M.R.O. 1—32,400—23-11-29.

# MADRAS RECORD OFFICE.

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## Government of Madras.

Financial DEPARTMENT.

G.O. No. 335 Press ~~Mis.~~

Dated 14th June 1859

***Not to be folded or roughly handled***

*Proceedings of the Madras Government, Financial Department, from 11th to 17th June 1859.*

No. 5. Read the following letter from W. BALMAIN, Esq., Secretary, Mint Committee; to T. PYCROFT, Esq., Chief Secretary to Government, Fort Saint George, dated 27th May 1859, No. 94.

1. I am directed by the Mint Committee to forward herewith, for submission to the Honorable the Governor in Council an original letter from Lieutenant Colonel Bell, the late Mint Master, dated 31st March last* with its enclosures being a Memorandum and letter† from Colonel F. C. Cotton, his Predecessor, containing valuable and important information in respect to the progress and improvements made in recent years in the Mint operations, and also suggesting certain alterations and increase of salaries to several Officers on the Establishment.

* *No.* 415.
† *Dated 1st February* 1859.

2. The Committee are desirous of expressing to Government, the high sense they entertain of the indefatigable zeal and energy evinced by the Officers in charge of the Mint; but would propose to defer the consideration of the several points therein suggested until the views of the Officer, who may be permanently vested with the charge of the Mint, shall have been ascertained.

3. In the meanwhile the Committee would suggest that such portion of Colonel Cotton's letter,* as refers to the extensive issue and circulation of small Silver and Copper coins in the Provinces be printed and transmitted to the Collectors, &c., also to the Engineer Officers in the Public Works Department in the several Districts, in view to their opinion being obtained as to the utility and practicability of such extensive circulation.

* *From para.* 6 *to* 13.

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From Lieutenant Colonel J. H. BELL, Engineers, Mint Master;

To G. L. PRENDERGAST, Esq.,
„ S. D. BIRCH, Esq.,
„ W. H. BAYLEY, Esq.,
} Mint Committee.

Dated 31st March 1859, No. 415.

GENTLEMEN,

Para. 1st. I have the honor to forward the accompanying Memorandum and letter from Colonel F. C. Cotton, late Acting Mint Master, and at the same time to bring to the notice of your Committee the alterations, which, partly following the excellent suggestions of Colonel Cotton, and partly proposing on my own judgment, I would recommend in the Mint Establishment.

2nd. It is hardly necessary for me to observe that the power and performances of the Madras Mint have been greatly increased of late years. Without additional power the performances of the Mint must have remained nearly Stationary. In this it differs greatly from such a Mint as that of Calcutta, which was sent out from England so perfect in all its parts, that it was found equal, during the vast importation of Silver which began in 1855, to an amount of work which had never been anticipated. As Colonel Cotton has shewn the Madras Mint has been enabled to increase its out-turn only by a considerable increase of power. The Lamination of Copper, for example, formerly performed only during an actual cessation of the Silver Coinage, is now effected by steam power; and the continuous Copper Coinage has rendered necessary more than double the number of Stamping Presses that were before sufficient. The new plan of using the Copper Scissile for Coinage, as yet only partially introduced, will require a still further increase of power, since the Mint will now laminate not only the Copper slips imported from Europe, but also the ingots cast from the melted and alloyed Scissile. The Steam Engines for Laminating Silver have not yet been rendered effective; but there can be no doubt that they will be so, or else that they will be replaced by others of European construction; and in either case there will be here also a considerable and permanent addition to the power of the Mint.

3rd. It is obvious that additional power must require additional Superintendence and skill to maintain it in effective use, without taking into consideration what it may have cost to establish. On this account the Mint, as it respects its Establishment, must be viewed in a different

light from that in which it formerly stood. The Superintendence and the skilled labor will under such circumstances doubtless require to be provided for on a more liberal scale than before, and I shall proceed to shew in detail the new arrangements that may be considered to be of real necessity.

1. The Superintendent of the Milling, Annealing and Stamping Departments should, agreeably to Lieutenant Colonel Cotton's suggestion, be raised to the first Class. The continuous Copper Coinage has greatly increased this Officer's duties and responsibility in all the three Departments of which he is the head. In the Stamping room 26 Presses are now set up instead of 12 the old number. The whole of the Coins now turned out of this Mint are remarkably good. I brought some of the best specimens of the Calcutta Rupees with me for comparison when I returned here, and could not find that they had any advantage over the Madras Coins. To maintain this high state of efficiency requires superior skill; and the head of the Department ought certainly to be as well paid as the other Superintendents.

For the same reasons the Deputy in these Departments should, I think, have the same Salary as the other Deputies, namely, Rupees 40 instead of 30.

2. The Department of Artificers requires considerable improvement. The increased power and operations of the Mint necessarily re-act upon this Department more than on any other, since all are dependent upon it for efficient maintenance. Besides this the Department performs a large amount of work for the Ordnance and Engineer Departments and for ships especially in the Iron Foundry, which is at present the only one in Madras, and will, I have no doubt, continue to be largely employed even when the Foundry at the Gun Carriage Manufactory is established; for work will doubtless increase as well as the means and appliances for its execution.

4th. As to the Superintendence in this Department the Salary of its head should be raised to Rupees 100 which is that of a Superintendent of the second Class, and he should have a Deputy in charge of the lathes and other tools which are at a considerable distance from the other workshops, and another Deputy for the Foundry. The present Head Turner receives Rupees 40 as a workman; but he superintends instead of working, and as the species of work under his charge requires superior skill and great care and attention his Salary as Deputy Superintendent should be raised to Rupees 60. The Salary of the Deputy in the Iron Foundry may be at the ordinary amount of Rupees 40.

5th. There is a serious want of good Whitesmiths (or filers) and Blacksmiths in this Department. There are many of these Artificers on the Contingent list, but all on wages too low to command the best amount of skill. If an addition of three well paid filers and three Blacksmiths be made to the Mint Establishment it is nearly certain that the Contingent workmen may be gradually reduced till the actual amount of wages will not much exceed the present scale, while the Mint will possess first rate workmen with situations to which the others will endeavour to succeed by diligent application to their work. The expense of the new arrangement will be 180 Rupees monthly, but this will be reduced immediately by the discontinuance of Contingent Servants costing Rupees 60.

6th. There is one Carpenter on the Establishment whose wages should be Rupees 40 instead of 30. When I first took charge of the Mint the Head Carpenter had Rupees 50 on the Contingent list. He was promoted to a higher situation on the Establishment, and his vacancy was not filled up; but as an efficient Carpenter is indispensible, I have proposed the foregoing moderate augmentation of Salary to meet the requirement.

7th. The pay of the Die Cutting Department was reduced in 1851 on account of the small amount of work. That work, in consequence of the continuous Copper Coinage, is now five or six times more than it was in 1851, and far greater than it ever was before, I propose a return to the former scale with a small augmentation in the case of one of the Engravers. The Head Engraver should have Rupees 60 instead of 50, as it is of much importance that there should be one man of superior skill in this Department.

8th. In the Bullion Office I recommend that the Deputy Treasurer may be placed on the footing of the other Deputies by an increase of Salary from Rupees 30 to 40, as his duties and responsibilities are much increased by the additional number of persons employed in the Mint.

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9th. The last recommendation that I have to make is that the Foreman's Salary may be raised from 200 to 250, which is the pay of the Head Accountant. Your Committee are aware that the situation of Foreman was not filled up till about 3 years ago. This Officer is now essentially necessary, and his duties are so extensive that I consider the pay originally fixed for the situation very inadequate. The addition of Steam power alone requires skillful supervision for which the Salary now proposed is the least remuneration that appears suitable.

10th. I should not venture to submit the foregoing propositions under the present circumstances of the country, were I not convinced of their necessity, and encouraged by the large profits which the extension of the Mint operations has produced, and which will continue to be far in excess of the increase of expense.

11th. In concluding this letter I wish to observe that at present the new Copper Laminating Department is on the Contingent List, and that I purposely abstain from recommending that it may form part of the Establishment until the new system of Melting and Laminating the Copper Scissile has been fully tried and established; for as I have above stated, the want of Machinery has hitherto prevented more than partial operations of this description, though they have satisfactorily shewn the correctness of the principle on which they are based.

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From Lieutenant Colonel F. C. COTTON, Engineers;

To G. L. PRENDERGAST, Esq.,
" S. D. BIRCH, Esq.,
" W. H. BAYLEY, Esq.,
} Mint Committee,

Dated Ootacamund, 1st February 1859.

GENTLEMEN,

Para. 1st. Having at the request of a Member of your Committee, written a Memorandum on the working of the Mint, and the changes that were effected during the two years I was in charge of the Establishment; I am induced to forward it to you rather with a view to place on record the services rendered by the Mint Officers and Artificers, and the urgent necessity for their better payment, than with any hope that the details it contains will be found of interest. There are however some matters concerning the capability of the Mint, and the duty it will be called upon to perform, which are worthy of the notice of Government, and having given them much attention, not only whilst holding the Office of Mint Master, but during the many years I have been employed in the country, in intimate connexion with all classes of its inhabitants; I have ventured to commit my views to paper, and now submit them in the following paragraphs to your Committee, with a request that if you think them of sufficient importance, you will forward them for the consideration of Government.

2nd. I need hardly say that when I took charge of the Mint, I felt confident that I could do nothing to improve the system on which it was worked, nor would I enter on the subject here, unless indeed I could induce the Government to re-consider Colonel Smith's suggestions on the few but very important points on which his proposals have not been adopted.* I found the Mint as that ablest of Mint Masters left it, and following immediately one so well qualified as Major Bell to detect a fallacy in the system had it existed, I did not hesitate to give my undivided attention to the executive; and under the peculiar circumstances of the time, I had the strongest inducements to extend as rapidly as possible the capabilities of the Mint, which in its then condition was altogether inadequate in power to the duties required of it.

3rd. At the time I speak of, a most unprecedented importation of bullion threatened to flood the Mint Cellars, as the receipts were considerably above the ordinary working powers of the apparatus. Major Bell had under the authority of Government increased the number of cattle in the Laminating Mills, and added to the hours of work; but it still appeared very doubtful, even if the Mint was exclusively employed in coining Rupee pieces, whether it could supply the Treasury with money fast enough to pay for the bullion tendered, and that it could issue small Silver coin and copper to the extent required, was admitted to be altogether hopeless. The em-

* I refer especially to the mode in which the Mint Master is nominally held responsible for the bullion purchased, without having it in his power to check its actual value on receipt.

barrassment in which the Government would have been placed had the silver continued to accumulate, was of itself sufficient to make the outturn of the Mint a matter of no slight moment. But as it appeared to me, there were results to be obtained by the operations of the Mint being carried on with vigour, which would materially affect the prosperity of the whole country.

4th. In my life spent in Civil Engineering, I have had an opportunity of observing the state of the trading and agricultural classes; and I have long since come to the conclusion that the Madras Presidency would rise but slowly from its effete condition, till the currency was greatly increased, and small coin freely circulating in every Village.

5th. To give life to trade, a vastly greater circulating medium is necessary, and any impediments which exist to the free introduction of the precious metals must be removed, before full benefit can be derived from the other efforts now making to increase the prosperity of India. But it is still more essential that the currency should be increased on account of the effect it would produce on the agricultural population.

6th. My experience has shewn me that while the payment for labour is in food only, the labourers will never be induced to exert their strength. It is supposed by those who have not looked into the subject that the Ryots get their work cheaply done because they pay very little for it; but such is not the case. The day's work done by their coolies is still smaller in proportion; and it is evident that any slight increase in the measure of grain given in payment has but little effect in stimulating their workmen's energy. The effect of a money payment is altogether different, and though it may take time for the coolies of some parts of the country to learn the value of money, its value when learnt makes it a stimulant sufficiently strong to rouse the energy of the most inert and unpromising.

