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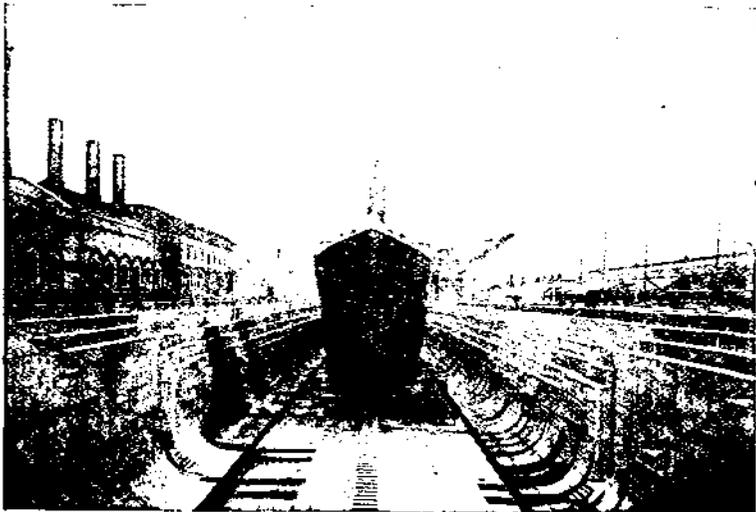
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*THE JUNCTION OF THE INDIAN AND RUSSIAN  
TRIANGULATION WORK IN THE PAMIRS.*

THE following account of the preliminary work in connection with the junction of the British and Russian survey work in the Pamirs as well as extracts from letters of the late Lieut. H. G. Bell, R.E., has been reprinted with the kind permission of the Surveyor-General in India from the *Records of the Survey of India* for 1912-13.

In 1913 the work was continued and completed by Lieut. K. Mason, R.E., who gives an interesting account of it in the June number of the *Geographical Journal*.

*Kashmīr Secondary Operations.*—In 1909, the International Geodetic Conference passed a resolution embodying the desirability of effecting a junction between the Indian triangulation and Russian work in the Pamirs. Accordingly, during the summer months of 1911, after the completion of observations which carried the Kashmīr Principal Series to points not far south of Gilgit, reconnaissances were undertaken of the country intervening between that series and the Pamirs, with a view to discovering a practicable route to be followed by the Indo-Russian connection. Three schemes were suggested to the officers entrusted with the reconnaissances.

The first was to extend the Kashmīr Principal Series as far as the Sakiz Jarab Range, on which stations would be established to the east of the Darkot Pass. From these points it was hoped that observations might be made to Concord and Salisbury Peaks on the Afghan-Russian border, which peaks would be included by the Russian observers in their triangulation on the Pamirs. The investigation of the practicability of this scheme was undertaken by the late Lieut. H. G. Bell, R.E. He reported that the main chain of peaks of the Sakiz Jarab Range was inaccessible and that the hills immediately to the south, only a little less difficult to negotiate, though they offered a satisfactory view to the north, were hidden from the south by high inaccessible peaks, effectually obstructing triangulation carried from the terminal points of the Kashmīr Principal Series.

A second scheme involved the carrying of secondary triangulation from the Principal Series, up the Yasin and Karambar Valleys to the neighbourhood of the Gazan and Bhort Passes, from which the Concord and Salisbury Peaks might be visible. After finding that the carrying of triangulation to the Darkot Pass was not feasible, Lieut. Bell turned his attention to the Karambar Valley. He found that

secondary triangulation could probably be taken as far as Harmot or Imit but that beyond this place the valley narrows considerably between precipitous hills and further progress was impossible.

The third alternative scheme was examined by Mr. Wainright. This was for secondary triangulation to break off from the Principal Series just south of Gilgit and to follow the Hunza and Kanjut Valleys as far as the Kilik and Mintaka Passes, and from thence to extend over the Taghdumbash Pamir to a junction with the Russian points. This scheme was found to be practicable. The valley as far as Hunza is comparatively open and the hills, though difficult, not inaccessible. Beyond Hunza, though the valley narrows in somewhat, fairly well-conditioned figures can still be laid out as far as Misgar. Here, in order to obtain triangles of sufficient length of side, the series has to run westward, out of the valley, and bending again in a general northerly direction, approach the Kilik Pass from the south-west. From this pass the triangulation can be easily carried across the Taghdumbash Pamir to the Russian points near the Beyik Pass.

As, by the time the reconnaissances had been carried out, the season was getting late and unfavourable weather was setting in, nothing further could be done that year. The Party returned, in the autumn of 1911, to India and a programme of work for 1912 was elaborated. With its final scheme worked up as far as possible, the detachment left India in May, 1912, to commence the actual observations. Recruited under Lieut. H. G. Bell, R.E., during the latter half of April at Rāwalpindi, after completing its equipment, it marched to Gilgit. Bandipur was reached on the 8th May, some little delay having been caused by deep snow encountered in the Tragbal and Burzil Passes. By May 31st all the detachment had been assembled at Gilgit and there the plan of operations was given final shape. Reconnaissances of the previous year had shown that the Hunza and Kanjut Valleys were probably practicable for triangulation, which, following this course, might be carried up to the Taghdumbash Pamir to effect a junction with the Russian triangulation, the terminal points of which were situated in the neighbourhood of the Beyik and Sarikoram Passes. It was proposed to base the triangulation on a side of the Kashmir Principal Series in latitude  $35^{\circ} 55'$  and longitude  $74^{\circ} 20'$ ; to carry it thence northwards to about latitude  $36^{\circ} 12'$ , where, following the valley, it would trend eastwards to longitude  $74^{\circ} 20'$  and at this point, near Atābād, it would again extend north to the Kilik Pass in latitude  $37^{\circ} 07'$ . From this pass, the Russian points lie to the north-east on the far side of the Taghdumbash Pamir in about latitude  $37^{\circ} 20'$ , longitude  $75^{\circ} 10'$ .

Between Gilgit and Hunza, the valley of the Kanjut River is comparatively open, the hills on either side are more accessible than is the case higher up the valley and as far as Hunza a graded road runs

along the right bank of the stream. In the neighbourhood of Baltit lofty snow masses rise above the valley on both banks. On the left bank, Rakiposhi Peak attains a height of 25,550 ft., while towering over the nearer masses on the right are the Hunza Peak (25,050 ft.) and a group of summits all over 24,000 ft. in height.

Beyond Baltit the hills close in to the stream, the slopes become barren and rugged and progress correspondingly more difficult. In many places the pathway is carried along the face of precipitous scarps supported, gallerywise, on iron or timber struts; in others the pathway climbs the hillside till it is possible to skirt the top of precipices too formidable to be dealt with by any such type of bridging. These steep ascents and subsequent descents to the villages lying close to the river, make marching in the summer months most trying; the heat in the narrow rocky valley is intense and travelling is, whenever possible, done before sunrise. After the flood water in streams has subsided, about November, the hillside path over the difficult stretches is generally forsaken for the river bed. Four marches above Baltit, the lower end of the much serrated and crevassed Batur Glacier is encountered. About 1 mile in width at this point, this glacier, striking the Kanjut Valley at right angles, forces its way across the river bed, butting up against the hills on the left bank. Seven marches from Baltit the junction of the streams from the Mintaka and Kilik Passes is reached at Murkushi. Here, there is a small grassy level thickly covered with willows, the last timber seen on the march to the Pamirs. From Murkushi two routes lead to the Taghdumbash Pamir, one *viâ* the Kilik, the other over the Mintaka Pass.

The scheme decided upon by Lieut. Bell was that he and Mr. McInnes should march at once to the Russian points on the Beyik Pass and, commencing building and observing there, work gradually over the Kilik and Mintaka Passes and down the Kanjut Valley to effect a junction with the triangulation which Mr. Collins and Mr. Abdul Karim were to carry from its lower end as far up the Hunza Valley as they could. In the meantime Mr. Abdul Hai was to effect a junction between the Kashmir Principal Series and the figures laid out by Mr. Collins in the Hunza Valley.

The various sections left Gilgit for their respective localities during the first week of June, but owing to unfavourable weather, very little reconnaissance and no observing was possible until 23rd. It was during this spell of bad weather that Mr. Abdul Hai's Camp on Yasho Chish Peak was struck by lightning. His servant was killed; his recorder was severely burnt, while he himself received a shock necessitating his return to Gilgit and eventually to headquarters in India.

Yasho Chish is one of the stations of the Kashmir Principal Series and was the first point visited by Mr. Abdul Hai in his attempt to

effect a connection between this series and Mr. Collins' Hunza Valley work. On the recall of Mr. Abdul Hai, the responsibility of this connection fell to Mr. Collins who had, in the meantime, carried the reconnaissance and building of stations up the right bank of the river as far as Hunza. Leaving Mr. Abdul Karim to continue from there the building up both sides of the valley, he returned to Gilgit and took up the observations, commencing at the base stations on the Kashmir Series. By July 28th he had completed work at four stations when he received news of Lieut. Bell's death and returned again to Gilgit to assume charge of the detachment.

Lieut. Bell and Mr. McInnes, on leaving Gilgit early in June, marched through the Kanjut Valley and over the Mintaka Pass to the Russian stations on the Beyik, which they reached on June 20th. Lieut. Bell then took up the work of observing while Mr. McInnes proceeded southwards towards the Kilik Pass, reconnoitring and selecting stations. While on the Beyik, Lieut. Bell spent one day with the officers of the Russian Survey Party encamped near Kizil Rabāt. Compliments were exchanged and experiences related. In one of his letters Lieut. Bell alludes briefly to this meeting; "dressed in long boots of the country and a *choga*, escorted by three local headmen and by Hunza interpreters, I crossed the Beyik Pass into the Russian territory to meet the Russian Survey Officers. I was met by a cavalcade consisting of the Colonel, a Captain, a Lieutenant and their escort of cossacks and cavalry."

Lieut. Bell had completed observations at three stations and had moved camp to his fourth station near the Mintaka Pass when he was seized, on 19th July, by an attack of appendicitis. Obtaining no relief and suffering much, he moved down to Lup Gaz, some 8 miles north of the Mintaka Pass, and on 25th morning sent to Mr. McInnes, then in the neighbourhood of the Kilik Pass, asking for assistance. Mr. McInnes arrived at Lup Gaz on the afternoon of the 25th to find Lieut. Bell very weak. During the previous five days there had been no sign of any definite improvement in his condition and after Mr. McInnes' arrival at Lup Gaz, the malady seemed to become gradually more acute. Late in the evening Lieut. Bell began to sink rapidly and about midnight he died. His body was interred temporarily near the Mintaka Pass to be brought down later, when the state of the Kanjut River permitted, to Gilgit for burial in the cemetery there.

The detachment was now reduced to three observers. The lateness in the season, the remoteness of the locale of operations and the impossibility, in any case, of completing the triangulation this year, were against the sending of another officer to take Lieut. Bell's place.

The charge of the detachment now devolved on Mr. Collins, who continued observations on the section between Atābād and Gilgit,

directing Mr. McInnes to take up the selecting and building of stations in the difficult country between the former place and Misgar, while Mr. Abdul Karim undertook the laying out of triangles southwards from the Kilik Pass, where Mr. McInnes had stopped, to Misgar. Mr. McInnes laid out six stations, forming sufficiently good figures, carrying the series to Misgar where he connected with Mr. Abdul Karim's section. This last portion of the triangulation between the Kilik Pass and Misgar, however, was very poor. The course selected for the series was badly chosen and the figures laid out were unsatisfactory. Before, however, a better disposition of stations could be arrived at, the weather got rapidly worse, and winter began to set in; new snow had fallen down to a level of about 11,000 ft., and the work of observing became daily more difficult. Field operations were accordingly closed on 18th September, the detachment recalled to India and disbanded on October 25th at Dehra Dun.

The following are extracts from the letters written by Lieut. Bell and give a more detailed account of the work done by his party:—

EXTRACTS FROM LETTERS FROM THE LATE LIEUT. H. G. BELL, R.E.

"*Bandipur, May 17th, 1912.*—To-morrow morning early, I start off on my northward way. Everything is as ready as it can be; all my loads are made up and coolies engaged. We are going in two parties, each taking about 120 coolies. The first pass is open for ponies; of the second I have no certain news."

"*May 21st.*—Since leaving Bandipur, I have been through all sorts of trials and tribulations. I got away from Bandipur in fine weather, and rode up the zig-zag ascent to Tragbal Bungalow, height about 9,000 ft. There was still some snow round the bungalow and in the evening it rained. Early in the morning I got everything packed up and we started off to cross the Tragbal Pass, 11,700 ft. It is quite an easy pass, but it is a bad place to get caught in a storm. It started to snow just as we got over the pass, and in the valley below it was pouring with rain. I found the bungalow in a sorry state, only two rooms were habitable; the others and most of the outhouses have been carried away by an avalanche. Luckily it cleared up soon after we arrived and we were all able to dry ourselves. Next day was fairly fine and I went down to Gurai Valley and then along the Kishenganga Valley to Gurais. There I had to change my ponies for coolies, so the loads had to be rearranged."

From Gurais to Burzil, the march was apparently slow and troublesome. The coolies had not yet settled down to routine and the distribution and adjustment of loads was not effected without some trouble.

"We reached Burzil about 3 p.m., the last few miles being over the snow. The bungalow itself was quite surrounded by it. Once more

I had to rearrange the loads and get everything ready for an early start on the morrow. We all got off before 3 a.m. and started the ascent of the pass by lantern light. Over the snow, I toiled along after the coolies and got up to the top of the pass by 8 a.m. just as it began to snow. The descent to Chillum is long but gradual and we got there by 4 p.m. in pouring rain and snow. At Chillum I had again to change my coolies for ponies, so I paid off the coolies and once more made up pony loads. Next morning it was snowing very hard, so I decided not to march that day and sent the ponies down the valley to get food and shelter. Next morning it was beautifully fine but the ponies which I had ordered did not turn up. A few came in the morning, the rest did not come till 4 p.m. So I left my assistant there and came on with what ponies there were. It soon began to snow again and then it got dark. The road was strewn with boulders that had lately come down the khud, and some were still falling. However, I went on in practical darkness, running across the bad places to avoid falling rocks; one only missed me by a few yards. Several of the ponies died of exposure, chiefly owing to the carelessness of their owners who left them in the snow without any covering or food.

“Eventually I reached Godhai Bungalow at 9.30 p.m. The majority of the ponies arrived a short time after.

“I left Godhai at 11 a.m. and got here, (Astor), another 17 miles march by 5.30 p.m. The scenery along this last march is very grand. In one place, the road passes through a deep and narrow rocky gorge and from above it one gets a peep at my old friend Nanga Parbat. To-day I halted to let my assistants catch me up. They got in in the afternoon. The road in front is badly broken, so there is not much chance of getting on just yet. I don't know what has become of the other half of my detachment, which should be two days behind me. I can't find out as the telegraph line has been broken for three days. The weather has been awful for this time of the year and has quite upset my plans. I hope to leave here to-morrow or the day after, so I ought to be in Gilgit before the end of the month.”

Bell reached Gilgit on May 28th. Owing to the recent rain, the heat in the Indus Valley was not as great as usual and apparently no troubles were met with beyond those incidental to long marches and bad roads.

Between May 28th and June 4th, Bell was occupied in organizing his detachment for its work in the Kanjut Valley. This was no easy matter and seems to have caused a good deal of worry. On June 4th he wrote: “It has been a great difficulty arranging supplies for my whole party and now my men are all dissatisfied and giving me a lot of trouble because in a place like this, where food is scarce, it is impossible to buy a large quantity at the usual bazaar rate. It is getting quite hot here. I shall be glad to get away to a cooler

climate." In this same letter he mentions that on the day after his arrival in Gilgit he had been in bed with severe stomachic pains which he put down to bad water which, he thought, he must have drunk somewhere.

On June 4th, making an early start, Bell with one of his assistants marched 18 miles to Nomal in the Hunza Valley. He seems to have been greatly rejoiced by the greenness of this village, well irrigated and cultivated in the midst of a barren forbidding country. On the succeeding days, he marched to Chalt, Hindi, and Baltit, which he reached on the 7th. Of his arrival at Baltit he wrote: "Marched from Hindi to Baltit, the residence of the Mir of Hunza: quite a pleasant ride through a succession of villages. A few miles out we were met by the Mir's younger son. On our arrival, we found a tent pitched for us in the Mir's garden and presently he, his Wazir and his eldest son came to welcome us."

On 8th he stayed at Baltit, dismissing his pony transport and rearranging the loads for coolies.

On 9th June, "though we were up very early, it was 7 a.m. before we got all our loads packed on to the coolies and started off, a task made all the more difficult as we had to do everything through interpreters. The Mir came to see us off and we started on foot as the made road stops here, and there is only a track winding up and down the precipices, no road for a nervous traveller, as it consists in many places of very kutchu-built galleries hanging over the precipices and a false step means a fall of several hundred feet. This evening we camped in a flat place by the river, the village of Atābād being in the hills above.

"10th. We continued our march to Gulmit, the road being rather worse than yesterday and the heat on the hillside rather trying. We camped in an orchard of apricot trees and were much worried by flies.

"11th. This morning our departure was delayed somewhat by our having to change some of the coolies. However we only had a short and easy march to Pasu, a village near a big glacier.

"12th. We left Pasu early, and had to cross the Batur Glacier which took us about an hour climbing up and down the masses of dirty black ice, bestrewn with all sorts of débris. We breakfasted on the glacier and continued our march to Khaiber, another small village where we met the hero of a hundred fights, a very cheery old man aged about a hundred.

"13th. To-day, we did another easy march, crossing the river by quite a decent bridge and camped at the village of Sost. We had a bad storm in the afternoon and the dust got blown into everything. The Mir's brother came to see me in the afternoon and I had a fairly long talk with him.

"14th. It was raining slightly very early this morning but soon

cleared up and we started off. Soon we had to ford the river, rather a perilous proceeding. We had two ponies on which several of us got across but the coolies had to wade. However they all got over safely though they were nearly washed away. The track was very bad along this march; in places it went along steep cliffs with very little foothold. In the afternoon we reached Misgar, the last village in British territory.

"15th. This morning we sent the main camp on to Murkushi and started to climb a hill above Misgar with just enough kit for the two of us for one night. We got up above the snow line by about 3 p.m., and camped there. In the evening we both had bad headaches and did not eat much dinner.

"16th. It was snowing when we got up but we climbed still higher and reached one peak only to find another still higher in front of us. The coolies had got behind. I had to go back to fetch them. Thus we went on a little further and came to such steep cliffs that we could not get up there with all the fresh snow about, so we gave it up and came back to camp; packed up and came down to Misgar. There we got ponies and rode on here (Murkushi), arriving about 5 p.m.; a very strenuous day. We were on the move for 12 hours with barely a rest."

On 17th. They halted at Murkushi to reassemble their kit and to ration the coolies. On the following day, they marched to Gul Khwāja at the foot of the Mintaka Pass in a snowstorm which, however, stopped in time to allow of tents being pitched and camp established "in the dry." In the afternoon Bell went out in the hope of securing an ibex head, but without success. On 19th, the party crossed the Mintaka Pass. "Again the track was very bad, and gave no end of trouble. One yak went over backwards and was only saved from an untimely end by several of us holding on to his horns till his load was cut loose. We crossed the Mintaka Pass in a snowstorm about 12 noon, leaving British India behind and entering Chinese Turkistan and the "Roof of the World." The descent on this side brought us down into a wide open valley covered with green grass where lots of yaks were grazing. We followed the valley down a long way till we reached an encampment where we were ushered into a "yart," a round dome-shaped wooden framework covered with felt, draped with embroidery inside and carpeted with thick rugs where tea and sweets were brought to us. The Sarakoulis are fine big men, very cheery and good-looking. Clothed in their many wadded coats, long boots and fur caps they look very picturesque. They certainly are most hospitable. They keep one "yart" always ready for guests. Some of our kit did not arrive till after dark owing to the difficulties of the road and the bad weather.

"20th. We stayed in camp to-day as it was very cold and stormy; repacked our kit and prepared to separate on the morrow. Several

headmen came to see me and I had to give them tea and entertain them."

On 21st Bell moved towards Beyik while his assistant, Mr. McInnes, turned off towards the Karchanai Pass. The next day Beyik Pass was reached and the two Russian triangulation stations located, the camp being established in a small open valley at the foot of the pass. On 23rd, he had a stiff climb to the eastern survey point in a snowstorm. By the time he had reached the summit, however, the weather had cleared and he got a view all round. He remarked that the Pamirs on the far side were much lower than those he had crossed and the mountains quite insignificant.

On 24th, he moved camp down the nullah back to Beyik, going out in the afternoon to select his first station. He also wrote a letter, in French, to the Russian Survey Officer, whom he thought to be encamped at Kizil Rabāt. He learnt later that, though expected, this officer had not yet arrived.

On 25th, he moved his camp into a small nullah close under his first station.

He writes on 27th: "We had more snow last night, but it cleared up in the morning and I moved up the nullah north of my camp and climbed up a long way and pitched my small tent in a very damp and cold spot, the only more or less flat one available.

