

Enclosure of Public Works Department letter Nos. 1380-85G of 3rd November 1881.

Report by Mr. Horace Bell on the work of the Assistant Engineers who have completed their practical course in England in the year 1880-81.

E. J. ALEXANDER.

Appointed Assistant Engineer, 2nd grade, 1st October 1880, and Fellow of Cooper's Hill College.

Posted to the Croydon and East Grinstead Railway under Mr. F. Barrister, Chief Engineer of the L. B. and S. E. Railway, and has remained there throughout the practical course. Has been visited twice. Once at the London Office, and the second time was taken over the works of the Railway.

Work seen on practical course.—Mr. Alexander has not had the advantage of definite and regular employment under Mr. Barrister, but has had occasional work in making out working drawings and tracings in the office and in measuring upon the works. He has had the free run of the works, and these are of an unusually interesting and instructive nature. The railway in hand is rather a heavy job through the chalk and green sand, and there are two tunnels through the former, and one of about 550 yards through the latter. There is also a long and high viaduct in brick, and many smaller works. The work is being carried out by contract, and Mr. Alexander will have seen the details of all kinds of railway work before he left the line, only excepting station work, which has not yet been begun.

Visits to other works.—Mr. Alexander has paid visits and made notes on the following works, *viz.*, Messrs. Westwood and Baillie's girder yard at Poplar, and the cement concrete work at Chatham Dockyard extension under Mr. Bernays, the Newhaven harbour works, and Saxby and Farmer's signal works.

Notes and general character.—Mr. Alexander's notes are very full and good, and he has generally shown great interest in his profession, and should be a very useful man. He appears also to have an unusually good knowledge of theory. He has earned full premium for the whole course.

R. E. CARTER.

Appointed Assistant Engineer, 2nd grade, 1st October 1880.

Posted to the Lincoln and Spalding Railway under Mr. R. Johnson, Chief Engineer, Great Northern Railway, and has remained on this work throughout the practical course. He has been visited twice.

Work seen on practical course.—Mr. Carter has not been regularly employed, but has nevertheless had many useful jobs to do; one, for instance, being the laying out of several miles of quarry tramway, and the office work for it. He has also had useful work in making working drawings and tracings in the Lincoln office and in measuring up. The line is not a heavy one, excepting in parts, one especially heavy cutting being a prominent feature; the bridges have been generally built of brick, and one of more than ordinary interest was one near Lincoln over a dyke of girders carried on cast-iron cylinders, which were sunk by excavation, sand pumps and pulsometer.

Visits to other works.—Mr. Carter has also visited and made notes on the following works: the Bradford Corporation Water-works extension, and the Sleaford and Spalding Railway under G. E. Railway Company.

Notes and general character.—Mr. Carter's notes on the works he has seen did not show to advantage for the first half of the course, and he did not get full premium for this period; but he has done better in the second half, and has collected a number of useful tracings in addition to his notes and memoranda, and has been awarded full premium.

W. E. CURRY.

Appointed Assistant Engineer, 2nd grade, 1st October 1880.

Posted to the Swindon, Marlborough and Andover Railway under Messrs. Watson, Smith and Watson, contractors for the work, and remained on this job throughout the practical course. He was at first at Marlborough on the Marlborough-Swindon section, and latterly at Weyhill on the Savernake Andover section. He has been twice visited.

Work seen on practical course.—Mr. Curry has had experience in a chalk and green sand country and on a line of rather heavy character. The bridges have been built of both masonry and brickwork, and he has had good opportunities of seeing these carried out from founds to finish. He has assisted in stacking out and measuring work, and has seen plenty of platelaying with the Vignoles rail which is used on this line. Generally the job he has been on has been a very instructive one, and the contractors he has been with are of a very good reputation and have given him full scope in learning his work.

Visits to other works.—Visited the works in progress of the Didcot, Newbury and Southampton Railway, where a good deal of cement concrete is being used in bridging.

Notes and general character.—Mr. Curry's notes for the first half of the course showed an apparent want of interest in his work, and did not earn full premium for this period; but he has done better latterly, and the fact of his having been more employed by the people he was placed with, indicated that he had picked up something and was more keen to work. He is, however, not a very hopeful case at present, and in fact lacks energy. As he has, however, done his best during the second half of the course, he has been granted full premium.

R. E. DYSON.

Appointed Assistant Engineer, 2nd grade, 1st October 1880, Fellow of Cooper's Hill College.