7th. When the Ryots' coolies first take service in the Engineer Department they cannot endure a hard day's work; but as they find themselves in the possession of money, and see that every effort they make, adds to their store of it, they increase their exertions daily, and learn that they are able to do three or four times the amount of work they had supposed themselves capable of. The first day's work in the Engineer Department is greater than is exacted from them by the Ryots, and I do not think I overstate it if I say that when sufficient inducement is offered, the work done by the agricultural labourers will be four times what it is at present. And as the productive powers of the country must, after all that is done for it, mainly depend on the activity of the working population, I look to the rapid extension of money payments for the labour of the country, as a point of vital importance.

8th. The substitution of money for food in the payment of the coolies has already begun, and will extend as rapidly as the means are supplied. There has been for some time an outlay of money amongst the labouring classes in the neighbourhood of the Great Indigo and Sugar Works, and also on the works of Engineering carried on under European management. The Railway works are circulating coin amongst the same class; and now that Europeans have more immediate concern in the purchase of labour for the Tank repairs, money will be placed in the hands of multitudes who never before possessed it. Where this is the case, the Ryots will be obliged to offer money too, or they will not be able to compete with those who do. And such to a certain extent has been the change in the Godavery Delta and other similarly circumstanced localities.

9th. To bring about this desirable change as speedily as possible, the coinage of Small Silver and Copper Coins must be far greater than it has been, or than it can be, in the present condition of the Mint. The use of steam in the lamination of Silver will make a considerable increase in the out-turn of Coin; and if the importance of a great issue of Small Silver is admitted, and authority is given for its manufacture, the Madras Mint may shortly issue each day fifty thousand pieces; while fifty thousand Rupee pieces, and a hundred and fifty thousand Copper pieces are also delivered daily.

10th. Such an issue of Small Silver Coin will not be sufficient to supply the whole country immediately, but it will have a very important effect in furtherance of the substitution of money for grain in the payment of coolies. And if at the same time a hundred and fifty thousand pieces of Copper are issued daily and forced into circulation, some money will shortly find its way into the most remote villages.

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11th. It will not be sufficient for the Mint to manufacture the Copper, and the Treasuries to receive it; it will still require some effort to get it into circulation. I have myself seen a total dearth of Copper Coin in the villages of a Collectorate, when it was said that there was more of it in the Collector's Treasury than he knew what to do with. In a recent inquiry, several Collectors considered that no more Copper Coin was wanted; and there have been cases where it was actually returned to Madras from the Collectors' Treasuries, while the country generally is notoriously deficient in money of all sorts.

12th. There are several reasons why the Copper Coin remains in the Collectors' Treasuries. First because it is not a convenient coin to issue, Secondly because the town in which the Treasury stands has soon an ample supply; and the want of it in the remote villages is not under observation. And thirdly because the most influential people of the District do not want it to be abundant. Those who deal in money make a profit by its being scarce; and the Ryots are strongly opposed to any thing which leads to the use of money instead of grain in the payment of the coolies.

13th. Under these circumstances it will need an effort to force the Coin into use; and the first step to be taken in some Districts must be to convince the Revenue Officers of the importance of such a currency. But it will be well to give them authority also to sell it at a discount. It is so sold, I believe, in Calcutta, and we should have a sale of it in all the coast Treasuries, if not in those inland also.

14th. In the fabrication of small silver coins, the Government is put to some expense, as it cannot be made for the seignorage charged on the silver purchased, but as there is a very considerable gain on the larger pieces, there would be no loss on the entire silver coinage, even though there were a vastly greater issue of two Anna pieces. And it certainly would not be a legitimate use to make of the Mint, if it was employed as a source of revenue, while the country was deficient in small coin. Still less so, while there is an excessive profit on the copper coin, as is the case at present.

15th. For the actual profit and loss on the several description of coins, I must refer your Committee to my annual Mint report. It is sufficient here to say that the profit of the Mint in 1856 and 1857, after all expenses were paid, amounted to Rupees 2,89,173, which it will be admitted allows a wide margin for expenditure on any coin the manufacture of which may cause a loss to Government. And I am sure your Committee will concur with me in thinking that although all that is necessary cannot be done, the issue of small silver and copper ought to be kept up to the greatest amount the Mint is capable of, so long as it does not lead to an accumulation of bullion in the cellars; a result which may however be anticipated very shortly, if my views are right as to the prospects of the external traffic of Madras.

16th. To what extent bullion will be returned in exchange for our exports it is impossible to say; it will depend upon the wants and tastes of the producers. And this much seems certain, that unless the character of the Hindoo population alters suddenly, after remaining unchanged for an unknown number of years,—whatever our exports may be, the precious metals will be our principal imports. When a Hindoo improves in circumstances, he alters very little his mode of life. The essentials of his comfort are few and simple, and for the most part procurable close at hand. His imported luxuries are Gold and Silver, and all calculations based on the supposition that our exports will be paid for in imported goods will prove fallacious. There cannot be a doubt that the import of manufactured goods will increase as the traffic of the country extends; but it is equally certain that as the communications between the interior and the coast are opened, the ratio of imported goods to exported produce will decrease; and the difference must be made up in a rapidly increasing importation of the precious metals. The value of other imports cannot be forced, and the only articles that will not become drugs in the market will be Gold and Silver.

17th. The immense value of the silver imported into the British Indian Empire in the last few years, especially in the two years preceding the Rebellion, has been the marvel of European financiers; and many in this country suppose it to be one of those spasmodic actions that occasionally occur in the traffic of the world. But this is not the light to view it in. It is in my opinion but the beginning of an absorption of the precious metals perfectly incalculable. And if

there has been a sudden decrease in the receipt of bullion in the past year, it is not to be accounted for by the market being overstocked with silver; but in the Rebellion in the North and spare Crops in the South leaving little surplus produce to export: while the return for much that was sent away was made in an unusual supply of Military Stores and Troops.

18th. The value of Gold and Silver in India was formerly greatly over-rated in consequence of its being accumulated in the hands of a few whose wealth was conspicuous. And some years ago, it was so reduced in the Madras Presidency that there were no great hoards any where; and the amount in circulation is supposed not to have been equal to one third of the annual revenue. It was in fact drained to exhaustion, but a healthy change in our foreign trade has taken place: and the export of raw products, which, when the cost of carriage to the coast is reduced, cannot be undersold by those of any other country in the world, has already turned the current of bullion to the Eastward. The improvements now begun in real earnest will raise the products of the country enormously above the wants of its inhabitants; and if my views are correct, nearly the whole of India's surplus will be bought and paid for in the Gold and Silver of other countries. Nor is it at all improbable that India will ere long be again exporting manufactures, and that to a far greater extent than it ever did before. I may instance one manufacture that must soon be restored to it; and that the manufacture of an article, the demand for which will be more rapidly increased than any other by the growth of prosperity, I allude to coarse cotton cloth, the clothing of the lower orders, the importation of which, literally hangs upon a thread.

19th. Not many years ago, the export of Cotton from India was ruined by the cheaper manufactures of Manchester; but it now appears that only one step in the manufacture of such cloth as I refer to can be more cheaply done in Manchester, and at the present time, vast quantities of Cotton Yarn (valued in 1858 at nearly 2 millions sterling) are imported from England to be woven into cloth in this country, and we have this extraordinary feature in the trade with India, that the Cotton grown in Berar is carried to the coast by most expensive means of transport 500 miles; yielding a profit to the carrier. It is there purchased, and the purchaser makes his profit on sending it to Liverpool; paying the freight including the actual cost of ocean carriage, and the Ship-owner's profit, the Insurance, Brokerage, and other charges. From Liverpool it is carried to Manchester to the profit of some one, and in Manchester, the Cotton spinner derives his income from it; though each bale need not remain in his factory six hours before it is not its way back to India, paying cost and profit to all who handle it on its return, as it did on its way to Europe. At one of the great ports of India it changes owners again, and is sent to one of the minor ports where it is landed and sold to inland traders, who carry it to the Weavers' Villages close upon its place of growth. The Cotton has not been carried through this circuit to be wove into a fabric of fine texture; it has been simply twisted into a coarse thread. And so soon as this one process can be as economically done in India as it is in Manchester, this manufacture will be restored to India, and the cloth will be cheaper, by the whole amount of costs and profits now charged upon the thread, than similar cloth made in Manchester.

20th. The extent to which this change will affect the bullion trade may be gathered from a Statement now before me, compiled from the Board of Trade's returns, which shews that "Cottons" and "Cotton Yarn" to the value of 10 millions sterling were exported to British India in eleven months of 1858, of which as I have before said nearly two millions were for Cotton Yarn.

21st. If, as I suppose, so great a portion of the vast exports that may immediately be anticipated, is to be paid for in bullion, and we continue to limit our metallic currency to Silver, a question arises as to where a sufficient supply of that metal is to be found and the answer is, that it is not to be found. The importation of Silver into India during the 2 years before the Rebellion, which was the merest trifle compared with that, which will be required to pay for our exports hereafter, threatened the loss to France, of her whole Silver currency; and if we are dependent upon Silver alone, the price will rise to the depreciation of the value of our exports; and we shall not only do a gross injustice to those who raise the produce sold, but give a ruinous check to the progress we are now making such efforts to advance. The remedy for this is a Gold Currency.

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22nd. Without going into the arguments for and against a double standard, and the risk to the Revenue of a depreciation in the value of Gold by the increasing discovery of it, I would only urge the direct and immediate loss that will result to India, of any thing that checks the extension of its cultivation and exports; and ask to what extent the value of Gold might not be reduced without injury to the Revenue, if by its aid, all the available soil of the country was brought under tillage, I may add that opening the Indian Empire to Gold will tend more than any other change that could be made, to keep that metal at its present value.

23rd. I cannot doubt that if the importance of a Gold currency to the prosperity of the country is admitted, it will be issued. And feeling certain that this must ere long be apparent, I shall offer such suggestions as I have to make regarding the Mint, under the supposition that there will be an immediate necessity for the coinage of that metal.

24th. The Madras Mint is by no means in the state it ought to be, with this prospect before it. It is ill-situated in a corner of the Native City of Madras; perfectly indefensible against a sudden attack, and as much out of reach of relief as it could possibly be. And as the buildings are altogether inadequate to the requirements of the country in the immediate future, and ill-adapted for any considerable extension, it seems highly advisable that a site should be chosen, and that steps should at once be taken to begin the erection of a new Mint.

25th. When the 20 horse laminating Engine is in full work, Silver Rupee pieces to the number of a hundred thousand daily might be issued, if only slight improvements are made in other Departments. And the present Mint might turn out daily three hundred thousand Silver and Copper coins. But this could only be done by the rooms being crowded with a thousand men; by a constant resort to temporary expedients, with no inconsiderable loss in the cost of manufacture; and the occupation of the whole space intended for the coinage of Gold, which is now entirely taken up with the apparatus for the coinage of Copper.

26th. I am confident that it will not be long before the demand for coin in the Madras Mint will amount to five hundred thousand pieces daily; and although the coinage of Gold would reduce very greatly the number of Rupee pieces required, it would not lessen the number of small Silver coins and copper; and it would be unadvisable in the construction of a new Mint, to calculate upon an issue in the three metals of less than five hundred thousand pieces in each working day.

27th. I have made no actual Estimate of the cost of such a Mint; but I think I can safely say it might be made very perfect for six lacs of Rupees. It would occupy at least three years in building, and certainly would not consume the profits of the present Mint in the same time; if copper was largely coined and thrown into circulation, the gain on that coin in the last year, with the very imperfect apparatus, having been 1,61,781 Rupees.

28th. The new Mint should in my opinion stand clear of the Native Town; and it would be highly advisable for the artificers and labourers to be located in a Village built expressly for them, where they would be known and cared for; and be under the constant supervision of the Mint authorities.

