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MADRAS RECORD OFFICE.

Government of Madras.

Financial DEPARTMENT.

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Dated 31-8- 18 71.	

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Not to be folded or roughly handled

Proceedings of the Madras Government, Financial Department,
31st August 1871.

No. 140. Read the following letter from the Under Secretary to the Government of India, Financial Department, to the Chief Secretary to Government, Fort St. George, dated Simla, 12th August 1871, Circular No. 2767 :—

Accounts.

I am directed to invite attention to some papers published in the Supplement to the *Gazette of India* of this date, regarding the decimal sub-division of the Rupee.

2. It will be observed that the measure is actually being introduced into Ceylon, apparently with the complete approbation of the people, and that it has been proposed by high authority that the same step should be taken in India.

3. I am to request that an endeavour may be made to ascertain how far a coinage of cents and half cents, which is all that would be needful at the outset, would be acceptable to the people, and whether it would be generally thought convenient to substitute in accounts a sub-division of the rupee into cents, for the existing sub-division into annas and pies

4. The opinion of the Chamber of Commerce on the whole subject should, with the permission of His Excellency the Governor in Council, be requested.

5. Upon the completion of any inquiries that may appear necessary, the views of His Excellency the Governor in Council should be reported for the consideration of the Government of India.

GOVERNMENT OF INDIA, FINANCIAL DEPARTMENT.

DECIMAL SUB-DIVISION OF THE RUPEE.

Note by Lieut.-General His Excellency the Hon. SIR W. R. MANSFIELD, K.C.B., K.C.S.I., *dated 7th March* 1870.

I take the liberty of circulating some official papers on the Currency of Ceylon which were lately forwarded to me by His Excellency Sir Hercules Robinson, the Governor of that Island.

The second set of papers refers to a project for the decimalization of the subsidiary inferior coinage of the rupee, according to which the rupee being divided in 100 cents :—8 annas = 50 cents, 4 annas = 25, 2 annas = 12½, 1 anna = 6½ cents.

It is proposed that the two first should remain in circulation, *viz.*, the 8-anna and 4-anna piece, and that for the inferior sums, these should :—

Silver	1	...	10th rupee.
Copper	1	...	20th ,,
	1	...	50th ,,
	1	...	100th ,,
	1	...	200th ,,

For the argument and the scheme, I refer to Mr. Molesworth's paper which has been very carefully worked out.

With regard to the simplification of account-keeping and the petty calculations which occur daily in every shop and bazaar, and further to the expediency of having metallic coins which may take the place of cowries, &c., &c., it appears to me that the scheme is worthy the best consideration of the Financial Department.

The objection which meets us at once is that the anna is the basis of our stamp-duties. The difficulty does not appear to be insurmountable, if some "give-and-take" arrangement be adopted in the lowest priced stamps, such as that suggested for Ceylon.

From the Director of Public Works, to the Honourable the Colonial Secretary, dated Colombo, 2nd September 1869, No. 1133.

[Decimal Coinage.]

Sir,—In compliance with the wishes of His Excellency the Governor, I have the honour to submit in a connected form the views which I discussed with him in the year 1866 respecting the introduction of a subsidiary decimal coinage of the rupee.

The value of the decimal system is too well-known and appreciated to render it necessary for me to enter minutely into its advantages; it may, however, be as well to combat an abstract and somewhat unpractical objection which is sometimes urged against it on the ground of the number 10 not being readily divisible without remainder by certain numbers—an objection not only to decimals but to the whole system of arithmetic now in use, and which, were it a forcible one, could only be met by entirely upsetting the present system, and adopting one based on the powers of 8 or 12; the former basis rendering it necessary to eliminate the figures 8 and 9 from our arithmetic, the latter rendering the creation of two additional figures necessary. Professor Airy (the Astronomer Royal) has, however, after a careful consideration of this question, expressed his opinion that the adoption of a multiple capable of easy division practically gives no advantage, though at first sight it may appear to do so, and he strongly recommends the decimal system as the best; and Mr. Babbage, before he commenced the construction of his calculating machine, found it necessary to enter into an examination to ascertain whether it would be possible to simplify the mechanism, or accelerate its effects by the use of an arithmetic arranged on other powers than 10; but after a patient investigation of the various bases, particularly those of 8, 12, and 16, he arrived at the conclusion that a system of arithmetic having the number 10 as its basis was, on the whole, the best; and the efforts now made by nearly all civilized nations to introduce decimal coins, weights, and measures, afford the best proof of the value of the system.