Posted for the first six months of the course to Messrs. Westwood, Baillie & Co.'s girder works at Poplar, and for the remaining four months under Mr. Nicolls, Engineer of the Glasgow and Paisley Railway. He has been visited twice.

Work seen on practical course.—The work in hand at Westwood, Baillie's yard while Mr. Dyson was there was mainly that of the Attock bridge (steel) girders, which are of large span and somewhat exceptional in design. There were also many jobs of plate girders of smaller size, pile work, and casting, of different kinds. Mr. Dyson did not actually work in the yards, but took all the various shops in turn, studying their details and making good use of his time in this way. The job in hand under Mr. Nicolls on the Glasgow and Paisley Railway was the opening out of a short tunnel and cutting through sandstone and laying down two more pairs of rails. This was done on a line under traffic, and in addition an overbridge had to be taken down and rebuilt over the cutting. This job has hardly been well pushed through, and Mr. Dyson has not had full advantage of it; but Mr. Nicolls has employed Mr. Dyson in useful work in designing working drawings for other work and in inspecting other works near Glasgow.

Visits to other works.—The only outside works visited by Mr. Dyson have been those on the Chatham Dockyard extension which are being carried out wholly in cement concrete, and are very instructive.

Notes and general character.—Mr. Dyson's notes were fully as good as could be expected, and he has proved himself, as regards the practical course, to be an able and hardworking fellow. He has had full premium for his notes, and is, I think, an exceptionally promising young man.

A. GRANT.

Appointed Assistant Engineer, 2nd grade, 1st October 1880.

Posted to Messrs. Neilson and Co.'s Locomotive works, Glasgow, and has remained there during the whole period of the course. He has been visited twice.

Work seen on the practical course.—Mr. Grant has been urged, and has fairly complied with the idea, to keep as far as possible working hours in these shops, and to work manually in the different shops for short periods. He has been allowed one clear day in the week solely for noting in the works, or on any outside work of interest. There has been ample work in hand at Messrs. Neilson's while Mr. Grant has been in the shops, and he should have picked up, and has, I believe, a very fair knowledge of the manipulation of metal work. This should be of great use to him. Mr. Grant has, however, had ill-health and has been twice absent for some days at a time on this account. His practical course has, moreover, been shortened by about a month on account of his getting leave to visit his parents in the West Indies before leaving for India.

Visits to other works.—Mr. Grant has not visited any other works.

Notes and general character.—It was agreed in Mr. Grant's case, as in that of others, in shops, that if they kept working hours and actually worked, their note books should be considered as of secondary importance. I think Mr. Grant has done his best in this direction, though his notes were not very good. This was due more, however, perhaps to ignorance than want of zeal. He has earned only part premium for the course, but seems to be a steady and fairly industrious fellow.

H. S. GUINNESS.

Appointed Assistant Engineer, 2nd grade, 1st October 1880.

Posted for the first six months of the course to Messrs. Sir William Armstrong and Co.'s Elswick works, Newcastle, and for the other four months to the Halifax, Thornton and Keighley Railway under Mr. H. J. Fraser. He has been visited twice, viz., once at each place.

Work seen on practical course.—The principal feature of the work at Messrs. Armstrong is (excepting the making of artillery) hydraulic machinery of all kinds and the manufacture of iron and steel for construction. Mr. Guinness worked manually in some of the shops for a time, but employed his time mainly in noting. He has got, I think, and certainly ought to have got, a thorough grasp of the details of hydraulic machinery, and also must have a good idea of the way in which iron, steel and other metals are designed and worked up.

On the Halifax and Keighley Railway he has seen a very heavy piece of railway work over very rough country. There are several tunnels and viaducts on this section, which were

in hand during Mr. Guinness' time there, and he has seen both brick and sandstone masonry in hand of a very good type. He has not been regularly employed by Mr. Fraser.

Visits to other works.—Has frequently visited the Cable Dene Docks at Shields, where cement concrete work is in hand, and Messrs. Hawks, Crawshaw's works at Gateshead and Messrs. Fowler's works at Lees. He has also seen some platelaying on a line in the Midland Counties.

Notes and general character.—Mr. Guinness' notes have been full and good; indeed above the average in quality, and he seems to have profited well by his practical course. He appears to me to be an intelligent, energetic fellow, and fairly keen on his work. He has obtained full premium for the course.

