60th Division captured a prisoner of 1st Division, just arrived at Bireh, who confirmed the news of the impending attack by the 19th, 24th, and 53rd Divisions in front, and the rest of the Turkish XXth Corps operating from the Jericho side.

Early on December 27th the Turks heavily attacked the 53rd and 60th Divisions, and particularly about Tel el Fut. They delivered eight assaults with picked troops. Meanwhile, the 74th and 10th Divisions were directed to advance on the left, towards Beitunia and Ram Allah. This prompt counter-attack disconcerted the Turks, who were being elbowed off the Nablus road. The Turkish attacks were fruitless ; their troops were spent, and the XXth Corps (Licut.-General Sir Philip Chetwode) on 28th December ordered a general advance northwards.

The 53rd, 60th, 74th and 10th Divisions, breaking down the Turks' resistance, gained ground on both sides of the Nablus road, and their final position on 30th December was Beitin-Balua-Deir el Khuddis.

The Turkish attempt to re-enter Jerusalem suffered crushing defeat, notwithstanding the fresh and specially trained troops brought up for it. They were caught exhausted, and the net result 1922.] EGYPTIAN AND PALESTINE CAMPAIGNS, 1914-1918. 221

of their offensive was that the British advanced on a 12-mile front for a depth of six miles on the right, and three miles on their left.

Sir Edmund Allenby's forces now held an admirable position to cover Jerusalem and Jaffa, and the cross-connecting road and railway, while the winter rains forbade any further advance.

In nine weeks of open warfare, the Egyptian Expeditionary Force had advanced its front some 60 miles, and had fought over sandy desert, open plains, marsh, and mountains, and with a climate varying from a Khamsin to a snowstorm.

Observations.—The operations of this campaign, from Beersheba to Jerusalem, brought out almost every principle of war.

All the great stragetical methods were practised :--

Surprise and envelopment-at Beersheba.

Penetration-at Hareira, followed by persistent pursuit.

Separation-after the battle for Junction Station.

- Interception, and Forcing the enemy to form front to a flank—as on the Nablus road.
- Refusing to conform to the enemy's movements—as when von Kressenstein tried to entangle us in the Hebron foothills.

All the familiar maxims, easy to quote, but so difficult to apply, were illustrated in these nine weeks.

Mystify and mislcad the enemy.-Effectively done at Beersheba.

Concentrate superior forces at the decisive point.-Carried out at Hareira.

Compel the enemy to expend reserves .- As after Umbrella Hill.

Economise force, and create fresh reserves at every opportunity.—In using only XXIst Corps for pursuit, and re-fitting the XXth Corps to be ready to relieve XXIst when tired.

Hit hard, hit often ; when checked at one point, strike elsewhere.— Exemplified at Gaza, and in the Jerusalem operations, 21st-24th November.

The campaign also illustrates remarkably the influence of geography, physical features, climate and communications, on the course of operations. And these operations also serve to illustrate the great influence which supply and transport have upon a campaign.

And the tactical problems worked out were as varied as the strategy: attacks from trenches, desert marches, river passages, forcing defiles, crossing mountains—all were dealt with. Again, at Beersheba, it was demonstrated how unsafe it is to leave out an isolated detachment within reach of a mobile enemy. While the means of warfare employed covered every imaginable device, nothing seemed missing, ancient or modern, from a camel convoy to a caterpillar, an artillery barrage, or a forced march.

This campaign also brings out the influence of the personality of the Commander. Sir Edmund Allenby was a careful, foreseeing, and
forceful leader. When he had decided on a course of action, he carried it through. In any contest of will, it was his way that prevailed, as his opponents discovered. In vain Kress von Kressenstein tried at Khuweilfeh to divert him from his main purpose; and later, von Falkenhayn's attempt to stay the retreat by threatening the right from Beit Jibrin was ignored by the British Commander-in-Chief.

Attention has already been directed to the way in which the mounted troops were developed and schooled in Sinai (p. 98); and since then they had achieved a more advanced stage of progress, in really fluid warfare, in Philistia, and in the Judean Hills. This campaign afforded opportunity for the extensive and continuous employment of cavalry in every variety of operation. But it must not be imagined that they alone won the war. The operations of the mounted troops depended on and were supported by the other arms. The campaign teems with instances of such mutual interdependence. In fact, it is probable that these operations will become a classic, for they constitute a nearly ideal instance of the proper use of all the arms in combination, and of cavalry in particular.

CHAPTER IX.

PREPARATIONS FOR AN OFFENSIVE IN THE SPRING OF 1918.—General situation in January, 1918.—Circumstances which prevented a continued advance—Features of Central and Northern Palestine—Preliminary operations for the spring offensive— Advance to Jericho and the Dead Sea—Further advances up the Jordan and along the Nablus road—The Raid on Amman—Crossing the Jordan —Turkish attack on Ghoranieh bridgehead—The raid on Es Salt—Effect of these raids in misleading the Turks—Observations on the operations, January to May.

PREPARATIONS FOR AN OFFENSIVE IN THE SPRING OF 1918.

General Situation in January, 1918.—By New Year of 1918, Russia had made a separate peace. The American Army was not yet fully trained, and Germany was preparing a great effort to effect a decision on the Western Front, before the United States could bring their forces into the war. The Turks were reoccupying the Caucasus, but losing ground in Mesopotamia. The Salonica front was stable. Egypt and the Sudan were quiet. (See Plates XI. and XII.).

In Palestine, the British line ran from five miles east of Jerusalem northwards to Beitin, then west to Nalin, and thence north-west to the sea-coast near Arsuf, ten miles north of Jaffa. The XXth Corps were on the right, XXIst Corps on the left, and Desert Mounted Corps mostly in rest about Mejdel, Esdud, Yebna. *Plate* XI shows the approximate positions of the British line towards the end of January, in February, and on 21st March. It will be observed how little force the Turks had then beyond the Jordan.

1922.] EGYPTIAN AND PALESTINE CAMPAIGNS, 1914-1918. 223

It might, perhaps, be asked why did not Sir Edmund Allenby go straight on in January, 1918, when he had in front of him a defeated army. One reason was the presence of the Turks in the lower Jordan valley, and in Moab, which will be dealt with further on. But the main factor was supply. The British force had outrun its communications. On 1st January their railway was 15 miles south of Ludd. The Turks had very effectively destroyed the big bridges on the mountain section of the Jaffa-Jerusalem railway; and the problem was how to feed the troops, and a civilian population in Jerusalem itself of some 80,000 souls, by a single road over difficult passes. The season was quite unsuitable for open warfare; and, in fact, it was impracticable to go on until the communications had been put on a sound footing.

Moreover, the further forward the British went now, the more easy they made the task of the Turks who would get nearer to their broad-gauge railhead at Rayak, near Damascus, and to their sources of supply. So the Commander-in-Chief's policy was to consolidate; and then to advance step by step, so as to be in a position to take the offensive later, and destroy the Turkish Armies altogether.

Geographical Features of Central and Northern Palestine, and across the Jordan.—The theatre of operations contained some very marked natural features. East of the Dead Sea and Jordan depression rose the mountains of Moab, from 3,000 to 4,500 ft. high. The approaches to this plateau are very difficult for troops or transport; but these fertile highlands furnished corn to Palestine and Syria, and were traversed by the Hedjaz railway from Damascus, through Deraa and Maan to Medina. North-west of these highlands, and about 100 miles from Jerusalem is the Hauran, or Jebel Druse, also famous for its wheat and barley. All this country is occupied by Arabs, generally owning little allegiance to the Turks. Jebel Ajlun, bordering the Jordan, was particularly notorious for its unruly tribes.

The approaches to the plateau of Moab all go up affluents of the Jordan—the Wadi Nimrin, the Zerka, Wadi el Arab, and the Yarmuk valley are the chief entries. The only practicable road for vehicles from Jericho leads through Es Salt to Amman on the Hedjaz railway, 50 miles from Jerusalem.

The river Jordan, hemmed in between Moab and the hills of Judea and Samaria, falls very rapidly from Lake Tiberias (-685 ft.) to the Dead Sea (-1,292 ft.). The river flows extremely fast, and rises rapidly after heavy rains and floods the banks. The stream is about 120 ft. across in the lower valley. Much of the bank is covered with thicket, passable only at the regular tracks. The chief tributaries on the west are the Wadis Kelt, Auja, Fara from Nablus, and Nahr Jalud through Beisan. The most important crossing-places are the Henu and Hajlah fords, near the Dead Sea, the Ghoranieh Bridge, the Jisr ed Damie at the end of the Wadi Fara, and the Jisr Mejamie near the Yarmuk (Jisr=bridge). A rough road traverses the valley northwards on the west bank from Jericho to Beisan, skirting the foothills. The climate of the Jordan valley is oppressive at all times, and in summer the heat is often intense, and malaria is prevalent.

West of the Jordan, the main range of the Judean hills embraces Mount Ephraim and Mount Gerizim, and north of Nablus extends into the mountains of Samaria, terminating in Mount Gilboa. This range is from 2,000 to 3,000 ft. high. The only road for vehicles is the ancient highway to Damascus, through Nablus, Nazareth and Tiberias; and this was only partially metalled. Water sufficient for local needs is found throughout the range. The valleys of Central Palestine are cultivated, and the hillsides often are terraced for olives and vines.

A branch of this main Judean range cuts across Palestine at an angle to it of 120 degrees and ends in Mount Carmel. This branch is from 1,200 to 1,500 ft. high—very rough country, and forms the southern boundary of the great Plain of Esdraelon. This plain is in three parts—the valley of Jezreel, with Beisan on the east; the Plain of Megiddo, opposite Nazareth in the centre; and the Plain of Acre under Mount Carmel on the west.

The Plain of Esdraelon is very fertile, and well-watered by the rivers Jalud and Kishon, but it is notoriously unhealthy and malarial in summer.

On the west, along the coast, lies the Plain of Sharon, famous as a battle ground in the Crusades, but marshy and malarial. This plain is traversed by a partly-metalled road from Jaffa to Tulkeram and Nablus, with a branch road from Tulkeram to Haifa and Acre.

The same sequence of river, mountain and plain continues on the north of the Plain of Esdraelon.

The river Jordan which rises in the southern slopes of Mount. Hermon, flows through Lake Hule (+7 ft.) into the Lake of Tiberias.

The Galilean Mountains west of the River Jordan are from 3,000 to 4,000 ft. high and merge into the Lebanon range. The Bay of Acre is a fine anchorage; and north of it there is a narrow strip of coastal plain which ends abruptly at Point Nakura, a steep spur of the lower Lebanon. Fair roads exist from Haifa and Acre across the hills to Nazareth, and up the coast to Tyre and Sidon.