Those, however, who have not been in the habit of using decimals can scarcely appreciate the advantages they afford when compared with annas and pie. The pie is the $\frac{1}{192}$nd part of a rupee, a very awkward fraction, and the following table shows that the decimal equivalents of annas and pie are scarcely less cumbrous:—

Table of the value of annas and pie in cents. or $\frac{1}{100}$ths of a Rupee from 1 *pie to* 15 *annas* 11 *pie.*

	P 0	P 1	P 2	P 3	P 4	P 5	P 6	P 7	P 8	P 9	P 10	P 11	
As.													
0	0	·521	1·041	1·562	2·083	2·604	3·125	3·646	4·166	4·687	5·208	5·729	As.
1	6·25	6·771	7·292	7·813	8·333	8·854	9·374	9·895	10·416	10·937	11·458	11·979	0
2	12·5	13·02	13·541	14·062	14·583	15·104	15·625	16·146	16·666	17·187	17·707	18·228	1
3	18·75	19·27	19·791	20·312	20·832	21·353	21·874	22·395	22·916	23·437	23·958	24·479	2
4	25·	25·521	26·041	26·562	27·083	27·604	28·125	28·646	29·166	29·687	30·208	30·729	3
5	31·25	31·771	32·292	32·813	33·333	33·854	34·374	34·895	35·416	35·937	36·458	36·979	4
6	37·5	38·02	38·541	39·062	39·583	40·104	40·625	41·146	41·666	42·187	42·707	43·228	5
7	43·75	44·27	44·791	45·312	45·833	46·353	46·875	47·395	47·916	48·437	48·958	49·479	6
8	50·	50·521	51·041	51·562	52·083	52·604	53·125	53·646	54·166	54·687	55·208	55·729	7
9	56·25	56·771	57·292	57·813	58·333	58·854	59·374	59·895	60·416	60·937	61·458	61·979	8
10	62·5	63·02	63·541	64·062	64·583	65·104	65·525	66·146	66·666	67·187	67·707	68·228	9
11	68·75	69·27	69·791	70·312	70·832	71·353	71·874	72·395	72·916	73·437	73·958	74·479	10
12	75·	75·521	76·041	76·562	77·083	77·604	78·125	78·646	79·166	79·687	80·208	80·729	11
13	81·25	81·771	82·292	82·813	83·333	83·854	84·374	84·895	85·416	85·937	86·458	86·979	12
14	87·5	88·03	88·541	89·062	89·583	90·104	90·625	91·146	91·666	92·187	92·707	93·228	13
15	93·75	94·27	94·791	95·312	95·833	96·353	96·875	97·395	97·916	98·437	98·958	99·479	14
	0 P	1 P	2 P	3 P	4 P	5 P	6 P	7 P	8 P	9 P	10 P	11 P	15

A new stamp ordinance will be necessary to carry into effect this alteration.

The adjustment on the proposed rates only give a loss of £43 on the total value of stamps issued in 1868, which amounts to about £108,000.

Table showing the proposed adjustments of rates for stamps on the decimal system.