"28th. Up at sunrise; moved further up the nullah and got on the ridge; went along its knife-like edge to a more or less flat place where I put up a signal station. A fine sunny day but even then my feet nearly got frozen with the cold. I stayed up there some time and then came down to my main camp; a long descent from 17,000 to 12,000 ft. On my arrival, I found McInnes there. After consultation, we decided to give up the scheme of the Karchanai Pass and try to go round by the Kilik."

On 29th, camp was moved again up the Beyik Nullah towards the western Russian point. The weather had improved, for Bell remarks that it seemed "to have changed for the better at last." On July 3rd, he was again at his first station about to commence observing. On this day he was not in camp till 9.30 p.m., for after completing the march, he went out after *ovis poli*. He secured one head but the stalk had taken him a long way from camp. "By the time we had cut his head off, it was dark and we had a long trek back to camp and an icy cold stream to cross. However I got there by 9.30 p.m. hungry and weary but elated and was up by 6 next morning."

On July 4th, Bell commenced observing under difficulties; a high wind was blowing and snow began to fall, and it was not till the next day that he managed to get work at this station finished, moving down afterwards to his main camp.

On July 6th, we "climbed up the Russian west station and found

the Russian signal deep in snow. However with 12 men and a bucket and phowrah we cleared away 10 ft. of snow all round it and pitched the observatory tent and made a platform for our tents. In the evening it started to blow and snow.

July 7th, I did observations and spent the rest of my time cooking my food, for when I go up to the stations, I can't take my cook as I have only 12 coolies to take up my own and my babu's kit, etc.

On 8th, he finished work and moved back to his main camp, going out in the evening after poli again but failing to get a shot.

The next day Bell went over to the Russian Survey camp, where he was received by the Russian officers, a Colonel, a Captain and a Lieutenant, and entertained in a "yart."

He wrote: "We were very merry and they most hospitable. I had to write my name in their pocket books and they in mine. Then we adjourned to photograph each other and returned for more refreshment. Then they escorted me back to the pass and we parted the best of friends.

"So now I have been into three empires this season and to the most northern point the Survey of India has reached."

On 10th and 11th, he prepared the Russian eastern point to receive his observatory tent, finished observations there and came down to his main camp. On 11th, he wrote: "I am very fit and have quite got my mountain legs and feel full of work."

From this station, Bell marched back towards the Mintaka Pass, to his last camp at Lup Gaz.

## DELHI DURBAR.

### SPECIAL REPORT ON AMPHITHEATRE.

THE "Durbar Amphitheatre" is held to include the whole of the location where the Durbar Assemblage took place, and the site which it occupied in this case was identically the same as that chosen for the 1877 and 1903 Durbars.

This report comprises the execution of the following works, but does not deal with any Military or Railway arrangements and operations:—

- I. The Durbar Shamiana with raised dais where Their Majesties received the homage of their Indian nobility and subjects.
- II. A Throne Pavilion from which His Majesty announced his Coronation as King-Emperor to all present.
- III. A covered Durbar stand for the accommodation of the Indian Chiefs, Durbaris, "Pirdah Nashin" ladies, the high officials of the Government, and certain privileged spectators.
- IV. An extensive uncovered stand for the general public, school children, etc.
- V. Erection of a flagstaff from which to fly the Royal Standard.
- VI. Retiring accommodation for ladies and gentlemen.
- VII. Water supply arrangements.
- VIII. Fire protection.
- IX. Laying out the grounds.
- X. Roads and paths.
- XI. Matting and felt.
- XII. Police parking grounds for vehicles.
- XIII. Temporary offices, workshops and godowns.
- XIV. Dressing and clearing up.

And these works will now be described in detail.

I. *The Durbar Shamiana*.—This was an open Shamiana 60 ft. by 60 ft. with an interior portion 20 ft. by 20 ft. raised and reserved for the dais with thrones on which Their Majesties were seated. The roofing of this portion was raised to a central finial from which the crimson velvet covering fell away towards the four sides. A deep fringe of crimson velvet highly embroidered with gold threadwork

was suspended on all four sides and the roof covering and fringe being lined with pale buff silk. Within the central portion there was hung over Their Majesties a richly embroidered "Chandoa" of velvet with gold tassels. Gilt finials and hammered copper-gilt posts completed the decoration of the Shamiana, which, in the bright sun with a light breeze playing on it, presented a magnificent appearance of oriental splendour. The plinth of the Shamiana was raised in ornamental plaster panels and was enclosed by a low railing in neat open geometric design with stepped approaches from all sides. Carpets specially designed and made in the Montgomery and Lahore Jails overlaid the red felt floor covering.

The central portion was again raised and was carpeted with crimson velvet handsomely embroidered in gold. The Throne chairs were placed on a small central dais 8 ft. by 8 ft. by 18 in. high, panelled in white marble and covered with an all-gold carpet made specially in Delhi. The flooring which was exposed at the platforms and plinths and on the stepways was laid with white marble, and the plaster panelling, railings and buttresses were painted plain ivory white. In order to prevent any undue vibration of the framework of the Shamiana by wind, the posts were guyed by flexible wire chords anchored into the ground and wound round with gold tape.

From the Durbar Shamiana there was a raised Processional Way to the Throne Pavilion which was 149 ft. long by 20 ft. wide, with a low gilt post and white cord railing down each side, and having a flooring of heavy red felt.

11. *Throne Pavilion.*—Particular attention was given to the construction and ornamentation of this structure as the Royal visit to India may be said to have been centred on this spot. In order to give adequate command for Their Majesties both to see and be seen by the vast concourse of troops and spectators assembled within the Amphitheatre, the pavilion was erected at the summit of a succession of rising terraces working up to a height of 15 ft. at the Throne Dais.

These terraces were 100 ft. radius octagonal, 80 ft., 50 ft., and 20 ft. square, the heights being 2, 5,  $3\frac{1}{2}$  and 3 ft. respectively, which, with the Throne Dais 8 ft. square and  $1\frac{1}{2}$  ft. high, gave suitable proportions and the required height. The plinths of all the terraces were highly ornamented, the plaster panels being beautiful examples of the Lahore School of Art design and plaster work. The lower octagonal terrace had a railing of small gilt posts with single white cotton rope and was laid with red bajri. On the plinth of the 80-ft.-square terrace a low openwork plaster panelled railing was erected. This and the 50-ft. terrace had white marble flooring.

As in the case of the Durbar Shamiana, the 20-ft.-square terrace and Royal Dais were laid with gold-embroidered crimson velvet and solid gold carpets respectively.

All approach stepways, which were not covered with red felt, were

of white marble. The Pavilion itself consisted of a made-up steel framework on which was fitted the golden dome with its beautifully ornamented plaster parapets, eaves, frieze, brackets and pillar casings. From under the eaves a velvet-roofed awning measuring 50 ft. by 50 ft. was spread out on all four sides in order to give protection from the sun. This awning had a deep fringe on which embolic signs and the Royal Monograms were embroidered in gold, and inside it was lined with pale yellow silk. Over the thrones again there was a suspended "Chandoa" of singularly rich design and make. The posts supporting the awning were encased with stamped copper-gilt sheathing and the gold guy lines gave the awning rigidity and finish.

The plinth panelling and platforms and all plaster and woodwork up under the awning was painted ivory white and above that the dome and parapets were covered with gold leaf with the result that the whole Throne Pavilion made up a dazzlingly beautiful structure well worthy of the momentous occasion.

III. *Covered Durbar Stand.*—The stand was in the form of a semi-circle having a radius of 100 yards, on the centre of the Throne Pavilion; but subsequently the Pavilion was pushed further out in order to stand more prominently in the Amphitheatre area.

The centre of the mound lay over that of the spectators' stand of the 1903 Durbar, and the stand, as in that case, faced out towards the north.

This stand was roofed over as a semi-circular shed divided off into 24 bays each having a depth of 60 ft. clear with an extra 20 ft. thrown out at the back giving an over-all roof of 80 ft. The ends were rounded off and left open. The ordinary accommodation amounted to 12,256 seated, and about another 2,400 persons standing on the terreplain at the back, but the actual numbers on the stand at the time of the Durbar was probably in excess of these totals as extra chairs were put in.

The front row 4 ft. wide was reserved for Indian Princes and the highest officials, behind them in three rows being the other Durbaris and officers. A passage 5 ft. wide separated those doing homage from the privileged public who were seated in the next 23 rows.

Indian ladies, limited to the family members of the Princes, were accommodated in screened-off boxes which were placed at the back of the centre eight blocks and constructed with partitions and curtains so that absolute privacy was obtained.

A Block at the East end of the stand was specially reserved for Press representatives, and, in addition, a stand was erected in the line of the troops near the Throne Pavilion for cinematograph operators and photographers, and they were also allowed to take up position in the eaves kiosks on the roof of the Durbar stand itself.

The seat tiers were made 6 in. high radiating on the common centre, and by reducing the number of roof supports along the front to a

minimum, and by placing them in pairs on the sides of the passage-ways, which were aligned on the centre spot, it was possible for everybody to get a good view of the proceedings.

The whole stand was made up of earth-filling, and to prevent the legs of the chairs sinking in thick coarse matting was laid on the seat tiers and covered over, in the case of the terrace and four rows in front and passage-ways with thick red felt, and on the back seats and terreplain with red serge.

By way of decoration, the columns of the inner edge were cased in with ornamented plaster work and the eaves of the roof were worked in with a pierced parapet, plaster barge boarding, eaves panels and fringe and brackets, which, painted white and picked out in gold, made a most effective frontage.

On the roof itself, which was of plain smooth roll-jointed iron sheets painted pale cream colour, there were eaves kiosks in the Indo-Saracenic design over the ends of the passages, and a cresting of plank fretwork with smaller ridge kiosks in the centres of the spaces between the passages. The plaster woodwork of the kiosks and cresting was all painted white. In the case of the two end gables, the same eaves decorative work was carried round under the roof and the gable was filled in with panelled open plaster work. At the back the columns were boxed in, a fretted barge board suspended all round and the terreplain passages railed off; all woodwork being painted white.

The whole shed was given an under-roof ceiling of whitewashed canvas stretched tight on wooden frames, which, with the iron work of the trusses, which was left exposed under the ceiling, were painted white. The covered blocks were marked off by letter boards suspended from the trusses and also fixed to the back row of columns, and by post signboards for the end uncovered blocks.

New unarmed bentwood chairs were provided for the Durbaris and spectators generally, but special easy chairs of very handsome design were given to the Princes and highest Government officials.

The radiating passage-ways in combination with the wide front terrace and the cross passages and open terreplain at the back made access to the seats an easy matter.

IV. *Spectators' Uncovered Stand.*—An open earthwork mound was constructed for spectators generally which was about 2,800 ft. long and 1,000 sq. ft. in cross section. This was also semi-circular in shape on a radius of 300 yards and the same centre as the covered stand. A large amount of levelling and other miscellaneous work, the aggregate of which was considerable, was carried out in connection therewith.

*Labour Used.*—Work was begun on March 15th by the 34th and 48th Pioneers, while the 32nd and 107th Pioneers were gradually drafted in about the middle of April to help and also do the earthwork

of the covered stand, and levelling and dressing operations. By May 15th when all military labour left Delhi, the greater portion of this earthwork had been finished off and the remaining work was completed during the hot weather by coolie labour.

*General Organization.*—A European Subordinate assisted by a Sub-Overseer was in immediate charge of the work and spent the whole day on it. His duty was to receive and account for all plant and materials used, arrange for the maintenance in good order of the railway plant, and give profiles and general technical assistance to the Pioneers.

A R.E. officer was in general charge of all Military labour employed by the Superintendent of Works, whether on the Amphitheatre or elsewhere. His duty was to distribute and explain to the different units the work to be done, arrange for the supply and distribution of necessary plant and materials, and to see, so far as could be done without interfering with the internal work of a unit, that the work was carried out as efficiently as possible.

*Earthwork Arrangements.*—The chief difficulty was the carriage of the earth and the lack of means to do it with. Along half the length of the uncovered mound, the minimum lead was 400 ft. ; along the bulk of the other half the minimum was fully 100 yards, while for the centre portion the lead was no less than 300 yards.

As the work was only decided on about March 6th and the 34th and 48th Pioneers commenced work on March 15th, there was no time to arrange for an efficient means of transport. Work was commenced with baskets and wheelbarrows, and donkeys were gradually brought in. Tram line and wagons were searched for everywhere but the collection of these necessarily took some time, and though nearly 100 of the latter were at work by the middle of May the majority of them had only been in use for a few days.

As it turned out it would have been well worth while to spend as much as Rs.15,000 on purchasing plant at first, but funds were not available and nothing could be done. Not only would the nett loss after re-sale have probably been less than the hire of donkeys, but the work would have progressed very much faster and cost less.

*Tip Wagons and Trollies Used.*—Nearly all the tip wagons used were either:—(a). 18-in. gauge wagons of 10 cubic ft. capacity borrowed from Jaipur. (b). 2-ft. gauge Decauville wagons of 27 cubic ft. capacity, some borrowed from Patiala and some bought. (c). 2-ft. 6-in. gauge wagons of 50 cubic ft. capacity borrowed from the N.W. Railway.

All three kinds were used under the same considerations by the 107th Pioneers, and they found that the amount of earth moved per wagon per diem was about in the proportion of 12 : 11 : 9 respectively. The greater the height of the banks the greater the advantage of the smaller wagon. In every case one man per 5 cubic ft. capacity

should be allowed for hauling when there are any gradients to negotiate. In addition to these, 20 Fowler trollies, which consisted merely of a framework on wheels 2-ft. 6-in. gauge, were obtained on loan from Peshawar, and proved most useful when provided with side and bottom boards. Some attempts to fit improvised tipping bodies of wood and corrugated iron with angle-iron frame to these and some smaller trollies proved unsuccessful in the case of the larger and not very successful with the smaller trollies.

*Line Used.*—This consisted of Decaerville tram line partly provided with iron sleepers and of Kalka Simla line of  $41\frac{1}{2}$  lbs per yard. It was found that, except where heavy trucks were used on light line, sleepers were only necessary at curves, in other cases loose rails were merely buried 1 or 2 in. in the earth and pegged down here and there. The sleepers used were ordinary kail baulks cut into pieces about 3 ft. 6 in. by 5 in. by  $2\frac{1}{2}$  in.

*Method of Working.*—When working donkeys it was found most necessary to keep the loaded animals approaching the work away from empty ones leaving it. The best plan was to drive them up to the top of the work by one path, along it for about 15 yards, during which they are unloaded, and back by another path.

With tip wagons there are two methods of working, one by a circular line running parallel with the bank and rising with it, and the other by single length of line running straight up at the tipping end.

The former has several theoretical advantages, but it was found in practice that the latter gave the better result owing to its greater flexibility. Every wagon should have a considerable number of baskets, the number ranging according to the size of the wagon. While the wagon is being emptied these baskets are filled by a party of diggers and placed in position alongside the line. When the wagon arrives its haulers empty into it the basketfuls which are standing ready and take them back to the fillers who have cut sufficient loose earth to fill them at once; in this way filling is rapidly carried out. Meanwhile a party of shovellers will have been engaged in moving into position the earth last brought to the work, so as to make room for the next consignment. In order to ensure that the wagons shall not be delayed by throwing their earth on to the line, a small trench should be made alongside the line after each trip, unless the tipping is done down a bank. It is hardly necessary to say that on a single line all the wagons must work together; if one is sent off and filled or emptied before the others it will cause confusion and delay. Every wagon has a maximum efficient incline, according to its capacity, above which it is best to throw the earth up by shovels.

The Fowler trollies were filled either with filled baskets or with earth. In the one case the haulers form a line and pass the baskets up by hand, the earth being immediately deposited where required.

In the other a separate body of shovellers is needed to move the earth from alongside the trolley to the desired spot, and it takes longer to empty the trolley, but more earth is carried per trip by this method. In practice there appeared to be nothing to choose between them, the latter method would, of course, be the best where earth had merely to be thrown down a bank.

*Accommodation, etc.*—The uncovered stand was raised 3 ft. by a puddled mud wall on the inner edge and finished to an inner slope of one in 4.6 with 27 steps, each 2 ft. wide, and a back slope of 1 to 1½, which was partially grassed, but not with any degree of success owing to failure of rains.

Stepways were made up the back slope at 50-ft. intervals and each half of the mound was divided into 24 blocks. The two halves of the mound were separated by a vista 100 ft. wide. On the seven blocks nearest the vista and on each side of it risers were fixed made of 5-in. by 1-in. planks screwed to 2-in. by 2-in. by 2-ft. 6-in. pegs. The three blocks nearest the vista on each side were covered with coconut matting for school children to sit on. The next four blocks on each side had rough fixed benches for which pieces of planks 2 ft. 6 in. long were driven 1 ft. into the ground at 3-ft. intervals and other planks were nailed over the top. Small battens 2 in. deep were nailed in front and behind for strength and also for appearance.

On the next 16 blocks "pens" were constructed. These consisted of a rail and post fence for each block. Each of the pen blocks was subdivided into four compartments. The front rail and post fence was continuous and was strutted back. Between each of these blocks was a passage-way 3 ft. wide and between the two front and two back compartments another similar passage-way for the Police. The uprights were 5 in. by 5 in. by 6 in. and were at 8-ft. spacing. The front uprights were 5 in. by 5 in. by 8 ft. and were strutted by the same scantlings. The rails were 24 ft., 16 ft., 15½ ft. and 15 ft., and were used as they could be best fitted in, the joints being wired. On the last or end block of each half were benches, and the circular ends of the mound were grassed.

The inner mud wall was mud plastered and whitewashed and the post and rails of the pens were painted white.

Passage-ways and partition rails radiated on the common centre. The blocks were allotted off without further subdivision and a pleasing colour design was effected by the occupants of each block wearing puggies of a certain colour, thus giving plots of pale yellow, green, orange, pink, etc., as seen from the Throne. The accommodation allotted provided for about 36,000 spectators, but this allowed for a considerable amount of space per person and as the stand was eventually densely packed it is probable that there were not less than 50,000 spectators on it during the ceremony.

*V. Flagstaff.*—By the co-operation and courtesy of the Director

of the Royal Indian Marine, the Bombay Dockyard supplied on loan two spars measuring 90 ft. and 60 ft. which together made up a flagstaff 135 ft. high from the ground to the crown at the top. This magnificent and graceful flagstaff was erected by the 1st Sappers and Miners under the direction of a Royal Indian Marine officer who remained in charge and at the Durbar ceremony saw to the breaking of the Royal Standard.

The foundations being of a particularly boggy and unreliable nature it was necessary to set up the butt of the Flagstaff on an embedded platform laid over a nest of piles.

Although it overtopped the Amphitheatre by a great height, the Flagstaff did not look in any way out of place, but on the contrary gave the appearance of fitting in very well with its surrounding features, and with the Royal Standard filled by the breeze the general effect was most imposing and attractive.

VI. *Retiring Rooms.*—In addition to retiring-room tents for Europeans and Indian gentlefolk and screened arrangements for natives, there was a building at the back of the Durbar stand, specially constructed for the purpose, in which two rooms were reserved and furnished as a provision against possible fatigue or temporary indisposition of Their Majesties, and the remaining two rooms were set aside for the same purpose for the privileged public. Each of the four suites comprised a comfortably furnished cloak room with large retiring room and a screened-off attendance courtyard at the back.

VII. *Water Supply.*—Not only was drinking water laid on in pipes with stand-post delivery in all parts of the Amphitheatre grounds, but there was also a supply of irrigation water from the Junna Canal which gave water to the grounds both by natural flow and also by means of a pumped supply where the ground lay at a higher level.

VIII. *Fire Protection.*—The arrangements made consisted of a 6-in. water main under pressure which led direct to the Throne Pavilion and the covered Durbar stand, supplemented by the horsed steam Fire Engine, which was very kindly lent by the Jubbulpore Municipality.

This engine, with the horse and firemen, was located in a station close to the stand and it stood ready for immediate action. "Minimax" Fire Extinguishers were also fitted to the posts of the stand at convenient places for use in putting out any conflagration in its earlier stages.

IX. *Laying out the Grounds.*—Grass lawns were marked out round the Throne Pavilion and grassing was started in the middle of July, "doop" grass being bought from contractors at 12 annas per maund and dibbled in. Rain appeared to be imminent at that time but unfortunately it held off with the result that the grass on the back

slopes of the spectators mound, except that which was watered and did fairly well, nearly all dried up. Soon after this a few showers fell and the spectators mound was completed and the inside lawns and "puttries" started. For this some 10,000 cubic ft. of village manure were bought at Rs.7 per 100 cubic ft. and some 3,000 cubic ft. of good night-soil manure was also used. The quantity of saltpetre and sand in the soil necessitated this. The local grass did not become green for about seven days and a considerable portion died altogether. Cultivated grass from the Agra Park was then used and did very well indeed, getting quite green in two days time. Considering the extreme poverty of the soil and the difficulties experienced, the grass lawns turned out very fairly well, but repairs were constantly necessary. The back of the Durbar Mound was turfed owing to being left till November on account of workmen, etc., employed on the roof of the Durbar, and this did very well indeed and remained green without any repairs.

Flower beds were made on the berms and with these and the white railings and green grass the back slopes of the covered stand looked very neat and smart from the approach roads.