Preparations for the Offensive in Spring, 1918. (Plate XI).—The enemy's line of communication, the Hedjaz railway, lay only 50 miles east of Jerusalem; and it was an obviously attractive operation to break across on to it. But no such undertaking east of the Jordan could be carried through until the lower Jordan valley and the principal crossings over that river were in British hands. Moreover, it was necessary, in order to secure their right flank, that they should control the crossings, and acquire sufficient space to the north of



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Ordnanos Survey. January 1981.



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EL MUGHAR.



EL MUGHAR. FRONTAGES OF 6th MOUNTED BRIGADE.

SKETCH III.

SKETCH IV.



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1922.] EGYPTIAN AND PALESTINE CAMPAIGNS, 1914-1918. 225

Jericho to ensure that Jericho, as an advanced base, would be immune from attack.

The Commander-in-Chief decided first to drive back the Turks on his right, take Jericho, and occupy the lower Jordan valley, and, later on, to extend his front northwards.

By securing the crossings over the lower Jordan he would :---

- (a) Prevent the Turks from raiding west of the Dead Sea;
- (b) Gain control of the Dead Sea, and probably secure grain for Jerusalem;
- (c) Obtain a good starting point for incursions into Moab; and to co-operate with Sherif Feisal's army working up the Hedjaz railway.

The limits for the first advance were fixed at the Dead Sea, and west bank of the Jordan up to the entry of the Wadi el Auja, eight miles north of Jericho.

The XXth Turkish Corps, on the right of the British, had about 5,000 rifles available; but the difficulties of the ground offered greater obstacles than the probable opposition of the enemy. A series of ridges provided strong defensive positions for the enemy, and the precipitous *wadis* running eastwards rendered cross-communication and cohesion between attacking troops very difficult.

Early in February, the 60th Division took over the line east of Jerusalem, and the 53rd Division on its left faced north-east and north. The general plan was for the 60th Division to advance directly as far as the cliffs overlooking Jericho; while the Australian and New Zealand Mounted Division was to cover their right, enter the Jordan valley near Nebi Musa, and cut off the Turks retreating from Jericho.

On 19th February, the 60th and 53rd Divisions made the first step. El Muntar, eight miles south-east of Jerusalem, was taken and, behind this feature, the mounted troops assembled to operate against the enemy's left. The 53rd Division gained ground commanding the El Taiybe-Jericho track.

During the night 19th-20th February, the 60th Division deployed for the attack of Talaat ed Dumm, and against Jebel Ekteif on the right—about five miles from Jericho. The left on the Wadis Fara and Kelt advanced about four miles. The mounted troops met strong opposition south of Nebi Musa, but found a way round, and by dusk one brigade was in the Plain of Jericho.

In the night the Turks withdrew, and next morning 21st February, the Australian troops entered Jericho and patrols reconnoitred to the Auja, and to Ghoranieh Bridge. The Turks had covered the latter with a bridge-head, and this was not engaged. The 60th Division took up a line on the high ground through Talaat ed Dumm. One mounted regiment was left to patrol the Jordan valley, and the

remainder of the Australian and New Zealand Mounted Division went back into rest camps.

Although the right flank was now secure, the Commander-in-Chief did not consider the base thus obtained sufficiently broad to permit of operations being carried out east of the Jordan against the Hedjaz railway. It was essential first to cross the Wadi Auja and occupy the high ground on the north bank about Mussalabeh, which covered the approaches to the Jordan valley by the Beisan-Jericho road. Secondly, by advancing further northward, on both sides of the Jerusalem-Nablus road, it was necessary to deny to the enemy the use of all tracks leading to the Lower Jordan valley. When this had been done, the enemy would be able to transfer troops from west to east of the Jordan only after making a big detour to the north.

Accordingly, the XXth Corps were directed to take Abu Tellul, north of the Auja in the Jordan valley, and further west to carry their line to Kefr Malik, the high ground by Sinjil, the ridge northwest of the Wadi el Jib, and so to Nebi Saleh. The XXIst Corps were to advance to the line of old Crusader's castles—Mejdel Yaba and Ras el Ain—and to the northern heights of the Wadi Ballut, which joined into the Wadi el Jib. The two corps would thus move forward their 26-mile front for a maximum depth of seven miles. The ground in the hills was rough and steep, and movements necessarily had to be slow.

The operations began on 8th March, and both corps made progress. The XXth Corps got to the line Nejme-El Taiybe-Sinia-Bir es Zeit, and the XXIst Corps took Abud, a lofty village.

The 60th Division crossed the Auja in the dark, and had stiff fighting to gain Abu Tellul, and to get astride the Jericho-Beisan road.

The 53rd Division took Tel-el-Asur, a very prominent point, while the 74th and 10th Divisions reached the Wadi Nimr and Wadi el Jib. On 11th March, the heights on the far side of these valleys were occupied. The XXIst Corps also completed its task, the 75th and 54th Divisions taking the line of the Wadi Ballut, and Ras el Ain, on 12th March, after severe fighting.

The experience we gained in these operations showed that a rapid advance in the hills was impossible unless unopposed. This was one of the reasons why the Commander-in-Chief chose the coastal area for his main operations in September.

The Raid on Amman.—The situation was now ripe for a raid on the Hedjaz railway. If the British could get on to that railway, the Turks would have to call up troops from the south to help to drive them off; and the forces opposed to Sherif Feisal would be effectively weakened. The particular objectives for a raid were a tunnel and a viaduct near Amman Station; or, failing these, the raiding troops were to do as much general damage as possible to the line elsewhere.

1922.] EGYPTIAN AND PALESTINE CAMPAIGNS, 1914-1918. 227

Amman is 30 miles east by north of Jericho. It is approached from Ghoranieh Bridge by a poorly-metalled and precipitous road up the Wadi Nimrin to Es Salt, a town of 15,000 inhabitants. Es Salt is a road centre for tracks from the Jordan fords at Um es Shert, and Jisr ed Damie, and from the north. The road from Es Salt to Amman was also difficult and in bad repair.

The force allotted to the raid consisted of the 60th Division, the Australian and New Zealand Mounted Division, Imperial Camel Brigade, a mountain artillery brigade, light armoured-car motor brigade, and a heavy battery—all placed under G.O.C. 60th Division (Major-General Shea).

The plan was for the 60th Division to force the crossings over the Jordan. The mounted division and camel brigade, after crossing the Jordan, were to move direct on Amman, demolishing the railway through Naaur and Ain es Sir. After demolishing the railway about Amman, the whole force was to withdraw to bridgeheads on the Jordan. The Turks by this time no longer held any ground on the west bank of the Jordan below the Auja.

The crossing of the Jordan was entrusted to the 18th Brigade (Brig.-Gen. C. F. Watson), supported by the divisional artillery. It was to force its way over at both Hajlah and Ghoranieh, and cover the construction of four or five bridges. Feints were to be made simultaneously at other suitable crossing-places, and a small party in motor-boats were to land on the north shore of the Dead Sea. The rest of the infantry were to cross by pontoon bridges at Ghoranieh, and the mounted troops at Hajlah. The river was high and unfordable, and the stream ran at about eight miles an hour.

The operations commenced early on 21st March, in heavy rain. The flooded Jordan continued to rise, and the attempts at Ghoranieh to cross it in the darkness failed. But at Hajlah, swimmers and rafts got across undetected, and so all efforts were concentrated on Hajlah.

The first bridge was ready by 0810 hours, three battalions were over by noon, and a second bridge was open by 1330 hours. The thicket was so dense that the troops could not extend until next day, when the Auckland Mounted Rifles had got across, and worked round behind Ghoranieh and cleared away the Turks there. By 2200 hours on 23rd March, five bridges were in use, but nearly three days had been spent merely in crossing the swollen river.

Next day the infantry drove the Turks off the Shunet Nimrin position; and, using two roads and with a mounted flank guard, occupied El Salt that night. But the mounted troops, marching directly on Amman in heavy rain, met great difficulties. All wheels had to be sent back. At 0500 hours on 26th March, they reached Es Sir, with animals so exhausted that only small demolition parties could proceed to the railway.

By that evening (26th March), the railway south of Amman

[October

was being blown up, but the mounted troops were held up in front of Amman, and the Turkish garrison was getting reinforcements. The infantry came up, and Amman was again attacked on 28th and on the night 28th-29th March. But the available artillery was insufficient, and the attacks only penetrated a part of the village.

Meanwhile, the Turks were getting stronger, and the Jordan bridges were causing anxiety as the river had risen nine feet more. Es Salt was threatened from the north. On 30th March at 1730 hours, the troops were ordered back. By the evening of 2nd April, General Shea's force was safely back west of the Jordan, but he kept a bridgehead on the left bank.

This twelve-day raid did not achieve all its objectives, but it had important results. It drew in reinforcements on Amman. The Turks round there increased from 4,000 before the raid to 8,000 just after. It greatly relieved Feisal's situation, and enabled him to become more active in raiding, and in besieging Maan.

The raid alarmed the Turks. They became apprehensive lest a still greater movement from the Jordan should seize Deraa, envelop their left, and cut off their armies in Palestine and Arabia.

The enemy soon realized how inconvenient the British bridgehead on the Jordan would be to them, and on 11th April they attacked simultaneously the Ghoranieh bridgehead and the British front on the Jericho-Beisan road. They got no success and left 500 dead. The enemy then withdrew to the Shunet Nimrin position and proceeded to settle down there.

The Raid on Es Salt.—The Turks at Shunet Nimrin were an isolated force; and at the end of April an opportunity presented itself to cut them off in conjunction with the local Arabs who had offered to assist. The Desert Mounted Corps and part of the 60th Division were employed. On the morning of 30th April the infantry attacked the Shunet Nimrin position in front, while the Australian Mounted Division by a detour north captured Es Salt by 1800 hours. In this move the troops covered 13 miles in 70 minutes.

A mounted brigade was left to watch the flank and stayed astride the Jisr ed Damie road, with patrols to the Zerka and a detachment at Um es Shert.

At 0730 hours on 1st May, this flank brigade was attacked by the 3rd Turkish Cavalry Division, and part of 24th Division, which had crossed during the night at and below Jisr ed Damie. The Turks penetrated between the main body of the brigade and their detachment at Um es Shert. The brigade fell back to the Wadi el Abiad, and lost nine guns in the bad ground. This left the troops in Es Salt only the Um es Shert track for supply or retreat.

Next day a combined attack from the north and south on the Turks at Shunet Nimrin had to be called off, owing to the difficulties of ground and the menace of two battalions, Turkish artillery, and

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1922.] EGYPTIAN AND PALESTINE CAMPAIGNS, 1914-1918. 229

cavalry on the north of Es Salt. Besides, the expected Arab support did not materialize, and Shunet Nimrin continued to get supplies. So, again, the evacuation of Es Salt was ordered. A difficult flank march was skilfully executed; and the raiding force was safely across the Jordan by the evening of 4th May, bringing nearly 1,000 prisoners.