Character of Stamp.	Number issued in 1868.	Value at present rates.		Value at proposed rates.	
		Rate.	Amount.	Rate.	Amount.
		Pence.	Rupees.	Cents.	Rupees.
Postage	265,303	½	5,527	2	5,306
Do.	1,224,938	1	51,039	4	48,997
Do.	68,694	2	5,724	8	5,495
Do.	56,963	3	7,120	12	6,835
Do.	18,099	4	3,116	16	2,992
Do.	32,017	5	6,670	20	6,403
Do.	8,175	8	2,725	30	2,452
Do.	10,880	9	4,080	35	3,808
Do.	21,624	10	9,010	40	8,649
Do.	103	21	90	85	87
Receipt, draft, or judicial.	385,688	1	16,070	5	19,284
Do.	58,368	2	4,864	10	5,837
Do.	18,340	3	2,292	14	2,567
Do.	27,156	4	4,526	18	4,888
Do.	3,657	8	1,219	30	1,097
Do.	39,958	9	14,984	35	13,985
Do.	2,295*	3	287	14	321
Do.	5,235*	4	872	18	942
Do.	4,438*	8	1,479	30	1,331
Do.	519*	9	194	35	181
Total...	2,253,050	.....	141,888	.....	141,457

The stamps marked * represent those above the value of a shilling, such as 1*s.* 3*d.*, 3*s.* 4*d.*, &c., but the fractional portion alone has been dealt with, because the value of the shilling may remain unaltered as 50 cents, and needs no adjustment.

The total number of stamps issued during the year 1868 was 3,112,184, but this includes a large number of six penny, shilling, and other stamps of higher value, which, as they will remain unaltered in value, I have omitted in dealing with the question of adjustment.

The stock of stamps in hand, with the exception of those which would bear a higher value, might remain in circulation at their adjusted value even after the introduction of the decimal system, for instance, the ½*d.* and 1*d.* postage might pass current for two and four cents, respectively; and inconvenience to the existing holders of such stamps might be obviated by a proclamation, that, after a specified date, certain stamps would pass current for specified values in cents—a period after that date being allowed to enable holders to return their stamps and receive an equivalent in other stamps. But to prevent fraud, no stamps of that class should be issued from the treasury during that period, or, if issued, that they should be so marked as to prevent their being exchanged for an equivalent to their nominal value.

It would be necessary that the 1*d.* draft, receipt, and other stamps, the value of which would be raised by the adjustment, should cease to be current; but a period should be allowed during which the holders of such stamps might be allowed to exchange them for other stamps equivalent to their original value.

The tolls would be but little affected by the new system, as all the more important toll rates might remain unchanged ; but as a new ordiance to fix the rates would in any case be required, new rates on the " give-and-take " principle might be adopted.

The following rates might require alteration :—

Nature of Toll rates.	Present rates.		Proposed rates.
	In pence.	In cents.	In cents.
Loaded canoe	16	66⅔	70
Passenger vehicle, two wheels	15	62½	60
Cart drawn by one animal			
Unloaded canoe			
Unloaded elephant cart	9	37½	40
Loaded elephant			
Unloaded dhoney	8	33⅓	30
Unloaded cart	4½	18¾	20
Unloaded canoe	4	16⅔	16
Additional horse			
Loaded ox			
Additional bullock	3	12½	10
Unloaded one horse cart			
Additional canoe			
Leaguer or cask			
Additional ox to passenger cart	2	8⅓	10
Unloaded ox			
Additional animal to cart	1½	6¼	6
Foot passengers at ferries			
Pigs, goats, &c.	½	2·08	2·00
	¼	1·04	1

The difficulties inseparable from the transition to the new coinage would, I believe, in practice, be less than might be imagined at first sight. I speak from personal experience on this subject, having resided in Portugal for a short time immediately after the introduction of the decimal system of mil-reis coinage in that country ; and though the transition was far more complicated than that which I propose (the Crusado and Testoon, with their subsidiary coins, being in full circulation), I was astonished to find how soon the people became accustomed to it, how little inconvenience was caused by the change, and how much the decimal system was appreciated.