Palm tubs and flower beds were put alternatively along the sides of the three vistas and processional, arrival, and departure roads which were most effective. The operations covered the laying of about  $2\frac{1}{2}$  millions sq. ft. of lawn and 8 millions of grassing.

X. *Roads and Paths*.—As the roads within the Amphitheatre were very extensive and only for use on a single occasion, it was necessary to make them to look well and cost little, so that a single coat of stone metal only was given with a layer of bajri over it which was renewed just before the Durbar and watered to keep the dust down. Bajri paths 24 ft. wide were made dividing up the massed troops. Outside the Amphitheatre, roads with better wearing value had to be given as the traffic in materials, etc., was very heavy and continuous. There, a kunkar coating was added and oil spreading given to keep down the dust. The length of roads constructed amounted to 6,086 ft. of 20 ft.; 2,376 ft. of 16 ft.; 2,700 ft. of 12 ft.; and 1,756 of 10-ft. metalled roads; and these are not included in the general report on roads. The remaining portions of the travelling widths were covered with bajri. Besides an allowance in the Amphitheatre estimate, another for Rs.4,857 was sanctioned in Secretary's No. 6,873, dated 6th September, 1911, which provided for the roads in connection with traffic arrangements.

XI. *Matting and Felt*.—As the treads of the seat tiers in the covered Durbar stand were only of rammed earth it was necessary both to lay coarse matting to prevent the legs of the chairs from sinking in, and also to cover up this matting with a floor cloth for appearance sake. The matting was purchased from that which was left over from the Allahabad Exhibition, and as a thin floor cloth would have

got rucked up and torn, it was decided to lay red felt on the front terrace and passages and for the first four rows of seats, and behind that a cheap red serge was put down which looked better and was more serviceable than the ordinary rough Indian red floor cloth. The felt and serge were purchased in England by Messrs. Clarke & Co., of Simla, on a commission percentage. These materials were taken up and re-used for the same purpose at the Review Ground Stands. About 5,500 square yards of felt and 10,000 square yards of serge were utilized for the Durbar.

XII. *Parking Grounds.*—For the regulation of traffic the Police authorities had the advantage of converging roads of approach from all sides, and they devised a system of separation by which the vehicles on any road kept to their own delivery platforms and parking grounds. This necessitated the construction of special feeder roads with arrival platforms and the levelling and dressing of the carriage parking grounds. The arrangement made proved eminently successful as both in coming and in going there was no delay or confusion, and any one could call up their motor or carriage within a few minutes of leaving their seat at the Durbar. The expenditure on these feeder roads is dealt with under Item X.—Roads, and the clearing and dressing of the parking grounds comes within the whole expenditure under that heading, Item XIV., for which no special estimate has been sanctioned.

XIII. *Temporary Offices, Workshops and Godowns.*—A temporary shelter, for the artizans employed to work under, for the storage of tools and goods and for the accommodation of the works office of the Assistant Engineer in charge of the Amphitheatre, was erected consisting of three open barracks, two 100 ft. by 20 ft. each, and the third 147½ ft. by 20 ft.; two rooms for office purposes and two for stores. All these were arranged to enclose an open courtyard measuring 106½ ft. by 100 ft. An irrigation channel supplying water for works purposes ran right through the premises, and pipe water was laid on for drinking and washing. Just before the Durbar the whole structure was dismantled excepting one of the store rooms which was left standing and converted into a station for the Jubbulpur Fire Engine which, with its horses and firemen, stood ready for immediate action in case of fire breaking out in or near the Amphitheatre.

Being constructed on light open lines the sheds suffered to a certain extent from a violent storm during the monsoon period, and repairs were carried out under a separate estimate.

XIV. *Dressing and Clearing Up.*—It came as a revelation to find what a tremendous amount of work there was in generally doing up the Amphitheatre grounds, and practically speaking a whole battalion of Pioneers were employed for six weeks on this alone. The work for the most part consisted in preparing the carriage parking grounds, dismantling up and clearing up workshops, filling hollows and water

courses, clearing away débris and tidying up generally. The expenditure incurred on this has been debited separately as no provision was made in the original estimate.

*General Remarks.*—The decorative work in the Covered Durbar Stand, Durbar Shamiana and Throne Pavilion was designed and carried out by the Principal, Mayo School of Art, Lahore. The students from this Institution came down to Delhi and camped out at the Amphitheatre so as to be always near their work, which was of a very intricate and extensive nature.

A large number of skilled artizans from Lahore and Amritsar were employed on the embroidery work of the Shamiana, Throne awning and carpets. An army of carpenters carried out the woodwork and the casting and erection of the plaster of Paris work. The time available being very short for the large amount of work of this nature, it became necessary to work long hours and at high pressure as the Durbar drew near in order to complete in time, and it is only to the devotion to duty of the staff, subordinates and workmen employed that it was possible to do so.

Night shifts were tried but given up after a time as the men got numbed and careless with the cold, and it was found better to work them long hours instead.

*A NARRATIVE OF THE SEVERAL TRANSACTIONS OF  
THE FRENCH IN THEIR ATTACK OF FORT ST. GEORGE,  
AND OF THE GARRISON IN THE DEFENCE OF THAT  
PLACE. ANNO 1758 AND 1759.*

*(Concluded).*

February 1st. The Enemy last night repaired the damaged Merlons of their Battery, and endeavored to lower the Cells of the Embrasures from whence in the morning they fired three Guns but with little effect, and were soon obliged to close their Embrasures as in the preceeding Day. The Haarlem, the Enemys Battery to the Southward and one Gun to the Northward fired on the Shaftsbury at Intervals all Day, and sent several Shot thro' her; we in return fired at the Ship, and the Enemys Southern Guns, but in the Evening a Twenty four pounder burst on St. Thome bastion and wounded 6 Men, of which 4 were mortally hurt. The Governour being there very narrowly escaped with a slight scratch. The Cuddalore Schooner came near the road in the Evening, and then stood away to the Northward again. Our Working Party last night was 54 Pioniers and 35 Sepoys who were employed as follows. 24 Pioniers pushing on our Gallery relieved each other every Six hours; the rest with the Sepoys were repairing the Pallisadoc in the Gorge of the North Lunette, repairing the Embrasures in the East Flank of the Royal Bastion, and levelling the Earth beat down on the banquetts of the lower Curtain. The Enemy threw but few Shells last night or in this Day.

2nd. Last night the Enemy worked at repairing the Parapet and lowering the Embrasures of their Battery on the Crest of the Glacis in which they opened again this Morning 5 Embrasures, and fired with Two Guns on the Angle of the Demi-bastion, which rarely struck the Top of the Parapet. Our Working Party was 51 Pioniers, and 100 Sepoys who were employed in repairing the Fascine Battery, in setting up Pallisadoes in the Gorge of the North Ravelin, and in repairing the Parapets of the North East Bastion. 27 Men were employed in pushing the Gallery under the North covered Way, and under the covered way near the blind. The Enemys Battery which fired a Shot now and then from one Gun was silent before noon. About three in the Afternoon Ustoff Cawn and the Enemy seem'd to be engaged in some Topes 4 or 5 Miles N. West and continued firing till 5 o'Clock. The Haarlem, and the French Frigate drew off last night and anchored to the Northward so that

the Shaftsbury had only two Guns from the Southward and one from the Northward to fire on her.

3rd. This morning about day break the Enemy sprung a Mine behind the Counterscarp of the Ditch opposite the East End of the Cuvette, and opened the Wall about 20 or 25 feet, but did no other damage than wounding 3 or 4 Men and an officer in the Demy with bricks. The intent of this opening is not very clear, because if it was designed as a descent into the Ditch it is so injudiciously made that 4 Guns from the Flank of the Royal fire direct into it; but I rather think it was intended to destroy the entrance to our Mine which was about 20 feet from theirs, or else they sprung it thinking we were at work on the out side, for The Engineer and people at work on our Mine heard the Enemy very distinctly at work within the Counterscarp about 2 o'clock in the Morning and alarmed them by knocking and calling out to bring the Match that we might spring our Mine. Our working Party of 54 Pioniers and 40 or 50 Sepoys was employed on the Mine, and Countermine and thickening the Parapet of the Demi-Bastion near the Saliant Angle which part the Enemys battery seems to be intended against.

4th. Last night the Enemy endeavored to make their Guns on the Glacis bear on the Demi and North East Bastions by lowering the Embrasures, but after firing a few Shot in the Morning they closed them as before. In short the oblique fire from the flank of the Royal Bastion and direct fire from three Guns on the North East is so superior to the Enemys that they cannot possibly stand it, and our Shells above an hour or two every morning. Our Working Party consisted last night of 53 Pioniers and 50 or 60 Sipoys who were employed in thickening the Parapet of the Demi-Bastion and carrying on the two Gallerys. The Enemys Large Shells being all expended is the reason we imagine that they only threw from Time to Time 8 or 10 Inch Shells from two Mortars in the Crochet at the foot of the Glacis (K). The fire of their Artillery from the several Batterys except that at the burying Ground of four Guns was also very slow. The two Large Guns at the Bar were this Morning with drawn, and a field Piece brought thither.

5th. This morning early we were surpriz'd with a sight 6 or 7 Vessells under Sail and concluded them at once to be our Ships from Bombay, but the advance of the Day soon discovered to our View the Enemys two Ships and 5 Small Vessells going out of the road and Standing Eastward, and as soon as the Sea Wind came in they stood to the Southward. This extraordinary Motion we can no ways account for, but by supposing the Enemy have had advice of our Ships being some where on the Coast, and fearful of theirs falling into our hands have sent them to take Shelter under Pondichery. A Red Flag was seen at the great Mount in the morning, and a great smoke, so that we conclude Usoff Cawn is got

thither, and hope he will soon get near to us. The Enemy last night fired a good deal of Musquetry, and this Morning fired three or four rounds from two Guns on their breaching Battery but were obliged to close it immediately, and scarce fired a Musquet Shot all Day. The four Guns at the New hospital were silent or with drawn, and only two fired slowly at the old hospital. Our working Party of 53 Pioniers, and 40 Sepoys were employed on the Demi bastion, North Ravelin, and Gallerys. Yesterday that under the North covered Way fell in, and had like to have discover'd us to the Enemy, but being no further advanced than the banquet of our covered Way we turned to the right till we got into the Center of the old Town wall, and then advanced forward towards the Enemys Battery. Indeed we imagined the Gallery to have been under the Parapet and were surpriz'd to see by the face of the covered Way that we were not so far.

6th. This morning six Embrasures of the Enemys battery to the Northward appeared to be repaired; and by their with drawing the Guns from the new hospital it is supposed they intend to restore their first grand Battery. Nothing else appeared to have been done as to their works, and their Battery on the Glacis was silent. Our Working Party consisting of 50 Pioniers, and as many Sepoys was employed in repairing the Parapets of the Demi Bastion and carrying on our Two Gallerys; thirty Sailors were Landed from the Shaftsbury to assist the Artillery, and the Ship no longer apprehensive of the Enemy went out into deeper water.

7th. Early this morning the Enemy saluted us with four Guns, and 1 Mortar from their old grand Battery, which cannot be much to the credit of the Attack, thus to retreat after having had four Guns in battery five Days on the Glacis. The old North East bastion which with three Guns has been maintained the whole Siege seems to be the object of their old (but once more new) Battery. The Angle of the Demi bastion is also battered from these four Guns, and as many from the burying Ground fire on the face. So that the Enemy have now as it were gone back to the 6th January and have on us the following batterys. At the old hospital 2 Guns plunging into and enfilading the whole North Front, At the Burying Ground four Guns battering the face of the Demi bastion, At the Grand Battery four Guns firing on the Salient Angle of the Demi, and on the old North East Bastion, and one Mortar throwing Shells of 10 Inches into the Town. On the Zig Zag which crosses the Ridge of the Glacis three Mortars throwing 8 and 10 Inch Shells into the Demi, and N. East Bastion, the blind and Fascine Battery. Our working Party of 50 Pioniers, and as many Sepoys were employed in raising, and repairing the left face of the North Ravelin, repairing two Embrasures on the North face of the Royal Bastion, and in carrying on the Gallerys.

8th. The Enemy this Morning fired with five Guns from their grand Battery, but the greatest part of the Shot from thence and the burying Ground go over our Parapets. Nothing new appeared in their approaches. Captain Barker and my self this Morning went off in a Mossula Boat on board the Europe Ship, and rowed from thence a little to the Northward, with an Intent to come back along shore and take a View of the Enemys Works in reverse. We got so far North, and so near, as to see plainly behind their grand battery which at first appeared very ill man'd but in an instant it was filled, and a Gun or two turned against us with which they fired five rounds at the Boat. This obliged us to make an hasty retreat, and prevented us from seeing so much of their works as we proposed. A Deserter who had formerly been in our Service came in from the Enemy this Evening, and informs us that the reason they abandoned their Battery on the Glacis was because they lost many men from the superiority of our fire had several Guns disabled, and were constantly apprehensive of being blown up by our Mine which they heard we were making under it. He also assures us that they are not making any Mines on their part as we apprehended. Our working Party of 50 Pioniers, and 27 Sepoys were employed in repairing the Embrasures on the North face of the Royal, which fire on the Enemys grand Battery; and those of the old N. East Bastion. Also in pushing on our Gallerys, one of which is now under the Enemys battery, and the other so advanced as to prevent any possibility of destroying the blind by a Mine. We had certain advice this afternoon of Major Caillaud's arrival at the Mount, but no Account of the forces with him. One of the Enemys Ships anchored this Afternoon in St. Thome road, which it was determined the Europe Ship shou'd attack. For if She is loaded with heavy Shells as we apprehend we ought to hazard greatly rather than let them be landed; because the damage they will do the works now the Enemy is so near will be irreparable, and give them an opportunity of effectually establishing the battery on the Glacis.

9th. Early this Morning we heard a smart Canonading towards the Mount which continued at Intervals all Day, and was renew'd very briskly towards the Evening. The Action was no doubt between a strong party of Mr. Lallys European Forces with his black Army, and our Troops under the Command of Major Caillaud who had just join'd Capt. Preston and Usoff Cawn from Tanjore, how it ended is hard to say, but we hope from the repeated reinforcements which the Enemy sent out that our people had the advantage. In the afternoon two Companys of Sepoys were sent out to the Bar and from thence proceeded to the Garden house which posts the Enemy had abandon'd; they found some Ammunition, Sand Bags &c. which they brought away, and set fire to the Enemys Gabions. It was intended that our Europe Ship shou'd make an

attempt in the night on the Ship which anchored off St. Thomé yesterday, however it was not done, and to Day many stores were unloaded, and carried to the black Town. The Enemy's Fire was not very brisk to Day, and most of their Shot flew over the Town. Nothing appeared to have been done at their approaches. Our working Party was last night 51 Pioniers and 27 Sepoys employed in repairing the Demi, and N. East Bastions, and carrying on the Galleries.

10th. The Enemy last night did nothing apparently to their approaches, and were pretty silent in their Batterys. During the Day they fired smartly from their Northern Battery, but most of the Shot seemed to be directed for the houses in the Town among which they made great havock; they also threw all their Shells into the Town so that the Siege seems to be begun afresh and the Attack intended against the houses rather than the Works. Our Working Party of Pioniers and 48 Sepoys were employed in repairing the old N. East Bastion, the Demi Bastion, clearing the Earth below, and in carrying on the Galleries. The Enemy's Ship went off in the night.

11th. The Enemy last night fired little musquetry, and did not, that we cou'd discover, make any addition to their approaches. The Cuddalore Schooner which came in yesterday in the Evening attempted to destroy a Sloop and Boat of the Enemy's to the Southward but by some means we are ignorant of, miscarried. Our Friends lately at the Mount we apprehend have been obliged to quit that Post; and retire towards Chinglaputt; but we hope only thro' want of Ammunition or Provision, and that they will soon return. Our Working Party of 56 Pioniers, and 133 Sepoys were employed in repairing 2 Embrasures, and thickening a Traverse on the Demi-Bastion, in clearing the Rubbish from the Mint Bastion, in laying a Platform and making another Embrasure near the Beach at the Fascine Battery. The Gallery under the Counterscarp being advanced about 95 feet two Chambers were made, and loaded with 250 lb. of Powder each. That before the blind was opened by a Pitt sap thro' the Glacis and a branch carried on a Parallel to the Covered Way towards the Enemy at the Stockadoe.

12th. Last night the Enemy advanced or rather repaired a small breast work they had at the End of the Stockadoe near the Sea side, but made no other alteration in their approaches. Our working Party of 57 Pioniers and 33 Sepoys were employed in repairing the North East Bastion and the Demi, and in lengthening out the Fascine battery quite into the surf by means of Casks filled with Sand, placing a barricade of Pallisadoes, Chevaux de Frize, and Trees in Front, and raising the Parapet. The Pioneers employed under the North Counterscarp continued to stop the Mine, and the blacks to advance the new Shaft. A Deserter came in this forenoon over

the Enemy's Lodgement on the Glacis and assures us that the Enemy are making no Mines ; but are much afraid of ours. The fire of the besiegers Artillery and Mortars has not been so brisk to Day as it was yesterday.

13th. This morning between 2 and 3 o'Clock we were alarmed by an attempt of the Enemy with 30 Europeans and 50 Coffrees to nail up our Guns at the Fascine battery. They advanced along the Sea side from the Stockadoe to within 30 Yards of our Work when being discovered they made an halt, and after receiving a fire or two from a 6 Pounder placed near the beach, they went to the right about in some confusion, and return'd within their works. The Drums having beat to Arms the whole Garrison repaired to their Posts, and plenty of Shells and Grape Shot were thrown into the Enemy's approaches. We had a Captain and 1 Soldier wounded, and the Enemy lost 5 or 6 Men whom we saw dead on the beach and in the morning a Serjeant of the Lorraine Regiment being mortally wounded crawled in to our cover'd Way and died soon after. From him we learnt the force, and intention of the Enemy. Our Working Party consisted of 57 Pioniers, and 48 Sepoys who were employed in repairing the N. East Bastion, the Demi-bastion ; clearing the rubbish from the North Curtain ; and clearing the Earth from the right face of the North Ravelin, with which banquets were made above. The Stopping of the Mine under the North Counterscarp was compleated to day, being intended to destroy the Enemy's battery if ever they attempt to reestablish it. The fire of the Enemy's North Battery, was to day very brisk, and that at the old hospital silent.

14th. Having observed that the Enemy before the rising of the Moon last night had placed some Gabions near the Sea side a little advanced beyond the Stockadoe, a brisk fire was kept thereon from the Fascine Battery and a Sally resolved to be made in the Morning. Accordingly about 6 o'Clock a Subaltern and 15 Men were sent along the covered Way till they got on the Flank of the Stockadoe, 40 more with 2 Captains went directly in front of the Stockadoe, and 20 with an Engineer went without Arms. The Enemy ran from their Post immediately, and our people took possession which they maintained till the Gabions by the sea side were over turned and thrown into the Surf ; The Earth Levelled and the Enemy's tools gathered up ; our Party then returned having only two men slightly wounded. The Enemy being fired on by the North Ravelin, Royal Bastion, Demi bastion, and Fascine battery with Grape, besides all the works with Musquetry must have lost many men. We cou'd have kept possession of the Stockadoe if we pleased ; but such a resolution was not taken. The intent of the Enemy advancing by the sea side must be with a View to bring Cannon against our Fascine Battery, or under cover of the beach which is steep, to advance by means

of traverses 'till they get beyond our Place of Arms, and then make an attempt on that, and the Fascine battery together. The Enemy were remarkably quiet all night in their Trenches and batteries, the only disturbance they gave us being by a Shell or two now and then; thus they generally act when they are carrying on any work. Our Working Party consisted of 24 Pioniers and 30 Sepoys, who were employed in clearing and repairing the Embrasures of the North East Bastion, repairing the Embrasures on the Demi, and repairing the Caponniere before the blind.

15th. Last night before the rising of the Moon the Enemy replaced the Gabions which had been over sett yesterday morning and endeavored to compleat the Traverse (N) but the fire of a 12 pr. from the Fascine Battery, and the Shells from the Demi bastion made such destruction among their Gabions, that they advanced their Work but little. Our Working party of 35 Pioniers and 40 Sepoys was employed in repairing the North East Bastion, the Embrasures of the Demi, One Embrasure on the Royal, the Demi Caponniere before the blind, and driving Pickets in Front of the Fascine Battery. The Mine being loaded three Pioniers attended it by turns, and were covered at night by 10 Grenadiers. The Enemys Fire to Day was very brisk in the Morning from 6 Guns on their Ground battery, 3 at the burying Ground and 2 at the old hospital, but at 5 in the Evening they only fired from 3 at the Grand Battery, and Two at the burying Ground; a great quantity of Artillery indeed to destroy defences! The French Frigate having returned the 14th at night and anchored in St. Thome road the Sailors which we had on Shore and 30 Marines were sent on board the Shaftsbury which sail'd to attack her about 11 at night, but the Frigate was gone out of sight by the morning.