A. V. HEATH.

Appointed Assistant Engineer, 2nd grade, 1st October 1880.

Posted to the Didcot, Newbury and Southampton Junction Railway under Messrs. Falkiner and Tancred, contractors for the line, and has remained on this work throughout the term of the course. Has been visited twice.

Work seen on practical course.—The above named Railway is being made under Mr. John Fowler as Engineer. It is of a rather heavy character in places, and has afforded Mr. Heath a varied and instructive field of study. The underbridges are in brick arching and portland cement concrete for abutments and wings, and some of the overbridges are throughout of cement concrete, including arches. This work has been well studied by Mr. Heath. He has also seen a small screw-pile bridge constructed from beginning to end, and has had varied experience in outdoor and indoor railway work for the contractor's agent; indeed, latterly he has had sole charge of the stacking out on the southern section. The Agent spoke of him as a most useful man, and was glad to make use of him.

Visits to other works.—Mr. Heath has paid frequent visits to the Newbury drainage works and the engine shops of Messrs. Plenty and Son at Newbury. He saw also the Swindon and Andover Railway works.

Notes and general character.—Few, if any, of the men have derived such full advantage from their practical course as Mr. Heath. His notes and sketches were models of what these should be, both for fulness of detail and as evidence of systematic observation. I have a very high opinion of Mr. Heath, and think he will turn out a very valuable man. He has earned full premium for the course.

W. A. JOHNS.

Appointed Assistant Engineer, 2nd grade, 1st October 1880.

Posted to the Lincoln and Spalding Railway under Mr. R. Johnson, Chief Engineer, Great Northern Railway, and has remained on this work throughout the course. Has been visited twice.

Work seen on practical course.—Has been with Mr. R. E. Carter on the above line. Neither students were regularly employed by the Resident Engineer, but have had useful work from time to time; amongst others, for instance, the field and office work in laying out and estimating a line of tramway to convey stone from the Ancaster stone quarries to the main line. Mr. Johns has had free run of the works and of the Resident Engineer's office, and has seen nearly all the various works of a railway in progress through ordinary country. The bridges have been generally of brick with stonework of a rough class in foundations and backing. He has also seen cylinders sunk by ordinary excavation and where there was a good deal of water to contend with.

Visits to other works.—Has paid a prolonged visit to the Halifax, Thornton and Keighley Railway, on which there are heavy works, and to the works of the Bradford water-works at Barden.

Notes and general character.—Mr. Johns has not shown quite as keen an interest in the works he has seen as I should have hoped for; but I make allowance in his and in Mr. Carter's case for the fact that they have not had regular and responsible employment. Mr. Johns appears to me to be, however, an active and intelligent young man, who will do well when he gets regularly into harness. His notes have been fair, but he has not earned full premium for the course.

H. J. JOHNSTON.

Appointed Assistant Engineer, 2nd grade, 1st October 1880.

Posted to the works of Messrs. Handyside and Company at Derby, and has remained there throughout the course. He has been visited twice.

Work seen on practical course.—Messrs. Handyside's works are devoted mainly to the construction of girders, roofing and roof trusses and malleable cast-iron work. The shops are good, and the work turned out is second, I believe, to none in England as to character and accuracy. While Mr. Johnston has been in the shops he has seen the iron piers of the Attock bridge constructed, the roof for the Victoria Station, Manchester, and various other works of minor interest in the way of girders and roof. He has studied malleable iron castings carefully at my suggestion, and has shown much attention to the works in hand generally. The firm have employed him moreover at useful work in designing in the office and give him a good character. He should have on leaving a very good knowledge of girder and roof work in all detail.

Visits to other works.—Has paid two or three visits to Victoria Station, Manchester, where a new roof was in course of erection.

Notes and general character.—Mr. Johnston's notes during his practical course have been very good and show much industry and intelligence. Messrs. Handyside's Manager speaks very

well of him and have employed him on several useful jobs in and out of the shops. He has earned full premium, and is, I think, a very promising young man.

H. J. LANDON.

Appointed Assistant Engineer, 2nd grade, 1st October 1880.

Posted to Messrs. Westwood, Ballie and Co.'s works for the first six months, and for the other four months to the Bradford water-works under Mr. A. K. Binnie. Has been visited twice, viz., once at each place.