This raid still more convinced the Turks of the danger to Deraa. The idea prevailed that these raids were primarily reconnaissances with a view to main operations later into Moab.

Observations.—The operations in Palestine of the first five months of 1917 afford remarkable examples of the employment of mounted troops in mountainous country, supported by infantry.

> In the taking of Jericho, the cavalry were working on the flank of the infantry, and succeeded in getting round behind the enemy, who, when his position was turned, wisely withdrew from the Jericho Plain.

The first raid to Amman illustrates how weather may upset operations, protracting them so that the advantage of surprise is lost. That raid furnishes another instance of forcing a river in the face of an enemy and of following up an advantage—by developing the bridges at Hajlah—rather than lose men in forcibly overcoming the resistance met with at Ghoranieh. This raid also showed how it is possible to reorganize transport, even in the midst of operations. The mounted troops had to extemporize pack-transport, and abandon their wheels, and yet were able to reach their objective as planned.

In the second raid, to Es Salt, the mounted troops again demonstrated the power of the "long arm," able to reach out, snatch an advantage, and rapidly return.

Looked at from the enemy side, both these raids illustrate the danger to which weak detachments—as were the Turks at Amman, Es Salt, and Shunet Nimrin—are exposed when the opponent is mobile and enterprising.

And then these raids show how an enemy may be misled strategically, and encouraged to expect developments from the wrong direction.

(To be continued.)

SNOW AND FLOOD IN NORTH-WEST PERSIA,

By CAPTAIN C. F. STOEHR, R.E.

ABOUT Christmas, 1920, orders reached the North Persian Force (generally known as Norperforce) that it was to withdraw to Mesopotamia in the spring, as soon as weather conditions permitted. At this time the force, which originated in the handful of officers and N.C.O.'s who were sent up with General Dunsterville in the hot weather of 1918, consisted of nearly half an Indian division, with headquarters at Kasvin, a strong detachment at Rustamabad facing a Bolshevik force, and another detachment at Zinjan. The L. of C. from the railhead at Quraitu on the frontier was a separate force.



It was decided that the withdrawal should begin at the end of March, but all surplus stores and sick or weaklings were to be gradually evacuated throughout the winter.

Unfortunately the winter of 1920-21 was incomparably more severe than the preceding one. In 1919-20 the first heavy snowfall occurred at Kasvin on February 1st, and it was only on the Aveh and Asadabad passes that the road was blocked by snow, and then rarely for more than a day or two. On a journey to Tabriz during January I found only a few inches of snow for about 40 miles, and most of that had disappeared on the return journey a few days later. In 1920-21 the ground at Kasvin was covered with snow from the middle of November, and the whole of the 170 miles from Kasvin to Asadabad, except the eight miles nearest to Kasvin, was blocked by snow, in several places for weeks on end. One convoy of Ford vans took 52 days to reach Kasvin from Hamadan, having waited 32 days at the foot of the Aveh Pass. On this pass there was a cutting in the snow, several hundred yards long, 16 ft. deep and just wide enough to take a car. Throughout the latter half of the winter mechanical transport was practically discarded, north of Hamadan at least, and the preliminary evacuation was carried out by Persian hired transport.

Every effort was made to keep open the road, several thousands of labourers being constantly employed in snow shovelling, but it had not been expected that any such effort would be required, so naturally the supervising establishment was far too small and took some little time to reinforce.

Perhaps the worst piece of the road in some respects, and certainly the worst piece that concerned the Norperforce engineers, was the stretch between 8 and 16 miles south of Kasvin. The great enemy here was the wind, for this stretch was exposed to a strong westerly wind which blew straight across the road from the Kuhin Pass. A regular cycle appeared to set in of snow, frost and wind, still air with perhaps slight thaw, snow, each phase lasting two to four days. The still period, the only one during which much progress could be made, was just about sufficient to clear the road; and regularly, either a day or two after the road had been opened, or before the work was quite finished, more snow or wind came, and the whole thing had to be begun again ; it is no wonder that all concerned felt it to be a labour of Sysiphus. On the evening of February 4th, for instance, the road was reported cleared over a width of 15 ft. throughout. The night was cloudless and, in Kasvin, still. Yet next morning the whole of that eight miles was found completely impassable for wheels owing to drifts which had formed during the night. A mile away from where the drifts began the air was warm and still; where the drifts were, a strong and bitterly cold wind was blowing and the air was full of driven snow. Had it been possible to foresee at all what the winter would be like it would have been well worth while to put up snow fences along the eight worst miles ncar Kasvin, and probably in other places also. The effect of a building a short distance to windward of the road was most remarkable, the road opposite to it being entirely free of snow, while at each end of the clear bit the drifts were several feet deep.

A last great storm occurred about March 20th, and it was not till the 29th that the road was opened for the last time. April in this region is a month of heavy rain-storms which, after gradually

231

decreasing in severity, cease during the latter half of May. Sometimes these storms, which are not entirely confined to the spring, are of intense local severity. One of them produced in a small torrent bed, normally dry, which had a culvert three to four feet wide, sufficient water to block up the culvert with boulders, tear away the stone parapets, and to carry across the road and deposit on its outer edge a boulder 6 ft. \times 3 ft. \times 2 ft. which must have weighed over a ton.

On this occasion the heavy rain and a sudden thaw, acting on the vast quantities of snow still left, caused floods such as none of the inhabitants could remember. The column at Rustamabad, which had been relieved by the Persian Cossack force, began its withdrawal about April 9th, and the first obstacle to overcome was a mountain torrent, only knee-deep, but bringing down boulders the size of a man's head; the whole bed was on the move and was rapidly deepening itself; all transport had to be rushed across this by hand.

A mile below the Menjil Bridge half a mile of the road was under several feet of water, nccessitating a new road being cut across the hillside, including a certain amount of blasting. This was done in 24 hours, largely by Indian transport drivers, who, seeing the bridge apparently sitting on the water, put their backs into the digging in a way quite unknown to the ordinary working party.

The Kizil Uzun, which unites with the Shah Rud just above Menjil Bridge, has a very large drainage area, and the flood which came down filled the 420 ft. $\times 25$ ft. of waterway of the bridge right up to the lower boom of the girders, and eroded or scoured out the central pier, 40 ft. $\times 20$ ft. brick and stone in cement, to such an extent that when the troops crossed the bridge the top of the pier was already 2 ft. or more out of line with the others, and ten days later the pier collapsed altogether.

The next obstacle consisted of a boulder some 20 ft. \times 10 ft. \times 5 ft., which had fallen on the road; fortunately it was resting on one end, so that a minimum amount of work was required to build the road round it.

In two places higher up, where the road had been built up on the foot of a sheer rock cliff, the torrent which ran alongside it had cut away the road till a breadth of little over 6 ft. remained, barely enough to let the transport pass. Had the road been narrowed by another 2 ft. there appeared to be no remedy short of blasting extra breadth out of the cliff, for that torrent in flood was no mean thing. A few miles higher up the road ran for a hundred yards across a mixture of soft rock and earth, where the whole mountain-side, to a height of several hundred feet, was gradually slipping. The torrent here made a sharp bend, and had carried away many protective walls since the road was built ; the final experiment made during the previous winter consisted of a diagonal groyne 7 ft. thick and high and about 30ft. long, of boulders in an improvised net of barbed wire ;



Types of Wash-outs. Result of a Torrent across the Road.



On Aveh Pass.



Aveh. The Pass nearly Open

AVEH PATH

the first big flood swept this away so completely that no trace could be seen. The result was that the road was continually being cut away, necessitating cutting into the hill-side, this in its turn bringing down falls from above which had to be cleared. However, a platoon of sappers and gang of Persians, working in reliefs throughout daylight for several days, managed to have the road open when the column arrived. Between this and Kasvin were no more obstacles except a few torrents across the road, capable of holding up a car but not a column. Meanwhile, we had other troubles at and below Kasvin.

Along the west wall of the town and under a 15-ft. or 20-ft. stone arched bridge runs a torrent bed, dry throughout summer and autumn, and the road to Hamadan runs along the top of its western bank. Down this came, one afternoon, a flood which made the bridge tremble distinctly until the pressure on it was relieved by the water breaking its bank a bit higher up and flooding across the road between the bridge and the junction of the Menjil and Hamadan roads. Quarter of a mile lower down it changed its bed, so that the current set in against the right bank, and by next morning had bitten a hundred yards out of the road in one place and was already biting into it in another ; the flood had lessened sufficiently, however, for protective measures to be taken. Where the road had completely gone a series of diagonal groynes along the former bank of the road nearest to the stream was put down. These groynes were 9 ft. to 15 ft. long and were formed of three to five posts driven well in and faced with corrugated iron sheets, which needed no fastening, as the force of the water held them firmly in position ; they were backed up by brushwood, but experience showed this to be unnecessary. The effect of these groynes was immediate ; within a few minutes of one being made a sandbank had formed behind it, and by next morning the whole area where the road had gone was a mass of dry shingle. The place where the torrent had only begun to cat into the road was protected by a wall of sandbags but probably groynes would have been better.

Thirty miles towards Hamadan the road crosses a shallow valley, which stretches for 40 or 50 miles towards Zinjan. Normally all the water coming down is diverted by a small bank of earth—hardly worthy of being called a dam—four miles above the road, into a canal which runs under the road. A heavy flood burst through the dam and caused a river to cross the road. When we commenced to tackle this job the river was running in two branches, requiring about 60 ft. and 20 ft. of bridge, which had to be strong enough to take loaded three-ton lorries. This meant spans of only 4 ft., and a lot of material, all of which had to be sent from Kasvin. The canal was carrying all the water that it could without endangering the bridge over it, so that no more could be diverted into it by restoring part of the dam. Before the material could be got out,

however, there was another problem to face. Over the eight miles south of Kasvin, where the snow had been worst, the road was a foot or so above the plain, with culverts to carry off water across the road. These culverts being quite insufficient to carry the floods, the water had banked up and in many places was flowing over the road in sheets a few inches deep and anything up to fifty vards wide. After a couple of days it began to cut ditches across the road from the downstream side, forcing the traffic further and further to the other side and eventually off the road into the flooded fields at the side. The remedy adopted was to cut ditches some 3 ft. wide across the road until there were enough to take all the surplus water, and then revet and bridge them with poplar poles, sacks, and corrugated iron. Eventually seventeen new culverts were required. All this work south of Kasvin required little engineering skill, but much supervision and energy, and some forethought. The work was very urgent, for the final evacuation was delayed at the last moment and the ration question was serious, the reserves having naturally been cut down to vanishing point.