16th. Tho' the Enemy last night did not again attempt to push on their Sap by the Sea side yet we kept a brisk fire till Moon light and by their silence suspected them to be some where at Work. Our people were employed in laying large Timbers, and sand bags on the Beach to make a Plat form at the Fascine Battery for a short Iron 12 pr. of a new make, weighing 11 hundred weight of which 2 came on the Shaftsbury. In driving Pickets in the Front and securing the Flank of the Fascine Battery by Trees laid in the surf. A Party of Sepoys were sent to Levell the Earth at the Foot of the Demi Bastion, but the Moon Rising Early they were discovered, and fired on by the Enemy, who killed one man, and the rest thereon abandoned the Work. The Embrasures of the N. East and Demi Bastion were repaired. The Enemys fire to Day was very brisk from their Artillery, but they threw very few Shells. We got the Platform ready on the beach for the Iron 12 pr. by noon, so that we had 2 Twelves and 1 6 pr. to prevent the Enemys approach. About noon a small Sloop anchor'd in the road and acquainted us that our Ships

were seen by her a few Days before in the Latitude 14 N°, and about 5 in the Evening we perceived 6 Sail to the Northward which we concluded to be ours, and apprehending the Enemy on sight thereof might attempt something, the whole Garrison was ordered to lay on their Arms at the several Posts during the Night.

17th. The whole Garrison being at their Posts last night a brisk fire of Musquetry was kept up against the Enemys Works. About 10 o'Clock the 6 Ships seen in the Evening anchored in our Road, and were known to be those we expected from Bombay. A few Pioniers only were employed to lay Plank with Nails drove thro' them in Front of the Fascine Battery. About 2 in the Morning the Enemy fired pretty smartly from Musquetry but their Shot flew high; fires appeared at the same Time in their Trenches, and by Morning we discovered that the approaches were evacuated, and the Enemy were quitting the black Town, having nail'd up all the Guns they cou'd fire from, and destroyed the Carriages which they thought serviceable. *Several of us immediately went into their Works, and were much astonished to see how roughly they had been treated by our Shot and Shells, and how unsupportable the Approaches were had they been vigorously attack'd by 2 or 300 men.* The Troops about 600 in Number were landed this morning and appear to be a set of well made Young men. I immediately set about a Survey of the Enemys Trenches that we might proceed to demolish them. Thus terminated the Siege of Fort St. George after the Garrison had been shut up 67 Days and the Enemys Batterys had been open 46. The Arrival of the Ships from Bombay with Succors doubtless hastened the Enemys Retreat and sav'd the black Town, but Mr. Lally for many Days had despair'd of Success, and by his Letter of the 14th (of which a Copy immediately follows) has furnish'd us with an incontestable Proof that the Preservation of our Liberty wou'd have depended on ourselves. An Evidence so valuable to the Garrison that the Satisfaction of knowing the certain Consequences of their gallant Behaviour; exceeded the Pleasure of seeing their Enemy retreat. The hurry of the Scene in which this Journal was wrote, and the nature of the Subject will I hope sufficiently apologize for the stiffness of the stile which can hardly be avoided, in repeated descriptions almost of the same daily occurrences wrote at the Time they happen.

From the Camp before Madrass 14th Febr'y. 1759.\*

A fine Stroke might be made here Sir, there is in this road a Ship of 20 Guns with all the riches of Madrass, on board, and as it is said she is to remain here till the 20th. The Expedition is just arrived, but Mr. Gerlin is not the Man to attack her, since she has already made him run away once. The Bristol on the other Hand, scarce

\* Letter from Mr. Lally referred to above.

appeared at St. Thome but on the uncertain report of the thirteen Ships off Porto Novo he took fright, and after having landed the Stores with which he was loaded, he would not even give himself time to take on Board 12 of his Guns, which he had lent us during the Siege. If I were judge of the Point of Honor of the Company Officers I wou'd break him like Glass as well as some others. Now either the Fidelle, or the Harlem, or this same Bristol, with her other 12 Guns, wou'd be sufficient to take the English Ship if she could get to windward of her, in the obscurity of the night. Maugendra and Tremillior, they say are in very good Condition (son't dit on très bons) and should they only serve to carry off 200 wounded, that we have here, the Service would be important. We yet continue in the same Situation, the breach made these fifteen days, still at thirty Yards from the Walls of the place, and never venturing to look up at it. I imagine when we get back to Pondichery, we shall all set about learning another Trade for that of War requires too much patience, of 1500 Sepoys of which it is judged the Army Consists, I reckon about 800 on the Road to Pondichery loaded with Sugar, Pepper and other Merchandize. As to the Cooleys, they have all been employed to the same purpose, ever since the Day that we arrived here. I shall take my Measures from this day for burning the black Town, and blowing up the Powder Mill. You will never conceive, that 50 French deserters, and about 100 Swiss, shou'd thus keep at Bay 2000 Men of the Kings and Compys. Troops, who are yet here in being, notwithstanding the extravagant Accots., which every one gives according to his own Fancy, of the Slaughter, that has been made of them, and you will be much more surprized, If I Should tell you, that exclusive of the Two Fights, and four Battles that we have had; and besides the two Batteries, which have failed, or to speak more clearly were built awry we should not have lost 50 Men from the beginning of the Siege to this Day. I have wrote to Mr. De Larche, that if he persists in not coming here, let who will get the Money from the Polygars, it shall not be me, and I renounce, as I apprized you above a Month ago, all concern directly, or indirectly wth. any thing that relates to your administration civil or Military, I wou'd rather go and Command the Coffrees of Madagascar than remain in that \*Sodom, which it is impossible but the Fire of the English must sooner or later destroy, If that from Heaven should not.

I have the Honour to be with  
 perfect Attachment  
 Your most humble and most obedt. servt.  
 Lally.

PS: I must apprize you that Mr. De Soupire having refused to take the Command of this Army, which I offered him, and which

° Meaning Pondichery.

he is authorized to do, by the Duplicate of my Instructions transmitted him from Court, you must, whether you will or not, together with the Council take it upon your selves, I engage only to lead it back for you, either to Arcott or Sadrass, send your orders thither, or come and take the Command your self, for I will quit it as soon as I get there.

Tho' the preceeding part is more properly a Journal of what pass'd in the Engineers Branch than a compleat Journal of the *Siege of Fort St. George*, yet to make it as agreeable and instructive as possible I have constantly remark'd the Enemys proceedings, and interspers'd it with many other the most remarkable Occurrences. I have also added a Return of the Garrison when it was invested, and an abstract of the Number killed wounded taken and deserted during the Siege; together with the Expence of Ammunition and Cannon on both Sides. So that in Substance every thing but tedious Intelligence from Spies, and the literary Correspondence is contain'd herein, that is to be found in the Journal kept with great Care and Pains by the Secretary Mr. Duprè. I shall moreover insert the following Remarks which I have made for the use of my assistants.

From observations on the Enemys Method of proceeding during the Siege, and a Survey of their Works and Batterys after their Retreat, many things have occured worthy a Remark; and tho' they cannot properly claim a Place here, yet as the Intent of keeping Journals is with a View to instruct, and inform Mankind, I believe some lessons may be drawn to our advantage from the Errors committed by our Enemys in the Siege of this place.

First then had Mr. Lally after taking possession of the Garden House forbore some Days the Plunder of the black Town, and amus'd us by reconnoitring and the appearance of batterys to the Southward; our whole Attention wou'd have been taken up to compleat the Lunettes just begun before the South Front, and to put the Works on that Side in the best posture of defence we possibly could. To deceive us more effectually a few distant shot might have been fired to interrupt the Workmen, and Partys of horse might have been dispos'd in the adjacent Villages to prevent the people from carrying their Effects out of the black Town. As soon as the heavy Cannon and Stores had arrived he might have changed his Situation as easy as he did on the 14th. December, and he wou'd then have found the Works on the North Front in a much worse Condition to oppose him than he did when he first broke ground. Here it must be allowed was great want of Finesse.

But above all is Mr. Lally to be censur'd for Suffering us unmolested to erect in open Day those invincible Obstacles to his Design, the Blind, and Fascine Battery; And besides to let us repair the Embrasures and damaged Merlons, to raise the Saliant Angles,

build Traverses, and those many additions which we did for near three Weeks to the very Works he intended to Attack, without the least interruption when he might with Cannon and even with Small Arms at no great risque have done us much hurt if not wholly confin'd our working partys to the night.

Impatient of waiting for his Cannon he opened the Batterys with a fire of 13 Guns which left it in our Power to Repair the Damages done by so weak a fire to our Works ; whereas had he thundered at once with 25 or 30 pieces of Cannon in the Manner we did . . . .

Advancing by single Zig Zags between Crochets or very Short Demy Parellels to the Top of the Glacis was Mr. Lallys next weak Step ; And as if the Approaches were not in themselves sufficiently insupportable they were directed so exactly under the Line of fire from their Grand Battery that on the least Sally the Cannon cou'd not play from thence without a certainty of hurting the Troops posted to defend the Trenches ; and they often fired in Reverse into their own Works.

Not Stretching a Parallel at the foot of the Glacis so as to take in the Capital of the Ravelin and embrace the North face of that Work was a neglect unpardonable, which they afterwards thought to remedy by erecting a Battery against that Work, but it was so obliquely situated, and so low that the Guns cou'd hardly throw a Shot into their object, and it was moreover enfiladed by the lower part of our Fascine Battery.

To compleat this Tragedy of Errors, a Battery terrible by its name was opened on the Crest of the Glacis with an Intent to breach the Demy Bastion, but so injudiciously was it construct'd that besides the obliquity of its direction the Guns wou'd hardly bear below our Parapets ; and it was so enfiladed from the North Ravelin, plung'd into from the Flank of the Royal Bastion, battered in front by the N. East annoyed by our superior Fire of Musquetry, and so certain a Mark for our heavy Shells and Stones, that it was impossible a Work much better constructed cou'd have been maintain'd under so heavy a Fire.

Carrying a Shaft from the Stockadoc across the cover'd way to the rounding of the Counterscarp and there springing a Fougasse whose aperture was directly opposite the Fire of 6 Guns from the Flank of the Royal, must be deem'd a most injudicious undertaking, if it was intended for any purpose but to terrify by its explosion.

The Direction of the Enemys Fire was I think equally imprudent with the Situation of some of their Batterys : For instead of maintaining a Constant and well laid fire against those objects whose ruin ought to have been their Aim, the Shot from a Single Battery often spread the whole extent of the Polygon ; and I believe it may with truth be said, that as many shot struck the Houses or went over the Town, as hit any part of the Works. Their Shells too

(except two Days) were thrown chiefly into the Town where in some measure they answer'd Mr. Lallys purpose by ruining many buildings, but he must have been very ignorant of our disposition to think the entire destruction of private houses, cou'd have sway'd in any degree the Resolution of the Garrison as to their defence. And one wou'd have imagined a Man of his reputed experience shou'd have known that nothing is more destructive to Earthen Works, or indeed to the Carriages and Troops on all Works, than plenty of heavy Shells thrown amongst them.

But what Surprizes most is, that no Mortars for Stones, Shells, Granadoes or other Artifices were brought up to support the breaching Battery, and incommode the Troops on the North East and Demy Bastions, when at the same time the Enemy suffered so much by a fire of that kind from thence. In short Mr. Lally seem'd to be eagerly desirous to possess the Town without allowing the Time or Materials necessary for the operation and practising that patient method of proceeding which he has since confess'd a Military profession requires.\*

By thus pointing out the illconduct of our Enemys in carrying on the Siege, I fear I may seem in some measure to lessen the Merit of the Garrison in their defence; but I hope it will still appear they have very just pretensions to praise. For if the length of the Siege, their hard Duty on Guards, and working partys; the want of Bomb-proof places to rest in be consider'd; together with their Attachment to the Service, Alacrity in the Execution of their Duty, and unanimous Resolution which appear'd in every Face to defend the last Spot of Ground, I say if all these are duely considered, it must be allow'd that every thing was done which cou'd be expected from a brave and faithful Garrison: And yet, I am almost fully persuaded had the besiegers not committed the Several Errors abovemention'd the Works mig't. have been so far ruin'd that the Fate of the Town wou'd have depended on the firm Resistance of the Garrison in a general Assault; which I believe wou'd have been opposed with as much Resolution, as it was expected with firmness.

As nothing very different from what is met with in all Sieges, or laid down as general Maxims was practised in our defence, it will be unnecessary to enter into a particular recapitulation; but I cannot with Justice omit the following Circumstances. To the credit of our Artillery let it be remark'd that two 12 prs. from the North Ravelin dismounted 24 prs. opposed to them, and that of 32 pieces of Cannon found on the Enemys Batterys 31 were disabled by our Shot, which are many more than we had hurt by the Enemy notwithstanding our Works were enfiladed, plung'd into, and taken in reverse; and I doubt not but the destruction of Carriages was equally great. I must also mention as a thing not Common in

\* Vide his letter of the 14th Febr'y.

Sieges that the Works by a few Men were kept in extraordinary good repair, and three Guns with a Stout Parapet were maintain'd on the North East Bastion from the first to the last Day of the Siege. An Addition was also made of a Battery by the Sea Side and two pieces more were fired the 16th Feby than the 14th December. Nor must I forget to observe that a few raw Men taken from the Pionier Company greatly outdid the much boasted Miners of the French, who were to blow whole Bastions into the Air: For after the breaching Battery was erected those men without having seen any thing of the kind before, and without any previous preparation of Stantions or Tools were set to open the Counterscarp and by continued hard labor carried a Shaft of 95 feet in length under the Enemys Battery where two Chambers were made and loaded with 250 lb. of Powder each. This Work was executed within a few feet of the Enemy, and in Sight of their Lodgment on the Glacis. They saw, and dreaded; but could not interrupt it, tho' we lost many men. Whoever considers the nature of the Soil, and that the Shaft was carried on under the explosion of the Enemys Guns which every Day made the Earth fall in, must allow this to have been a most laborious and hazardous undertaking.

Having said thus much of the Errors committed in the Attack, and Remark'd what was uncommon in our defence I will proceed to a particular View of the Enemys Approaches and Batterys as they were the Day the Siege was raised; beginning with that on the Crest of the Glacis.

This Battery opened with 5 Embrasures, three of wch. were intended to breach the Saliant Angle of the Demy Bastion, and two to fire against the blind and North East; but the Construction and position was so ill contrived that the Enemy were obliged to close their Embrasures every Day after firing a few Shot which in general flew over: The havock made in this Battery by our shells and Shot must certainly have been very great; for seven Guns 18 and 24 prs. with their Carriages lay disabled and some of them oversett in a very confus'd manner.

The lodgment on the East Side of the Cover'd Way, and behind the Stockadoe instead of being raised with a thick Parapet wellfaced with Fascines, and Banquets made below, was nothing more than a little loose Earth thrown up into some Gabions placed without Order. Nor were the Crochets or Demy parallels which ought to have been capacious and well made Works, formed in any other manner than the common Zig Zags, which were a kind of flying Sapp about 4 feet broad; so that undoubtedly had it ever been necessary to resolve on attacking the Enemys Trenches with a body of 4 or 500 men we cou'd not have failed to drive them from their grand Battery, and nail up all their Guns.

Near the foot of the Glacis on the face of a Zig Zag was a Battery

of 4 Embrasures intended to ruin the Parapet and dismount the Guns of the right face of our North Ravelin; but the Allignment of the Parapet was so far from parallel to its object that it was hardly possible to twist the Embrasures into an opening that the Guns might see our Work. Here lay four 24 prs. disabled and their Carriages ruin'd.

On that part of the 2d Crochet to the right of the Zig Zag the Enemy had fired three 8 and 10 Inch Mortars and left behind them two disabled beds, but the Mortars being light they carried them off the morning of their retreat.

In the grand Battery which opened 15 Embrasures (of which 3 were directed to the North Ravelin and 12 on the Demy and N. East Bastions) were 6 Guns mounted on their Carriages, and tho' the Enemy had fired from four of them the 16th in the Evening, yet all but one had received considerable damage on the Muzzles, and might in fact be reckoned disabled; there were besides 5 Guns with their Carriages and some spare ones dismounted and ruined behind the right wing of this Battery the Enemy for a long time had fired 6 Mortars of 12 French Inches, but afterwards removed them to make room for Guns leaving 2 disabled Beds.

In the Battery a little to the left of the burying Ground which was tolerably well built and opened four Embrasures, were three Guns mounted on their Carriages, which had been fired the preceding Evening, but were all damaged on their Muzzles. Five Guns in the Battery and one more near lay dismounted and three Carriages by them ruin'd. This Battery to appearance was built with a design to enfilade the right face of the North Ravelin and the Cover'd Way before it, but it was placed a Considerable distance to the left of the face produced and consequently cou'd not answer that purpose, its greatest execution was on the face of the Demy Bastion near the Shoulder against which two Guns constantly played; and the other two so far from having any particular object generally threw their shot at random from the Angle of the Royal to that of the Demy.

On the side of the old Town ditch behind a steep Bank opposite the Portuguese Church were the Remains of four Mortar Platforms, and 2 disabled Beds. And from hence it was the Enemy threw their heavy Shells after they had made their Lodgment on the Crest of the Glacis, because their former Situation there became too hazardous with respect to themselves.

On the Battery to the left of the old hospital vulgarly called Bungarees, and mann'd by the Lorrainers, I cou'd not discover any Guns, but imagine some must have been disabled and buried or thrown into Wells, which was more likely to be the Case because that Battery was silent several days before the Enemys retreat. It was built among the ruins of houses and had 6 Embrasures, from

two of which the Enemy for some days battered the left face of the Royal; but afterwards with four only enfiladed the right face and the cover'd Way before it, took the right flank in Reverse, and plung'd into the Demy Bastion adjoining to this Battery on the left was another in a different direction which opened 4 Embrasures, and from whence three Guns were fired on the right face of Pigots Bastion for a few days, after which it was silent, but with what View the Enemy directed any Fire on that Work no one ever cou'd conceive, because that Bastion cou'd neither be attack'd or offend them.

The Battery built in the Front of the New Hospital near the place where the Companys Gardenhouse formerly stood had 4 Embrasures and as many Guns were constantly fired from thence till a few days before the Siege was raised. It was intended I suppose to ricochet and plunge into all the Works of the North Front and indeed it might have proved the most troublesome Battery to us of all which the Enemy erected, but I do not think they had Cannon enough on it, nor that those they had were managed with the greatest address. There were neither Guns nor Carriages found on this Battery and perhaps none were disabled on it, because as the Guns always fired en ricochet the Embrasures were choak'd in Front and the Guns not to be seen.

Upon the whole it is Matter of Astonishment how the Enemy work'd their Guns and Mortars so quick as they did, or how they managed to fire from their Trenches. Instead of Platforms compos'd of Sleepers and Stout Plank they had scarce anything but thin flat roofs of black Houses, or a few unequal pieces of Timber laid in the Earth without being naild or fastened together; and none of these above 9 feet in Length. Their Mortar Platforms were of the same Nature or made of Doors buryed in the ground and a little Straw laid on the top to deaden the Shock. Their Gabions were made of every kind of wood promiscuously and with so little skill that none deserved the name but a few which were made of Rattans. The Fascines in general were little better, except some wch. were made of Coconut leaves, and these I am of opinion wou'd answer extremely well if made with care. The Enemys Carriages (except 6 whose Flanks were very long and consequently must work easy) were so ill shaped, mounted so high and altogether so short, that the impulse of the Trail on the ground was almost in an Angle of 45 degrees, and the weight of the Gun lay so near to the End of the Trail that I am convinced their Artillery cou'd only be managed by great labor and Numbers. Every other apparatus even of the most trivial kind was equally clumsy, ill design'd, and unmanageable. To these then and the other Circumstances above described it certainly is owing that Mr. Lally succeeded no better in his Attack on Madrass and lost so many men in the prosecution of it.

The whole Number of Guns found on the Batterys, left in the black

Town, at St. Thomé, and other places which are collected together is 52, of which 33 are 18 and 24 prs. the rest 9 prs. or Small Iron field pieces. There were a great many Carriages, Limbers and Tumbrils of different kinds found on the Batterys and in the Park of Artillery, but few of them are serviceable. Out of the Tanks, Wells, Surf, and scattered on the ground, were collected many thousand shot of Sizes, which added to those found in the Town and Works will more than replace the quantity we fired during the Siege. Powder in Casks, and flannell Bags was found in abundance carelessly scattered about the Batterys and Trenches, from whence we may easily account for the frequent explosions our shot and Shells occasioned. At St. Thomé and in the black Town were found 150 Barrels of good Powder and as many Casks of Ammunition but great part of the latter was damaged. Many other Military Stores were pick'd up which the Enemys precipitate Retreat, wou'd not allow them time to destroy. Nor wou'd they have been able to accomplish their design on the Powderhouse, but that it had been made a Magazine, and there was then lodg'd in it a considerable quantity of Powder and Cartridges. These they set fire to about 8 in the Morning, and effectually shook down the whole Building; but the operation was so hastily performed that the Gunners who fired the Train had not time to escape, and were crush'd to death by the fall of the Walls.