Work seen on practical course.—Mr. Landon was posted to Messrs. Westwood and Baillie's with Mr. Dyson, and the description already given of the work seen by the latter equally applies to Mr. Landon, who made also as good use of his time, I think, as Mr. Dyson. On the Bradford water-works, Mr. Landon has been employed by Mr. Binnie at the Thornton moor new reservoir, a new work for giving additional supply to the high level parts of the town. The dam is an earthen one with cement concrete core (in lieu of puddle trench), and of very unusual depth and dimensions. He has seen all the work at the conduits, steam-excavators, and all the details of reservoir work, both at this work and at the Barden upper reservoir; also a new work, which Mr. Landon has had frequent opportunities of visiting. He has also had the run of the Engineer's Office at Bradford and had useful work to do there.

Visits to other works.—Visited Chatham Dockyard works and new reservoir works at Barden near Skipton, where there is good masonry and concrete work in hand.

Notes and general character.—Mr. Landon's notes have been full and good and show great industry and attention to detail. He appears to me to be a steady, hardworking fellow, and much interested in his profession. He has earned full premium for the course.

E. A. LEE.

Appointed Assistant Engineer, 2nd grade, 1st October 1880.

Posted to Messrs. Hawks, Crawshaw & Co.'s Engine and Ironworks at Gateshead on Tyne for the first six months, and to the Haulbowline Dock at Queenstown under Mr. J. O. Andrews for the remaining four months. He has been visited twice, viz., once at each place.

Work seen on practical course.—Mr. Lee, who was accompanied by Mr. Maconchy, was not altogether well placed at Messrs. Hawks, Crawshaw's works. They now do more iron manufacture than engine and other work, and their shops are untidy, cramped, and rather out of date. However, Mr. Lee saw some useful work in the shape of a screw-pile pier for Rangoon and plate girders for Indian Railways. He was able also to get a good idea of moulding and machine work and the general operations of an engine shop; all of which is useful experience for designing in future in India. At Haulbowline he has seen the operations in full swing of the construction of a very large graving dock and basin constructed of limestone masonry and cement concrete. The foundations have been on caissons of brick blocks, under sunk as in India, and on piling. He has also had useful work in Mr. Andrews' office in making and copying working drawings and in helping generally on the job.

Visits to other works.—Visited Cable Dene new docks in construction at North Shields several times, and new works on Cork and Queenstown Railway near Queenstown.

Notes and general character.—Considering Mr. Lee's opportunities at Gateshead, his notes were good, indeed as good as could well be expected, and he is, I think, a steady and an original-minded young man. He has earned full premium for the course and has profited fully, I think, from what has been before him.

G. MACONCHY.

Appointed Assistant Engineer, 2nd grade, 1st October 1880.

Posted in the first instance to Messrs. Hawks, Crawshaw and Co.'s works at Gateshead on Tyne, and remained there six months. For the last four months was moved to the Bradford water-works new reservoir at Barden under Mr. A. R. Binnie. Has been visited twice.

Work seen on practical course.—At the Gateshead works Mr. Maconchy had experience in the construction of girders, of a screw-pile pier for Rangoon, and of general machine work in engines and machinery of all kinds. He had also excellent opportunity for studying iron manufacture in all stages at Messrs. Hawks, Crawshaw's ironworks near the shops. At Bradford he has seen in full operation the construction of a very large reservoir with earthen dome and concrete hearting in lieu of puddle below ground. He has seen masonry in culverts, weirs and conduits in hand, and the use of the "steam navy" or machine excavator.

Visits to other works.—Mr. Maconchy has visited and made notes on the Newcastle water-works and on the Cable Dene Docks at North Shields.

Notes and general character.—The notes and sketches made by Mr. Maconchy during the course have been somewhat below the average quality; but I attribute this not to the want of industry and attention so much as the want of the faculty of observing details. He has been awarded full premium for the course, but not without some hesitation. He seems to have plenty of ability, but is not yet very keen, I fear, at his profession. He will, however, probably improve considerably when he gets into regular and responsible work.

G. MILLS.

Appointed Assistant Engineer, 2nd grade, 1st October 1880.

Posted to the Great Western Railway Locomotive shops at Swindon under Mr. W. Dean, Locomotive Superintendent, and has remained there throughout the course. He has been visited twice.