29th. I need hardly say that it will be necessary to keep the present Mint up to the best that can be made of it, till the new building and apparatus are in readiness. The Copper coinage might be first removed, as it requires none of that extreme caution that is necessary where the precious metals are worked. And the immediate management of that portion of the new Mint might be under an Assistant to the Mint Master, an Officer absolutely necessary when the Establishment is put upon a proper footing. This would allow of Gold being coined for 2 years in the present Mint without the issue of copper being delayed. If an immediate order for the issue of a Gold currency was given, additional buildings must be raised in the present Mint; and their cost ought not for a moment to be allowed to weigh against their being erected, as the outlay of thirty or forty thousand Rupees required for purpose, is not worthy of consideration in a case where the interests of our export trade are concerned.

30th. I cannot close this paper without an acknowledgment of the ready support I invariably received both from your Committee and the Government during the time I had charge of the Mint, and when if I had not been allowed unusual latitude, I could not have brought those

expedients into use from day to day, which enabled me to claim for the Mint Establishment, the credit of the increase in outturn and profit, exhibited in the Returns of the two last years.

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*MEMORANDUM on the operations of the Madras Mint in the years 1856-57 and 58, by Lieutenant Colonel F. C. COTTON.*

The readiest way of giving an account of what has been done will be to start from the Mint Gate, and follow the metal in its course through the several rooms or departments, till it leaves the Stamping Presses fit for delivery. But before I pass the Gate I must say a few words as to the Mint Guard, which has somewhat changed in constitution and position in the period I am speaking of.

The Guard was originally composed of Forty Sepoys under the command of a Native Officer, and was sheltered in a shed leaning against the Mint wall, outside the Gate. Under this arrangement, half a dozen men might have held the Guard shut up in their shed, while by its sloping roof a hundred men abreast might have easily ascended the wall.

The Guard room is now within the Mint, and the shed is removed; and as the Government has sanctioned an addition of 19 Peons to the Police Force, for the purpose of keeping watch outside, the sentries are all within the walls at night, posted on the terraced roofs of the buildings where they can see what is passing and communicate with the watch outside.

The Mint Gate, and the Establishments kept up for watch and search have been somewhat improved to suit the times, but during the hour of dinner when the work people gather round the entrance to take their food from those who bring it to the Mint, it is still a scene of terrible confusion, and a carriage passing is a source of danger to the crowd.

The sheds within the outer Gate having been removed, there is now a trifle more space, and a little room allotted to the East Indians for their mid-day meal is better suited to its purpose. The Porters lodge also has been enlarged and improved, and the dirty mats which formerly covered the entrance passage, have been replaced by a terraced roof; but the Gateway is still a most unworthy entrance to a public building of so much importance as the Mint.

Mr. Englefield the keeper of the Gate, who has been in the service of Government for 51 years and for the last 13 has held his present post, requiring some help, the Mint Committee authorized my entertaining a European Assistant (Mr. Tindale) who promises to be as true to his trust as his superior, if he should succeed him in his Office. Mr. Englefield's services being of no ordinary character, I must place on record the high opinion I entertain of his fidelity in the discharge of one of the most invidious duties that could be assigned to any man.

Mr. Englefield has a pension, and the pay of his Office has been lately increased, but he ought in addition to this to have a house allotted to him in the immediate vicinity of the Mint, as it is highly advisable that some European should be at hand at all times, and the Gate keeper has a claim to suitable accommodation.

If the Mint premises are enlarged, as is contemplated, I purposed to make another entrance for carriages and Carts under the present school room giving up one room of the Stores for this object, an arrangement I consider necessary to avoid the confusion caused by the entrance of carriages by the work people's Gate, during the dinner hour and the time of search in the Evening.

The Merchants Bullion melting room has been completely altered. The Bullion was formerly melted in open Charcoal fires, blown by hand bellows. There were four pits for these fires within the room, and four more in a shed attached to the wall. The waste of fuel in these open fires was enormous, and when all were burning together the heat in the room was intense. One of the first changes I made was to correct this—sanction was granted for the expenditure of 401 Rupees for building a Chimney to which five furnaces were attached suitable for Coke, which when covered suffer little heat to escape. The result of this was, that with Coke at 29 Rupees a ton the cost of melting a lac of Silver was reduced from 35 to $3\frac{10}{16}$ Rupees. The room is never over heated now and as the quantity of ashes from the Coke is very small compared with that from the great heap of Charcoal burnt, the loss of Silver in the rubbish, is much reduced. As the hot bars of Silver broke up the granite flooring, I have laid down an Iron flooring in that part

*Proceedings of the Madras Government, Financial Department, from 11th to 17th June 1859.*

of the room where the bars are thrown. In a room where the Merchant's Silver is operated upon, the floor ought to be kept in especially good order as all particles lost in it become illegitimate perquisites of the Mint, whereas if the floor be good, nothing need be lost. The good result of this improvement has been exhibited in the last settlement report.

Though the Public Bullion melting room has had something done for its improvement, it is by no means in the order it ought to be, considering its importance.

There are six good draught Furnaces in the room, with cranes to lift the pots of melted metal and deposit them in the pouring frames. This apparatus is all very old, and so were the moulds. The room is low and at times excessively hot in consequence. The floor was very much broken by the heated pots and bars being laid upon the granite slabs, and the mode of trimming the bars, scattered much more Silver about the floor than need have been cut off.

The changes made in this room consist in a trifling alteration of the furnaces in order that Coke should be used instead of Charcoal, an Iron flooring over all parts of the room on which the heated bars and pots are placed, and the use of a pivot knife, instead of an adze for trimming the ingots.

Though no Silver is ever volatilized or lost by heat in this room, some is actually lost in the rubbish, and by an absence of care and cleanliness great expense may be incurred, by allowing the particles of Silver to be mixed with the ashes and dust, as it can only be recovered from them by a costly process; and under the best management some Silver will remain in the dross (so called) because it would not repay the cost of recovery.

Every thing which is out of order in the melting room may be said to add to the loss from these causes, and the changes were all made with a view to reducing the causes and loss to the utmost. The substitution of Coke for Charcoal, is not only an economy in the expenditure upon fuel, but as the quantity used is comparatively smaller, and the residue after burning, smaller still, the heap of rubbish in which Silver can be secreted is much reduced and as the silver ultimately lost bears a proportion to the size of the heap, there should be an actual saving of metal by this change.

Though there ought to be no permanent loss on the floor whether even or uneven still the broken floor led to untidy habits, the particles of Silver were mixed with the dirt giving a greater additional labour and expense in their recovery. The Iron floor will lead to more care and it will be the Superintendents' fault if there is any considerable expenditure hereafter in removing Silver from any rubbish except the ashes from the fires.

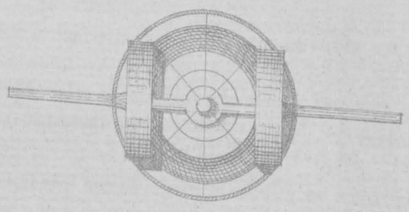
If the melting room is kept as free from dust as it ought to be, the spillage in pouring should be swept up almost free from mixture and as the old moulds have been replaced by new ones with sharp edges but little Silver need be scattered in the act of pouring.

The following Statement will shew how great has been the increase of work in this room and much credit is due to Mr. Duarte the Superintendent as well as to the Furnace men for the way in which the unusual demand upon them was responded to.

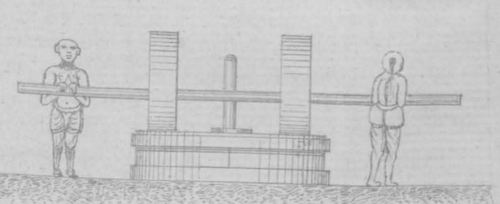
| Year. | Silver Bullion & uncurrent Coins melted. | | | Scissile, &c. | | | Total. | | |
|---|---|---|---|---|---|---|---|---|---|
| | Tolas. | A. | P. | Tolas. | A. | P. | Tolas. | A. | P. |
| 1847-48..... | 27,44,845 | 15 | 4 | 25,10,949 | 10 | 7 | 52,54,895 | 9 | 11 |
| 1848-49..... | 13,78,712 | 2 | 11 | 9,07,919 | 5 | 5 | 22,86,631 | 8 | 4 |
| 1849-50..... | 9,74,941 | 3 | 1 | 6,75,751 | 1 | 2 | 16,50,695 | 4 | 3 |
| 1850-51..... | 21,56,042 | 12 | 4 | 15,57,573 | 10 | 3 | 37,13,616 | 6 | 7 |
| 1851-52..... | 40,64,042 | 5 | 8 | 31,30,328 | 1 | 1 | 71,94,370 | 6 | 9 |
| 1852-53..... | 42,97,959 | 2 | 7 | 26,30,848 | 7 | 3 | 69,28,807 | 9 | 10 |
| 1853-54..... | 66,29,964 | 3 | 11 | 51,51,190 | 10 | 10 | 117,81,154 | 14 | 9 |
| 1854-55..... | 23,66,002 | 4 | 9 | 27,65,412 | 15 | 0 | 51,31,415 | 3 | 9 |
| 1855-56..... | 65,02,223 | 6 | 0 | 44,28,056 | 2 | 4 | 109,30,279 | 8 | 4 |
| 1856-57..... | 81,83,394 | 14 | 0 | 72,06,422 | 9 | 1 | 153,89,817 | 7 | 2 |
| 1857-58..... | 96,00,602 | 4 | 9 | 79,43,603 | 15 | 3 | 175,44,206 | 4 | 0 |

The Silver recovery room which is attached to the melting room, and is under the same Superintendent, has had its apparatus and mode of working a good deal changed. The plan formerly was to grind up the dross on the common curry stones with a stone roller, and after the mixture of lead with the dross, to melt it in little pits in the ground with hand bellows. As the quantity of Silver increased it was found impossible by these means to keep pace with the accumulation of dross and the first change was to introduce a triturating mill of two stones working on edge in a small Circle. Fortunately I found, in one of the rooms, such a mill, out of use. It had been put up some twenty-five years before to work with cattle, but too great speed had apparently been attempted and it never was brought into use. I removed the stones from the gearing, and arranged them to work by men which answered well, and the curry stones which had filled the room with coolies doing each an infinitesimal amount of work, were at once discarded still more work being required a second mill was set up and as its arrangement is peculiarly simple, I add a drawing of it.

*Birds Eye View*



*Elevation*



It will be seen that no framing is needed, the men work at the ends of the axle, which is placed at a such a height above the floor as to enable the coolies to exert their strength as they walk round the mill; and the stones are kept in position by an iron pin in the centre which runs through a hole in the axle, and works so loose that the weight of the stone is always upon the material in the mill.

We were in great difficulty as to the disposal of the dross, from the quantity accumulated, when Mr. Scriven, the present Manager, returned from Calcutta and informed us that instead of the mixture of lead and dross being melted in pits, it was formed into balls with Bratty and mixed with Coke in a Cupola to be melted with a blast as in a smelting furnace.

Several sizes of these Cupolas were tried and a great deal of work done by them, but the waste of lead in the furness was very great and the principle was wrong, inasmuch as the heap of dross was greatly increased by it and as I have before said, all addition to the quantity of dross entails a further loss of Silver.