The Houses in the black Town were not hurt much more than what happened in the Course of the Siege from our Shot, or for the Enemys convenience, altho' Mr. Lally says in his intercepted Letter of the 14th Febry. that he shou'd take measures to destroy it, and tis not to be doubted, but he wou'd have kept his word, had he been more at Leisure. A Step of this kind however cruel it appears, the Customs of War might warrant; for by destroying the houses of the black Inhabitants, Numbers wou'd have been reduced to extreme Poverty, and having no longer Possessions Support, but from daily labor, wou'd have retired to Places where they had a better chance to live unmolested: The Company consequently must have suffered, but it was pitiful, and mean to damage, and intend the total destruction of the Governors Garden house, the Houses of Private Gentlemen at the Mount, and other places near Madrass. It is true the destruction of these Buildings was a loss to the owners but in no degree prejudicial the Company or the Commerce of the Settlement. The only inconvenience was to a few Gentlemen who as their leisure permitted, or health required, spent a Day or a Week in the Country for the benefit of the Air.

Not such was the Treatment of the conquered at Chandernagore; Private houses were not only left unhurt, but many of those which had received inevitable Damage in the Siege were repaired, and the owners suffered to reside in them with their effects. But what

better cou'd we expect from a Commander whose Barbarity to his own people was such, that he left 44 miserable wretches in an hospital without a Single Person to assist them; and without having the good manners, or humanity, to leave a Line requesting our Care. Good nature in us supplied the want of it in him, and the Enemys wounded were treated on a footing with our own. It certainly can be no agreeable Task to enumerate the many Instances of ill treatment from an Enemy; on the contrary it would be a pleasure to receive Favors from them to make acknowledgments, and to have occasions of returning the Civility. Nations from Political Motives engage in War particulars manage it; and tho' ordered to kill, slay, and destroy, would gain more honor by acting with Lenity when conquerors, than by treating the conquered with rigor.

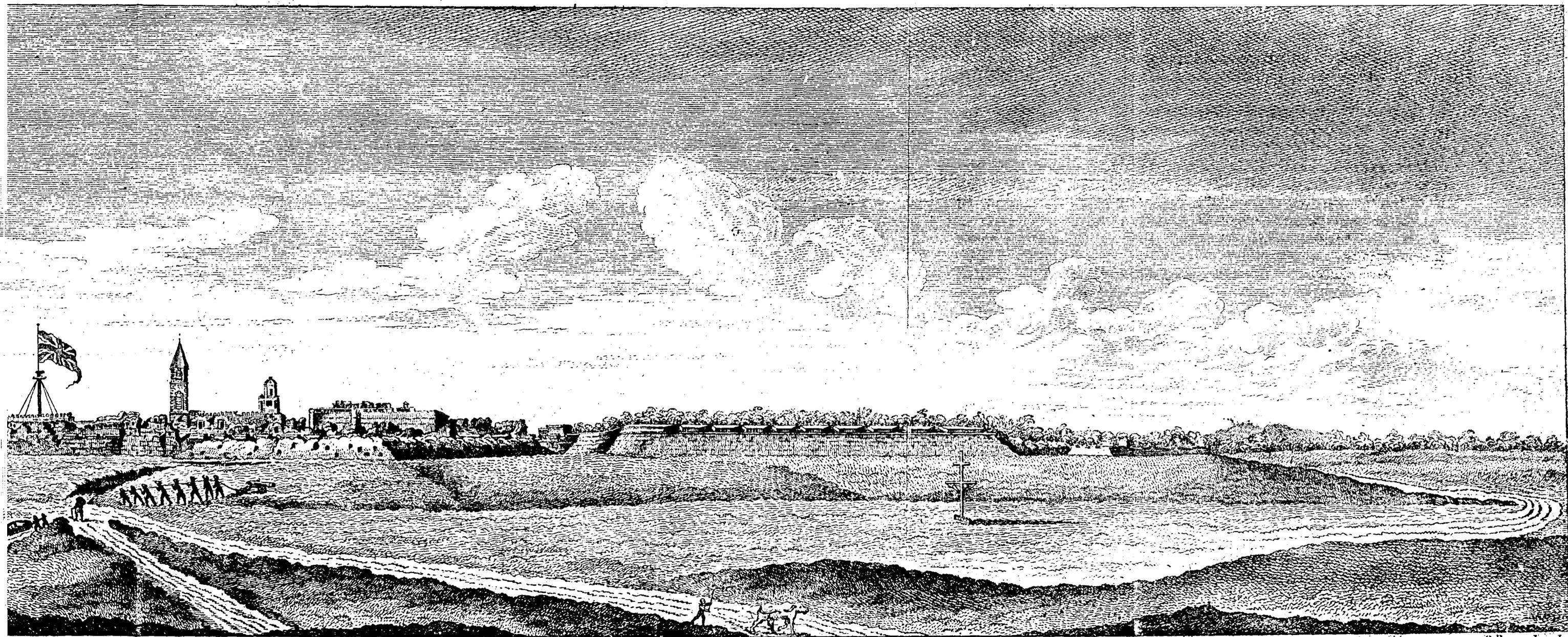
LIST OF THE OFFICERS KILLED AND WOUNDED IN THE SIEGE OF FORT ST. GEORGE, 1759.

*Killed.*

Major.....	Paul Polier .....	of the Companys Infantry.
Captains .....	{ John Hume .....	do.
	{ Augustus Monchanin .....	
	{ Stephen Bilhock .....	
Capt. Lieutenants ..	{ Jonathan Brooke .....	Companys Artillery.
	{ William Robson.....	Companys Infantry.
Lieutenants .....	{ John Little .....	do.
	{ Joseph Bales .....	do.
	{ Brown .....	64 Regiment.
	{ Richard Chace .....	Companys Infantry.
Ensigns .....	{ Schomborg .....	do.
	{ William Barnes .....	do.
	{ James Belton .....	do.
	Dead of Sickness, Capt James Ogilvy	do.
15	Lieut Fireworker John Teal, Royal Artillery.	

*Wounded.*

15		
Captains .....	{ Richard Black .....	of the Companys Infantry.
	{ Edmund Pascall .....	do.
	{ Charles Todd .....	do.
	{ William Elliot .....	do.
	{ Ross Lang .....	do.
Lieutenants .....	{ Leonard Parrott .....	do.
	{ John Hopkins .....	64 Regiment.
	{ Archibald Blair } Prisoners	Companys Infantry.
	{ Stephen Smith }	
2nd Lieutenant ...	Edgar Wietman.....	Royal Artillery.
Ensigns .....	{ Richard Fitzpatrick .....	Comps. Infantry.
	{ John Billingham .....	
	{ Thomas Wilcox .....	
Ensign.....	Richard Cook made Prisoner,	
14	but left behind among the	
—	Enemys Sick when they	
K. and W....	29 retreated.....	do.



P. Benard sculp.

*A View of F. St. George, as it appeared after the Siege, 1759.*

*SIEGES AND THE DEFENCE OF FORTIFIED PLACES BY  
THE BRITISH AND INDIAN ARMIES IN THE  
XIXth CENTURY.*

*(Continued).*

By COLONEL SIR EDWARD T. THACKERAY, V.C., K.C.B. (LATE R.E.).

THIRD BRITISH SIEGE OF BADAJOZ, *March, 1812.*

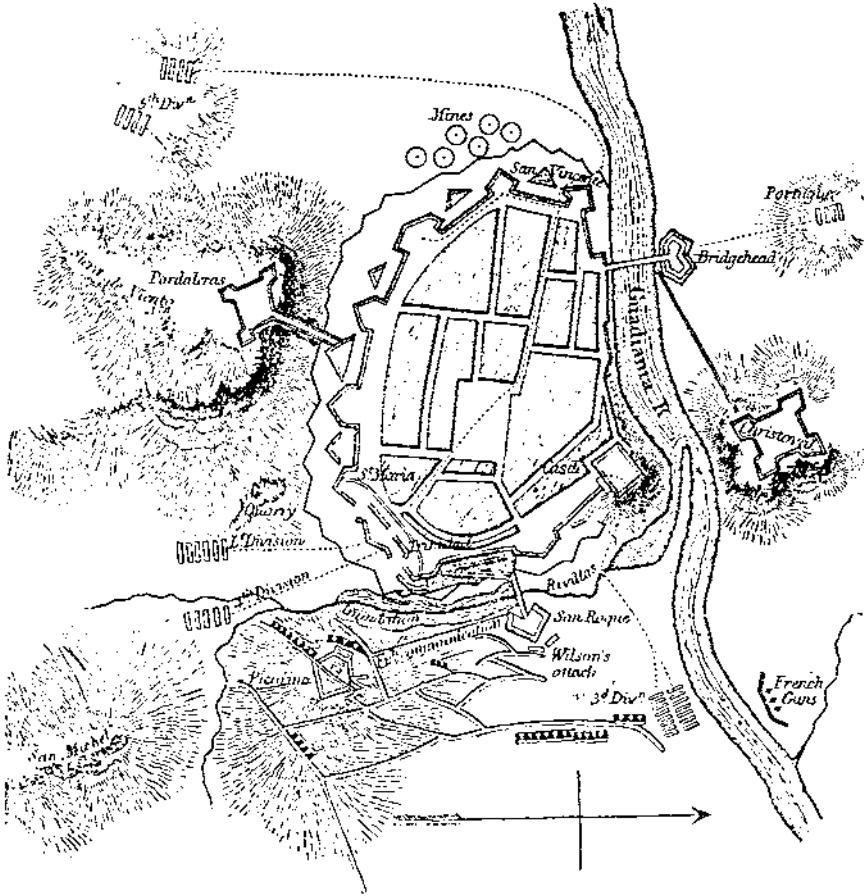
After the capture of Ciudad Rodrigo, Lord Wellington was once more in a position to turn his attention to Badajoz. It was known that Marmont's battering train had been captured in Rodrigo, and for this reason an irruption of the French into Portugal during the absence of the Allies could be attended with no permanent ill-effects, as they had no heavy artillery with which to reduce either Ciudad Rodrigo or Almeida. Towards the end of January therefore Lieut.-General Leith with the 5th Division marched into Rodrigo to form a garrison whilst the defences were repaired and strengthened, and on the 5th of March, the breaches having been rendered perfectly defensible and the place having been in some degree provisioned, it was finally handed over to the Spaniards. Meanwhile preparations for the attack on Badajoz were secretly proceeding: the battering train and Engineers' stores were embarked at Lisbon for a fictitious destination, transferred to smaller vessels at sea, landed at Alcacer do Sal, and thence transported overland to Elvas. Fascines and gabions were also made at Elvas as if intended for the works there, and every preparation was pushed on for the final attack on the fortress. On the 16th of March all was in readiness for the siege; the 3rd and 4th Divisions crossed the Guadiana by a pontoon bridge which had been thrown across the river some 4 miles below the town, and invested Badajoz without meeting with any opposition from the enemy.

The fortress itself was garrisoned by a mixed force of French, Russian and Spanish troops, 5,000 in all including sick, and a reconnaissance showed that it had been greatly strengthened since the attack of the preceding year. Phillipon making himself felt in every direction, had scoured the vicinity of the place, destroyed

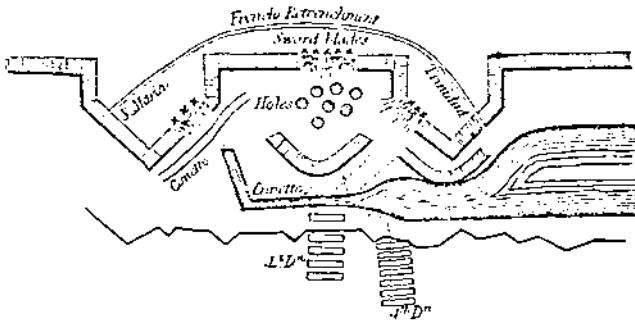
many small bands, carried off cattle almost under the guns of Elvas and Campo Mayor, and his spies were abroad from Ciudad Rodrigo to Lisbon and from Lisbon to Ayamonte. He had made an interior retrenchment in the castle and augmented the number of its guns; the rear of Fort Christoval was also better secured, and a covered communication from the fort itself to the work at the bridgehead was nearly completed. Two ravelins were constructed on the south side of the town, a third was commenced, and likewise counter-guards for the bastions; but the eastern front next the castle, which was in other respects the weakest point, was without any outward protection save the stream of the Rivillas. A "cunette" or second ditch had been dug at the bottom of the great ditch, which was also in some parts filled with water; the gorge of the Pardalleras was enclosed, and the work connected with the body of the place from whence powerful batteries looked into it. The three western fronts were mined, and on the east the San Roque Bridge was built up to form an inundation 200 yards wide, which greatly contracted the space by which the place could be approached. All the inhabitants had been ordered to lay up food for three months, and two convoys with provisions and ammunition had entered the place on the 10th and 16th of February; the stores of powder and supply of shells were, however, inadequate.

Wellington finding the old attack against Christoval impracticable, desired to assail one of the western fronts, which would have been scientific; but the Engineers pointed out that he had neither mortars, miners, nor guns, nor the means of bringing up sufficient stores for such an attack. Indeed the want of transport had again forced the Allies to draw stores from Elvas to the manifest hazard of that fortress, and hence here, as at Ciudad Rodrigo, time was necessarily paid for by loss of life, or rather the crimes of the politicians were atoned for by the blood of the soldiers. It was finally resolved to attack the bastion of Trinidad because, the counter-guard there being unfinished, that bastion could be battered from the hill on which the Picurina stood. The first parallel was to embrace the Picurina, the San Roque, and the eastern front in such a manner that counter-batteries might destroy all the armament of the southern fronts which bore against the Picurina Hill. The Picurina itself was to be battered and stormed, and from thence the Trinidad and Santa Maria Bastions were to be breached. All the guns were then to be turned to open a third breach in the connecting curtain which was known to be of weak masonry, and thus a storming party could turn any retrenchment behind the great breaches. In this way the inundation could be avoided, and, although a French deserter declared that the ditch was 18 ft. deep at this point, such was the General's confidence in his troops that he resolved to storm the place without blowing in the counterscarp.

SIEGE OF  
BADAJOS  
1812



PLAN OF BREACHES



Dickson's battering train of 52 pieces included sixteen 24-pound howitzers for throwing shrapnel shells, but this missile was little prized by Wellington, and partly to avoid expense, partly from a dislike to injure the inhabitants, neither in this nor in any siege did he use mortars.

Of 900 gunners present 300 were British, the rest Portuguese, and there were 150 sapper volunteers from the 3rd Division, not skilful but of signal bravery. The Engineers' Park was behind the heights of St. Michael. Picton had direction of the siege—Colville, Kempt, and Bowes alternately commanded in the trenches—the Engineer officers Burgoyne\* and Squire conducted the attack, and during the night of the 17th, 1,800 men, protected by a guard of 2,000, broke ground 160 yards from the Picurina. A tempest stifled the sound of the pickaxes, and, though the work was commenced late, a communication 4,000 ft. in length was formed and a parallel 600 yards long, 3 ft. deep, and 3 ft. 6 in. wide was opened. When day broke the Picurina was reinforced, and a sharp musketry interspersed with discharges from some field pieces aided by heavy guns from the body of the place was directed on the trenches.

In the night of the 18th two batteries were traced out, the parallel was prolonged right and left, and the previous works were improved. The garrison raised the parapets of the Picurina, lined the top of the covered way with sandbags and planted musketeers to gall the men in the trenches, who replied in a like manner.

On the 19th, Wellington having secret intelligence that a sally was intended, ordered the guards to be reinforced. Nevertheless at 1 o'clock some cavalry came out by the Talavera Gate, and 1,300 infantry under General Viellande, filed unobserved into the communication between the Picurina and the San Roque—100 men were prepared to sally from the Picurina itself, and all these troops jumping out at once drove the workmen before them and began to demolish the parallel. Previous to this outbreak the French cavalry had divided and commenced a sham fight on the right of the parallel, the smaller party, pretending to fly and answering Portuguese to the challenge of the piquets were allowed to pass, and, elated by the success of this stratagem, galloped to the Engineers' Park, 1,000 yards behind the trenches, where they cut down a few men before help came. Meanwhile the troops at the parallel having rallied upon the relief which had just arrived beat the enemy's infantry back even to the castle. In this hot fight the besieged lost above 300 men and officers, the besiegers only 150, but Colonel Fletcher, Chief Engineer, was badly wounded and several hundred entrenching tools were carried off, for Phillipon had promised a high price for each; yet this turned out ill as the soldiers neglected the fight to gather tools.

\* Afterwards Field Marshal Sir John Burgoyne, G.C.B.

After the action a reserved squadron of dragoons and six field pieces were always stationed behind St. Michael, and a signal post was established to give notice of the enemy's movements.

Wet and boisterous weather harassed the workmen, flooded the trenches, and retarded progress, but on the 19th the parallel was entirely opened, and on the 20th enlarged; next night it was extended across the Seville road and three counter-batteries were commenced.

On the 20th a slight sally had been repulsed, and during the night another battery against the San Roque was commenced and the battery against the Picurina was finished. Yet heavy rain again retarded the works, and the besiegers, having failed in an attempt to drain the lower parts of the parallel by cuts, made an artificial bottom of sandbags. The besieged, thinking the curtain adjoining the castle was the true object of attack, threw up an earthen entrenchment in front, and commenced clearing away the houses behind it.

Vauban's maxim that a preliminary investment is the first requisite in a siege had been neglected at Badajoz to spare labour, but the great master's art was soon vindicated by his countryman, Phillipon finding the right bank of the Guadiana free, made a battery in the night for three field pieces and at daylight raked the trenches: the shots pitching into the parallel swept it in the most destructive manner for the whole day, and the loss would have been terrible if the soft nature of the ground had not prevented the ricochet of the bullets. Orders were immediately sent to the 5th Division, then at Campo Mayor, to invest the place on that side, but these troops were distant and misfortunes accumulated. In the evening rain filled the trenches, the flood of the Guadiana sank twelve of the pontoons of the fixed bridge and broke the tackle of the flying bridges; the provisions for the army could not then be brought over, the guns and ammunition were on the right bank and the siege was on the point of being raised. In a few days, however, the river subsided, some Portuguese craft were brought up to form a flying bridge, the pontoons saved were employed as rowboats, and the communication was thus secured for the rest of the siege without accident.

On the 23rd the besieged were working on their entrenchment covering the front next the castle, and the besiegers were fixing platforms, when at 3 o'clock sudden rain filled the trenches, saturated earth fell away, the works crumbled, and the attack was entirely suspended. Next day the place was invested beyond the Guadiana by the 5th Division, and the weather being fine the batteries were armed with ten 24-pounders, eleven 18-pounders, and seven 5½-in. howitzers, all of which opened on the 25th; they were vigorously answered, and a howitzer was dismantled and several

artillery and Engineer officers were killed. Nevertheless the San Roque was silenced, the Picurina garrison so galled by the marksmen that none dared to look over the parapet, and as the external appearance of that fort did not indicate great strength General Kempt was ordered to assault. The outward seeming was, however, very fallacious, the fronts were well covered by the glacis, the flanks deep, the rampart at 14 ft. from the bottom of the ditch was protected with thick slanting palings, and above them there was an earthen slope of 16 ft. A few palings had been knocked off the covered way and the parapet was slightly damaged, but it was repaired with sandbags and the ditch was profound, narrow at the bottom, and flanked by four splinter-proof casemates. Seven guns were mounted, the entrance by the rear was protected by three rows of thick paling, and the garrison was 200 strong—every man having two muskets. The top of the rampart was garnished with loaded shells to push over, a retrenched guard-house formed a second internal defence, and small mines and a loopholed gallery under the counterscarp, intended to take the assailants in rear, were begun, but not finished.

Five hundred men of the 3rd Division assembled for the attack. Kempt ordered 200 under Major Rudd, of the 77th, to turn the fort on the left—an equal force under Major Shaw, of the 74th, to turn the fort by the right—and 100 men from each of these bodies were to enter the communication with San Roque, and intercept succour coming from the town. The flanking columns were to make a joint attack on the fort, and the hundred men remaining formed a reserve under Capt. Powis, of the 83rd. The Engineers, Holloway, Stanway, and Gipps, having 24 Sappers bearing hatchets and ladders, guided these columns, and 50 of the Light Division provided with axes were to move out of the trenches at the moment of attack.

#### ASSAULT OF PICURINA.

At 9 o'clock, the night being fine and the arrangements skilfully made, the two flanking bodies moved forward. The distance was short and the troops quick, but the fort black and silent before, now seemed a mass of fire. The assailants running to the palisades in the rear with undaunted courage endeavoured to break through, and, where the destructive musketry and the thick pales rendered their efforts useless, they strove to get in by the faces of the work, yet the depth of the ditch and the slanting stakes still baffled them. The enemy also shot fast and fatally, and the crisis being imminent Kempt sent the reserve headlong against the front; then the fight and the carnage became terrible, and a battalion coming out from the town to the succour of the fort was encountered and beaten by the party on the communication. The guns of Badajoz and the castle now opened, the guard of the trenches replied with musketry,

rockets were thrown up by the besieged, and the shrill sound of alarm bells mixed with the shouts of the combatants increased the tumult. Still the Picurina sent out streams of fire by the light of which dark figures were seen struggling on the ramparts ; for Powis had escalated where the artillery had beaten down the pales, and the other assailants throwing ladders in the manner of bridges from the brink of the ditch to the slanting stakes also mounted, and all were fighting hand to hand.