The difficulties might, I think, be much mitigated by issuing beforehand a proclamation, that, after a specified date, the existing copper coinage would not be lawful money ; and the calling in of the coin might be facilitated by the offer of a small premium on all sums in coin per exceeding, say, Rupees 40 paid into the treasury, the cost of such premium might be recovered from the profits on the issue of the new copper coinage.

With contract, based on states of the existing coinage, I believe there would be no difficulty ; such contracts will be few, and they would in all probability expire before the new system could be brought into operation ; but, if not, the calculations might be made on the rates of the old coinage, and the gross accounts so calculated would not be affected to any appreciable extent.

The prices paid for different retailed articles would very soon adjust themselves without any special provision.

I have, &c.,

GUILFORD L. MOLESWORTH.

The Standard Commissioners' Report of 1841 contains the following statement : "The first point, which has called for our special notice, is the general question of decimal scale. It

The following example will serve to illustrate the difference between the two systems :—

Example 1.

Required the cost of 7 yards of cloth at 7 rupees 6 annas and 5 pie per yard.

By Annas and Pie.		By Decimals.
7 Rs.	6 annas.	R. Cts.
7	7	
—	—	5 pie. 7·40
49 Rs.	(16) 42 (2 Rs.	7
	32	—
2 10 0	10 annas.	12/35 7
2 11		2 11 51·80
51 12 11		

In this example 8 figures and simple multiplication alone are required by the *decimal* system, whilst 36 figures and division as well as multiplication are entailed by the system of *annas and pie.*

Example 2.

Required the cost of 56 superficial feet of Zinc, at 13 annas 11 pie per foot.

By Annas and Pie.		By Decimals.
	11 Pie.	87 Cents.
13 annas.	56	56
56	—	—
—	66	522
78	55	435
65		48·72
	12/616	
16) 728 (45 Rs.		
64	16) 51 + 4 (3 Rs.	
—	48	
88		Rs. A. P.
80	3 annas.	3 3 4
—		45 8 0
8 annas.		48 11 4

In practically converting annas and pie, all the figures might not be set down in the manner of the foregoing examples, but the comparative amount of arithmetic is in each case fairly represented ; such cases are of constant occurrence in all business transactions, and though ready reckoners are used to diminish the labour, it is far better to adopt a system requiring no such appliances.

The coins at present in use in Ceylon are as follow :—

	Decimal of Rupee.	Value, assuming the Rupee = 24 pence.	Fraction of Rupee.
Rupee	1·	24*d.*	1
½ Rupee	·5	12	½
¼ ,,	·25	6	¼
4-penny piece	·166	4	1-6
2-anna piece	·125	3	1-8
One penny	·0416	1	1-24
Two Stiver piece	·0312	¾	1-32
Half-penny	·0208	½	1-48
One Stiver	·0156	⅜	1-64
Farthing	·0104	¼	1-96
Challie or pie	·0052	⅛	1-192

I would propose that the rupee, ½ rupee, and ¼ rupee should remain in circulation, and that the rupee should be divided into 100 parts, which I may term "cents" for convenience. The coinage for Ceylon would then stand as follows :—

PROPOSED NEW CURRENCY.

—		Fraction of Rupee.	Cents.	Equivalent value at 24 pence to a Rupee.
Existing coins	Silver ...	Rupee ...	100	24
	,, ...	½ rupee ...	50	12
	,, ...	¼ ,, ...	25	6
New coins	Silver ...	1-10 rupee..	10	2·4 or 2½*d.* nearly.
	Copper ...	1-20 rupee..	5	1·2 or 1¼*d.* ,,
	,, ...	1-100 rupee.	1	·24 or ¼ ,,
	,, ...	1-200 rupee.	½	·12 or 1 challie nearly.

The foregoing table is calculated on the assumption that 24 pence equal the rupee, because the practice in this Colony renders it necessary to make the comparison between the proposed and the present coinage on this basis.

The lowest coin might be half a cent, and accounts might then be kept in two columns only, *viz.*, rupees and cents. Should it be considered necessary to carry out the decimal system to its full extent, this coin might be called a five mil piece ; but it is scarcely desirable, for practically the five mil piece would never be used in accounts, and anything smaller than five mils or about half a farthing would be too small for coinage.