This consideration induced me to try the cost of working all the dross in crucibles, in order that it might never have any addition. Suitable furnaces were therefore put up in the dross recovery room and Mr Desilva the storekeeper having by his admirable care, reduced the cost of the blacklead crucibles very much we were able to employ them and use any required heat without risk of their craking in the fire. This enabled us to use an extreme heat with the dross from the iron melting pots, which is the most refractory dross that has to be dealt with, and can only be worked at a very high temperature. To raise the heat to the utmost without a waste of fuel, the aperture leading from the furnace into the chimney was reduced, and the fire supplied with oxygen by a blast from a fan attached to a Steam Engine which was working some fifty yards distant. The ash pits were made air tight by iron trapdoors, and though the pressure of air must have been very trifling it was so well distributed through the fire, that the whole was probably turned to account, and the result convinced me, that we should give up the use of Chimneys, and apply a blast instead of a draught to every fire in the Mint.

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The changes in this room were not completed till the settlement was far advanced, so that the economical result was not fairly tested by last year's work but should be seen by this time.

During my first year's management of the Mint, I had the great advantage of the knowledge possessed by Mr. Duarte (Senior) who, though receiving his pension, was allowed to help his son, the present Superintendent of the Melting room.

Mr. Duarte had a thorough knowledge of all the operations of this department of the Mint, and spent his whole day in the Superintendence of the work. I do not hesitate to say that his life was shortened by his doing so. When it was thought that his son understood the several processes sufficiently well, Mr. Duarte's services were dispensed with, but he survived only a few months; his eye sight, which had been gradually failing from the effects of the lead fumes, grew worse and worse as his health declined, and his death which followed closely upon his loss of sight, was evidently from the same cause, the unwholesome air he had been breathing in the dross recovery room.

The object of my remarks upon this subject is not merely to record as a testimonial to his memory the zeal with which Mr. Duarte devoted himself to the work required of him, but also to bring to notice the cause of his death, in hopes that Government will see fit to make some amends to his family.

Mr. J. Duarte the present Superintendent is very attentive to his duty, and will I hope as he gains experience be a worthy successor to his Father; but he has yet to shew how far he can turn to account the improved means placed at his disposal.

The Deputy Superintendent Mr. S. Scriven, is a highly intelligent young man, and promises to be of great use in the Mint. He was, of service to me in an examination into the wastage in the merchants' Bullion Room, and if he acts as faithfully through life as he did then he will be a valuable public servant.

The Statement exhibiting the quantity of Silver melted will shew how greatly the labour and responsibility of the inmates of the melting and recovery rooms have increased since their pay was fixed by Colonel Smith.

*Page 3.*

*The Laminating Room* during the two years under review has had no actual addition by power, but by the most active efforts on the part of the Superintendent and work people, and of working extra hours, the outturn has been very greatly increased, as the following statement will shew.

| | Single Rs. | Half Rs. | Quarter Rs. | Double As. | Total. |
|---|---|---|---|---|---|
| 1848/49 | 11,78,059 | ,, | 4,01,242 | 2,98,142 | 18,80,443 |
| 1849/50 | 6,96,837 | ,, | 4,65,864 | 5,09,783 | 16,72,484 |
| 1850/51 | 15,58,344 | ,, | 8,87,358 | 16,16,636 | 40,62,338 |
| 1851/52 | 34,49,793 | ,, | 2,59,662 | 6,33,072 | 43,42,527 |
| 1852/53 | 39,78,917 | ,, | ,, | ,, | 39,78,917 |
| 1853/54 | 66,25,129 | ,, | 4,08,000 | 8,32,000 | 78,65,129 |
| 1854/55 | 24,95,985 | ,, | 7,67,613 | 18,48,350 | 51,11,948 |
| 1855/56 | 45,02,699 | 8,71,700 | 19,74,164 | 11,37,047 | 84,85,820 |
| 1856/57 | 74,42,364 | ,, | 31,45,349 | 49,41,401 | 155,29,114 |
| 1857/58 | 81,88,234 | 5,55,573 | 25,41,192 | 53,43,346 | 166,28,315 |

As the issue of Silver Coin from the Mint has of late been regulated entirely by the Amount of work that could be done by the rolling mills, every effort has been made to bring into use a twenty horse Steam Engine that was begun by Colonel Smith four years ago, when his urgent recommendation to employ steam in the Mint was coldly received by Government. This Engine was made expressly to supersede the bullocks employed in turning the two rolling mills, and to give so much additional power to this department, as would ensure its being able to keep pace with the receipt of Bullion. Though a bold effort of Colonel Smith's, and the only thing to be done under the circumstances, the making of this Engine has been a terrible clog upon the ope-

rations of the Mint, and if Colonel Smith could have foreseen the time it would take to complete it and the liberal views that were to be entertained both by the Committee and the Government in all matters connected with the Mint before it was fit for use he would have bided his time to send to England for an Engine, where he could have bought a far more perfect one for less money than this has cost. It was his pride that the Mint artificers made their own Machinery which they have indeed done, most cleverly, but had their Machinery been made for them during the last two years, they would have been able to make far more Coin, which would have been a better employment still.

This Steam Engine was brought into work just before I gave up charge of the Mint, and it promised to do good service and although it has been out of use again in consequence of some of the material being imperfect, it has shewn power sufficient for more than double the amount of work done by the Bullock mills, and will enable the Mint to meet the present requirements of Government in the Silver Department. It is probable however, even now, that it may be advisable to apply an English made Engine to this important duty, and remove the Mint made Engine to other service.

While upon the subject of Machinery making, I must observe, that although I strongly recommend the manufacture in India of such simple machinery as can be made cheaply and well, I am quite sure that all complicated machinery ought to be imported for the present.

As the Mint was all but swamped by the receipt of Silver, it was evident that if some additional means were not brought into use, no Copper could be coined, while the demand for it was increasing daily. I was fortunate therefore in procuring a ten horse Engine from the Engineer Stores, which enabled me to begin a distinct Copper department, altogether independent of the Silver Laminating mills. Indeed I had to bring this Engine to aid in the Silver department for a short time, and by its help I was enabled to issue a larger proportion of small Coin, of which there is a complete dearth in the country. As I had this Engine at work, I was able during the examination of the balances of the 26th settlement to take up the floor of the Laminating room and lay down the framing for the four steam mills, which advanced the operations of the next year at least six weeks, as it was impossible to do any thing in this room while this work was in progress.

With the exception of what was done to forward the Steam Engine and mills, no change in the apparatus or mode of working was made in the Laminating room, which had already been raised and supplied with upper ventilation. But the room adjoining, on which the Silver straps are annealed, was entirely remodelled. In this room two new ranges of Annealing Furnaces were built, and so thrown back as to give double the space in the room, while the roof was raised to the height of the Laminating room, to give more air and reduce the heat, which it did effectually. A small dross recovery room was also added, so that the process should not be carried on within the annealing room.

Being anxious to get rid of the purchase of fuel from the Contractor I brought into use Coal, for the annealing of the Silver straps, and the economy was apparent; but as the deposit of soot upon the straps led to confusion as to the weight of Silver delivered to the cleaning room, I abandoned this trifling improvement, and returned to the use of wood.

The *assorting* room, which like all the old rooms of the Mint, was only 12½ feet high, has been raised 6 feet, and a heavy partition wall having been removed, it is now a very good room, and well suited to its purpose. As any movement in the air disturbs the balances in use, there has been a difficulty about its ventilation and as the number of inmates increased with the increasing Coinage, the room became quite unwholesome. The additional height made a material difference and the introduction of perforated sheets of Zinc below the windows has caused a slight draught which has relieved the room very much.

The suite consisting of the Laminating room, annealing and assorting and second cutting rooms being all under one management, I have spoken of them together. They are all under the Superintendence of Mr. Bowie than whom no one in the Mint has rendered more essential service in the last two years. Mr. Bowie has been 17 years on the establishment and has a through knowledge of the working of the Iron Foundry over which he has had a general Superintendence, he has the entire charge of the Mint Buildings and has had the management of all the changes that have been made in them in the last 2 years. Mr. Bowie has been indefatigable in his exertions coming first to the Mint and remaining till the last every day; and to push on the buildings on which so much depended, he has given up many of the Mint holidays. I consider Mr. Bowie one of the most zealous and efficient men I ever met; and his services to the Mint are invaluable. I was glad to have the opportunity of raising his son to the appointment of Deputy Superintendent in the Laminating room, and I should be glad to see Mr. Bowie's pay raised to an amount more adequate to his deserts.

The changes required in this room will be considerable, even after the steam Mills are in position. The cutting Tables must be re-arranged and when the Bullock shed and gearing are removed a transept should be added for Cellars, in order that the Silver straps should be stowed in the room, at night, instead of their being sent to the Treasury, which causes a most unnecessary amount of work. The Office Books, and a pair of scales for the receipts and deliveries should be in the transept also which should at the same time form the entrance to the whole suite of rooms.

Though there is good upper ventilation by the skylights, ventilation is required below and I recommend that perforated zinc sheets should be placed under each window as has been done in the assorting room. These should be double, and if necessary iron bars might be placed between them, for security at night.

An apparatus for the second cutting of Rupees, like that admirable one in use for double annas and quarter Rupees, should be set up within reach of the Engine. A Beam for this has been prepared by Mr. Maddox.

A new assorting Machine on Colonel Smith's pattern has been in progress for the last two years. It is very much required, and when completed will reduce the crowd of boys, who are huddled together in the most unwholesome way when there is a pressure of work.

As Mr. Maddox has no Office room assigned to him, he passes much of his time in these rooms, and it is well that he should do so as the Laminating and assorting apparatus both require peculiar management, and having taken part in Colonel Smith's experimental working of them for a number of years, Mr. Maddox has a thorough knowledge of all that is required in both departments, and his suggestions from time to time have been of great value, even to Colonel Smith, and have been invaluable to me.

There are two Native artificers in this room whose names deserved special mention, not only as skilful workmen, but as men possessing indefatigable energy. The first of these is Yamachary, who has been on the Establishment 17 years and like all the best of the artificers, is sadly under paid. The second is Nyneapah charry who has been employed for seventeen years and is deserving of the same praise. The following Statement will shew the growth of work in this department in the last 10 years.

Weight of Metal Worked in.

| | Silver. | | | Copper. | | |
|---|---|---|---|---|---|---|
| 1848-49.... | 22,06,040 | 14 | 0 | 36,37,880 | 12 | 0 |
| 1849-50..... | 15,40,979 | 11 | 8 | 61,42,675 | 10 | 0 |
| 1850-51..... | 35,13,966 | 3 | 0 | 61,18,231 | 2 | 0 |
| 1851-52..... | 65,40,491 | 5 | 0 | 47,76,217 | 2 | 0 |
| 1852-53..... | 67,88,755 | 14 | 0 | 53,21,447 | 6 | 0 |
| 1853-54..... | 116,86,034 | 3 | 0 | 67,00,509 | 4 | 0 |
| 1854-55..... | 57,36,550 | 7 | 7 | 52,56,036 | 8 | 0 |
| 1855-56..... | 99,36,047 | 6 | 5 | 60,84,023 | 12 | 0 |
| 1856-57..... | 159,01,685 | 10 | 11 | 152,04,133 | 1 | 0 |
| 1857-58..... | 179,35,160 | 14 | 1 | 289,91,604 | 10 | 0 |

The *Milling* and *Cleaning Room* is under the control of Mr. Christian, the Superintendent of the Stamping Room. The only changes that have been made in it in the last two years are, a slight improvement of the annealing furnaces, to make them burn their smoke more completely—

and the addition of 8 new Milling Tables ; a very greatly improved apparatus for this purpose, has been designed by Mr. Maddox with a view to the work being done by one of the Engines. One of these machines has been prepared and proved, but as the work could be done sufficiently well by hand it has not been thought advisable to occupy the artificers in making up the number required, while so much more important work is left undone from a want of hands.

These Rooms ought to be raised for they are crowded and overheated, and entirely without ventilation.