While the most urgent work was being started the torrent across the road just outside Kasvin had much diminished, but was very troublesome to cars and lorries; if a car stuck, the scouring action of the water immediately caused it to start sinking in the sand, and in a few hours it would so bury itself that little but the hood was visible. After some difficulty, due to the water having found its natural channel and trying to retain it, the first day's work being a failure, and that done on the second day being swept away by the flood which the melting of the snow brought down every afternoon, the water was finally put under the bridge again. The method adopted was to drive in pickets on the line of the new bank to be made, put down corrugated iron sheets against the pickets, with filled sacks to stop any rush of water under the sheets, and then back up with shingle.

By the time that this was done the Menjil column had reached Kasvin, the road, with all the new culverts and the ford across the flood thirty miles away, was taking marching echelons with Persian transport, and all that remained was to get the mechanical transport across the latter flood.

By April 23rd the two bridges were finished, and the M.T. began to cross. A convoy of Fords crossed first, then the armoured cars, then the 3-ton lorries began. Between the two bridges was a stretch of 80 yards of dry river-bed, consisting of firm round shingle and sand. The first half of this had been very heavily metalled, but only about 3 in. had been put on the second half, as the foundation appeared so firm. The leading lorry, however, pulled up the thin metalling sufficiently to get through it to the foundation, and then rapidly dug itself in, owing to the round shingle having no coherence, despite its hard surface. The leading lorry was helped out and across with ropes, but before they could be stopped two others had crossed the first bridge and were standing on the heavily metalled portion of the road. The leading of these two lorries was loaded with aeroplane engines, in packing cases which were too heavy to manhandle. It was now evening and a heavy storm had started, so further work was postponed till next morning. It would have been impossible to pull the lorries across during the night, for the first lorry of all had gone too near the edge of the improvised road on the far side and had bogged itself, effectually blocking the road.

During the night the river rose a foot, and next morning the two lorries were standing on a small island, with a stream 2 ft. deep between them and either bridge. Nothing could be done that day, but by the following day the water had subsided sufficiently to train part of it back to its former channels and to prepare for bridging the new channel which had formed.

During this day, however, the R.A.F. and M.T. officers decided to try to get the lorries across a ford and to risk their sticking in the river-bed, and on the following day the venture was made. A tender, replaced by the first lorry across, ran backwards and forwards in a hard field on the far side, assisting each lorry across with a long tow-rope. By the late afternoon only four lorries were left, but the water had risen and become too deep for them to use their engines, and one was stuck in the stream, with engines stopped.

Remembering Sir Ian Hamilton's saying that a thousand men can make a 6-in. gun climb like a chamois, every available man, perhaps 200 in all, with all the rope that could be found, were turned on and pulled across the lorry in the water and the next one with unexpected case. There remained only the two which had been stuck in the river-bed for the last three days, and to enable them to be moved four rafts, each 10 ft. square, had been made up of 4-in. poles, so as to form a movable corduroy road. With the aid of these the more lightly loaded lorry was turned round and moved back to the near bank, where it moved up to the ford and was pulled across. The heavier one was moved up the island to the upper end and pulled over amid great excitement and enthusiasm.

This was the last of the numerous and varied obstacles which the Norperforce sappers had had to overcome during the previous three weeks, and, in fact, the last work that the company did on field service, for four weeks' pleasant marching took us to railhead, *en route*, with nearly every other unit of Norperforce, to India.

It was just three and a half years since the company had landed at Basra, and never once did the men fail to rise to the occasion, however great the effort demanded. The greater the call the harder they seemed to work, and the officer might consider himself fortunate who, throughout his service, never commanded a less willing unit.

MEMOIR.

COLONEL EDWARD DICKINSON.

ALTHOUGH it was known that Colonel Dickinson had been suffering for some years from heart complaint, the news of his death, which took place somewhat suddenly, but quite peacefully, on the 30th June, came as a great shock to those brother officers who knew him well, and especially to those with whom he was closely associated in the last important work of his career—the Trusteeship of the R.E. Officers' Widows Society. Of this work more will be said presently.

Dickinson was born on the 8th April, 1849, and was, therefore, at the time of his death, in his seventy-fourth year. He joined the "Shop" in February, 1868, and obtained his commission in July, 1870. After the usual two years' course at Chatham he went to Aldershot on appointment to the old Pontoon Troop, which was then one of the mounted units of the Corps, and during his three years' service there he gained some of that knowledge of the Corps organization and equipment which served him in such good stead when, later, he became A.A.G.R.E. From Aldershot he went to Bermuda and Halifax, and, later, to Egypt, where he took part in the Expedition of 1882 (Medal and Bronze Star), and in the Soudan Expedition of 1885 (Actions at Hasheen and Tofrek, two clasps). He was at Aldershot again for seven years-1889-1896when he still further widened his knowledge of Corps organization and affairs, and then went to Barbados as C.R.E., which appointment he held for nearly three years. In the middle of 1899 he came home to take up the Staff appointment of A.A.G.R.E. at the War Office, and of his services there during nearly three years General Sir William Salmond, who was then D.A.G.R.E., speaks in very appreciative terms. Dickinson's Corps work was completed by nearly four years' service in Ireland, first as Colonel on Staff for R.E., and then as Chief Engineer, retiring from the Service on reaching the age limit on the 8th April, 1906.

On retirement he served on a commission on War Department Lands and Properties, and later did good work in connection with Territorial Force Buildings. In the Great War he was employed on the Billeting Committee during the period September, 1914 to July, 1915 and, amongst other duties, helped in the very important and difficult task of selecting sites for the Divisional Hutments which were built for the accommodation of the New Armies. Later, from December, 1915 to February, 1916 he was engaged on a special mission to St. Lucia.

This is a fine record of valuable work, well and truly done, for



COLONEL EDWARD DICKINSON

Dickinson was thorough in everything he undertook, but to the younger generation of officers who did not know him in his earlier days he will be, perhaps, best remembered through the splendid service he rendered to the Corps by his unceasing labours during the last few years in connection with the R.E. Officers' Widows Society, already alluded to above. The War, with its sad roll of young widows and the rapid and unprecedented increase in the rate of Income Tax, had seriously affected the financial stability of the Society, with a resultant burden of anxiety and labour falling mainly upon Dickinson as Senior Trustee. The story of the conversion of the Society into a Company, and its reconstruction upon a sound financial basis, will be fresh in the minds of all, but only those who were closely associated with Dickinson in the steps he took towards this end will ever know the immense labour that fell upon his shoulders and the high ability he brought to bear upon this extraordinarily difficult question. The officers of the Corps owe him a great debt which they can only repay by holding his invaluable services in very kindly and grateful remembrance.

Dickinson, amongst his many useful activities, took very great interest in the R.E. Charitable Fund, and for some years served upon the Committee, only resigning his seat thereon when the removal of his home to the country made it impossible for him to attend the meetings regularly.

Now, in writing a memoir such as this, it is natural that one should consider what are the objects that are to be served thereby. In the first place, it must be an intense gratification to sorrowing relatives and friends to be told how well the one they loved has served his King, his Country and his Corps, and to learn in what high esteem and affection he was held by his brother officers. But there is something more than this. Surely the record of the well-spent life with all its high ideals—the fine character, the spotless reputation, the lovable nature, the kindly courtesy—and all were Dickinson's should be an inspiration to the young officers of the Corps to follow the example set by him of doing one's best with all one's might and of putting duty first in all things.

A quotation from a letter of sympathy, written to Mrs. Dickinson by Colonel Denis de Vitré, a former subaltern of Dickinson's, will well illustrate all that good influence and good example signify and stand for. He says: "Nothing can efface from my memory the high example he set us young officers of how a pure and high-minded officer should devote himself to his dutics."

Dickinson could have desired no nobler tribute to his life's work, and we, who are left behind, might indeed be well content if, in the twilight of life, we could only hope that men will thus speak of us when we are gone.

1922.]

CORRESPONDENCE.

To the Editor, R.E. JOURNAL.

Sir,

I have read Lieut.-Colonel L. V. Bond's criticism of "The Tactical Theories of Captain Liddell Hart" with considerable interest, and I am glad to think that there is someone who is ready to throw down a challenge on behalf of the fighting soldier, in the face of the military pundits. Sapper "Nobby" Clarke and Subadar Bir Bahadur are old friends of mine, and I am delighted to see someone taking up the cudgels on their behalf. Anyone who has had the good fortune to see the show from a front-line trench knows what the mentality of these men counts for.

At the same time, we must be fair all round. Anyone who has had to teach the young idea knows that it is necessary at first to give them a clear idea, by means of concrete example, of what is right in theory and what is wrong; otherwise they will probably not grasp the essential articles of their military religion. This can be done quite easily in simple English, without having recourse to any jargon of stock phrases, or any other "flap doodle"—to use Colonel Bond's phrase. I imagine that Captain Liddell Hart, whose articles I must confess I have not read with over much care, has set himself to try and produce some definite examples embodying somebody's theory, with this object in view.

It seems to me, therefore, that Colonel Bond's criticism, which is at present entirely destructive, should be followed up by some enunciation by him of how the true faith in these matters should be set forth to the rising generation.

Destructive criticism is often very amusing to the critic and also to those who are not its objects. Colonel Bond's criticism has afforded me much amusement.

About forty years ago a celebrated R.E. officer wrote a very amusing book to destroy the theory and practice of what he called the "drawing board" military engineer. It was delightful to read; but I remember that after reading it, as a young second lieutenant, I felt that any military faith I then possessed had been destroyed, and that its destroyer had given me little to replace it. I was rather more in the dark than ever.

I would suggest, therefore, to all critics that this destructive frame of mind should be avoided. It is easy to pull a thing to pieces, but it is a dangerous thing to do, unless you put something better in its place.

Yours faithfully,

G. WALKER, Colonel.

REVIEWS.

LES CHEMINS DE FER FRANÇAIS ET LA GUERRE.

(Second Notice).

THIS treatise, by Colonel le Hénaff and Captain Bornecque, the former Director of Railways at G.Q.G., the latter attached to the 4th (Railway) Section of the General Staff, is a detailed and exhaustive account of the work and achievements of the French railways during the war, and worthy of attentive study by all who are interested in the complex question of transportation under modern conditions during a great continental war.

It begins with the plans worked out in peace-time for mobilization under varying conditions, started in 1868 by Marshal Niel, and more seriously studied after 1870. The 4th Section of the General Staff was charged with this duty, in which it was assisted by Commissions for each Railway Company, with a military and a civil member and technical advisers—under them were sub-commissions for railway lines and stations. There was also a Consultative Commission working with the 4th Section of the G.S., composed of superior officers of the Army, Navy and Railway Companies—and apparently corresponding to our Railway Committee.