The axe-men of the Light Division, compassing the fort like prowling wolves, soon discovered the gate and hewing it down broke in by the rear, but the struggle still continued. Powis, Holloway, Gipps, and Oates, of the 88th, fell wounded on or beyond the rampart—Nixon of the 52nd was shot 2 yards within the gate—Shaw, Rudd, and nearly all the other officers had fallen outside—and it was not until half the garrison were killed that Gaspar Thiery, the Commandant, surrendered with 86 men ; the others rushing out of the gate endeavoured to cross the inundation and were drowned.

Phillipon thought that the Picurina would have delayed the siege five or six days, and had the assault been a day later this would have happened ; for the loopholed gallery in the counterscarp and the mines would then have been completed, and the body of the work was too well covered by the glacis to be quickly ruined by fire. He was baffled by this heroic assault which lasted an hour, and cost 4 officers and 40 men killed, 15 officers and 250 men wounded, and so vehement was the fighting, that the garrison had not time to roll over the shells and combustibles arranged on the parapet.

When the Picurina was taken three battalions advanced to secure it, and though a great turmoil and firing from the town continued until midnight, a lodgment in the works and communication with the first parallel were established, and the second parallel was commenced ; yet at daylight the redoubt was so overwhelmed with fire from the town that no troops could remain and the lodgment was entirely destroyed. In the evening the Sappers effected another lodgment on the flanks, the second parallel was then opened in its whole length, and the next day the counter-batteries on the right of the Picurina exchanged a vigorous fire with the town, by which one of the besiegers' guns was dismounted.

In the night of the 27th a new communication from the first parallel to the Picurina was made, and three breaching batteries were traced out ; one for twelve 24-pounders, to breach the right face of the Trinidad Bastion, occupied the space between the Picurina and the inundation ; a second for eight 18-pounders, to breach the left flank of the Santa Maria Bastion, was on the site of the Picurina ; a third on the prolonged line of the front to be attacked contained three shrapnel howitzers to scour the ditch and prevent the garrison working in it. At daybreak these works furnished with gabions and sandbags,

were lined with musketeers who galled the workmen employed on the breaching batteries, and the cannonade was brisk on both sides. Two of the besiegers' guns were dismantled, the gabions placed in front of the batteries to protect the workmen were knocked over and the musketry became so destructive that the men were withdrawn from the front and threw up earth from the inside.

On the night of the 27th the second parallel was extended to the right, with the view of raising batteries to ruin San Roque, destroy the dam that held up the inundation, and breach the curtain behind ; but the Talavera road proved hard, and the moon shone so brightly that the labourers were quite exposed and the work was relinquished. On the 28th the screen of gabions before the batteries was restored, the workmen renewed their labours outside, the parallel was improved and the besieged withdrew their guns from San Roque. Yet their marksmen still shot from it with great exactness, and the plunging fire from the castle dismounted two howitzers in one of the counter-batteries which was therefore dismantled. The enemy had also during the night observed the tracing string which marked the direction of the sap in front of San Roque, and a daring fellow, creeping out just before the workmen arrived, brought it in the line of the castle fire whereby some loss was sustained ere the false direction was discovered.

In the night the dismantled howitzer battery was re-armed with 24-pounders to play on the San Roque, and a new breaching battery was traced out on the site of the Picurina against the flank of the Santa Maria Bastion. The second parallel was also carried by the sap across the Talavera road, and a trench excavated for riflemen in front of the batteries.

On the 29th, a slight sally made on the right bank of the river was repulsed by the Portuguese, but the sap at San Roque was ruined by the enemy's fire, and the besieged continued to raise the counter-guard and ravelin of the Trinidad and strengthen the front attacked. The besiegers armed two batteries with 18-pounders which the next day opened against Santa Maria with but little effect, and the explosion of an expense magazine killed and hurt many men.

During the siege Soult, having little fear for the town yet expecting a great battle, was carefully organizing a powerful force to unite with Drouet and Danican. These generals had occupied the district of La Serena to keep open the communication with Marmont by Medillo and Truxillo ; but Graham and Hill forced them into the Morena, while Morillo and Penne Villemur, lying close on the Lower Guadiana waited an opportunity to fall on Seville when Soult should advance ; and there were other combinations to embarrass the French Marshal.

Marmont was concentrating his army in the Salamanca country, and it was rumoured he meant to attack Ciudad Rodrigo. Wellington was disturbed by this information. The flooding of the rivers

would prevent a blockade and he knew Marmont had not obtained a battering-train; but the Spanish generals and Engineers had neglected the new works of Ciudad Rodrigo; Almeida was in a bad state, and the project of invading Andalusia was likely to be stopped by these embarrassments.

On the 30th it became known that Soult was coming from Cordova. Then the 5th Division was brought over the Guadiana, Power's Portuguese Brigade and some cavalry only being left to maintain the investment on the right bank, and the siege was urged vehemently. Forty-eight pieces were in constant play and the sap against San Roque advanced; yet the enemy was equally diligent, his fire was destructive and his ravelin and counter-guard on the menaced front visibly advanced. By the 1st of April the sap was close to San Roque, the Trinidad crumbled, and the flank of the Santa Maria which was casemated and had hitherto resisted the batteries, also began to yield. By the 2nd, the face of the Trinidad was very much broken, but at the Santa Maria, the casemates being laid open, the bullets were lost in the cavities, and the garrison commenced a retrenchment to cut off the whole of the attacked front from the town.

During the night, a new battery against the San Roque being armed, two officers and some Sappers glided behind that outwork, gagged the sentinel, placed powder barrels and a match against the dam of the inundation, and retired undiscovered; yet the explosion did not destroy the dam and the inundation remained. Nor did the sap make much progress because of the French musketeers; for though the marksmen sent against them slew many, they were reinforced by means of a raft with parapets which crossed the inundation, and men also passed by the communication from the Trinidad Gate.

On the 3rd, guns were turned against the curtain behind the San Roque, but the masonry proved hard, ammunition was scarce, and as a breach there would have been useless while the inundation remained, the fire was soon discontinued. The breaches in the bastion were now greatly enlarged, and the besieged assiduously laboured at the retrenchments behind them, and converted the nearest houses and garden walls into a third line of defence. All the houses behind the front next the castle were also thrown down, and a battery of five guns intended to flank the ditch and breach of the Trinidad was commenced on the castle hill outside the wall; the besiegers therefore traced a counter-battery of 14 shrapnel howitzers to play upon that point during the assault, and the crisis was fast approaching. The breaches were nearly practicable, but Soult having joined Drouet and Danican, was advancing, and as the Allies were not in sufficient force to assault the place and give battle at the same time, it was resolved to leave two divisions in the trenches and fight at Albuera: Graham therefore fell back towards that place, and Hill, destroying

the bridge at Merida, marched from the Upper Guadiana to Talavera Real.

To gain time being now, as in war it generally is, the essential ingredient of success, the anxiety on both sides redoubled, yet Soult was still at Llerina on the morning of the 5th when the breaches were declared practicable. The assault was therefore ordered; but though Leith's Division was brought up to assist, a very careful personal examination caused such doubts in Wellington's mind that he delayed until a third breach should, as he originally designed, be opened between the Trinidad and Maria Bastions. This could not be commenced before morning, and in the night the enemy laboured assiduously behind the openings, regardless of the showers of grape with which the batteries scoured the ditch and breaches. Next morning the guns were turned against the Trinidad curtain, and the bad masonry crumbled so fast that in two hours a yawning break was seen, and Wellington having again examined the points of attack renewed his orders for the assault. Then the soldiers eagerly made ready for a combat, so fiercely fought, so terribly won, so dreadful in all its circumstances that posterity can scarcely be expected to credit the tale.

So sensible was the English General of Phillipon's firmness and the courage of his garrison that he spared them the affront of a summons, yet, seeing the breach strongly entrenched and the enemy's flank fire still powerful, he would not in this dread crisis trust his fortune to a single effort. Eighteen thousand daring soldiers burned for the signal, and he, unwilling to lose the services of one, gave to each division a task such as few generals would have the hardihood even to contemplate. For on the right Picton was to file out of the trenches, cross the Rivillas River and scale the castle walls, 18 to 24 ft. in height, furnished with all means of destruction and so narrow at top that the defenders could easily reach and overturn the ladders. On the left Leith was to make a false attack on the Pardaleras, but a real assault on the distant bastion of San Vincente, where the glacis was mined, the ditch deep, the scarp 30 ft. high, and the parapet held by bold troops provided each with three loaded muskets that the first fire might be quick and deadly.

In the centre, the 4th and Light Divisions, under Colville and Andrew Barnard, were to march against the breaches. They were furnished like the 3rd and 5th Divisions with axes and ladders, and preceded by storming parties of 500 men each with their respective forlorn hopes; the Light Division was to assault the bastion of Santa Maria, the 4th Division to assault the Trinidad and the curtain, and the columns were divided into storming and firing parties, the former to enter the ditch the latter to keep the crest of the glacis.

At first only one brigade of the 3rd Division was destined to

attack the castle, but just before the assault a sergeant of Sappers deserted from the French and reported that there was but one communication from the castle into the town, wherefore the whole division was directed to assail in mass.

To aid these great attacks General Power's Portuguese were to make a feint from the other side of the Guadiana, and Major Wilson, of the 48th, was to storm the San Roque with the guards of the trenches; this general outline was filled up with many nice arrangements, some of which were followed, others disregarded, for it is seldom all things are attended to in a desperate fight. Nor was the enemy idle. While it was yet twilight some French cavalry issued from the Pardaleras, escorting an officer who endeavoured to look into the trenches with a view to ascertain if an assault was intended; but the piquet on that side jumped up, and firing as it ran drove him and his escort back into the works. Then darkness fell and silently the troops awaited the signal.

#### ASSAULT OF BADAJOZ.

Dry but cloudy was the night, the air thick with river mist, the ramparts and the trenches unusually still; yet a low murmur pervaded the latter, and in the former the lights were seen to flit here and there while the deep voices of the sentinels at times proclaimed that all was well in Badajoz. The French, confiding in Phillipon's well-known skill, watched from their lofty station the approach of enemies whom they had twice before baffled, and now hoped to drive a third time blasted and ruined from the walls. The British standing in deep columns were as eager to meet that fiery destruction as the others were to pour it down, and both were alike terrible in their strength, their discipline, and the passions awakened in their resolute hearts. Former failures there were to avenge, and on both sides leaders who furnished no excuse for weakness in the hour of trial. The possession of Badajoz had become a point of personal honour with the soldier of each nation, but the desire for glory with the British was dashed by a hatred of the citizens on an old grudge; and recent toil and hardship with much spilling of blood had made many incredibly savage. The wondrous power of discipline bound the whole together as with a band of iron, and in the pride of arms none doubted their might to bear down every obstacle that man could oppose to their fury.

At 10 o'clock the castle, the San Roque, the breaches, the Pardaleras, the distant bastion of San Vincente were to have been assailed simultaneously, and it was hoped the strength of the enemy would weaken within that fiery girdle. But many are the disappointments of war. An unforeseen accident delayed the attack of the 5th Division, and a lighted carcass thrown from the castle, falling close to the 3rd Division led to its discovery and compelled the troops to

anticipate the signal by half an hour. Then, everything being suddenly disturbed, the double columns of the 4th and Light Divisions also moved silently and swiftly against the breaches, and the guard of the trenches rushing forward with a shout encompassed the San Roque with fire, and broke in so violently that scarcely any resistance was made.

But a sudden blaze of light and the rattling of musketry indicated the commencement of a more vehement combat at the castle. Picton, having been hurt by a fall in the camp and expecting no change in the hour, was not present, and consequently General Kempt led the 3rd Division. Having passed the Rivillas in single files by a narrow bridge under a terrible musketry fire he had re-formed, and running up a rugged hill reached the foot of the castle, where he fell severely wounded, and as he was carried back to the trenches met Picton who was hastening to take the command. Meanwhile the troops spreading along the front had reared their heavy ladders, some against the lofty castle, some against the adjoining front on the left, and with incredible courage ascended amidst showers of heavy stones, logs of wood and bursting shells rolled off the parapet, while from the flanks the enemy plied his musketry with fearful rapidity, and in front with pikes and bayonets stabbed the leading assailants or pushed the ladders from the walls, and all this was attended with deafening shouts and the crash of breaking ladders, and the shrieks of crushed soldiers answering to the sullen stroke of the falling weights.

Still swarming round the remaining ladders those undaunted veterans strove to be the first to climb, until all being overturned the French shouted victory, and the British, baffled but untamed, fell back a few paces and took shelter under the rugged edge of the hill. There, the broken ranks were somewhat re-formed, and the heroic Ridge springing forward seized a ladder and calling with stentorian voice on his men to follow, once more raised it against the castle, yet to the right of the former attack where the wall was lower and an embrasure offered some facility. A second ladder was soon placed alongside of the first by the Grenadier Officer Caneh, and the next instant he and Ridge were on the rampart, the shouting troops pressed after them, the garrison amazed and in a manner surprised were driven fighting through the double gate into the town and the castle was won. A reinforcement from the French reserve then came up, a sharp action followed, both sides fired through the gate and the enemy retired.

All this time the tumult at the breaches was such as if the very earth had been rent asunder. The two divisions had reached the glacis just as the firing at the castle commenced, and the flash of a single musket discharged from the covered way as a signal showed them that the French were ready; yet no stir was heard and darkness

filled the breaches. Some hay-packs were thrown, some ladders placed, and the forlorn hopes and storming parties of the Light Division, 500 in all, descended into the ditch without opposition ; but then a bright flame shooting upwards disclosed all the terrors of the scene. The ramparts crowded with dark figures and glittering arms were on one side, on the other the red columns of the British, deep and broad, were coming on like streams of burning lava ; it was the touch of the magician's wand, for a crash of thunder followed and with incredible violence the storming parties were dashed to pieces by the explosion of hundreds of shells and powder barrels.

For an instant the Light Division stood on the brink of the ditch amazed at the terrific sight, but then with a shout that matched even the sound of the explosion the men flew down the ladders, or disdaining their aid leaped reckless of the depth into the gulf below—and at the same moment amidst a blaze of musketry that dazzled the eyes, the 4th Division came running in and descended with a like fury. There were only five ladders for the two columns which were close together, and a deep cut made in the bottom of the ditch was filled with water from the inundation ; into that watery snare the head of the 4th Division fell, and it is said that above a hundred of the Fusiliers—the men of Albuera—were drowned in it. Those who followed checked not, but, as if such a disaster had been expected, turned to the left, and then came upon the face of the unfinished ravelin which being rough and broken was mistaken for the breach and instantly covered with men ; yet a wide and deep chasm was still between them and the ramparts, from whence came a deadly fire wasting their ranks. Thus baffled they also commenced a rapid discharge of musketry and disorder ensued ; for the men of the Light Division, whose conducting Engineer had been disabled early and whose flank was confined by an unfinished ditch, rushed towards the breaches of the curtain and the Trinidad, which were indeed before them but which the 4th Division had been destined to storm. Great was the confusion, for the ravelin was quite crowded with men of both divisions, and while some continued to fire others jumped down and ran towards the breach ; many also passed between the ravelin and the counter-guard of the Trinidad, the two divisions got mixed, the reserves which should have remained at the quarries also came pouring until the ditch was quite filled, the rear still crowding forward and all cheering vehemently. The enemy's shouts were also loud and terrible, and the bursting of shells and grenades, the roaring of guns from the flanks, answered by the iron howitzers from the battery of the parallel, the heavy roll and horrid explosion of the powder barrels, the whirring flight of the blazing splinters, the loud exhortations of the officers, and the continued clatter of the muskets made a maddening din.

Now a multitude surged up the great breach as if driven by a

whirlwind, but across the top glittered a range of sword-blades, sharp-pointed, keen-edged on both sides, and firmly fixed in ponderous beams chained together and set deep in the ruins; and for 10 ft. in front the ascent was covered with loose planks studded with sharp iron points, which moved when any attempt was made to cross them and the soldiers falling forward on the spikes rolled down upon the ranks behind. Then the Frenchmen, shouting at the success of their stratagem and leaping forward, plied their shot with terrible rapidity, for every man had several muskets, and each musket in addition to its ordinary charge contained a small cylinder of wood stuck full of wooden slugs, which scattered like hail when they were discharged. Once and again the assailants rushed up the breaches, but always the sword-blades, immovable and impassable, stopped their charge, and the hissing shells and thundering powder barrels exploded unceasingly. Hundreds of men had fallen, hundreds more were dropping; still the heroic officers called for new trials, and sometimes followed by many, sometimes by a few, ascended the sides, and so furious were the men themselves that in one of these charges the rear strove to push the foremost on to the sword-blades willing even to make a bridge of their writhing bodies, but the others frustrated the attempt by dropping down; and men fell so fast from the shot, that it was hard to know who went down voluntarily and who were stricken, and many stooped unhurt who never rose again.

At the beginning of this dreadful conflict, Andrew Barnard had with prodigious efforts separated his division from the other and preserved some degree of military array; but now the tumult was such that no command could be heard distinctly except by those close at hand, and the mutilated carcasses heaped up on each other and the wounded struggling to avoid being trampled upon broke the formations, order was impossible. Officers of all ranks, followed more or less numerous by the men, were seen to start out as if struck by sudden madness and rush into the breach which yawning and glittering with steel seemed like the mouth of a huge dragon belching forth smoke and flame. Gathering in dark groups and leaning on their muskets the troops looked up in sullen desperation at the Trinidad, while the enemy stepping out on the ramparts, and aiming their shots by the light of the fire-balls which they threw over, asked as their victims fell, why they did not come into Badajoz.

In this dreadful situation, while the dead were lying in heaps and others continually falling, the wounded crawling about to get some shelter from the merciless shower above, and withal a sickening stench from the burnt flesh of the slain, Capt. Nicholas, of the Engineers, was observed by Lieut. Shaw, of the 43rd, making incredible efforts to force his way with a few men into the Santa Maria Bastion. Shaw immediately collected 50 soldiers of all regiments and joined him, and although there was a deep cut along the foot of that breach

also, it was instantly passed and these two young officers led their gallant band with a rush up the ruins ; but when they had gained two-thirds of the ascent a concentrated fire of musketry and grape dashed nearly the whole dead to the earth. Nicholas was mortally wounded and the intrepid Shaw stood alone. With wonderful coolness he looked at his watch, and saying it was too late to carry the breaches rejoined the masses at the other attack. After this no further effort was made at any point, and the troops remained passive but unflinching beneath the enemy's shot which streamed without intermission ; for of the riflemen on the glacis, many leaping into the ditch had joined in the assault, and the rest, raked by a cross-fire of grape from the distant bastions, baffled in their aim by the smoke and flames from the explosions, and too few in number, entirely failed to quell the French musketry.

About midnight when 2,000 brave men had fallen, Wellington who was on a height close to the quarries, ordered the remainder to retire and re-form for a second assault ; he had heard the castle was taken, but thinking the enemy would still resist in the town was resolved to assail the breaches again.

This retreat from the ditch was not effected without further carnage and confusion, the French fire never slackened, a cry arose that the enemy was making a sally from the distant flanks, and there was a rush towards the ladders. Then the groans of the wounded, who could not move and expected to be slain, increased, and many officers who had not heard of the order, endeavoured to stop the soldiers from going back ; some would even have removed the ladders but were unable to break the crowd.

All this time Picton was lying close to the castle, and either from fear of the loss of a point which ensured the capture of the place, or that the egress was too difficult, made no attempt to drive the enemy away from the breaches. On the other side however the 5th Division had commenced the false attack on the Pardaleras, and on the right of the Guadiana the Portuguese were sharply engaged at the bridge, thus the town was girdled with fire, for Walters' Brigade having passed on during the feint on the Pardaleras, was escalating the distant bastion of San Vincente. His troops had advanced along the banks of the river and reached the French guard-house at the barrier gate undiscovered, the ripple of the waters smothering the sound of their footsteps ; but just then the explosion in the breaches took place, the moon shone out, the French sentinels discovering the columns, fired, and the British soldiers springing forward under a sharp musketry began to hew down the wooden barrier at the covered way. The Portuguese panic-stricken, threw down the scaling ladders, the others snatched them up again and forcing the barrier jumped into the ditch ; but the guiding Engineer officer was killed, there was a cunette which embarrassed the columns, and the

ladders proved too short, for the walls were generally above 30 ft. high. The fire of the enemy was deadly, a small mine was sprung beneath the soldiers' feet, beams of wood and live shells were rolled over on their heads, showers of grape from the flank swept the ditch, and man after man dropped dead from the ladders.

Fortunately some of the defenders had been called away to aid in recovering the castle, the ramparts were not entirely manned, and the assailants discovering a corner of the bastion where the scarp was only 20 ft. high, placed three ladders there under an embrasure which had no gun and was only stopped with a gabion. Some men got up with difficulty, for the ladders were still too short, and the first man who gained the top was pushed up by his comrades and drew others after him until many had won the summit; and though the French shot heavily against them from both flanks and from a house in front, their numbers augmented rapidly and half the 4th Regiment entered the town itself to dislodge the French from the houses, while the others pushed along the ramparts towards the breach and by dint of hard fighting successively won three bastions.