*The Stamping Room* to which the Silver is carried for completion has been thoroughly changed. It was one of the old narrow and low rooms of the Mint, utterly unfit for a number of men to work together in. There were 12 Presses in this Room when I took charge of the Mint, and when even this number was fully manned, there were about 180 men in the Room but when the number of Presses was completed to 18, the work people amounted at times to 250, a great portion of whom were working through the day to their utmost strength and requiring all the fresh air that could have been given to them. The crowded state of the room must have been most injurious to their health.

As in every case where I have thought it advisable to recommend an improvement of the Mint, I had the support of the Committee and the sanction of Government for the money I demanded. I was allowed to double the breadth of this room, raise it 5 feet, and give it a good ventilation by skylights. When that was done I raised the number of Presses to 26, of which six are of smaller size intended for the coins that require short bars, worked only by two men. The advantage of these small Presses, is, that they are worked with smaller screws, and these can be obtained from the screws worn out in the large Presses by being put into the lathe and reduced. Besides the space necessary for all the Presses required for an issue of 3 lacs of Pieces daily there is now room for the weighing men and also for the Superintendent and his Gomastas.

The management of this set of rooms has been admirably conducted by Mr. Christian who has been employed in the Mint for 17 years ; and now holds one of the most important posts in it with a salary, quite inadequate.

I don't understand how it was that the Superintendent of these rooms was placed on the list in a Second Class ; and it certainly is an improper arrangement. Mr. Christian has a greater number of men under his controul than any other Officer in the Mint ; he has charge of three distinct operations and his constant attention is necessary to maintain the accuracy and beauty of the Coin.

To shew the great increase of work done in this Room I subjoin a Statement of the average number of pieces issued in each working day for the last 10 years : and I trust that my earnest recommendation that the Superintendent of these Rooms should be placed in the first Class may be attended to.

| Years. | Pieces of Silver Coins | Pieces of Copper Coins. | Total pieces of Silver and Copper Coins. | Average per day. |
|---|---|---|---|---|
| 1848–49... | 18,80,443 | 60,57,445 | 79,37,888 | 28,553 |
| 1849–50... | 16,72,484 | 66,12,046 | 83,54 530 | 30,052 |
| 1850–51... | 40,62,338 | 117,50,141 | 158,12,479 | 56,879 |
| 1851–52... | 43,42,527 | 16,29,995 | 59,72,522 | 21,483 |
| 1852–53... | 39,78,917 | 91,40,401 | 131,19,318 | 47,191 |
| 1853–54... | 78,65,129 | 31,88,202 | 110,53,331 | 39,760 |
| 1854–55... | 51,11,948 | 43,01,900 | 94,13,848 | 33,862 |
| 1855–56... | 84,85,820 | 93,10,976 | 177,96,796 | 64,016 |
| 1856–57... | 155,29,114 | 155,75,465 | 311,04,579 | 1,11,887 |
| 1857–58... | 1,66,28,345 | 329,78,603 | 496,06,948 | 1,78,442 |

There is another excellent public servant in this Department of the Mint, whom I regret to leave in an appointment very much under paid. Narrainsawmy the Deputy of the cleaning Room has been in the Mint for the last 15 years, and bears the highest character for zeal and integrity. He has immediate charge of the preparation of both the Silver and Copper Blanks for the final process of Stamping and his increase of work is shewn by the Statement entered above. I have always felt that Narrainsawmy ought to have his salary increased but I could not find any other post for him so suitable as the one he holds, which ought to be a far better paid appointment than it is.

The Coin after stamping is finally examined in a very low room off the Treasury which is very unfit for its purpose. It has hardly any ventilation, is frequently full of men, and every door and Window must be kept shut, lest the balances should be disturbed.

The alteration I propose in this case is to build a room for the purpose over the Treasury, and place the Stair-case where the Treasury Shroffs now sit. I object very strongly to a second story being raised on the buildings near the Mint wall, but there is no reason why a building in the square should not be double the height, and the sooner the Treasury has a room over it the better.

The Mint Treasury serves its purpose well, and if cellars are added to the laminating room there will be space sufficient for the Bullion received. The Treasurer Mr. Price has lately been appointed on Mr. Peterson being promoted to the Deputy Accountantship. He is a zealous man and will I am sure do justice to the important post he holds.

The fabrication of Copper Coin was formerly carried on only as far as the Silver Apparatus could be spared for it, and as the receipt of Silver increased, the Coinage of Copper became impossible. Taking advantage therefore of one of the rooms set apart for the Coinage of Gold ; now quite out of use, I fitted up a rolling mill, and obtained as I said before from the Engineer Department a Steam Engine of ten horse power to work it. The demand for Copper being urgent, the apparatus was put together hastily, with the intention that it should be better finished at some future period, but its services have been too much needed ever since, and there is no immediate probability of time being found to alter it.

In addition to the Mill and Engine, 17 cutting tables have been set up in an adjoining room, and the cost of the whole of this important addition to the Mint Apparatus admitting as it does of an issue of 2,00,000 Copper pieces daily, was only 5,005 Rupees.

The Engine employed was one of those which contains the Boiler and Engine in one ; and was admirably suited in that respect for the work required of it. It was brought into use without being placed on a built foundation, and being covered by a few sheets of zinc was at work in a few days. There were however several objections to it. First that the Cylinder being very small it moved much too fast for the Mill, and the speed had to be brought down to one fourth. This could not be done by a belt without placing the Engine farther from the Mill than was convenient and it was necessary to add a wheel and pinion for the purpose. But a still greater fault was apparent after the Engine had been at work some months, and it was found that its form made it very difficult to repair. In consequence of this, it has been out of use for sometime and can only be patched in a clumsy way.

Before the Engine failed, it had however, been at work 20 months and had earned almost its whole cost in each week of that time, as without it no Copper Coin could have been made, whereas so great a quantity was issued, as gave to Government a clear profit of 2,13,500 Rupees.

The Copper Laminating room is too low, and the want of light, and fresh air is still more apparent in the cutting room where the cutters are arranged to be worked by the Engine, but time has not been found to make the connecting Apparatus, and the crowd of men at work without ventilation always distressed me as I entered the room.

If new Buildings are not erected for the Copper Department, these rooms should be at once raised, and have sky lights placed on the roof for ventilation.

Mr. John Maddox the Deputy Superintendent of this room, has managed it exceedingly well, under the supervision of Mr. Bowie, to whom he was subordinate in the Silver Laminating Department, of which this was made a Branch.

The Home Government having at last responded to my urgent request that the Copper indented for by Major Bell should be immediately sent out I was able to carry on the Coinage

with vigour, and as will be seen by the following Statement, the profit even on the smallest Coins was very considerable, making due allowance for a loss upon the sale of waste Copper.

| | Copper. | | | | | | | | Cost of Laminating, Cutting, Milling, Cleaning, Stamping Dies, &c., and including the wear of Machinery. | | | Loss on the sale of Scissel. | | | Gain. | | | Cost including half charges of Mint Committee and Mint Office together with Mint Masters salary. | | | Gain. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number. | | Stamp value. | | | Weight. | Value. | | | | | | | | | | | | | | | | |
| | | | Co's. Rs. | A. | P. | lbs. | Co's. Rs. | A. | P. | Co's. Rs. | A. | P. | C. Rs. | A. | P. | Co's. Rs. | A. | P. | Co's. Rs. | A. | P. | Co's. Rs. | A. | P. |
| $\frac{1}{2}$ Annas | 132,30,439 | | 4,13,451 | 3 | 6 | 3,79,478 $\frac{7}{16}$ | 2,54,960 | 7 | 6 | 14,222 | 11 | 5 | 14,781 | 3 | 7 | 1,29,486 | 13 | 0 | 31,885 | 5 | 7 | 1,11,824 | 2 | 10 |
| $\frac{1}{4}$ do | 185,64,441 | | 2,90,069 | 6 | 3 | 2,62,017 $\frac{1}{8}$ | 1,75,571 | 3 | 3 | 13,552 | 0 | 7 | 10,206 | 6 | 4 | 90,739 | 12 | 1 | 27,336 | 2 | 2 | 76,955 | 10 | 6 |
| Single Pie | 83,31,920 | | 43,395 | 6 | 8 | 40,187 $\frac{15}{16}$ | 26,909 | 11 | 0 | 4,499 | 3 | 8 | 1,565 | 9 | 8 | 10,420 | 14 | 4 | 7,665 | 5 | 10 | 7,254 | 12 | 2 |
| Single Cents | 28,65,400 | | 63,038 | 12 | 9 | 58,758 $\frac{3}{4}$ | 41,521 | 0 | 2 | 3,080 | 4 | 10 | 2,288 | 10 | 11 | 16,148 | 12 | 10 | 6,905 | 9 | 9 | 12,323 | 7 | 11 |
| Half do | 24,36,500 | | 26,801 | 7 | 11 | 24,969 $\frac{11}{16}$ | 17,644 | 5 | 5 | 1,778 | 10 | 3 | 972 | 10 | 0 | 6,405 | 14 | 3 | 3,587 | 11 | 11 | 4,596 | 12 | 7 |
| Quarter do | 8,35,400 | | 4,594 | 11 | 2 | 4,293 $\frac{1}{2}$ | 3,033 | 15 | 2 | 451 | 1 | 10 | 167 | 4 | 4 | 942 | 5 | 10 | 768 | 9 | 1 | 624 | 14 | 7 |

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It was however evident at the first auction sale of Copper scissel that the increasing Coinage would soon flood the limited market of Madras with waste Copper, and that the merchants, taking advantage of the accumulation in the Mint would be able to dictate their own price. This threatened the loss of the whole Government profit on the Coin, and as I have elsewhere reported I had to meet the difficulty, by bringing the Copper into Coinage by a slight alloy of tin.

For sometime, the only Furnaces I had for this purpose, were those of the Merchants Bullion room, where the Store-keeper had Temporary Management. But when the Silver Coinage ceased, for the settlement of Accounts, I made use of all the furnaces in the melting and recovery room and the weight of Ingots prepared from the Scissile, amounted in all to 95 tons of which 35 tons has been issued in Coin.

As I hoped the Scissile Copper will hereafter always be coined, I built 10 furnaces for melting it in crucibles, and in a room adjoining the melting room made arrangements for a roughing mill to be worked by one of the small Engines. Annealing furnaces were also built for softening the straps under lamination. And as I had determined to supply all new furnaces with a blast, I arranged for the passage of air through the laminating room from a fau driven by the mill Engine.

This was all incomplete when I gave up charge of the Mint, but every thing is sufficiently far advanced to shew what my intentions were. I proposed to lay down Iron rails along the line of the Furnace, in order that a light travelling crane might me made to reach them all, and as the room is open I proposed to have an Iron screen on the same rail to keep the wind off the moulds while the metal was being poured. The moulds themselves being either fixed in separate frames, or made to travel on another line of rails, as was found in practice to be most convenient.

As I was anxious to use as little alloy as possible, I reduced it to $\frac{1}{100}$ part, but as I consider the Coin all better for a slight mixture of Tin I recommend at least double that quantity being used, if not one per Cent, the quantity originally used by Doctor Bannister.

There are many interesting points yet to be determined as to the best mode of working this metal, and the pure Copper also. It being a question indeed, whether pure Copper ever ought to be worked upon.

In Calcutta, if I am rightly informed, the Copper tile of commerce is used, and rolled hot. The mixed metal cannot be so treated, as when heated it crushes in the Mill, but it laminates so well cold, with occasional annealings, that I think it probable it would answer to melt up the tile Copper and alloy it for Lamination; and I am confident this process would answer better than the present plan of rolling the very thick tiles, if the Ingots were made to economize the expensive process of Lamination, as thin as they could be made without becoming unsound. In making moulds for Copper every effort should be made to keep the Ingots thin and the length of the moulds should be determined by this. It is probable that if the Ingots are shot they may be made thinner than if the moulds were longer, in which case it would answer to reduce their length. Or they might be cast thin and of considerable length by the moulds being laid horizontal or nearly so, with a passage for the air at the lower end.