On the order for mobilization " Plan No. 17 " was put in operation. by which the railways in the sector Maubeuge-Paris-Dijon-Belfort passed under the direct control of the Minister of War. This was in view of a concentration on the German-Luxemburg frontier. According to our authors this mobilization and concentration of armies was accomplished exactly according to schedule and without the slightest hitch. The "Nord" system dispatched 3,121 trains on the 2nd to 4th day of mobilization; the Paris-Lyon-Marseille, 3,262 trains. In all, more than 10,000 trains were in motion for mobilization alone. For the concentration of the mobilized units at the front four separate routes were laid down, so arranged that there should be no crossing of any two lines on the level, and no using of the same lines at any junction. Great importance was attached to the "Regulating Stations" from the time of mobilization to the end of the war-situated at a suitable distance from the front. Behind them no deviation from schedule was allowed to the trains. Beyond them to the front the "Regulating Commission " had absolute power as to the disposal and destination of every train.

The plan is stated to have worked to the minute, and five armies, with 1,200,000 men, 400,000 horses, 80,000 vehicles, were disembarked at their destination by the 18th August, 16th day of mobilization, exactly as predicted.

Besides the movement of these troops, the railways had also to provide for their supplies and munitions, removal of casualties, mobilization and concentration of reserves, the food supply of Paris and certain fortresses, and the collection of supplies to replenish the Army Stores.

All this had just been completed at an immense expenditure of effort, when the invasion of Belgium, the arrival of the British Army, the retreat of the left and centre of the allied Armies, the transfer of several Corps from right to left, the evacuation of civilians and depôts from the invaded zone, the removal of Belgian rolling stock and all movable material from the French railways affected, produced a most serious crisis, and a tremendous strain on the railways, particularly the lines of the Nord and Est. The first care was to provide new regulating stations for those wiped out, and then to establish lateral lines for the movement of the Corps from East to West, which resulted in the regrouping of the Armies and the victory of the Marne. That all this was accomplished without a serious breakdown must extort a tribute of admiration for the skill and resource of the superior direction, and the devotion and loyalty of the railway personnel.

After the Marne came the "rush for the sca"—again the Nord and Est bore the brunt of the traffic, in addition to the labour of repairing the damage done to the lines by the retreating Germans, of which the most serious was the destruction of the great bridge of Laversine on the line Paris-Creil, the main communication from Paris to Maubeuge, Lille and Calais. A temporary viaduct, begun 9th October, was finished in 25 days, and a new permanent bridge in reinforced concrete was completed by 31st May, 1915.

The book goes into great detail as to the movements of reinforcements from East to West during the prolonged struggle on the Belgian border, during which the British Army was moved from about Soissons to take its glorious part in the battles of Ypres. For the details and difficulties of these movements, the reader must be referred to the text.

On the establishment of the front of trenches to the sea at Nieuport began the long period of trench warfare, in which the work of the railways settled down to the business of the supply of the Armies of the West with the countless needs of the new warfare, the transport and supply of the Armies of the East, and the conduct of the post and parcel post.

Supply alone became a prodigious charge. Six million combatants, French, Belgian, English, American, with a million horses, with tens of thousands of pieces of artillery of all calibres, required in 1915 65,000 trains, in 1916 84,000, and for the first six months of 1918 45,000. This was reckoned, in 1918, at 1,000 tons, or two trains of 50 vchicles, for each French division, whereas, in 1914, 70 to 140 tons sufficed for a division. The smooth and regular pouring in of such a vast tonnage of material of infinite variety from so many diverse sources, required the utmost care and forethought, in which the "Regulating Stations" played a most important part, while the lines of communication were carefully adjusted to serve the sectors of the front.

The inception of campaigns in the near East involved fresh complications. At first the troops were dispatched by sea, but in 1916 the enemy's submarines made it imperative to cut down the sea passage to the shortest possible route. Thus the main body of the Eastern Armies with all their supplies travelled by Modane and Mont Cenis (occasionally by the Riviera) through Italy to the port of Tarentum. The British Armies and their reinforcements and supplies also had to take a similar route, starting from Cherbourg and Havre with all the necessary halting stations for food and rest throughout the length of France and Italy. All this imposed a fresh effort on the French railways, the more embarrassing as it cut right across the direction of the traffic to the Armies of the West.

A chapter is devoted to the conduct of the postal and parcels service, of which the difficulties can be imagined, with the constant shifting of units and individuals, and the necessity for secrecy as to their positions. The solution was a "statistical section" in Paris, working through the paymasters of units. The figures are colossal. Suffice it to say that they equalled daily the whole correspondence circulating in France in time of peace.

A chapter entitled "Les Evacuations" deals with the removal of sick and wounded, and the stream of men going on leave.

For the sick and wounded, at first ordinary troop-trains were used, except seven hospital trains, prepared beforehand. These were insufficient for serious cases, so improvised hospital trains were fitted up, and as improved by experience, found to serve their purpose satis-, factorily. Besides these there were semi-permanent trains fitted up for both sitting and lying cases. The distribution of the cases to the various hospitals required much care and arrangement, but the details of this are more suited for study by the R.A.M. Department. Its importance is shown by the fact that up to the Armistice the number removed was 3,610,000 in 12,000 trains, the numbers varying in average according to the intensity or cessation of battle on the front.

The "leave train" was a new departure in warfare, not previously thought of. It carried with it its own difficulties in the suitable adjustment of trains to destination. It further took up 2,728 carriages which could ill be spared, and, of course, added to the overwhelming strain on the railways, and excessive crowding on the trains of the interior. The Paris-Orleans line alone issued in 1015 nine million leave tickets !

The authors next proceed to study the railways as instruments of manœuvre, carefully worked out in 1912 in a confidential memorandum, divided into strategic movements over long distances of large bodies, and tactical movements of small units for short journeys. The latter never caused any difficulty and were used principally for reliefs, especially on the British front. The former required careful planning as to entraining, detraining, the route to be followed, and the nature of the trains to be employed. But all had to be in readiness in the shortest possible time, with every detail worked out. For this purpose certain "rames" (rakes=trains made up, but without engines), varying frcm 180 to 300, were kept in readiness as near as possible to the Corps in reserve, the course of procedure between the C.-in-C., the Director of Railways and the G.O.C. L. of C. (Arrière) was laid down, and the lines of lateral communication (rocade) worked out in several sections, and improved as experience dictated to ensure easy and rapid communi-

cation from flank to flank. It is on these lateral lines and on the Regulating Stations that the French seem mainly to have depended for rapid strategic movements.

The German offensive of March, 1918, although to some extent foreseen and provided against, cut more deeply into the railway system than had been expected, and involved long and devious routes for reinforcements. Perhaps the most serious result of the German push was the loss of the vital junction of Amiens, cutting the main line from the North to Paris and throwing that traffic on lines already congested and inadequate, thus requiring enormous labour in establishing a new through line of double track via Beauvais to Paris.

Another demand on the already overburdened French railways was made by the call for reinforcements in Italy, after the catastrophe of the Carso. The book traces the routes by which the British and French troops were sent, there being only two possible lines—by the Mt. Cenis and the Riviera—the latter impeded by a single line from Vintimille to Savona. There was also now and always the necessity of supplying Italy with coal and Switzerland with cereals, while the possibility was even envisaged of having to transport an Army to the latter country in case of an attempt to turn the French right flank by an invasion of Swiss Territory. Much detail is given of the difficulties of the routes, the means adopted to ameliorate them, and the number of trains employed, which amounted in two and a half months to 634 via Modane, 770 via Nice, and a relief via Briançon, with a march by road over the mountains into Italy, of 140 trains.

Our authors next go into the details of the railway plans for the various offensives in Champagne, on the Somme, on the Aisne and in Flanders, with the means adopted to improve the often very inadequate communications for supply and munitions. Another chapter deals with the German attack on Verdun, and the extreme difficulty of reaching that fortress by rail after the loss of the St. Mihiel salient, while the only other main line by St. Ménéhould was partly under enemy fire. Here a metre-gauge railway proved of the utmost value.

The German retreat on the Somme, in March, 1917, produced fresh difficulties and required a fresh effort in reparation and extension of railways, with, as usual, a careful organization of lines of lateral communication (rocade). It enables the authors to make an interesting comparison between the German and French railway organization behind the front line, which ends as follows :--" So thus, no combined plan, few depôts, transhipments (from standard to metre or 60 cm. gauge) lavishly organized in view of the abundance of manual labour. They laid 130 km. of 60 cm. gauge without establishing a united or homogeneous system." It is evidently considered that the French worked on a sounder and more systematic plan. But in this it would appear that they flatter themselves unduly. Since writing the above I have had the advantage of seeing a map of the German and British fronts between Peronne and Arras prepared by the R.C.E. of the 5th Army (Col. Ramsey) from aerial photographs, reconnaissance and spies. This shows a far more complete and systematic network of 60 cm. lines and lines of lateral communication than anything that we or the French could boast. There can be little doubt but that the Germans have nothing to learn from their opponents in the use of railways of any gauge.

Next comes a detailed study of the various measures taken to remedy the dislocation caused by the German advances in 1918 towards Amiens, to the Marne, and on Béthune, and even in anticipation of further enemy successes. The lesson of all this is the extreme importance and delicacy of the railway system immediately in rear of great armies in semi-stationary warfare, and the vital importance of the lines of lateral communication to the strategic necessities of the campaign.

But it is not only the lines in immediate touch with the Armies that suffer. Chapter XIII discusses the reaction on the railways of the interior of the transportation crisis. It describes the great intensity of traffic on the systems of the Nord and Est, more than three times the whole traffic of peace-time on a much reduced mileage. The domand for rolling stock was felt to the furthest borders of France, greatly curtailing the general train service. In 1916 the traffic reached-as compared with peace-time-on the State Railway, 146%; on the P.L.M., 149%; on the Orleans, 166%; on the Nord, 200%; while these figures rose still higher in 1917 and 1918. The demand for rolling stock constantly increased. In 1918 the tonnage to be moved demanded 457,426 trucks, but 393,331 only were available, including 35,435 supplied from England. Of engines 15,642 were required, 15,508 (1,035 British) were forthcoming. Of personnel, 402,808 were necessary, but only 345,294 could be counted on, and those, like the material, already almost worn out. Nothing but the most careful organization and the utmost devotion of the personnel could make head against such difficulties.

We now come to the counter-offensive, July-November, 1918, with the re-grouping of the Armics under Marshal Foch and the general advance towards Belgium and Luxembourg. Once more the railways were called on for a supreme effort, not only in shifting, transporting and supplying whole Armies, but also in repairing the devastation wrought by the retreating Germans and in following up as best they could the advancing Armies.

Chapter XV is devoted to a description of the most effective destruction of the railway systems of the Nord and Est, every tunnel, bridge and culvert blown up, the permanent way torn up, the crossings, signalling boxes, stations, water supply, etc., ruined, while retarded mines were sown with diabolical perversity. It also details the measures taken to repair the lines and follow up the Armies.