In the last of these combats Walker leaping forward sword in hand at the moment when one of the enemy's cannoneers was discharging a gun, was covered with so many wounds that it was wonderful that he could survive, and some of the soldiers immediately after perceiving a lighted match on the ground cried out that it was a mine! At that word, such is the power of imagination, those troops who had not been stopped by the barriers, the ditch, the high walls, and the deadly fire of the enemy, staggered back appalled by a chimera of their own raising; and in this disorder a French reserve under General Veillande drove on them with a firm and rapid charge, pitching some men over the walls, killing others outright, and cleansing the ramparts even to the San Vincente. There, however, Leith had placed Colonel Nugent with a battalion of the 38th as a reserve, and when the French came up shouting and slaying all before them, this battalion, 200 strong, arose and with one close volley destroyed them; then the panic ceased, the soldiers rallied, and in compact order once more charged along the walls towards the breaches; but the French, although turned on both flanks and abandoned by fortune did not yet yield. Meanwhile the portion of the 4th Regiment which had entered the town was strangely situated. For the streets were empty and brilliantly illuminated and no person was seen, yet a low burr and whispers were heard around, lattices were now and then gently opened, and from time to time shots were fired from underneath the doors of the houses by the Spaniards, while the troops with bugles sounding advanced towards the great square of the town. In their progress they captured several mules going with ammunition to the breaches; yet the

square itself was as empty and silent as the streets. The tumult at the breaches was however like the crashing thunder, and showed plainly that the fight was still raging there, and hence, quitting the square the troops attempted to take the garrison in reverse by attacking the ramparts from the town side, but they were received with a rolling musketry, driven back with loss, and resumed their movement through the streets. At last the breaches were abandoned by the French, other parties entered, desultory combats took place, Viellande and Phillipon, the latter of whom was wounded, seeing that all was lost, passed the bridge with a few hundred soldiers and entered San Christoval, which was surrendered next morning upon a summons to Lord Fitzroy Somerset, for that officer had with great readiness pushed through the town to the drawbridge before the French had time to organize further resistance. But even in the moment of ruin the night before, the noble Governor had sent some horsemen out from the fort to carry the news to Sault, and they reached him in time to prevent a greater misfortune.

Of the excesses committed by the troops, and the violence which resounded for two days and nights in the streets of Badajoz it is unnecessary to write in this article. On the third day, when the city was sacked, when the soldiers were exhausted by their own excesses, the tumult rather subsided than was quelled; the wounded men were then looked to and the dead disposed of. Five thousand men and officers fell in this siege, and of these, including 700 Portuguese, 3,500 had been stricken in the assault, 60 officers and more than 700 men being slain on the spot. The five Generals, Kempt, Harvey, Bowes, Colville, and Picton, were wounded, the first four severely; 600 men and officers fell in the escalade of San Vincente, as many at the castle, and more than 2,000 at the breaches, each division there losing 1,200!

When it is realized that this frightful carnage took place in a space less than a hundred yards square—that the slain died not all suddenly nor by one manner of death—that some perished by steel, some by shot, some by water, that some were crushed and mangled by heavy weights, some trampled upon, some dashed to atoms by the fiery explosions—that for hours this destruction was endured without shrinking and the town was won at last, the invincible courage of the British can be more clearly appreciated. And it is entirely wrong to suppose that the French were unworthy enemies, as the garrison stood and fought manfully and with good discipline. Yet who shall do justice to the bravery of the British soldiers! the noble emulation of the officers! Who shall measure out the glory of Ridge, of Macleod, of Nicholas, of O'Hare of the 95th, who perished on the breach at the head of the stormers, and with him nearly all the volunteers for that desperate service! Who shall describe the martial fury of that desperate rifleman, who, in his resolution to win,

thrust himself beneath the chained sword-blades and there suffered the enemy to dash his head to pieces with the ends of their muskets ! Who can sufficiently honour the intrepidity of Walker, of Shaw, of Caneh, or the hardiness of Ferguson of the 43rd, who having in former assaults received two deep wounds was here, his former wounds still open, leading the stormers of his regiment, the third time a volunteer, the third time wounded ! No age, no nation ever sent forth braver troops to battle than those who stormed Badajoz, and Lord Wellington's passionate outburst of grief when he heard of the night's havoc was but a fitting tribute for the loss of his gallant soldiers.

*(To be continued).*

## TRANSCRIPT.

### THE SIEGE OF ADRIANOPLE.

From an article by V. N. POLYANSKI in the September, 1913, and subsequent numbers of *Injenerni Jurnal*.

(Continued).

#### CHAPTER II.

##### THE STRENGTH AND EQUIPMENT OF THE ATTACK.

The II<sup>nd</sup> Bulgarian Army under General Ivanov, and the Bulgarian heavy artillery, were present throughout the siege. After the Battle of Kumanov, in which the Turkish main army in Macedonia was defeated by the Servians under Prince Alexander, the II<sup>nd</sup> Servian Army consisting of two divisions joined the siege army, and was placed under the supreme command of General Ivanov. Later on, the Servian Siege Park also joined. The Siege Armies.

Hence *troops of both Allies* operated against Adrianople. The heavier task fell, in the end, to the Bulgarians, but the help afforded by the Servians was so substantial that without it the place could not have been captured, in spite of the unfinished condition in which its defence works were found to be in October, 1912.

The numbers of the besiegers did not remain constant throughout the siege. In the first period (before the armistice), when only a blockade of the fortress was contemplated, the numbers were as follows:—

Infantry (Bulgarians and Servians)	..	80 battalions.
Field guns	.. .. .	250 ..
Heavy guns	.. .. .	102 ..
Cavalry	.. .. .	11 squadrons.
Grand total, 80,000 men.		

Subsequently, when it was decided that the fortress must be taken by assault, the armies were reinforced to the following strength:—

Bulgarians	.. .. .	105,000 men, with 342 guns.
Servians	.. .. .	47,000 men, with 98 guns.
Grand total, 160,000 men.		

The nature of the troops was also changed, as the regular troops had to be sent away to reinforce the Chatalja Army, and their place was taken by reserves.

## BRIEF DESCRIPTION OF THE BULGARIAN AND SERVIAN TROOPS.

Infantry.

The Bulgarian division consists of three brigades (24 battalions); the brigade consists of two regiments; the regiment of four battalions (*drujina*); and the *drujina* of four companies. The Servian division consists of four regiments (they have no brigade organization); the regiment, of four battalions; the battalion of four companies (*cheti*), and the *cheti* are divided into tenths (sections).

The Bulgarian infantry are armed with the 8-m.m. Mannlicher magazine rifle, and the Servian infantry with the 7-m.m. Mauser. Both have blunt-headed bullets and short sword-bayonets. The number of cartridges carried by the Bulgarians is as follows:—On the soldier, 120; in the battalion two-wheeled transport, 40; and in the park, 90 per rifle. By the Servians:—On the soldier, 150; in the regimental transport, 60; and in the divisional transport, 100 per rifle. A very noticeable feature of the Servian infantry was their extreme economy in the expenditure of ammunition and their good fire discipline, in consequence of which their ammunition supply was found to be fully sufficient.

Both rifles were adapted for firing with or without fixed bayonets. The Bulgarians preferred the former as they anticipated difficulty in fixing bayonets prior to an assault.

The Servian infantry carried hand grenades of the Swedish "Ozen" pattern, slung from the belt. The peculiarity of these grenades was that on bursting they gave off a black smoke, making a smoke screen in addition to other damage. Each company had 46.

Three-quarters of the Bulgarian infantry and one-half of the Servian infantry were equipped with small shovels. Later on, however, all the men in both armies carried them, the numbers being made up from those captured from the Turks in the first battles.

The standard of military training of both armies was high. Many of their regulations and instructions had been drawn up since the Russo-Japanese War, and were quite up to date. In their tactics French views prevailed. In technical training, the Bulgarians followed the Russian school, their engineer instructions were Russian, and also their fieldwork types. They had instructions for the siege of fortresses.

The Servian fieldwork types and the general basis of their field engineering instructions were German, but just before the war some special instructions were prepared by them and issued in the form of lithographic slips.

Field  
Artillery.

Each Bulgarian infantry division included a field q.f. regiment and a field non-q.f. regiment. The former was divided into three "divisions," each of three 4-gun batteries (36 guns), and the latter of two "divisions" (24 guns).

The Bulgarians had, besides, nine batteries of 12-c.m. field q.f. howitzers, the greater number of which were used against Adrianople.

Each Servian division had one q.f. regiment, consisting of three "divisions," or nine batteries (36 guns). They had before Adrianople two regiments, less one division, total 60 q.f. guns.

Table showing the characteristics of the field artillery of the Allies :—

Calibre and System.	Extreme Range.		Types of Shell.
	Shrapnel.	Common.	
75-m.m. q.f. Schneider-Creusot gun.	6000	6000	Shrapnel, common, with 6.5 kilogrammes.
8.7-c.m. non-q.f. Krupp gun	4000	6000	Shrapnel, case, common, with powder.
7.5-c.m. non-q.f. Krupp gun	3000	6000	Shrapnel, case, common, with powder.
12-c.m. q.f. field howitzer (Schneider).	6500	6500	Shrapnel, high-explosive, with 20.5 kilogrammes.

The Servian 75-m.m. gun was an excellent weapon, of the latest French pattern. Its advantage over the Bulgarian one was that it had the independent line of sight. The q.f. guns and howitzers were equipped with shields, and the ammunition boxes had armoured bottoms and lids. The batteries carried portable observatories, telephones and signalling apparatus.

The training of the Servian artillery was first-class and their regulations and tactics were identical with those of the French. The training of the Bulgarian artillery was also good, with French views predominating.

The *engineer troops* included pioneer units and corps of military Engineers. engineers. The pioneers do not normally form a part of the Bulgarian division, but may be allotted to the divisional commander. The Servians have two pioneer companies in a division. At Adrianople the number of pioneer units was very inconsiderable. The details of actual numbers were not obtainable, but apparently there was not more than one battalion, allowing one half-company to each brigade section of the investment line.

The commander of engineers of the siege armies was Major-General Vazov, who was subsequently made commandant of the front chosen for attack. His assistants were Colonel Dobrevski, who commanded the engineers on the North-East Front, Lieut.-Colonel Silyanovski (North-West Front), Capt. Matov (South Front), and others. On the West Front there were Servian engineers.

The commander of engineers of the Bulgarian armies was General Yankov, and his assistant was Major Rankov, who had charge of the technical branch. All the engineers in the Bulgarian service who were serving with siege companies before the fortress had qualified at the Nikolaev Engineer Academy at St. Petersburg. From conversations with various senior officers the writer ascertained that the Bulgarians were well pleased with their *technical knowledge* as military engineers, but considered that the *tactical training* of the Russian Academy was not strong.

A composite Bulgarian-Servian cavalry brigade, consisting of the Cavalry. Bulgarian Life Guards and the Servian Timok Cavalry Regiment, was employed against the fortress. In addition to this, a separate Bulgarian cavalry brigade (eight squadrons) was posted at the village

The Troops. of Dimotiki, and operated in conjunction with the besiegers. The cavalry were armed with carbines of the same systems as the infantry. The Bulgarian soldiers in outward appearance resemble Russians, but there is a great psychological difference in their natures. The former are morose, cunning, deceitful and cruel, qualities entirely opposite to those of the Russians. Outwardly their discipline and drill appear to be very weak, but their knowledge of duty and love of country have been satisfactorily developed. They drink in hatred of the Turk with their mothers' milk, and look upon him not as a man but as a Turk.

The Servian soldiers do not outwardly resemble Russians, but their nature is much more similar. They are more Slavonic, and milder, though passionate and impetuous. They are not naturally cruel and can easily live in harmony with the Turks, as the latter can with them. The Servian officers are more cultured and better educated than the Bulgarians, but the latter are more resourceful and resolute in action.

Heavy  
Artillery.

The Bulgarian heavy artillery consists of three battalions, the "Sofia," "Shumla" and "Widin." The first two were used against Adrianople. Each battalion, which in peace time consisted of two companies, each of 80 men, was raised on mobilization to 3,000 men, and was divided into "heavy" and "light" divisions, which in turn were split up into groups, with two to three batteries to a group. The batteries were 4-gun, 3-gun, 2-gun and even single-gun. The total number of guns in the Sofia and Shumla Battalions was 102.

The following table shows the characteristics of the Bulgarian siege artillery (guns of the same calibre which differed in length of bore are described conventionally by the letter I. over the number of calibres in the length of the bore) :—

Calibre and System.	Range in Metres.		Types of Shell.
	Shrapnel.	Common.	
<i>Schneider-Creusot.</i>			
(1). 12-c.m. L/25 lightened gun.	6000	7510	Shrapnel, common, with 16 kilogrammes powder.
(2). 12-c.m. L/28 lightened gun.	6500	7850	Shrapnel, common, with 20 kilogrammes powder.
(3). 15-c.m. howitzer . . . . .	—	5180	Shrapnel, high-explosive, with 40 kilogrammes.
<i>Krupp.</i>			
(4). 12-c.m. L/30 long gun . .	7825	9650	Shrapnel, common, with 20 kilogrammes powder.
(5). 15-c.m. L/30 long gun . .	9660	10420	Shrapnel, common, with 40 kilogrammes powder.
(6). 12-c.m. non-q.f. howitzer	—	5470	Shrapnel, high-explosive, with 20 kilogrammes.

The platforms for the heavy guns were of French pattern, consisting of three cross-ledgers, with long bolts, on which were laid four layers of planking ("shields"), with holes for the bolts to pass through, the whole being secured with nuts. Two of the 15-c.m. had, instead of platforms, *wheelways*, *i.e.*, wide "runs" held together by distance pieces.

They had special shoes for the trails and wedges for the wheels. These were very serviceable platforms and gave the guns great mobility.

The *Servian Siege Park*, which arrived after the armistice, consisted of the following Schneider-Creusot weapons of new construction :—

12-c.m. long guns	..	..	..	10
12-c.m. q.f. howitzers	..	..	..	20
15-c.m. q.f. howitzers	..	..	..	8

The last-named were the most powerful and the best weapons in the siege park of the Allies.

As the supply of warlike stores was maintained with difficulty, an extreme but prudent economy was observed in the expenditure of ammunition.

For aerial reconnaissance the Bulgarians had two captive balloons and 25 aeroplanes, but from the weakness of the *personnel* and the want of repair of the *matériel* only one balloon and six aeroplanes were used. Subsidiary  
Equipment  
of the  
Attack.

In November the Russian detachment under M. Shchetinin (First Russian Aeroplane Company) arrived with four aeroplanes of the Farman No. 7 type, and some *personnel*. The aeroplane park was at Mustapha-Pasha.

The balloon, used for regulating the fire of the heavy batteries, proved of the very greatest service. The aeroplanes flew over the fortress, threw out proclamations, and produced some moral effect, but were of no actual use, as they flew at a height of not less than 4,000 to 5,000 ft., and consequently could obtain no information of any value. The general construction of the fortress was already known, and details of the construction and the posting of the troops could not be seen from so great a height.

Heavy fire was brought against the aeroplanes from rifles, 10·5-c.m. guns and from guns of special design, but during the whole period of the siege only once was the observer in the captive balloon wounded by shrapnel. The Bulgarian airman, Tarokchiev, was killed in a fall of his aeroplane at Mustapha-Pasha.

The Bulgarians had six *searchlights* with 60 and 90-c.m. projectors ; they were allotted to the heavy artillery, and worked satisfactorily and usefully. One searchlight was disabled by a Turkish shell.

Communication throughout the besieging forces was maintained by telegraph and telephone. Great importance was attached to the organization of communications, and yet this was not always a success, as will be seen in the survey of the military operations. Communi-  
cation.

Besides the telephones with the troops, the divisions had telegraph detachments, and in addition there were 200 kilometres of cable in the Engineer Park. But this quantity proved insufficient, and during the siege the Bulgarians obtained 600 kilometres more.

So large a requirement of telephone cable is explained by the *necessity to have a double network laid in all directions*, owing to the frequent instances of damage being done to the cable by their own troops.

During attacks they sent forward telephone stations with the advanced troops in the endeavour to connect up captured points immediately with the rear. For this purpose in addition to the troops' telephone

systems, they laid out systems from the divisional headquarters, *duplicating* the troops' systems, and making terminals from which to lay out further developments.

The artillery had their own systems, independently of the infantry.

In the Engineer Park, besides large entrenching tools and other technical equipment, the Bulgarians had 1,000 *body shields* of French pattern, for protecting sappers from rifle bullets when demolishing obstacles. These shields were of 6-m.m. steel and were fitted with felt slings for carrying slung from the neck, and with loopholes for firing through. They weighed about 9 lbs. each. It was found that at a distance of 50 paces the sharp-nosed bullet went right through them, and as the wire obstacles were usually placed at this distance from the enemy's trenches, they did not prove of much assistance.

Lieut.-Colonel Silyanovski proposed a shield made of two of these shields with a 10-m.m. air space between them, but it was rather heavy.

Before the war, the Bulgarians had discussed a shield of 12-m.m. steel of German make, but it weighed about 44 lbs., and was not adopted.

For wire cutting there were special cutters, with which both the pioneers and the infantry were equipped, and also explosives.

Transport.

*Transport Equipment.*—For the carriage of stores to the besieging armies the Bulgarians used the normal gauge Sofia-Constantinople railway, as far as the station at Mustapha-Pasha. From there the loads were dragged by bulls and buffaloes, the carts being attended by the owners of the beasts, among whom were many Turks who were Bulgarian subjects. By this arrangement—that the carts were attended by the owners of the draft animals—the latter were well cared for and did very useful work. In spite of this, in the transport of stores and guns fully 2,000 head died. This form of transport was the only possible one, on account of the very bad condition of the roads in European Turkey.

Each heavy gun under normal conditions was dragged by four pairs of bullocks, but during rainy weather the teams were doubled. In this manner the field artillery also was dragged through the mud, as the horses sank in and were unable to pull the guns. The rapidity of transport with bullocks was from 1 to 1½ miles per hour.

The Bulgarians had no portable railway, and motor lorries were brought up only towards the end of the campaign.

### CHAPTER III.

#### MEASURES PREPARATORY TO THE MILITARY OPERATIONS.

FOR a long period previous to the war the Bulgarian general staff, recognizing that it was inevitable, and fully appreciating the strategic importance of Adrianople, had been systematically preparing for the eventual siege of that fortress.

The preparations for the siege had been careful and thorough, and had been carried on in conjunction with the general preparations for military operations in Thrace. For the last 15 years they had been under the supreme direction of Major-General Fichev, a capable and widely experienced man, who devoted himself entirely to this duty.

He had received his higher education in the Italian Military Academy, and in the war held the post of Chief of the Staff of the Army.

The fortress had been studied by the actual reconnaissance of Bulgarian officers, and also by means of a system of agents, on whom the Bulgarians had expended as much as from 50,000 to 60,000 francs annually.

The map had been prepared progressively. It was begun upon the foundation of the Russian 3-*verst* map, and all information and corrections, as they were received, were added to it. The surrounding country was reconnoitred, and sites for the strong points were marked upon the probable positions of the attack. On the 1st July, 1911, a fair copy was prepared in which all the data which had been obtained up to that date were shown, including all the defence works of the fortress. The scale was  $\frac{1}{200,000}$  with contours at 5-metre vertical intervals, and chain-dotted contours at 40-metre vertical intervals.

In that year the Bulgarian Staff carried out a fortress war-game, with the object of bringing into prominence the strong and weak points of the fortress, and of preparing a plan of attack.

Notwithstanding the minuteness of the information which had been obtained, it did not prove to be completely accurate. It appears to have exaggerated the strength of the forts, by assuming that those of the North-West Sector were fully completed specimens of the German designs, which they certainly were not. The wire entanglements, which surrounded the fort line in a continuous ring, were not shown. The Bulgarians did not credit the information which had been supplied by their agents in this case. To them the distribution of the entanglements appeared to be absurd, but it was in fact correct. A Turkish engineer explained this distribution by saying that the lines of obstacles had been laid out by the soldiers themselves, in his absence. No works were shown on the map which had been constructed subsequently to the 1st July, 1911, and naturally all the works which were carried out during the period of mobilization were wanting.

#### *Field Operations in the Fortress Area.*

The mobilization of the Bulgarian troops was ordered on the 29th September, 1912, and it was carried out harmoniously and expeditiously. Three armies were formed for the operations in Thrace:—Ist Army, General Kutinchev; IIInd Army, General Ivanov; and IIIrd Army, General Radko Dimitriev. At the head of all the armies there stood nominally Tsar Ferdinand, and actually his assistant, General Savov.

On the 17th October they commenced their advance, the general objectives of the three armies being laid down as follows:—The Ist Army, on the centre of the Turkish position, which extended from Adrianople to Kirk-Kilisse; the IIInd Army, on the Turkish left flank, the fortress of Adrianople; and the IIIrd on their right at Kirk-Kilisse.

Kirk-Kilisse, or Lozengrad, was, in the words of Goltz-Pasha, "so strong that only a Prussian army could capture it, and that only after a three-months' siege." It lay 38 miles to the east of Adrianople, in the same vilayet, at a junction of metalled and unmetalled roads. It had been fortified to form the right flank of the Turkish defensive line,

and, shortly before the war, a branch line of railway had been laid to it from the station of Lupulu on the Sofia-Constantinople railway.