With so great a consumption of Copper as will take place now that the Mints are supplying all India with Copper Coin, it will be worth the manufacturer's while to prepare the metal in suitable Ingots for Coinage, and such an arrangement should be made immediately, always provided that so immoderate a profit is not allowed to the manufacturers as has been given for the Lamination of the straps supplied from England for the Madras Mint.

It is probable that the cheapest supply for India would be obtained from Australia or under present circumstances *Japan*, but I have not had time to go thoroughly into this question, and can only offer suggestions for enquiry.

The only room through which the metal for coinage passes, which has not yet been noticed, is the Copper Cleaning and Annealing room where the blanks are prepared for Coinage. This has had two new reverbaratory Furnaces capable of Annealing 26 tubes at a time, otherwise no change has been made in this room but it is now being raised and doubled in breadth, which is necessary in order to moderate the excessive heat in which the people work. Cellars for Copper blanks are wanted and space will be found for them in the addition now making to the room.

The Die Cutting room has been very much altered and greatly extended. It is under the management of Mr. Phillips who has made every exertion to keep pace with the increasing demand for Dies; the following Statement will shew how well his efforts have succeeded.

| Years. | Total of Gold Dies. | | Total of Silver Dies. | | Total of Copper Dies. | | Grand Total. | | Total amount of expense for each year. | | | Value per pair of Dies. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tops. | Bottoms. | Tops. | Bottoms. | Tops. | Bottoms. | Tops. | Bottoms. | | | | |
| 1848-49..... | ..... | ..... | 136 | 434 | 102 | 381 | 238 | 815 | 4,217 | 0 | 0 | 8 |
| 1849-50..... | ..... | ..... | 8 | 123 | 96 | 398 | 104 | 521 | 4,111 | 0 | 0 | 13 $\frac{1}{8}$ |
| 1850-51..... | ..... | ..... | 146 | 364 | 0 | 0 | 146 | 364 | 4,308 | 15 | 0 | 16 $\frac{7}{8}$ |
| 1851-52..... | ..... | ..... | 264 | 278 | 0 | 0 | 264 | 278 | 4,826 | 0 | 0 | 17 $\frac{3}{4}$ |
| 1852-53..... | ..... | ..... | 658 | 544 | 71 | 0 | 729 | 544 | 6,675 | 0 | 0 | 10 $\frac{7}{16}$ |
| 1853-54..... | ..... | ..... | 569 | 711 | 213 | 4 | 782 | 715 | 7,270 | 0 | 0 | 9 $\frac{11}{16}$ |
| 1854-55..... | ..... | ..... | 249 | 243 | 353 | 459 | 602 | 702 | 5,535 | 0 | 0 | 8 $\frac{7}{16}$ |
| 1855-56..... | ..... | ..... | 475 | 416 | 68 | 60 | 543 | 476 | 6,116 | 0 | 0 | 12 |
| 1856-57..... | ..... | ..... | 178 | 586 | 349 | 276 | 527 | 862 | 9,918 | 0 | 0 | 14 $\frac{1}{4}$ |
| 1857-58..... | ..... | ..... | 507 | 1087 | 1340 | 1250 | 1847 | 2337 | 16,678 | 0 | 0 | 7 $\frac{15}{16}$ |

The Die Annealing Furnaces have been rebuilt on a new plan which is found to answer well and admit of much more work being done. Two powerful Presses have been added, which though much used at present, for stamping the Infantry waist plates, will eventually be a great aid to the Die Department.

Adjoining this room, and under Mr. Phillips' management also, another room has been opened for the manufacture of 62,000 plates for the waist belts of the European and Native Infantry. And in connection with it a Brass Foundry has been built which is capable of doing all the Brass castings required in the Mint. This was much required as formerly the Brass was melted in open charcoal fires, with a great expenditure of fuel. The cost of the Foundry building, the Chimney and Furnaces, was only 960 Rupees, which was recovered in a few months by the saving of fuel. The economy of the change is exhibited in the following Comparative Statement of the cost of Melting Brass in the old and new Furnaces.

| | | |
|---|---|---|
| 56 lbs. of Brass requires 5 Parrahs of Charcoal cost | :. | 1-15-1. |
| Do. do. 56 lbs. of Coke | ,, ... | 0-10-0. |
| | | 1- 5-1. |
| Saving on a Ton of Metal melted... ..... | | 77-11-4. |

Mr. D'Casta, the indefatigable Manager and Moulder in this Department deserves a word of notice, as he is no less skilful in his trade than he is faithful in his exertions.

My object in taking up the manufacture of waist plates at the request of the Inspector General of Ordnance was two-fold. First, because if the order was to be executed, my doing so, would save the Government no less than 31,000 Rupees, and secondly, because it gave me the means of improving the Die Department and Brass Foundry. The price at which the waist plates could be made by private manufacturers was one Rupee a set, while the Mint undertook them at less than half of that, but the cost of the metal being increased by a heavier muster being determined on, their cost will be raised to 8 Annas a set, or exactly half the Contractors offer. It was no slight object thus to save the Government 31,000 Rupees, although it might seem impoltic, at a time when the Mint was overwhelmed with Bullion to take in work for another Department, it was not so in fact, as what is required for the extension of the Mint is a School of Artificers by which to extend its operations as required. This it has never had to any extent, and I was glad to take up any work that did not require great skill, in order that I might have a number employed, from whom to select suitable hands. It would have been quite another thing, had I taken up work that required the skill of the few accomplished Artificers in the Mint.

About 32,000 of these plates had been made up to October last when I gave up the Mint

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and as they are manufactured now at the rate of 200 sets a day, they should all be delivered by May.

The Nitric and Hydrochloric acid still have not been altered but the Sulphuric acid Chamber has been entirely renewed; lead having been ordered out for the purpose by Major Bell.

Mr. D'Silva the Storekeeper has had charge of the acid Manufactory, and has in this, as in every other work he has undertaken, made important improvements. The Sulphuric acid which was before supposed to cost four Annas a pound does not now cost above two Annas, though the price of the Materials used is not reduced. This change was mainly effected by mixing the materials before they left the Mint with the view of preventing them from being stolen, the Chamber being half a mile distant, and the ingredients more readily saleable when separate than when mixed. When the new Chamber is in use the cost will be lower still.

The Turners Lathes, Plaining Machines and Boring Machines are under the management of Mr. John Schwanke, who in addition to the characteristic energy of a Mint Artificer, has very good skill in the management of these Machines. Mr. Schwanke is one of those who from the sudden growth of the Mint, and the great demand for skilled labour in other Departments, is sadly underpaid and altogether ill circumstanced. His services are most valuable and his charge a very important one, and every day becoming more so. His pay at present is only 40 Rupees a month, and because he is not styled a Superintendent he will not be entitled to a Pension; I beg to recommend strongly that he be made a 2nd Class Superintendent, for it is impossible to suppose that the Mint will be able to retain the services of men fit for such charge as he holds, unless they are more liberally remunerated.

At present the Room is very much too small for its purpose, and sanction has been granted for an upper story being built. To economise space, I proposed instead of a stair case having a balanced box to take the men up and down, by which also the heavy articles will be lifted to the upper room.

A small Engine has been purchased to work all these Machines, and the sooner it is brought into use the better, as from the want of power they all work at too low a speed and half their value is lost in consequence.

The Iron Foundry has been very much altered. When I took charge, the draught furnaces were doing all the work, and exceedingly well they answered in several respects. By their means Guns could be melted down and castings made of $1\frac{1}{2}$ if not 2 tons weight. But they were not convenient in all ways; the expenditure of fuel in them was very great, the iron could not be varied through the day to suit the work, and they were ill adapted to their purpose when there were no large castings wanted.

I found in the Foundry a very serviceable little $2\frac{1}{2}$ Horse Engine which, with its Boiler was made in the Mint, under the instruction of Colonel Smith; a most creditable piece of workmanship, especially as the Artificers who made itknew nothing of its use. A furnace was attached to this Engine, and an experimental Cupola, but the latter was very inefficient and out of reach of the Foundry crane. Having tried the Engine and Fan and satisfied myself as to their effect, I set up a good Cupola in the Foundry pit, and having obtained a supply of Coke, made all but the very heavy castings by means of the Cupola. When this had been in operation some time, a great demand was made on the Mint by the Ordnance Department for small Iron castings which occupied so much space when moulded that the Cupola could only be kept in blast above 3 or $3\frac{1}{2}$ hours. This was bad economy, as the chief expenditure of fuel is in the heating of the Cupola. I determined therefore to set up another crane and double the size of the pit which added very much to the power of the Foundry, and reduced materially the cost of the castings.

I consider the Foundry to be now in very effective condition except that the moulding is somewhat imperfect, in consequence of its being almost entirely done by boys brought into the Foundry to learn their business. These lads promise exceedingly well and I feel sure that their work will very soon be equal to that of men.

I subjoin a specimen of one day's work in the Foundry to shew the actual result of the Cupola.

| | No. | lb. | | No. | lbs. |
|---|---|---|---|---|---|
| Double Ingots moulds | 8 | 504 | Small Cap Square | 4 | 16 |
| Small Floor Plates | 18 | 828 | Large do. do. | 3 | 63 |
| Large do. do. | 4 | 292 | Bullet Manufacturing wheels | 2 | 76 |
| Melting Pots | 6 | 1,086 | Bearing | 1 | 40 |
| Hawser Pipe | 1 | 342 | Cap Square | 1 | 12 |
| Do. Connecting Pipe | 1 | 40 | Small Fly wheels | 2 | 280 |
| Small Band wheel | 6 | 240 | Cutting Press | 2 | 474 |
| Second size wheel | 6 | 288 | Coupling Boxes | 2 | 70 |
| Pedestal | 1 | 9 | Large Dogs | 3 | 36 |
| Hangers | 1 | 90 | Small do. | 3 | 24 |

As a supply of Bells was required for the Churches and Arsenals in the interior, an application was made to the Mint to know at what rate they could be cast. The cost promised was 11 Annas a lb., and the manufacture was at once begun. The metal having been previously mixed and melted into lumps in the Brass Foundry was run down in one of the draught furnaces, and Six Bells weighing 2125 lbs. have been cast together. The Arsenal has already been supplied with 26 of these Bells, and the remainder will be completed immediately.

Mr. G. A. Schwanke the Superintendent of the Foundry has also charge of the Carpenters and I have lately added to his Establishment a great portion of the Smiths who have been removed from the Mint to the Foundry Yard. Mr. Schwanke is another of those faithful and zealous men for which the Mint is so remarkable, devoting himself heart and soul, to his work and taking the greatest pride in it. I beg strongly to recommend that Mr Schwankes appointment may be made that of a Second Class Superintendent which it undoubtedly ought to be, as he has a still more important charge than his younger brother before mentioned.

It will be advisable to put up another Cupola which has been begun and may be completed, for a trifle. If this is done there may be a casting every three or four days, and the outturn of the Foundry increased to three or four hundred tons a year.

The yard in which the Foundry stands was also occupied by the cattle, but as the whole Mint was over-crowded with work people I could no longer afford the space, so I removed the Bullocks and made a line of forges in the sheds they had occupied. These are blown by English Bellows, but in other respects on the common native plan, yet the work done is very good and one Smith Armoogum would be considered skilful in any European workshop. The use of dust coal which is purchased at 5 Rupees a ton instead of Charcoal costing $27\frac{5}{16}$ Rupees has caused a very great saving of expense, but I am not able to give the exact amount of it.

I proposed if I had remained in the Mint to raise and ventilate the Smith's shed, and raise the fires and anvils so that the men should stand to their work. The forge should have a blast from the Foundry Engine which I hoped to fit for the purpose by increasing the boiler by one pair of tubes.