Chapter XVI, on transport after the Armistice, need hardly detain us. The main duty was the supply of the Armies of Occupation (213 divisions—British, French, Belgian and American), the leave-trains, those for demobilization of the Allied Armies, including an Italian Corps, and the repatriation of prisoners of war, all over greatly increased distances, while the re-establishment of commerical traffic, and the requirements of the devastated provinces had also to be provided for.

We now come to a part of the book devoted to the detail of the British share in transportation, in which at first our Army was entirely dependent on the French railways. The preliminary puzzle was that "one could

not foresec exactly in which ports, at what date, in what order of battle. or in what numbers would arrive the British Army." How were suitable trains to be made up or placed where needed at such scattered ports? Eventually trains were made up to accommodate-K type, a battalion ; U, squadron or R.H.A. battery ; R, R.F.A. or ammunition column; S, R.E. and Ambulance; Y, H.Q. or odds and ends-and Then came concentrated at the ports Boulogne. Havre and Rouen. the question : Where was the British Army to concentrate ? The French G.Q.G., with the concurrence of our G.H.Q., desired our Army to be The British brought at once into line with the French in Belgium. Government wished it to detrain about Amiens, in order that it might have time for rest and re-organization, even proposing that it should prepare a defensive position there ! This obviously did not meet the requirements of a critical moment. On the 12th August a discussion lasting three hours at the War Office, between Lord Kitchener and the British and French General Staffs, at last brought him round to their view, and through him the Cabinet, and the detrainment took place between Hirson and Maubeuge. The number of trains employed, for five divisions of infantry and a Cavalry Corps, being 339 trains carrying 4,480 officers, 115,043 other ranks, 45,623 horses, 5,565 guns and limbers, 1,380 wagons and 2,108 bicycles—the entrainments commencing on 15th August, and being completed with exact punctuality on 27th.

From this moment up to July, 1916, the French railways undertook both the transport and supply of the British Army, including its transfer from the Aisne to the neighbourhood of Ypres, and the movement of our Indian Army from Marseilles to the front "with all the precautions necessary to meet the susceptibilities of race and caste." The arrange ments and works necessary to ensure smooth traffic are given in detail, with special notice of the Regulating Stations at Abbeville and Romescamps, the latter a vast installation of which the utility was only recognized by our authorities during the battle of the Somme. Mention is made of the famous Railway Depôt at Audrouicq, one of the few big works undertaken in the early days by our railway troops. "The prelude to the great works undertaken by the British specialists in the course of the next two years."

It is explained that our lack of a large military railway establishment made it at first necessary for the French railways to do our work as well as their own, but that the increase of the British Armies and the stabilization of the front made a change necessary—and a demand for further help on our part. On the other hand, I believe it is well-known that the French were very jealous of any interference on our part with their railways, and we were in a position to give them plenty of assistance before they would admit its necessity, only forced from them by the imminent breakdown of their service in 1916, and the vast railway organization which we created under the direction of Sir Eric Geddes at the end of 1916, and after, might have been provided much earlier had its necessity been realized by both French and British G.H.Q.—while it was long enough before either G.H.Q. realized how much might be done by temporary or light railways to expedite supply and relieve the road transport. It is unnecessary to go into the detail of the British railway organization when Sir E. Geddes took it in hand. Suffice it to say that from the end of 1916 we took over and worked the whole railway system supplying our Armies, with our own rolling stock and personnel, and laid the numerous additional lines necessary for the Somme offensive, the various attacks in 1917, the great depôts and magazines for our stores, and the 60 cm. lines that formed a complicated network of supply immediately behind our trenches.

In conclusion it is remarked that "the Army of 1914 arrived without any means of working or constructing railways, either in personnel or material.... The rôle of Regulating Stations, such as we understand it, is played in no way. The French Army undertook all the transport and most of the work till 1916, while urging the British to adopt our methods. As the English effectives increased the British Command began to understand the situation, and when once the decision was taken, its execution was pursued with that application and tenacity which are characteristic of the English nation, and constitute one of the elements of its success."

The next chapter deals with the American transport. Here again The urgent was a very serious fresh burden on the French railways. necessity for getting American troops into France prevented the previous provision of a transport system. At no time up to the Armistice did the American Army provide more than half its railway transport. The geographical exigencies of disembarkation caused the American lines of communication to cut right across those of the French Armics, from the ports of Brest, St. Nazaire, Rochefort and Bordeaux to the whole front between Paris and Nancy. Much personnel was required to instruct and interpret for the American drivers, guards, etc. In November, 1918, the American effectives amounted to 2,500,000 men, requiring 410,000 tons of supplies per month. The American Army was considerably broken up, by the self-sacrifice of its command, to reinforce the Allied Armies at the crisis of the German advance in 1918. All this imposed a traffic of such importance, such intensity, such duration, on four different railway systems already fully crowded and least prepared, as imposed an exceptional effort on the lines affected, and could not be accomplished without delays and accidents. Still, the trains arrived with sufficient regularity, men, arms and supplies were brought where wanted, without any question that the lines of communcation would fail to bring up whatever was needed at the right moment.

A final chapter reviews the whole subject. The general traffic rose 41% on that of 1913, with, on part of the Nord railway, an increase of 200% at times. Up to 11.11.18, 100,000 trains transported 60,000,000 men. For supplies were required daily a mean of 80 trains of food, 40 of munitions, 16 of engineer stores, 16 of various material, 16 for maintenance of roads, 25 reinforcements; that is, 200 trains per day, or 300,000 wagons and 550 engines.

To accomplish this much work was required on new lines, doubling single lines, diversions, shunting and depôt yards, repairs, etc., as to which details are given. Praise is adjudged to the unity of direction under a central authority which applied the resources of all the railway companies where necessary and assured the co-ordination of effort.

The metre-gauge lines proved useful where they existed. For new lines it was found better to make use of normal gauge.

The vexed question of the 60 cm. gauge, of which little has been said in the preceding chapters, occupies but half a page. It is urged that for a war of position it can render good service. It adapts itself to the ground more readily than broader gauges, with gradients of 25 to 30 mm. and curves of 20 m. radius, but its capacity diminishes rapidly as the slope increases. It requires a numerous personnel, and, contrary to previous belief, very heavy ballasting. In a similar war in future, the main effort should be directed to the formation of units of construction and operation (for broad gauge, which Canadian and American experience in pioneer work shows to be as easily and expeditiously laid and worked with better results).

Finally—the railway is as important in plans of campaign as men, arms or science. An Army deprived of a railway, well organized and worked, would find itself in as critical a situation as if it lacked guns or munitions.

H. M. SINCLAIR.

REINFORCED CONCRETE.

By CAPT. A. F. DAY, R.E. (Published at the School of Military Engineering, Chatham, 1922.)

REINFORCED Concrete is a subject which is full of anomalies. Though based on a very few of the simplest of engineering principles, it embraces an infinity of complicated structural applications. Again, although it is subject to exact mathematical calculations, the numerical results are dependent upon empirical values, the truth of which rests upon quite incalculable human elements.

One effect of this was early to introduce the reinforced concrete specialist, and subsequently to maintain him in his position. In spite of all that has been argued against the practice, it is still customary in civil engineering to entrust both design and execution of important works to specialists. This practice has immense advantages, but it carries the objection that the architect has little, if any, control over expense. Now, expense is usually the ruling factor in peace-time military works, and the R.E. officer can never divest himself of responsibility for it. Consequently, he must always be so far familiar with the details of works in his charge as to be able to check the designs and calculations of such specialists as may be called in, and to accept some measure of responsibility for the result, of their labours.

This requires, first of all, a thorough theoretical training in the general fundamentals of every branch of engineering, and, afterwards, clear and concise guidance from approved manuals or handbooks.

Now a further effect of the peculiarities of reinforced concrete construction is to produce a literature prolific in extent but confined in direction to two principal tracks. The one is that of the constructional specialist, who enlarges upon the manifold practical applications of his art until his book assumes the appearance of a maker's catalogue; the other is that or the designer, who, being mainly interested in theoretical considerations, packs his volume with discussions on the theory of structures.

The student of reinforced concrete *per se* becomes harassed and confused. Detailed practical examples have little value until some personal experience has been accumulated; while the Theorem of Three Moments, Euler's Strut Formulæ, and Differential Equations for the determination of Bending Moments and Deflection are better studied apart. Between these two tracks, then, there existed a gap, and—be it said without further preamble—the manual under review fits into that gap with striking success, and goes far towards filling a decided want.

The author's intentions are shortly described in the Preface* as being two-fold :—firstly, to provide a manual of instruction for young officers, and, secondly, to offer guidance to others, who may be actually engaged in constructional work. Unlike many good intentions, these are admirably carried out. The book is written clearly and concisely, and follows a perfectly definite and consistent plan.

The theory of the subject is worked out from first principles, and the usual necessary formulæ are arrived at in the same way. The most important formulæ are expressed by graphs, which have been plotted over a full range of common values. By this means cumbrous arithmetical computations are eliminated, and both student and designer are saved much labour. Throughout the book the notation and quantities recommended by the R.I.B.A. Report of 1911 have been followed.

Section I outlines very shortly the basic principles of reinforced concrete design. Section II treats of Bending Moments and Loads. A few standard cases are worked out; the method adopted, if not entirely satisfactory, being straightforward and easily understood. As already pointed out, this part of the subject belongs to the General Theory of Structures, and there are various ways of approaching the calculations. In order to simplify explanations in subsequent chapters a certain amount of work on the theory of the subject cannot be avoided. It is rightly reduced to a minimum here. The illustrations of typical main beams, facing page 6, are open to criticism. The longest possible clear centre span is usually demanded, which requires two rows of piers, and involves somewhat different mathematical treatment to the cases worked out.

Sections III to VIII are devoted to Singly Reinforced Beams; Slabs; Doubly Reinforced Beams; T-Beams; Shear Reinforcement; T-Beams with Fixed Ends.

* The Preface refers to this as the second book on the subject ever published by the S.M.E. It overlooks Notes on Steel Concrete by Major J. Wina, published in 1903. Although little more than a resume of a voluminous French work that had lately appeared, it came out at a period when little interest was shown by most British engineers; and it certainly served to arouse the attention of many R.E. officers, to whom, for some time, it must have been the only introduction to this highly important subject.
[OCTOBER

Examples are worked out to illustrate the system of trial and error that is almost always called for in this work. The large number of variables in these calculations often forms a stumbling-block to the inexperienced learner, who lacks confidence in making the necessary assumptions. In the examples given work is much simplified by the use of the graphs, and figures for breadth and depth of beam are usually assumed at the start. For the benefit of the student it should be pointed out that, failing such aids, the determination of the neutral axis is usually the ruling factor; and, since this may involve awkward arithmetic, it is best assumed straight away.