Work seen on practical course.—Mr. Mills has spent the principal part of his time at Swindon in working manually for short periods in the foundry, the smithy, and the erecting shop, and has, I think, obtained a satisfactory and extremely careful insight into the details of machinery and ironwork generally. The Swindon shops are exceptionally good and well arranged, and Mr. Dean has kindly and cordially met every suggestion I have made as to the employment and instruction of the two men (Mr. Mills and Woolecombe) we have had with him. Mr. Mills has further spent more than a fortnight in studying the reconstruction of the Cornwall viaducts on the Great Western Railway, an opportunity of much value, as the works are exceptionally large and the masonry very good and interesting.

Visits to other works.—Has made a prolonged visit and inspection of the reconstruction of the viaducts in masonry on the South Devon Railway, and visited and noted on the erection of an iron bridge at Shrewsbury for the Great Western Railway.

Notes and general character.—I think Mr. Mills has made good use of his practical course, and his notes are very fair indeed, considering that he actually worked at Swindon. He seemed always anxious to grasp the essentials of the work before him, and to avoid wasting time on unimportant points. He has earned full premium; and if his health stands, he should be a very useful man in India.

J. MANSON.

Appointed Assistant Engineer, 2nd grade, 1st October 1880.

Posted to Sir William Armstrong and Company's works at Elswick for the first six months, and to the Halifax, Thornton and Keighley Railway under Mr. H. J. Fraser for the remaining four months of the course. He has been visited twice, viz., once at each place.

Work seen on practical course.—The remarks under this head made with regard to Mr. Guinness apply equally to Mr. Manson, as they have both had the same experience together.

Visits to other works.—See remarks under this head regarding Mr. Guinness with whom Mr. Manson has been coupled throughout the course.

Notes and general character.—Mr. Manson has done very well indeed during the course, and has not only worked manually in the shops, but has produced very good notes on hydraulic machinery and iron manufacture while at Sir William Armstrong's works at Elswick. His notes on the Halifax and Keighley Railway are very satisfactory. He has obtained full premium for the course.

M. NETHERSOLE.

Appointed Assistant Engineer, 2nd grade, 1st October 1880.

Posted for the first six months to the South Eastern Railway Locomotive shops at Ashford under Mr. James Stirling, and for the remaining four months to the Haulbowline Dock at Queenstown under Mr. J. O. Andrews, M.I.C.E. Has been visited twice, viz., once at each place.

Work seen on practical course.—I arranged that Mr. Nethersole should keep part working hours at Ashford, viz., 9 to 6, and work manually in three shops—the foundry, boiler shop, and erecting shop. This he did thoroughly and took one day a week at my suggestion for noting round the shops generally. He has profited, I think, unusually well by this experience, and has a decided bent for mechanical engineering. At Haulbowline Mr. Nethersole has had the run of a heavy job in the shape of a new graving dock of very large size with basin adjoining, part of which is excavated in rock. He has seen here coffer dams, caisson sinking, pile foundations, and very heavy masonry, while close at hand he had an interesting work in the reconstruction of a viaduct on the Queenstown Railway, with cast-iron cylinders sunk in a small creek, and with traffic kept going alongside. Mr. Andrews has employed Mr. Nethersole in designing and general office work, and speaks well of his quickness and ability and of his good theoretical training.

Visits to other works.—Visited Chatham Dockyard works in cement concrete, and the slatty viaducts (iron cylinders and girders) on the Cork and Queenstown Railway.

Notes and general character.—I have a high opinion of Mr. Nethersole and think he has profited to the utmost from his year at home. His notes are exceptionally full and good, and he has earned full premium.

R. D. PERCEVAL.

Appointed Assistant Engineer, 2nd grade, 1st October 1880.

Posted for the first six months to Messrs. Dübs and Company, Locomotive Engineers, Glasgow, and for the remaining four months to the Glasgow and Paisley Railway, under Mr. T. Nicolls. Has been visited twice, viz., once at each place.

*Notes in
Madras
P.M.S.*

Work seen on practical course.—Mr. Perceval kept part working hours and worked manually for most of his time at Messrs. Dübs in three of the shops. He has thus had a fair insight into machinery and the manipulation of metal work in locomotive construction. During his time with Mr. Nicolls in Glasgow, there was not very much outdoor work to see, but he (and Mr. Dyson who was with him there) got useful experience in setting out and in designing working drawings in the office.

Visits to other works.—No outside works of any importance have been visited by Mr. Perceval.

Notes and general character.—The notes made by Mr. Perceval during his practical course have been of fair quality and, considering his having worked in the shops, were awarded full premium. On the whole, I think Mr. Perceval has utilised his time at home to good advantage.