It is impossible to call Kirk-Kilisse a fortress, as it was neither defended by all-round fortifications, nor did the local conditions render it secure from envelopment, and consequently it was not proof against assault.

Its permanent defences consisted of only two forts—lunette batteries—of the seventies. These lay on the north side of the town at a distance from the latter of from 1 to  $1\frac{1}{2}$  miles, and from 2 to  $2\frac{1}{2}$  miles apart. They could see one another, but the low ground between them was not swept by their fire. In their front there was from one-half to three-quarters of a mile of ground which was dead from the forts, but commanded by rifle trenches placed in front of them. The Bulgarians named the left fort "Ferdinand" and the right "Bulgaria."

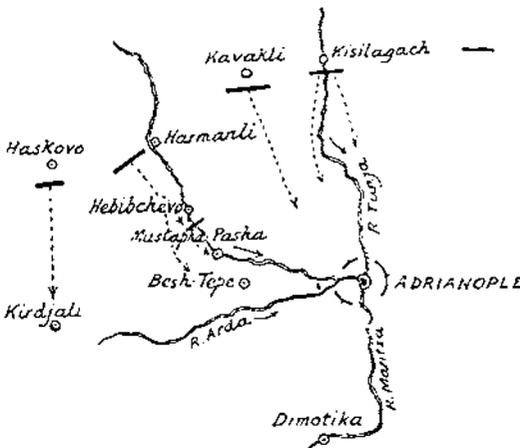
In addition to the forts there were a few field batteries and rifle trenches to the west and east of the town. The lines generally commanded the ground within 35 to 45 yards of their front, but they were themselves commanded from high ground lying  $3\frac{1}{2}$  to  $4\frac{1}{2}$  miles to the north.

Why Goltz-Pasha should have spoken in such flattering terms of a "fortress" consisting only of two old forts, is quite unintelligible. In all probability his object was to deceive the Bulgarians.

It will now be understood why *the main attack of the Bulgarian forces was directed against the right flank of the Turkish line*, and how it came about that the first collision of the opposing forces received the name among the Bulgarians of the Battle of Lozengrad. It may be mentioned that in an old plan of operations, which was known to the Turks, it was proposed that the Bulgarians should turn the Turkish left flank at Dimotica.

With a view to acting against Adrianople the units of the II<sup>nd</sup> Army were concentrated in readiness as follows (see sketch plan):—

- 1st Brigade, 2nd Infantry Division, at Haskovo.
- 8th Infantry Division at Harmanli.
- 9th Infantry Division at Kavakli.
- 3rd Infantry Division at Kisilagach.



PLAN NO. 1.—Grouping of 2nd Bulgarian Army before the outbreak of war.

On the east of the 3rd Division, for connection with the 1st Army, there were moved up six cavalry regiments ; in front of the 8th Division, on the Bulgarian-Turkish frontier, at Hebibchevo, there were six squadrons. These squadrons were to be the first to cross the frontier, with the object of seizing the stone bridge across the Maritza at Mustapha-Pasha, one of great importance to the Bulgarians, as if the bridge had been destroyed they would have had great difficulty in bringing up supplies for the use of the troops operating against Adrianople.

These cavalry carried out their task successfully. The regiment of Turkish infantry, with one battery, after slight resistance evacuated the town of Mustapha-Pasha, and on their retirement made an attempt to demolish the bridge. But in this they were prevented by the energetic action of the cavalry, and only succeeded in doing slight injury to one of the piers.

The advance of the columns of the II<sup>nd</sup> Army was begun on the same day, their marches being calculated with the following objects :—(1) To attract a strong garrison to the fortress, to draw away the Turkish reserves towards the left flank, and thereby to support the attack of the 1st and III<sup>rd</sup> Armies ; (2) in case of the success of the field operations, gradually to proceed with the investment of the fortress, and to make it impossible for the garrison to operate against the communications of the 1st and III<sup>rd</sup> Armies.

It appears that an assault on the fortress did not enter into the plans of the Bulgarian Headquarters.

For the fulfilment of these objects the movements of the columns of the II<sup>nd</sup> Army were so directed as to threaten the fortress from the north and north-west ; to surround it completely was beyond the strength of this army. The 1st Brigade, 2nd Division, was directed to move from Haskovo on Kirdjali, where Turkish troops had been located. The 3th Infantry Division advanced along the right bank of the Maritza, from Harmanli on Mustapha-Pasha and Besh-Tepe. The staff of the II<sup>nd</sup> Army went with this division and halted at Mustapha-Pasha.

The 9th Infantry Division advanced from Kavakli, across the Sakar-Planina Range, between the Maritza and Tunja, upon Adrianople. The 3rd Infantry Division advanced in the same direction along the Tunja, having one brigade on the right, and two on the left, bank.

The last-named column was intended to keep in touch with the 1st Army, and, for communication with the 8th Division, the cavalry which had captured the bridge at Mustapha-Pasha was allotted to its right brigade. Nevertheless the connection between the columns was weak. The 8th and 9th Divisions lost touch from the beginning of the forward movement, and only re-established it two days later before Adrianople. According to the staff of the 9th Division this was caused by the difficult conditions under which the division had to move over the Sakar-Planina Mountains.

On the 17th and 18th October the columns of the II<sup>nd</sup> Army moved on uninterruptedly, without encountering any opposition ; on the 19th the advanced guard of the 9th Division dislodged, after some fighting, some small Turkish detachments on the north of the fortress, and approached the fortress positions ; the 8th Division completed the

turning movement and approached the fortress from the west side. On the 21st fighting commenced along the whole line from Adrianople to Kirk-Kilisse, and on the 22nd the 8th Division after a series of fights dislodged the Turks from the villages Chermen, Besh-Tepe and Yurush.

On these same days the 1st Army routed, in an encounter battle at the village Seliola, the centre of the Turkish Army, and the IIIrd Army advanced on Kirk-Kilisse. The Turks met the Bulgarians on some strong mountain positions considerably to the north of this place, and fought with resolution, but the turning of their flank and the unexpected appearance of a Bulgarian brigade in rear of Lozengrad on the night of the 22nd—23rd, spread panic among the Turkish troops, and they fled, evacuating Kirk-Kilisse without fighting. The defeat of the Turks appeared to be the result of a preconceived idea that the Bulgarians intended to turn their left flank. In order to throw back their enemy to the west they advanced their right flank, and thereby favoured the Bulgarian turning movement. This premature advance of the Turks—commenced before they had concentrated their forces, and in spite of the plan of operations which had been arranged—inevitably led to disaster.

On the 21st the garrison of the fortress made a sortie with weak forces in an easterly direction, but were thrown back with heavy loss.

On the 23rd all the Turkish armies were in full retreat on the Lule-Burgos position, leaving Adrianople to its fate.

During this period the fortress performed the valuable services of attracting to itself three out of the nine divisions of the Bulgarian Field Army, and of securely protecting the left flank of the Turkish armies. This made it possible for the Turks, without fears for their left flank, to move their reserves to Lozengrad with the intention of attacking the left flank of the IIIrd Bulgarian Army. But these general reserves approached the field of battle only to find that all was over, and the Turkish Army already beaten.

This was the whole share of the fortress in the Battle of Lozengrad. It is true that the Turks attempted a sortie in an easterly direction, but with such small forces that it could in no way have influenced the operations of the 1st Army.

If the number of the garrison be taken into consideration—almost equal to, if not exceeding, that of the IIrd Army—there would be reason to have expected active operations by the Turks in large numbers against the flank of the 1st Army. The conditions were very favourable for them, as the IIrd Army had advanced against the North-West and West Sectors of the fortress, which were the most strongly fortified. For the defence of these positions the Turks might have detailed a quite insignificant force, and could have directed the greater part of the garrison without any risk against the flank of the 1st Army. In case of failure they could easily have retired upon the fortress, while success would have completely reversed the results of the action, for the fortress would then have threatened the rear of the victorious IIIrd Army, and might have held it back pending the arrival of the strategic reserve.

The action of the Bulgarians was correct. They were bound to advance in the directions chosen, as it would have been too risky to

have attempted to turn the fortress from both sides in the presence of so strong a garrison. To divert larger forces with the object of attempting to take the fortress by assault would have been unsound, as their main object—to defeat the enemy's field army—required that the decisive blow should be struck against the other flank. Furthermore an assault on the fortress could hardly have succeeded without the help of heavy artillery.

It must also be remembered that the two brigades of the 3rd Division which moved against the fortress from the north on the left bank of the Tunja were in communication with the 1st Army, so that in case of a powerful sortie towards the east, they might have parried the blow. It is probable, indeed, that the destruction of the sortie of the 21st October was actually carried out by these brigades.

The fighting of the portions of the 11nd Army on the north and west, though it was not very serious, nevertheless achieved its object, in chaining the garrison to the fortress positions.

*(To be continued).*

## REVIEWS.

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ALLEN'S COMMERCIAL ORGANIC ANALYSIS (VOL. III. HYDROCARBONS, PETROLEUM, AROMATIC ACIDS, EXPLOSIVES).

By DAVIS & SADTLER.—(Published by J. & A. Churchill).

IN these days when the road engineer and mechanical engineer are increasingly using hydrocarbons in their various forms both to improve the surface of the roads and to drive and lubricate the motor engines which give power to our machines which run on the earth, which fly in the air, and which penetrate under the sea, it is well that the constituents of these should be thoroughly understood.

Messrs. Davis & Sadtler have produced a volume dealing with these matters, and in the latest edition have brought up to date the information as to their special qualities, with methods of detecting and estimating their impurities and adulterations.

It is a book which should be found in every engineering library, and for all who are interested in the employment of oils and the large family of benzines and petroleum products it will prove a mine of valuable information.

A useful chapter on explosives by A. Marshall, the Chief Chemical Examiner of the Indian Ordnance Department, has a special interest for the military engineer.

The price of the book is 2rs. net and containing as it does 600 pages of scientific research, it will be conceded that it is well worth the money.

The work is produced by the publishers in their usual excellent style.

J.W.

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## RECOLLECTIONS WITH REFLECTIONS.

By MAJOR-GENERAL SIR THOMAS FRASER, K.C.B., C.M.G., R.E.—  
(William Blackwood & Sons, Edinburgh and London. 15s. net.  
With Portrait and Maps).

THE author gives a *précis* of the Military Services of his family while in Ireland from the 17th century, and of the events of his own life up to the San Stephano Treaty in 1878. It was the writer's good fortune to be an eye-witness of the great military events of the period and get a valuable narrative of his experiences in France in 1871, and in Paris during the Commune, while recent history gives special piquancy to his Turkish records of the time, and to the part he took in both European and Asian Turkey in 1876, and in the Russo-Turkish Campaign of 1877 in Bulgaria, where he was present on secret service.

## NOTICE OF MAGAZINE.

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REVUE MILITAIRE SUISSE.

May, 1914.

### THE BATTLE OF SEMPACH.

By Capt. B. de Cerenville.—The writer claims for this battle the most important place in Swiss annals, and considers that its anniversary might well be made a national holiday. The article is of historical interest only.

### DIVISIONAL STAFF DUTIES.

By Colonel E. Louderegger.—The writer expresses doubts as to whether the present system of issuing orders quite conduces to the sure and rapid movement of the new Swiss Division, which consists of three brigades instead of two. Including the Chief Staff Officer there are now four staff officers with the division. The compilation of orders for the train is frequently the cause of delay in the issue of the combined orders. When once the General and his C.S.O. have made up their minds what course to pursue, there should be no reason why the staff officer entrusted with the administration of duties in rear should not compile his orders whilst the remainder are compiling the tactical orders. All could then be issued together, but it would save further time if the two classes of orders were issued on separate papers, so that they could be read simultaneously by the various officers concerned in the brigades and other units.

The issue of combined orders simultaneously for all units is laid down in the regulations as a general rule, but separate orders may be issued when the case demands, and greater use might be made of this proviso. Several cases are taken from the 1912 manœuvres where this course might have been pursued with saving of labour to the Divisional Staff, and much greater convenience and saving of time to the troops concerned. Such orders can frequently be compiled simultaneously by different staff officers. Each order should contain information on the situation, the general positions of neighbouring troops, and of the intentions and position of the Divisional General, but details only applicable to other bodies of troops need not be included. In schools and courses for staff officers the distribution of work amongst subordinates and the issue of separate orders should be frequently practised, and this should be supplemented by exercises and war games for each staff as a whole, independently of manœuvres.

## REGULATIONS FOR VISUAL SIGNALLING.

By L.—A short account of the steps leading up to the issue of these regulations for all arms, with a summary of the principal points. The regulations are not peremptory; cavalry and artillery may use them or not as they like, infantry may use their old flags and lanterns, or employ screens and special lanterns, so long as they make the signals in accordance with the prescribed principles, *i.e.*, the Morse alphabet, conventional signs, and code of abbreviations. With luminous apparatus a dot is represented by a flash, a dash by a longer flash, with flags, discs or screens a dot is signalled by showing one, a dash by showing two.

## VOLUNTARY TRAINING.

A contribution towards Major Verrey's suggestion that young officers should do more, outside their actual periods of training, to fit themselves for their military duties. The writer considers that the will to do so is not lacking; what is required is stimulus and encouragement from the nation at large, their representatives, and the military authorities. Victory does not always fall to the side of big battalions and large resources; moral courage and a determination to win are of great importance. In some countries, notably in Japan and Germany, the whole nation is trained to think of war not as an abstract possibility, but as a reality that may take shape at any moment. From childhood patriotism is inculcated, books are published setting forth the great events of the Nation's history, with the sole view of moulding a national spirit, engravings and pictures of glorious episodes in war are to be seen in libraries and museums, anniversaries of victories are kept as national festivals, Navy and Army Leagues keep these questions constantly before the minds of the people by pamphlets, travelling exhibitions, and lectures, illustrated by the magic lantern, followed by national songs. It is the Nation's work to produce the soldier, the officer's to train him to ideas of courage and self-sacrifice, not only to make him a good marcher, a marksman, and a scout, but to develop his character and martial ardour. In a militia or territorial army it is especially difficult to obtain these results.

It is all very well to suggest that an officer should train himself of his own free will, should collect parties of his men, and take them out on Sundays for exercises and instruction, but where is he to obtain arms, uniform, tools and other materials? The Council of War will not authorize their issue, pleading lack of funds; and even if parties were thus trained they would get no benefit from it when they came up for the usual period of training. The re-engagement of N.C.O.'s is discouraged and there is little incentive for efficiency. To remedy these difficulties unit commanders might be given an annual subsidy. If the people and their representatives could only be persuaded of the truth of von Moltke's maxim that "the value of an army depends above all on its patriotism," they would not grudge the money required to develop this virtue.

A. R. R.

## CORRESPONDENCE.

## DESTRUCTION OF OBSTACLES.

SIR,

The subject of the destruction of obstacles by means of explosives has received a great deal of attention by many officers commanding units since Major McClintock's article on the Bangalore Torpedo appeared.

The accompanying plate illustrates a torpedo made at Chatham, which is suited to the employment of guncotton slabs.

It has the merits of being simple to make and easy to load. It is easy to place and is more rigid than the cylindrical torpedo.

The only special precautions to be taken are that the tin sheets overlap from the *nose* towards the handle so that the joints do not catch in the entanglement, and that all guncotton dust and fluff after loading is brushed away before finally fixing the top.

I am,

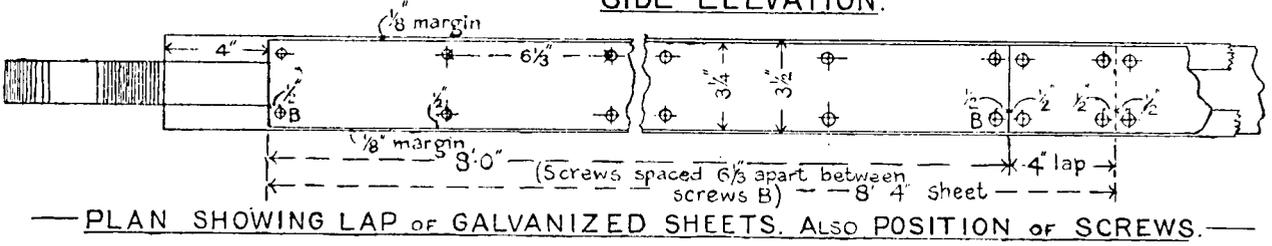
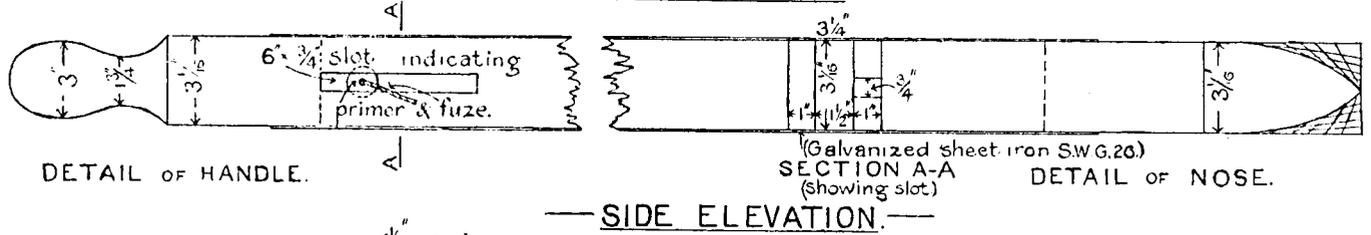
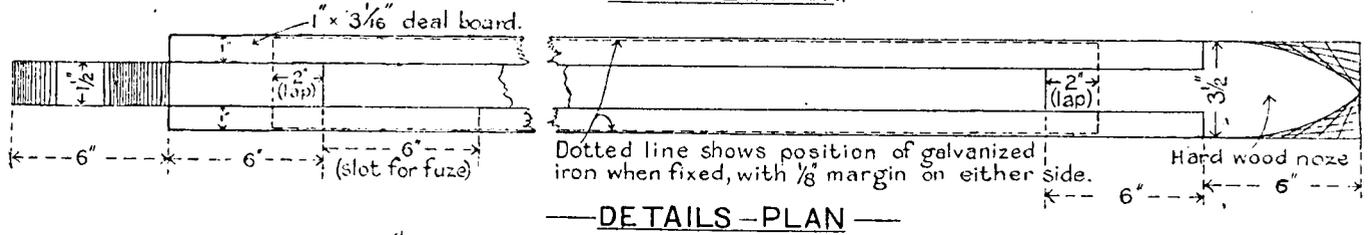
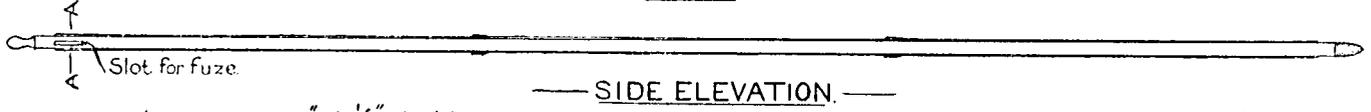
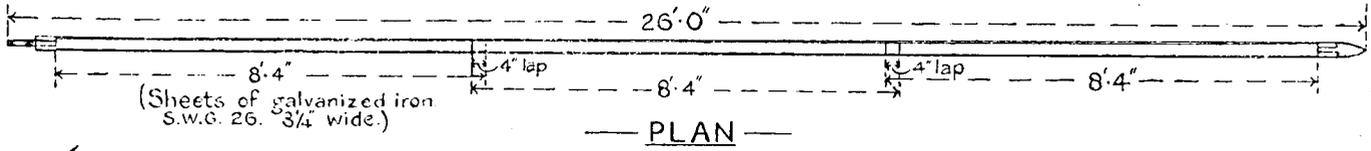
Yours faithfully,

R. N. HARVEY, *Lieut.-Colonel,*  
*Chief Instructor in Fortification.*

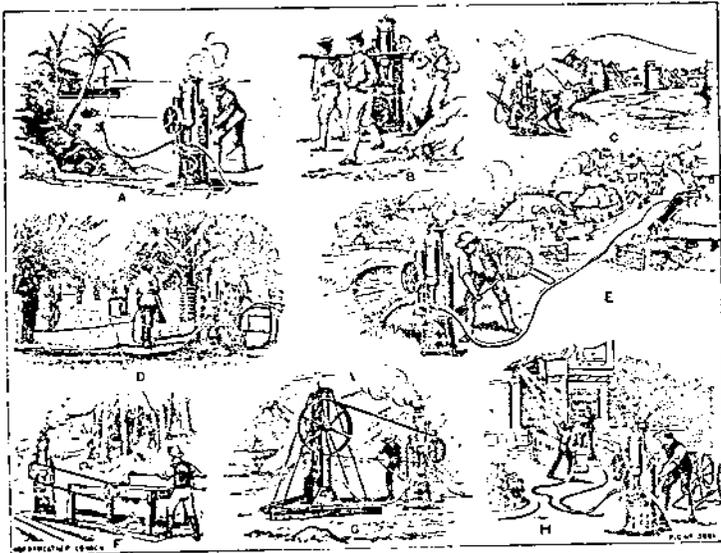
Fortification School, 4th June, 1914.

The Editor, *R.E. Journal.*

PLAN OF TORPEDO FOR WIRE ENTANGLEMENTS.



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