The section on Shear Reinforcement is excellent, though more emphasis might perhaps be laid on the importance of this subject. Practical considerations so often lead to high ratios of tensile reinforcement being provided, that failure will first occur by shear. This point is seldom made clear in text-books.

Section IX deals with Deflection in Beams.

Section X, which treats of Columns, follows generally on the lines of the R.I.B.A. Report. This part of the Report was, the present writer believes, based on an earlier one (1907) by a French Committee, who proposed a formula for the safe load on spirally reinforced columns, that would have been well worth quoting. It has the great merit for a student of explaining itself at a glance. The formula is :---

$$\mathbf{P} = \mathbf{C} \left(\mathbf{A} + n \mathbf{A}_{\mathrm{L}} \right) \left(\mathbf{I} + m \frac{\mathbf{V}_{\mathrm{H}}}{\mathbf{V}} \right)$$

where P ==safe load on column,

A =Sectional area of column,

- A_{L} =Sectional area of longitudinal reinforcement,
- $V_{\rm H}$ =volume of helical reinforcement,
- V =total volume of column,
- n =coefficient varying from 8 to 15, and depending chiefly on nature of concrete,
- m = coefficient depending on pitch of helix, varying from 8 to 33.

Values of n and m were proposed as the result of extensive trials. The tables in the R.I.B.A. Report are believed to have been elaborated and built up from the French values.

Section XI deals with Foundations; Section XII with Retaining Walls; and Section XIII with Members under Direct Stress and Bending Moment.

Section XIV enumerates certain miscellaneous applications of reinforced concrete. In referring to chimneys, the advantages of this form of construction, when ratio of length to diameter is high, are not mentioned. The immense saving in weight and bulk over brickwork has led to a good deal of investigation of recent years into the questions of temperature stresses and effects of hot gases on the concrete.

The final five sections contain brief but useful notes on Falsework, Steel-work, Supervision, Specifications, Commercial Products.

As Appendices are given a list of symbols and a list of formulæ. The

latter might perhaps have been dispensed with; the time spent in digging a formula out from its proper context is generally time well spent. In its place we would have liked to see a summary of the IGII R.I.B.A. Report. There follows a number of useful tables, an excellent index, and lastly, the graphs, eleven in number, already referred to.

The book is thoroughly well printed and produced. A short list of *errata* has been issued, mostly minor corrections in the Tables, and no other misprints or errors have been noticed.

As a text-book for the general engineering student, as distinguished from the specialist, this volume can hardly be too highly praised, and deserves a wide circulation. The selling price to the public is not stated,* but the present writer believes that the book only requires to become known to be adopted by many schools of engineering outside the S.M.E.

When the education of R.E. officers at Cambridge was recently under discussion, an opinion was expressed that it was a mistake to adopt any University standard as that required by a military engineer; rather should efforts be made to develop and extend the School of Military Engineering until it came to be recognized by all grades of engineers as the centre of general engineering instruction.

Idealistic in conception as it may be, such a view is probably, if for financial reasons alone, impracticable in realization.

But if the S.M.E. can continue to produce text-books on a level with the Manual of Reinforced Concrete a considerable step in that direction will have been made.

G.H.A.

* The price fixed by H.M. Stationery Office is ros. 6d.-ED., R.E.J.

NOTICES OF MAGAZINES.

MILITÄR WOCHENBLATT.

No. 51.—In an article on the political position of Poland from the military standpoint, from January to March, 1922, the following situation is recorded :—No material changes have taken place in the Army, the strength of which is estimated at 300,000. Physical training of boys from 7–16 years of age, followed by a military preparation from 17–20 years of age, is carried out on the same lines as in France as a preliminary to military service. The process of arming the light artillery with French guns has been completed. Uniformity and sufficiency of clothing is still lacking. The bulk of the officers are drawn from former Legion and Austrian officers. The French Military Mission is being reduced to 100 officers under General Niessel.

The foreign policy continues to follow the French lead. The object of separating Germany from Russia, from the Black Sea to the Baltic, by means of a Federation of States under Polish domination has almost been attained. Poland has concluded treaties with all her neighbours, Lithuania excepted, with a view to mutual support of French policy at Genoa. She has also made with France an economic agreement which is declared to be disadvantageous to her.

1922.]

Poland is not satisfied with the economic inclusion of Danzig in her Customs area, but desires to absorb the Free State of Danzig wholly. Lithuania's aloofness is described as being due to the question of Vilna, a solution for which has not been found. Notwithstanding the fact that a Polish victory was obtained in the elections, England and France have not agreed to attachment to Poland. France favours the autonomy of Vilna in order not to offend the Lithuanians too far.

With the rest of her neighbours Poland has completed a number of important agreements, which, *inter alia*, in case of attack bind the signatories at least to benevolent neutrality. It is suggested, however, that a defensive alliance is certain to exist. The latest changes in the Lithuanian Cabinet are described as favourable to Poland.

The economic situation of Poland is continuing its downward grade. The budget is not balanced. In the opinion of the writer there is no possibility of an improvement.

Captain O. Groos' book, entitled The War in the North Sea, receives most favourable mention by Admiral Dick.

Owing to the lack of literature treating with the psychology of the masses, Kurt Hesse's book, *Der Feldherr Psychologos*, is warmly welcomed.

A plea is entered for the introduction of a summer uniform for German officers, who would, it is said, gladly bear the expense in order to obtain the comfort it would give them. The men already possess one.

No. 52.—An interesting review of the political and military situation in S.E. Europe appears. According to the writer, the policy of the Little Entente may be summarized under the following three headings :—

- Military encirclement of Germany's former allies, Hungary and Bulgaria (Austria has now been linked up in certain respects with the interests of the Little Entente by the Treaty of Lana).
- (2) Economic Union of the Danube States to the exclusion of the sponsorship of the Western Powers.
- (3) Equal rights with the Great Powers of Europe in conferences dealing with general European questions.

Considerable progress is recorded, largely owing to the influence of the Czecho-Slovakian Foreign Minister, Benes, to whom the credit for a *rapprochement* with Poland is due. By this means a quadruple alliance between Poland, Rumania, Jugo-Slavia and Czecho-Slovakia has been brought into being. Benes is said to have succeeded in directing the policy of this alliance in support of certain principles at Genoa. These were mainly the inviolability of the treaties which have founded the new Europe; exclusion of discussion on reparations; refusal to accept any Danube Confederation; and an united front against Germany and Russia. Prague is represented as being the centre of the Pan-Slav movement, working to gain influence in European politics with a view to being able eventually to confront Russia on terms of equality should she ever recover her strength; and concurrently making every endeavour to cut Germany out and establish a firm footing there herself. This quadruple alliance, we are told, has a population of 70 millions and possesses an army of about 912,000.

Concerning the individual States the following is reported :---

Czecho-Slovakia.—Progress is being made with the building up of the army. In case of war, 21 divisions are immediately available for service. Special importance is attached to the aerial arm, which is under French direction.

Reference is made to the Treaty with Poland of 6th November, 1921, whereby the military encirclement of Germany in the East has been completed—a success for French policy. A loan of $f_{10,000,000}$ sterling was successfully raised in England.

Austria.—In virtue of the Treaty of Lana (15th December, 1921), Austria gets a credit of 500 million kronen. This Treaty provides for mutual neutrality in case of attack, and mutual suppression of all activities directed against either State or towards the reconstitution of the former régime. In practice Austria is thereby linked up with the Little Entente. Simultaneously the military ring round Hungary has been strengthened.

The suggestion has been made in the Austrian Press to introduce the Swiss militia system. This proposal is only justified by the financial position and the failure to recruit the army, which in December last was 70 per cent. under strength.

Hungary.—The Entente has succeeded in enforcing the disarmament in Hungary in accordance with the Treaty of Trianon. The question of the monarchy continues to play a not unimportant rôle in spite of the failure of the late King Carl to re-instate himself.

Rumania.—The army estimates for 1921-22 provide for a peace strength of 192,000 men. Rumania and Jugo-Slavia concluded a military convention on 22nd January, 1922, which completed the encirclement of Hungary. Attention is directed to the *entente* with Greece, brought about by the relationships of the Royal Houses; tending on the one hand to counterbalance Italian schemes of expansion at the expense of the Balkans, but on the other to complete the military encirclement of Bulgaria.

Jugo-Slavia.—In Jugo-Slavia no appreciable progress has been made with the reorganization of the army. It remains to be seen if the replacement of General Zicevic by General Vasic will speed matters up. The shortage of junior officers continues. Sanguinary encounters occurred in Croatia and Dalmatia during the mobilization for the suppression of the monarchist rising in Hungary. Germany has concluded a commercial treaty with Jugo-Slavia in which the latter renounces the right conferred on her by the Treaty of Versailles to confiscate German property.

Bulgaria.—Bulgaria is unable to maintain by voluntary enlistment the army allowed her by treaty; last February her army, including gendarmerie, numbered 6,000, instead of 33,000. The disarmament of Bulgaria is complete.

Greece.—In Greece it is reported that the French Military Mission ceased work at King Constantine's return, since when relations have become very strained with the Greek officers. An interesting article, taken from writings of Oswald Spenglen, appears. He starts with the assumption that the XIXth century was characterized by an absence of great wars and revolutions, when even the most difficult crises were overcome by methods of diplomacy. He then proceeds to argue that the explanation lies in the universal preparedness for war obtaining everywhere, fear of which at the eleventh hour induced postponement of definite decision and the substitution of political moves in lieu. The outstanding features of the XIXth century were giant standing armies and universal conscription.

Historical allusion is made to the growth of armies and fleets since the Napoleonic era. This rivalry is summarized as being "a war without war "—a war for supremacy in armaments, preparedness, numbers, and engineering. The intolerable tension of this condition of things has come to an end with the late war by, it is alleged, the abrogation of universal conscription, a law originating from the French revolution itself. This will result in the replacement of large conscript armies by smaller armies, composed of professional volunteers, who, be it noted, are soldiers enthused for war.

Ipso facto this present century must become one steeped in war. The author estimates that two generations will pass before the warlike spirit of these professionals will prevail over the will of the peacelover. He goes on to prophecy of the vastness of the areas to become involved, together with the ruthlessness with which the wars of the future will be conducted. He supports his argument on the rapidity with which the present generation has acquired the habit of almost ignoring events which, previous to the War, would have shaken society to its foundations. In proof of this he points to Russia and asks who seriously considers the millions who are succumbing in that unhappy land.

He thinks it may safely be assumed that amidst these future catastrophies of blood and horror, the usual cry for reconciliation and peace will be raised in the degree necessary for effectively staying these grand events. However much one may foster the desire for peace it is necessary to face facts as they are. Life, if it is to be great, is hard. The choice is one between victory and defeat—not between war and peace—and the fruits of victory belong to the victor. These truths are apt to become obscured in the turmoil of events, but are confirmed in history, from which the author proceeds to quote, commencing with China, A.D. 535.