E. G. SALTER.

Appointed Assistant Engineer, 2nd grade, 1st October 1880.

Posted to the Chatham Dockyard extension works under Mr. E. A. Bernays, Superintending Engineer, and has remained there throughout the course. Has been visited three times.

Work seen on practical course.—The works at Chatham consist of the construction of a large basin with cement concrete retaining walls, locks and buildings. The lock chambers are closed by iron caissons. Mr. Salter has seen all this in progress, and has at the same time had free access to the dock-yard shipbuilding shops, where there is ample field for the study of iron and metal work generally. Mr. Salter's practical course should make him quite fitted to deal with cement concrete in all its many applications.

Visits to other works.—Mr. Salter has visited the Royal Albert Docks, where cement concrete has also been used almost exclusively for building. Has paid frequent visits to a new line of railway near Chatham at Hoo, and has also visited for two days the building exhibition in London.

Notes and general character.—Mr. Salter's notes for the first half of the course were not very good, and there was little excuse for this, seeing that he had ample leisure for this purpose, but as I judged the fault to be mainly in his want of knowledge what to note, I awarded him full premium, and both visited him and wrote to him fully on the subject of notes. He has done better for the last half of the course, and has paid more attention to the shop work at the dockyard shops. He is not a very vigorous and keen hand at his work, but may improve under the stimulus of responsibility. He did not earn full premium for the whole course.

A. J. SCRATCHLEY.

Appointed Assistant Engineer, 2nd grade, 1st October 1880.

Posted to Messrs. Neilson and Co.'s Locomotive works in Glasgow, and has remained there throughout the course. Has been visited twice.

Work done on practical course.—The experience obtained by Mr. Scratchley has been derived entirely from Messrs. Neilson's shops, and during the period of the course there has been very ample work in hand. Mr. Scratchley has worked for part of each day in some of the shops, and employed the rest of the time and one whole day a week besides in making notes. He should have, and I think he has obtained, a very fair idea of metal working, and should be a useful man for designing and erecting ironwork of a simple kind.

Visits to other works.—Mr. Scratchley has paid visits to Sir William Armstrong's works at Elswick, where there is a speciality for hydraulic machinery, and has also seen the work at the North Shields docks and the works of Messrs. Dübs and Co. in Glasgow.

Notes and general character.—I have not been very satisfied with Mr. Scratchley's work on the course, and his notes and work generally have not earned him full premium. He appears not to be keen at his profession, and to be rather inclined to drift along without making efforts to improve himself. He may, however, as I have said of others, do better when he gets responsible employment.

W. R. SHAW.

Appointed Assistant Engineer, 2nd grade, 1st October 1880.

Posted in the first instance to the Belfast waterworks under Mr. L. Macassey, and remained there for the first six months. Has moved for the last four months to Messrs. Hawks, Crawshaw and Co.'s works at Gateshead on Tyne. Has been visited twice.

Work seen on practical course.—The work seen by Mr. Shaw on the Belfast waterworks was the construction of a large impounding reservoir near Carrickfergus. The dam was an earthen one with clay puddle hearting. The outlet taken under dam in tunnel. He was constantly employed in supervising the works by the Resident Engineer, and employed spare time in copying the working drawings and in making tracings for use on the works. He has seen good masonry in conduits, small bridges over same and in waste weirs. He has also seen concrete work and piling in hand at the Carrickfergus harbour works, which were close at hand and under the same Engineer. At Hawks Crawshaw's works he has seen the erection and manipulation of ironwork, which, though only for a short time, will give him useful knowledge in designing.

Visits to other works.—Visited new docks under construction at North Shields, seeing piling, concrete work, &c., and has also seen useful work of similar kind at the Carrickfergus harbour works.

Notes and general character.—Mr. Shaw's notes were unusually good, showing a keen interest in the work before him and a full grasp of the details of construction. He is I think at Rugby and a very promising young man. He has been awarded full premium for the course.

C. A. SMITH.

Appointed Assistant Engineer, 2nd Grade, 1st October 1880.

Posted to the London and North-Western Railway under Mr. C. A. W. Pownall, Resident Engineer, Northampton. He has been visited twice. Once at Northampton and once at Rugby.

Work seen on practical course.—The work on which Mr. Smith was engaged was the making of a new loop line for goods traffic between Rugby and Northampton, and the new works for Rugby station. He has had very good opportunities for studying the general details of railway construction, and has been regularly employed as an Assistant by Mr. Pownall who gives him a high character for industry and attention.