There is a great want of good Workshops in the Mint, and all that it seems possible to do is to add accommodation as circumstances will permit and necessity drives, without attempting any comprehensive re-arrangement, which would only cause a waste of the working time of the Mint, and never result in any thing perfect.

In a continuance of the shed in which the Smiths now work the crucible makers have been located, as the use of lead crucibles in the recovery of the dross and in melting up the scissile Copper has necessitated a much greater manufacture than there was space for in the hut formerly used.

The following Statement of the cost of these crucibles from the time they were imported from England will shew how well Mr. D'Silva the Storekeeper has succeeded in this, another of his several manufactures. To facilitate the grinding of the materials a mill has been set up like those before described.

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| Cost of Blacklead Crucibles received from England. | Rs. | A. | P. | Cost of Blacklead Crucibles made in the Mint. | Rs. | A. | P. |
|---|---|---|---|---|---|---|---|
| 1 Dozen of 10 lbs. Crucibles | 9 | 8 | 1 | 1 Dozen of 10 to 20 lbs. Crucibles | 1 | 0 | 3 |
| 1 Do. of 25 ,, do. | 30 | 5 | 11 | 1 Do. of 30 to 50 ,, do. | 2 | 14 | 6 |
| 1 Do. of 50 ,, do. | 65 | 9 | 5 | 1 Do. of 60 to 100 ,, do. | 4 | 2 | 0 |

Having substituted Coke for Charcoal whenever it was practicable while the former was procurable in the market, I have been sometimes at a loss when it was not to be purchased. On several occasions I have had help from the Railway Stores, and at other times I have had to make the Coke myself. This I did in mounds, with Coal very unfit for the purpose, but still it enabled me to keep the work going, and was not so expensive as Charcoal, though the wastage was excessive, and the material but indifferent.

A large quantity of Coke has been indented for from England, but there is no promptness in furnishing articles from home, and it is better to be as independent as possible of that source of supply. I strongly recommend therefore that the oven I have begun should be completed and the Government Stores examined for coal most suitable for coking.

There is one Department of the Mint that has not been mentioned. The Stores, which are kept by Mr. D'Silva, a man of 10 years service in the Mint and one of its very best servants. For a short time Mr. D'Silva took his place as Treasurer, but there was no one on the Establishment qualified for the management of the Stores and the manufactures connected with them, and the Government having made the pay of the Office equal to that of the Treasurer, Mr. D'Silva returned to his post where I hope he may remain till he can claim the emoluments of a 1st Class Superintendent.

The only material change in this Department has been the flooring of the rooms which formerly was of deep sand. I have been able to add some more space in the Store rooms by getting rid of a vast mass of Charcoal dust which was the result of the Charcoal being sifted within the Mint as a security against fraud. Two fine rooms were occupied with this rubbish, one of which has been added to the Die Cutting Department, the other to the Store.

The want of space in the Mint, and the danger of removing the rubbish daily has led to one of the most important squares being occupied with rubbish and filth. I was able to get rid of the cattle dung, which was formerly allowed to accumulate for 6 or even twelve months at a time, by burning it in an old furnace that stood there out of use; but there is still an immense collection of rubbish in the square, at the end of each settlement which I hope to throw a little more out of sight by removing the Sulphuric Acid pans, and concentrating the acid near the Lead Chamber. If this is done, care should be taken that the rubbish is not allowed to touch the outer wall of the Mint.

In consequence of this and other still more abominable filth being allowed to accumulate in the Mint, the whole of the wells are tainted. I got permission therefore to use one of the wells in the seven well compound, and to lay down pipes from it into the Mint square, where there is now at command the very best water in Madras. The Engines should all be supplied with this water, as well as the work people; and for greater convenience two or three branch pipes should be laid down to different parts of the Mint. When this is done, all the present wells should be closed over leaving only the means of dropping a hose into them in case of fire.

It has been my great object while in charge of the Mint to add to the East Indian Artificers, and to give them a fair chance of rising to the highest Offices. As a rule this has not been the case, and there is even now a feeling in the Mint Office that the Artificers are as a class inferior in position to the writer class. I was most anxious to correct this, and was fortunate in being able to select a man for the Head of the Office who began his career working with his own hands. I brought into the Mint as many East Indian lads as I could find employment for, and to give them a fair chance of qualifying themselves for the Office, I instituted a school which they attend for two hours every morning before they go to work. It was my wish that they should learn all that would enable them to be more valuable Mint servants, and as I consider that their intelligence would be greatly improved by their having an opportunity of extending their knowledge, I proposed their reading History and other subjects unconnected with their employment. But

I should strongly object to their being educated to other trades, and especially to such as turn their heads from their own proper duties; and should the establishment ever be sufficiently extensive to have its annual examination before the Madras community, I hope on that day the books may be laid aside, and the boys made to shew their skill in the trades they have been brought up to, which should be the source of pride both to the Mint Master and his boys. Mr. Drury the Chaplain of Black Town, having most kindly agreed to attend the school once a week, that morning is devoted to religious reading.

I look upon the East Indians as likely to make Artificers of a very superior class, when they can be induced to continue at their work, after their intelligence has been improved by education; but the rate of wages paid to Office writers is so much better than that paid to the ablest smiths that it is not to be expected that men who can write a good hand will be contented to work at laborious trades, unless they have before them a prospect of its leading to some well paid Office eventually. And there are not now Offices enough of this description in the Mint. The superintendence has always been inadequately paid. And this mistake is of course still more conspicuous now, not only because the number of work people is very greatly increased, but because there is a much greater demand for skilled labour; and, with reference to what I have before said because more rapid promotion is necessary to induce well educated Artificers to stand by their trades. It will not be bad economy to pay what is necessay to obtain and keep in the Government service this superior class of workmen. And I do not hesitate to recommend a great additional expenditure in the Mint on this account.

As I selected the East Indian boys almost entirely from amongst those who were destitute, and could only afford to give them the pay that their work was actually worth, I had the difficulty to contend against that, they were half starved, and the small pittance I could give them went to support half a dozen hungry brothers and sisters. Under such circumstances it was impossible to suppose that they would ever be men with the requisite physical strength for a good day's work; so I arranged for their having one meal a day as part of their pay, which is eaten about the dinner hour in the Mint.

I hav only now to name the Office which is as well conditioned, punctual, and prompt, as other Departments of the Mint. It is headed by one who has a right from his antecedents to be there. Mr. Scriven was frequently employed by Colonel Smith in trying all his valuable experiments; is a very good theoritical chemist and excellent manipulator; he has a knowledge more or less of all the processes that are gone through in the Mint, and in consequence understands all the questions that arise in the Office, which one who had only learnt the duties of a Writer or Accountant could not. The pay of the Office requires a revision like that of all the rest of the establishment, for there are old servants in it most inadequately remunerated.

Before closing this Memorandum, I must urge the appointment of an Assistant to the Mint Master. At present the next in importance to him is the Superintendent of Machinery, but he is not in a position to take charge of the Mint in the absence of the Mint Master.

Mr. Maddox the Superintendent of Machinery is a man of great natural talent, and is as zealous as he is efficient and trustworthy. I have not space to enumerate how much important service Mr. Maddox has rendered to the Mint in a service of 17 years. During the time I was in charge, his experience and practical skill were invaluable to me. And he is an admirable example of what I have said regarding the fitness of the East Indians for attaining excellence as mechanics. Mr. Maddox began life when a good mechanical education was not to be had; but he has made the most of his opportunities, and has a far more clear idea of the theory of what he does, than English foremen in general. Mr. Maddox is however in his proper place.

The next man to the Mint Master should have had an English education and some English experience; and I would recommend that some practical Engineer should be appointed to the Mint not to take charge of the Machinery or any particular branch, but to be a permanent Assistant to the Mint Master and to use some of his authority in his absence. I should not recommend this appointment as a step to the Mint Mastership; and I feel sure that a man suited to the Office of Permanent Assistant would consider himself as being well paid with seven hundred Rupees a month.

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No. 6. ORDER THEREON, 14th June 1859, No. 335.

Resolved that Extract from Lieutenant Colonel Cotton's letter of 1st February last, paras. 6 to 13 be furnished to the Board of Revenue, and to the Chief Engineer, Department Public Works, who will report, after referring to those Officers in the Revenue and Public Works Department respectively, whom they may wish to consult upon Colonel Cotton's views relative to the extensive issue and circulation of small Silver and Copper Coins in the Provinces.

2. Adverting to para. 2 of Mr. Balmain's letter, the Government would wish to have the opinion of the Committee on the various points mooted by Colonel Cotton at an early date.

(Signed) T. PYCROFT,
*Chief Secretary.*

Exd. A. P. W. Begbie.

# Statement Shewing the Present and Proposed Mint Establishment Prepared Agreeably to the Extract from the Minutes of Consultation under date

| Year | Revenues ordinary | Revenues Extra ordinary | Charges ordinary | Charges Extra ordinary | Total Revenue | Total Charges | Net Surplus | Net Deficient |
|---|---|---|---|---|---|---|---|---|
| | C.Rs | C.Rs | C.Rs | C.Rs | C.Rs | C.Rs | C.Rs | C.Rs |

No.
Date
Extract from Home Department Government of India
Office to which the Proposition refers

| Office | Nature of Charges: Present Scale | C.Rs a p | Nature of Charges: Proposed Scale | C.Rs a p | Proposition: Permanent Increase per Month (C.Rs a p) | Permanent Decrease per Month (C.Rs a p) | Period | Temporary Increase per Month (C.Rs a p) | Temporary Decrease per Month (C.Rs a p) | Period | Grounds of Proposition | Local Government recommendation | Orders of the Government of India: Home Departments Remarks | Financial Departments Remarks | Orders |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mint Office | 1 Head Accountant | 250 .. .. | 1 Head Accountant | 250 .. .. | .. .. | | | | | | | | | | |
| | 1 Deputy do | 140 .. .. | 1 Deputy do | 140 .. .. | .. .. | | | | | | | | | | |
| | 1 Book Keeper | 70 .. .. | 1 Book Keeper | 70 .. .. | .. .. | | | | | | | | | | |
| | 1 Fair Writer | 35 .. .. | 1 Fair Writer | 35 .. .. | .. .. | | | | | | | | | | |
| | 1 Accountant | 40 .. .. | 1 Accountant | 40 .. .. | .. .. | | | | | | | | | | |
| | 1 do | 30 .. .. | 1 do | 30 .. .. | .. .. | | | | | | | | | | |
| | 1 do | 25 .. .. | 1 do | 25 .. .. | .. .. | | | | | | | | | | |
| | 1 Draftsman | 30 .. .. | 1 Draftsman | 30 .. .. | .. .. | | | | | | | | | | |
| | 1 Head Conicopoly | 14 .. .. | 1 Head Conicopoly | 14 .. .. | .. .. | | | | | | | | | | |
| | 1 Die do | 14 .. .. | 1 Die do | 14 .. .. | .. .. | | | | | | | | | | |
| | 1 Moochie | 8 .. .. | 1 Moochie | 8 .. .. | .. .. | | | | | | | | | | |
| | 1 Head Peon | 10 .. .. | 1 Head Peon | 10 .. .. | .. .. | | | | | | | | | | |
| | 4 Peons at 7 Rupees each | 28 .. .. | 4 Peons at 7 Rupees each | 28 .. .. | .. .. | | | | | | | | | | |
| | 1 Superintendent of Machinery and Foreman of Work | 200 .. .. | 1 Superintendent of Machinery and Foreman of Work | 250 .. .. | 50 .. .. | | | | | | The duties being extensive and Steam power added the pay originally fixed is quite inadequate. | | | | |
| Mint Treasury & Bullion Room | 1 Treasurer & 1 Bullion Keeper | 100 .. .. | 1 Treasurer & Bullion Keeper | [illegible] | .. .. | | | | | | | | | | |
| | 1 Deputy do | 30 .. .. | 1 Deputy do | 40 .. .. | 10 .. .. | | | | | | The duties and responsibilities are increased by the additional number of persons employed in the Mint. | | | | |
| | 1 Shroff | 14 .. .. | 1 Shroff | 14 .. .. | .. .. | | | | | | | | | | |
| | 1 Conicopoly | 14 .. .. | 1 Conicopoly | 14 .. .. | .. .. | | | | | | | | | | |
| | 1 Weighingman | 14 .. .. | 1 Weighingman | 14 .. .. | .. .. | | | | | | | | | | |
| | 1 Head Assorter & Examiner | 14 .. .. | 1 Head Assorter & Examiner | 14 .. .. | .. .. | | | | | | | | | | |
| | 1 Melter | 14 .. .. | 1 Melter | 14 .. .. | .. .. | | | | | | | | | | |
| | 1 do | 10 8 .. | 1 do | 10 8 .. | .. .. | | | | | | | | | | |
| | 1 Gollah | 8 .. .. | 1 Gollahs | 8 .. .. | .. .. | | | | | | | | | | |
| | Carried Over | 1112 8 .. | | 1172 8 .. | 60 .. .. | | | | | | | | | | |