The following particulars concerning the production of munitions by Germany during the war are given from official sources :---

The total production of rifles, carbines, pistols, etc., was 10,000,000. Five months after the outbreak of war the daily production was 1,200, which later was increased to 250,000 per month. In July, 1916, the monthly output of machine-guns reached 2,300; in the Spring of 1917 it had increased to 7,000, and in the Avtumn touched 13,000. The maximum output in hand grenades was attained in the winter of 1916-17, when it totalled 9 millions a month. The following monthly outputs (maxima) are recorded.

After 1917, Guns for Light Artillery				•••		3,000
In 1917, Tree	nch Morta	rs		•••		4,300
Sandbags		•••		•••		20 millions
Steel Helmet	s					500,000
Gas Masks		•••		•••	•••	500,000

Captain Helling gives a short review of the new regulations for trench mortars.

An article appears deploring the attacks made by the Radical and Democratic Press on the meetings of Associations of ex-officers and men, which are described as, in reality, cloaking anti-republican demonstrations.

A comparison is drawn between the toleration shown to the Red Flag and the hostility evinced to the black, white and red.

No. I.-A political review of events in Russia from the military standpoint, embracing the period February to April, 1922, is penned by von W. He takes the view that no attack by Russia on the Western Front is probable so long as the reorganization of their armies is incom-Some particulars concerning the army are given. plete. It is estimated as about equal to that of the Czar's army in 1913-14, viz., 11 millions. He remarks on the dwindling gold reserve and the effort to improve the situation by the confiscation of Church property-a measure calculated to offend most deeply the religious susceptibilities of the Russian people. That the Soviet Government should dare to place such an act on their statute-books is, for him, proof enough that their power is still maintained, notwithstanding rumours to the contrary. The situation arising out of the Genoa Conference is discussed together with the effects of the Treaty of Rapallo.

The results of the trials of the War Criminals held at Leipzig are declared to have vindicated German innocence—a fact which, in the opinion of the author, is slowly but surely being realized in neutral countries.

Nos. II and III form a combined number, doubtless owing to the strike. General von Altrock writes to refute the complicity of the German officer in the murder of Rathenau.

H. DE C. TOOGOOD, Captain, R.E.

28th August, 1922.

REVUE MILITAIRE GÉNÉRALE. June, 1922.

The Revision of the Regulations.—A continuation of the article by "Lucius," sixth period, continued.—II. Application to the Great German Offensives of the Spring of 1918. 1st.—The German offensive in Picardy of 21st March was the greatest since the war began. On a front of 70 kilometres between Scarpe and Oise 73 divisions were engaged, 50 of which were brought up by night in seven days. The artillery preparation (12 field and 11 heavy batteries per kilometre, or 1 gun per 10 metres of front) lasted five hours, two of which were against the hostile artillery. The British only were attacked, the 5th Army

[OCTOBER

(Gough) by three times its number, and here the Germans broke through. French reserves were hastened up to close the breach, but, if the Germans had had cavalry available, the case might have assumed a different aspect. As it was, the attack was checked by 30th, and when it was renewed on 4th April a new front had been formed round the salient, which was 50 kilometres deep. Ludendorff then suspended the operations in Picardy, and on 9th April launched an offensive in Flanders between the La Bassée canal and Armentières on a front of 15 kilometres (extended later to Ypres) with nine infantry divisions in first line, and later by five fresh ones (artillery preparation, two hours). After an initial success this attack was stopped by the determined resistance of the French at Mount Kemmel (25th April). The salient formed was 12 kilometres deep.

Considering that until the first days of April the Germans enjoyed a superiority of two to one, the reason for their failure requires investigation. The most important one was their lack of adequate reserves. To feed the 73 divisions at first engaged, 10 fresh ones were brought up after the first six days, nine others between 1st and 8th April, and the attack in Flanders required another 38 divisions, a total of 130 divisions or two-thirds of the German force on the Western front. Another reason was want of rapidity in the advance, which allowed of forces being assembled to meet the danger. In fact, once the German infantry was separated from its barrage, its progress was very circumspect and was checked by the slightest resistance. Ludendorff recognized this, and in a series of Notes further defined his doctrines, first postulating that success depends on rapidity and energy in execution, and the initiative displayed by the infantry when in action beyond the first line. He again pointed out the two phases of the battle, the methodical attack on the fortified position minutely prepared and regulated by the higher command, then the attack on troops no longer installed on a continuous line, when long preparation must be abandoned to give no time for the enemy to rally, and success depends on the junior commanders forestalling the enemy. The regimental artillery frequently intervened too late, and Ludendorff foreshadowed the eventual attachment of a group of field artillery, and even some heavy guns, to enable each battalion to dispose of a section of guns and the regimental commander to make his action felt in case of necessity. In another place he indicated the tactics to be followed in reducing machine-gun positions, instead of rushing them with the bayonet. " What is decisive is not numbers, but fire."

After the offensives of 21st March and 9th April the Germans hoped to be able to join up the two salients they had formed. But the common danger had led the Allies to a step in advance towards unity of command and on 26th March the co-ordination of the action of the Allied Armies on the Western front was entrusted to General Foch, and at length, on 14th April he was given the effective command of the allied forces. The Germans had dearly bought their first successes; their losses had been severe, and at least a month would be required before they could attempt a fresh effort, a delay which the Allies could also turn to good account.

and.-General Foch was already preparing a counter-stroke to free the Amiens-Paris railway when he was anticipated by the German attack on the Aisne of 27th May. Faithful to his principles, Ludendorff had chosen the lightly held Chemin des Dames front for his new effort, and, in place of seeking a decision by again attacking the British Army, preferred first to draw the French reserves southwards and exhaust them. The mass of the French Army was now concentrated to the North, where there were many indications of a fresh offensive, and on the 60-kilometre front selected for the attack there were only eight divisions in first and four in second line. However, less confident of breaking through than on 21st March, the enemy limited the objectives to be attained as the general line Rheims-Heights of the Vesle-Soissons. The German concentration of 30 divisions was, with slight exceptions, carried out by night, and, to ensure surprise, the artillery preparation was to last for only two hours and forty minutes-one gun per seven metres in the densest portion of the front. The infantry strength of the attack was 42 divisions or five times that of the defence. On the evening of 27th May the attack reached the Vesle and halted on its objective, when orders were given to push on south and southwest to gain the Marne, which was reached on 30th. Here again a mass of cavalry thrown into the breach would have been of inestimable value to the Germans. On the wings the results were less brilliant, Soissons was captured on 29th, but Rheims held ; further efforts failed to enlarge the salient, and by 4th June the 42 divisions had been exhausted by the 50-kilometre advance. The French had engaged all their cavalry divisions and 30 divisions of infantry, also two American and one British divisions. The position was critical and reserves almost all expended. However, Ludendorff was about to open his intended attack on the right bank of the Oise, but required time to bring his artillery from the Aisne, and the proposed date was postponed from 7th to 9th June. His preparations had been detected, surprise was impossible and his losses were heavy. The artillery preparation, as usual by night, lasted 4 hours 20 minutes, and 10 infantry divisions, 13 in first line, attacked on a front of 35 kilometres. The French had 7 divisions in first line, 4 in second, and the attack penetrated 8 kilometres in the centre, but was slower on the wings. On roth slight progress was made, and on 11th the French delivered an unexpected flank attack with 4 fresh divisions and 163 tanks, which brought the Germans to a standstill by 15th, but exhausted all the French reserves.

The German offensive methods had given them a very large measure of success, but on 9th June Ludendorff had to issue another Note recalling the dominant principles, particularly the boldness and energy to be displayed by the infantry. "Speaking generally, excessive boldness is less harmful than too great circumspection. . . It is the duty of the higher command to watch the rear and the security of the flanks. . . The enthusiasm of the infantry, its aptitude for marching, its endurance and spirit of self-sacrifice, notably in the officers, are primary conditions of success." Still, disquieted by the diminution in his effectives, he insisted upon the necessity for husbanding the infantry by greater use of the machine-gun and regimental artillery, and on

OCTOBER

engaging the reserves where the attack was making the best progress. He made it clear that breaking through was of less importance than inflicting on the enemy greater losses than those experienced. On 13th and 16th June he issued further Notes on artillery tactics.

3rd.—It was not until the middle of July that the German Army was again ready to attack; of their 207 divisions &r were in reserve, but half of these had not been brought up to strength. Meanwhile, on 21st June the German Chancellor, von Kuhlmann, announced that the war could not be decided on the battle-field, on which Ludendorff decided to stake his all. Since the Château Thierry salient (result of the offensive of 27th May) could not be enlarged westwards, he decided to extend it by a grand offensive on both sides of Rheims towards Chalons and Epernay, on a front of 90 kilometres, and if this was successful to open another in Flanders. But in Champagne, East of Rheims, the French had a strongly fortified position, a zone of advanced posts with an intermediate position for the main defence, held by 70 infantry divisions, of which 27 were organized for a vigorous counter-attack. The battle opened on 15th July, after an artillery preparation of 3 hours 20 minutes. On the front of the French IVth Army (42 kilometres) 50 divisions attacked (26 in first line) 13 French divisions, of which only 8 were in first line, but these were supported by a powerful force of artillery. The advanced line was broken, but the intermediate position held, and by noon the attack had failed. On the Marne, the . river was crossed on a 22-kilometre front by 13 infantry divisions, of which 8 were in first line. The crossing began during the artillery preparation of 3 hours 40 minutes, in order to bring the infantry to their position of departure south of the river. The French VIth Army of 9 divisions, of which 51 were in first line, checked the attack by the evening, after it had advanced 5 kilometres, and no German artillery had been able to cross the bridges. However. between Rheims and the Marne the Germans made better progress, advancing 10 kilometres against the French Vth Army, but on 16th and 17th the enemy was checked, while the position of the German divisions, which had crossed the river became critical. On 18th General Foch opened his counter-offensive on the German right flank between the Aisne and Belloy on a 40-kilometre front. The Xth Army, to the north, (18 infantry divisions, 470 batteries, 244 medium and 225 light tanks) attacked without any artillery preparation, and south of them the VIth Army (9 divisions, 230 batteries, 48 medium and 225 light tanks) after 11 hour's preparation. The Germans were absolutely surprised and retired 8 kilometres on a 20-kilometre front. For 5 days Ludendorff strove to restore the situation but failed, as the French Vth Army was now menacing his other flank. He then issued orders to recross the Marne on night 19th/20th, and to evacuate the salient as far as the Vesle, at the same time renouncing his blow in Flanders. The initiative now passed finally into the hands of the Allies.

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(To be continued.)

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