Visits to other works.—Mr. Smith has not been able to pay visits to other works, as he has been fully employed otherwise by Mr. Pownall.

Notes and general character.—The notes, sketching and tracings offered by Mr. Smith during the course have been of fair quality, though not so full as I had hoped to see. His reason for this is, and it is perhaps valid, that he has been so fully occupied with regular work that he had little leisure for notes. He was awarded full premium for the course.

S. N. SQUIRE.

Appointed Assistant Engineer, 2nd grade, 1st October 1880.

Posted to the Belfast waterworks under Mr. L. Macassey, and has remained there throughout the course. Has been visited once only.

Work seen on practical course.—The works on which Mr. Squire has been employed consist of the construction of an impounding reservoir near Carrickfergus of large size. The dam is of earth and has a clay puddle hearting. This work has been seen throughout by Mr. Squire, and he has also seen the construction of conduits, culverts, outlet tower and tunnel, and some pipe laying. He has also had close at hand and constantly visited the works at Carrickfergus harbour under the same Engineer, and where he has seen cement concrete put down in blocks and in mass. He should be a useful man for waterworks or irrigation works.

Visits to other works.—Mr. Squire has visited the sewage disposal works at Belfast and the new dockyard works in concrete at Chatham.

Notes and general character.—Mr. Squire's notes have been extremely good and have obtained full premium. I consider him to be a painstaking and industrious young man who will turn out well in India.

H. J. STRICKLAND.

Appointed Assistant Engineer, 2nd grade, 1st October 1880.

Posted to Messrs. A. Handyside and Co.'s works at Derby, and has remained there throughout the course. Has been visited twice.

Work seen on practical course.—The work done in Messrs. Handyside's shops consists of the construction of iron roofs, small and large girders and girder-work of all kinds, malleable cast-iron work, and castings of all kinds. While Mr. Strickland was there, the firm had ample work in hand; amongst other jobs, the wrought-iron pier of the Attock bridge over the Indus. Mr. Strickland has employed himself usefully and industriously in the various shops and yards, and has also had valuable experience in the drawing office. He should go out to India as a useful man for the erection of ironwork.

Visits to other works.—Has visited the Victoria Station at Manchester and seen the erection of a new roof there (made at Messrs. Handyside's).

Notes and general character.—Mr. Strickland has made excellent notes during the course, and has been awarded full premium.

G. W. SWEET.

Appointed Assistant Engineer, 2nd grade, 1st October 1880.

Posted to the Chatham Dockyard extension works under Mr. E. J. Bernays, Superintending Engineer, and has remained there throughout the course.

Work seen on practical course.—The remarks made under this head as regards Mr. Salter apply equally to Mr. Sweet. They were both together with Mr. Bernays, and were similarly employed.

Visits to other works.—See also remarks on this point for Mr. Salter.

Notes and general character.—I scarcely think Mr. Sweet has done himself full justice as regards his notes. For the first half indeed he only obtained part premium. He has done better, however, in the last half. He is not, however, sufficiently keen at his profession, and is, I fear, not very industrious. Mr. Bernays, however, speaks well of his attention and general good conduct. He has not obtained full premium for the whole course.

*M. L. Bell
6774/81*

Nos. 1380-45G.

GOVERNMENT OF INDIA.
PUBLIC WORKS DEPARTMENT.
GENERAL.

To *The Secy. to the Govt of Madras
P. W. Department.*

Simla, November 3, 1881.

I am directed to forward for information 3 copies of detailed reports by Mr. Horace Bell on the work of the Assistant Engineers from the Royal Indian Engineering College, who have lately completed their practical course in England.

I have the honor to be,

SIR,

Your obedient Servant,

M. L. Bell

Under-Secretary to the Government of India.

No 2906 W. of 21st Nov 1881
B

Recorded.

Att

18.11.81

P. W. C. No 6774

GOVERNMENT OF INDIA.
PUBLIC WORKS DEPARTMENT.
GENERAL.

To

Nos. 1380-85G.

Dated Simla, November 3, 1881.

Received 18 Nov: 81

2-1 (2.5.6)

2.5.6.

Report by Mr. H. Bell on the work of the Assistant Engineers from the Royal Indian Engineering College who have lately completed their practical course in England.

Entd. in Receipt Regr.

to the order