It may be desirable to convey an idea of the value of the $\frac{1}{100}$ part of a rupee to the native mind more easily, by using the term siya (hundred) instead of cents, and the Singhalese character for this term could be impressed on the coins.

The two-anna piece might, or might not, remain in circulation as 12½ cents, but I think it would be more convenient to discourage its use, as the 10-cent piece would be a far more convenient coin, and some confusion would exist in the use of two coins so nearly of the same size and value. On the other hand, this might be obviated to some extent, by milling the edge of the 10-cent piece to distinguish it more readily, as the three-penny and four-penny pieces were distinguished in England.

The introduction of the new coinage would naturally be attended with considerable difficulties; it becomes, therefore, necessary to consider the character of such difficulties, and the best method of meeting them.

The principal of these difficulties are—

I.—The adjustment of stamps and tolls.

II.—The circulation of coins of the two systems at the same time, and the adjustment of small rates.

The first of these difficulties alone require serious consideration. The penny stamps being 4·166 cents, it is clear that the stamp by the altered coinage must be made either four or five cents in value. If it be made five cents, private individuals will have to pay 20 per cent. more for their penny stamps, whilst if it made four cents, there will be a loss to the revenue of about four per cent. on stamps of the value. This difficulty may, however, be easily overcome by an adjustment based on the present issue of stamps, which would give the advantage to the private individuals in some instances, and to the Government in others ; the total result remaining nearly the same as at present, without inflicting an injustice on the individuals or entailing a loss in revenue.

The following adjustment, based on the stamp issues of 1868, will serve to illustrate my meaning. I would recommend that the penny postage stamps should be made four cents, the half-penny postage stamps two cents, whilst the present penny receipt or draft stamp should be made five cents.

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31*st August* 1871.

"introducing this subject, we beg leave to invite the attention of the Government to the advantage "and facility of establishing in this country a decimal system of coinage. In our opinion no single "change, which it is in the power of a Government to effect in our monetary system, would be felt "by all classes as equally beneficial with this, when the temporary inconveniences attending the "change had passed away."

Commissioners appointed in 1843 stated that "they felt it their duty to represent that they "were strongly impressed with the advantages of a decimal system of coinage."

The Standard Commission, recommended in August 1869 "That the decimalization of the "(British) system of coinage, should be undertaken by Government."

Mr. S. S. Lloyd, Chairman of the Association of Chambers of Commerce, states in evidence before the Royal Commission on International Coinage, July 1868 : "I think the recognition of "the advantages of the decimal system of accounts is growing very much amongst the commercial "community :" and before the same Commission, E. K. Mespratt, Esq., Member of the Council of the Liverpool Chamber of Commerce, in reply to the question, "does the quotation of the prices of cotton by eighths of a penny militate against the expression of a desire for a decimal division ?" says : "Considering that Liverpool has very prominently come forward in favour of decimalization, "it would not seem as if the decimalization created any difficulty in the way of the quotation of "the cotton—and considering that they have in America a decimal system as regards their money, "and that they got over the difficulty of expressing the eighth in a very simple manner, I do not "see that it is any real difficulty. I think it is only a fancied difficulty put forward by men who "are in favour of the deodecimal system. I do not think there is any practical difficulty about it.

"Liverpool merchants have, I think, been more prominently than any others in favour of the "decimalization. I suppose, you know, that they altered the scale of corn to the cental, the "100lbs., in order to facilitate transactions."

Proceeding of Meeting of the Association for the Introduction of the Decimal System into Ceylon,
1st December 1869.

—

MEMBERS PRESENT :

The Hon. the Queen's Advocate, Hon. T. B. Stephen, G. D. B. Harrison, Esq., M.L.C., H. W. Gillman, Esq., C.C.S., C. A. Lorenz, Esq., G. L. Molesworth, Esq., H. Dias, Esq., C. L. Ferdinands, Esq., Lieutenant C. Woodward.