Proposition

Extract from Memorandum Report of Superintendent of Stamps & Dies to which the Proposition refers

No
Date

Nature of Charges

| Present Scale | | Proposed Scale | | Permanent Increase per Month | Permanent Decrease per Month | Temporary Increase per Month | Temporary Decrease per Month | Period | Period |
|---|---|---|---|---|---|---|---|---|---|
| Brought Over | £ Bar 1128 | | £ Bar 1128 | £ Bar 60 | £ Bar | £ Bar | £ Bar | | |
| **Melting and Refining Rooms.** | | | | | | | | | |
| 1 Superintendent | 140 | 1 Superintendent | 140 | | | | | | |
| 1 Deputy do | 40 | 1 Deputy do | 40 | | | | | | |
| 1 Conicopoly | 14 | 1 Conicopoly | 14 | | | | | | |
| 1 Melting Maistry | 20 | 1 Melting Maistry | 20 | | | | | | |
| 1 Deputy do | 12 | 1 Deputy do | 12 | | | | | | |
| 1 Refining and Parting do | 12 | 1 Refining and Parting do | 12 | | | | | | |
| 1 Acid Maistry | 12 | 1 Acid Maistry | 12 | | | | | | |
| 1 Cooly | 6 | 1 Cooly | 6 | | | | | | |
| 1 Gollah | 8 | 1 Gollah | 8 | | | | | | |
| **Laminating Cutting and Adjusting Rooms.** | | | | | | | | | |
| 1 Superintendent | 140 | 1 Superintendent | 140 | | | | | | |
| 1 Deputy do | 40 | 1 Deputy do | 40 | | | | | | |
| 2 Conicopolies at 14 Peach | 28 | 2 Conicopolies at 14 Peach | 28 | | | | | | |
| 1 Weighingman | 12 | 1 Weighingman | 12 | | | | | | |
| 1 Head Laminator | 12 | 1 Head Laminator | 12 | | | | | | |
| 1 do | 10 | 1 do | 10 | | | | | | |
| 1 Pit Maistry | 10 8 | 1 Pit Maistry | 10 8 | | | | | | |
| 1 Head Adjuster | 12 | 1 Head Adjuster | 12 | | | | | | |
| 1 do Assorter | 11 | 1 do Assorter | 11 | | | | | | |
| 1 do do | 9 | 1 do do | 9 | | | | | | |
| 1 Superintendent of the Bullock Mills | 20 | 1 Superintendent of the Bullock Mills | 20 | | | | | | |
| 10 Bullock Drivers at 5/4 Peach | 52 8 | 10 Bullock Drivers at 5/4 Peach | 52 8 | | | | | | |
| 1 Gollah | 10 | 1 Gollah | 10 | | | | | | |
| **Milling Cleaning & Stamping Rooms.** | | | | | | | | | |
| 1 Superintendent | 100 | 1 Superintendent | 140 | 40 | | | | | |
| 1 Deputy do | 30 | 1 Deputy do | 40 | 10 | | | | | |
| 1 Milling die Filer & Setter | 12 | 1 Milling die Filer & Setter | 12 | | | | | | |
| 1 Filer | 11 | 1 Filer | 11 | | | | | | |
| 1 Chuckledar | 10 | 1 Chuckledar | 10 | | | | | | |
| 1 Furnace Maistry | 12 | 1 Furnace Maistry | 12 | | | | | | |
| 1 Proff do | 10 | 1 Proff do | 10 | | | | | | |
| 1 Head Stamping die Setter | 14 | 1 Head Stamping die Setter | 14 | | | | | | |
| 1 Stamping do | 10 | 1 Stamping do | 10 | | | | | | |
| 1 Conicopoly | 14 | 1 Conicopoly | 14 | | | | | | |
| 1 Head Proff | 12 | 1 Head Proff | 12 | | | | | | |
| 1 Gollah | 8 | 1 Gollah | 8 | | | | | | |
| **Die Cutting Room.** | | | | | | | | | |
| 1 Superintendent | 80 | 1 Superintendent | 100 | 20 | | | | | |
| 1 Engraver | 40 | 1 Engraver | 60 | 20 | | | | | |
| 1 do | 30 | 1 do | 40 | 10 | | | | | |
| 1 Punch Maker | 25 | 1 Punch Makers | 35 | 10 | | | | | |
| 1 do | 21 | 1 do | 30 | 9 | | | | | |
| 1 Die Puncher | 21 | 1 Die Puncher | 25 | 4 | | | | | |
| 1 Chuckledar & Polisher | 10 | 1 Chuckledar & Polisher | 10 | | | | | | |
| 1 Die Temperer | 8 | 1 Die Temperer | 8 | | | | | | |
| 1 Apprentice | 10 | 1 Apprentice | 10 | | | | | | |
| 1 do | 8 | 1 do | 8 | | | | | | |
| Carried Over | 2212 8 | | 2425 8 | 183 | | | | | |

Orders of Government of India

| Grounds of Proposition | Local Government recommendation | Home Departments Remarks | Financial Departments Remarks | Orders |
|---|---|---|---|---|
| The duties and responsibilities of these offices are greatly increased from the continuous Copper Coinage. The number of Stamping Presses were formerly 12 at present 26. | | | | |
| The Amount of work is about six times greater now, owing to the incessant Coinage of Copper. | | | | |

No
Date
Office to which the Proposition relates

Extract from Proceedings of Board of Trade on Proposition

Proposition

| Nature of Charges | Present Scale | Proposed Scale | Permanent Increase per Month | Temporary Increase per Month | Period | Temporary Decrease per Month | Period |
|---|---|---|---|---|---|---|---|
| | Rs a r | Rs a r | Rs a r | Rs a r | | Rs a r | |
| Brought Over | 22428 . | 2425 8 . 183 . . | | | | | |
| Artificers Room. 1 Superintendent & Founder | 80 . . | 1 Superintendent & Founder 100 . . | 20 . . | | | | |
| 1 Head Turner | 40 . . | 1 Deputy Supt. in the Artificers Room 60 . . | 20 . . | | | | |
| 1 Spring plate Maker | 30 . . | 1 do in Iron Foundry 40 . . | 40 . . | | | | |
| 1 Head Brazier | 30 . . | 1 Spring plate Maker 30 . . | . . . | | | | |
| 1 Carpenter | 30 . . | 1 Head Brazier 30 . . | . . . | | | | |
| 1 Blacksmith | 30 . . | 1 Carpenter 40 . . | 10 . . | | | | |
| 1 Filer | 30 . . | 1 Blacksmith 30 . . | . . . | | | | |
| 1 Moulder | 20 . . | 1 Filer 30 . . | . . . | | | | |
| 1 Apprentice | 10 . . | 1 Moulder 20 . . | . . . | | | | |
| | | 1 Apprentice 10 . . | . . . | | | | |
| | | 1 Blacksmith 40 . . | 40 . . | | | | |
| | | 1 do 30 . . | 30 . . | | | | |
| | | 1 do 20 . . | 20 . . | | | | |
| | | 1 Filer 40 . . | 40 . . | | | | |
| | | 1 do 20 . . | 20 . . | | | | |
| | | 1 do 30 . . | 30 . . | | | | |
| Store Room. 1 Head Store Keeper | 100 . . | 1 Head Store Keeper 100 . . | . . . | | | | |
| 1 Comicopoly | 14 . . | 1 Comicopoly 14 . . | . . . | | | | |
| Apprentices 3 Apprentices at 30 Rs each | 90 . . | 3 Apprentices at 30 Rs each 90 . . | . . . | | | | |
| 1 do at 20 Rs do | 80 . . | 1 do at 20 Rs do 80 . . | . . . | | | | |
| Mint Establishment 1 Superintendent | 70 . . | 1 Superintendent 70 . . | | | | | |
| 1 Head Gollah | 15 . . | 1 Head Gollah 15 . . | | | | | |
| 5 Gollahs at 10 Rs each | 50 . . | 5 Gollahs at 10 Rs each 50 . . | | | | | |
| 3 do at 8 Rs do | 24 . . | 3 do at 8 Rs do 24 . . | | | | | |
| 1 Sweeper | 5 . . | 1 Sweeper 5 . . | | | | | |
| 1 Toty | 38 . . | 1 Toty 38 . . | | | | | |
| | Total 2994 . . | Total 3147 . . 153 . . | | | | | |

Fort St George,
Mint
31st March 1859.

J. C. V.

Orders of Government of India

16

| Grounds of Proposition | Local Government recommendations | Home Departments Remarks | Financial Departments Remarks | Orders |
|---|---|---|---|---|
| From encreased power and operations in the Mint, the wants of all Departments necessarily react upon this, as all are dependent on it for efficient maintenance. Besides a large amount of work is done for the Ordnance and Engineer Department and for Ships. | | | | |

J. R. Bell
Mint Master.

Financial Depart^t

No. 335

Proceedings of the Madras Government

From the Secretary to the Mint Committee 27 May 1859.

Order thereon 14 June 1859. No. 335.

Resolved that extracts from Lieut Col Cotton's letter of 1 February last para 6 to 13 be furnished to the Board of Revenue and to the Chief Engineer DPW — who will report — referring ~~consulting~~ to those Officers in the Revenue & PW Dep^ts respectively whom they may wish to consult — upon Col Cotton's

bickwt Relation
to the existing
issue and
circulation of
small bills &
copper coin
in Provinces -
2. Adverting to
para 2 of Mr
Baldwin's letter
to Lord would
wish to have the
opinion of the
Committee on the
various points
mooted by Col
Cotton at an early
date -

JP.

Revenue Bd.
Revenue Dept
Chief Engr Dept
Ord Dept
Secret Mint Committee

Disptd 17th

Disptd 17th

I quite agree.
List of disputes in
the Newspapers (in which
all may join) on such
a subject as this
is worth any amount
of references to
official Department.
I propose to
act as soon as the
References have been
made to the Board of
Revenue & to Chief
Engineer, & Papers should be
handed to the Newspaper writers.

WM

Pro of Govt 17 June
Financial 1859 Depart

No. 335

Pro: of Government

D/14 June /59.

F No. 328.
"—" 25 7/54
" 72 /61 /60

Directing that Extracts from Lt. Colonel Cottons letter of 1st February last para 6 to 13 relative to the extensive issue and circulation of small Silver and Copper Coins in the Provinces be furnished to the Board of Revenue and to the Chief Engineer for report after consulting with certain other Officers — and desiring to have the opinion of the Mint Committee on the various points mooted by Col. Cotton regarding improvements to the Mint.