The meeting then proceeded to the election of a Chairman and Secretary.

It was proposed by Mr. Molesworth, and seconded by Mr. Lorenz, that Mr. Harrison be elected Chairman. *Carried unanimously.*

Proposed by the Hon. R. F. Morgan, Q.A., seconded by Mr. Dias, that Lieutenant Woodward be elected Secretary. *Carried unanimously.*

The following gentlemen were added to the list of Members :—

A. Wise, M.L.C., D. Wilson, M.L.C., A. M. Ferguson, T. Steele, and J. A. Martensz.

The following members proposed by Mr. Lorenz were elected :—

James Van Langenbery, Kandy, J. H. Tennekoon, Kurunegala, Solomon, John Pulle, Jaffna Edremanisinger, Durasamy, Colombo, E. H. Dehigama, M.L.C.

The Chairman then called on the Secretary to read the report.

Proposed by the Hon. T. B. Stephen.

Seconded by Mr. Lorenz.

That this report be adopted. *Carried unanimously.*

Proposed by Mr. Dias.

Seconded by Mr. Gillman.

That a deputation should wait on His Excellency the Governor to present a copy of this report, and such of the petitions as shall have been received up to date with an abstract of the signatures.

The Secretary was directed to communicate with the Private Secretary to learn from His Excellency what day next week would be convenient for him to receive the deputation after Wednesday.

The meeting was adjourned till this day week at 3-30 P.M.

C. WOODWARD, *Lieut., R. E.*

First Report of the Association for the Introduction of a Decimal System into Ceylon.

The Association sees much reason for congratulation in the present aspect of the decimal question in Ceylon.

The past efforts of the Association have met with the most unequivocal success. The paper drawn up and published by the Association for the purpose of explaining to the masses the proposed decimal currency and its advantages, has been widely circulated, and has produced a strong and universal feeling throughout the country in favour of the decimal sub-division of the rupee.

The planting community, already prepared for decimals by their use in working out estate expenditure,* at once appreciated its advantages and signed the memorials very numerously.

The native traders, whose natural aptitude for computation has enabled them readily to grasp and appreciate the explanation given by the Association, have come forward most readily in support of the decimal currency.

Numerous petitions are daily pouring in from all parts of Ceylon, and the signatures attached to them show that the feeling in favour of the decimal system is shared by all classes alike.

In Jaffna, where Indian proclivities and proximity to India might be supposed to prejudice them in favour of the anna and pie, the inhabitants have come forward even more readily than elsewhere in support of the movement for decimals.

The Missionaries and others engaged in education, seeing the advantages such a system must give them in their labours, are also active supporters of the movement.

The public journals are now unanimous in the advocacy of the decimal system, and a few extracts from the different journals are annexed to this report.

The Association has further cause for congratulation in the accession to their strength of several members of the Executive and Legislative Councils and other gentlemen of high position and standing in Ceylon.

The Association has carefully avoided entering upon the question of whether any change from the present system is necessary. Amongst their members are some who hold that no change is required—others consider that a change is desirable—but all are unanimous in favour of a decimal currency, should the present system be abolished.

APPENDIX No. 1.

Memorial to His Excellency SIR HERCULES ROBINSON, K.C.M.G., *Governor and Commander-in-Chief of the Island of Ceylon and its Dependencies, &c., &c., &c.*

MAY IT PLEASE YOUR EXCELLENCY,—We, the undersigned, having heard that the present currency of £ *s. d.* is to be abolished, and that rupees substituted for it, most earnestly request that if such a change be necessary, the subsidiary divisions may be decimals of the rupee, and *not annas and pie.*

We have every reason to believe that the term "decimal" is not generally understood in Ceylon, and that many erroneously fancy a decimal coinage must involve some great and difficult change, and that it will be necessary for those who do not understand decimal arithmetic to learn it before they can comprehend and use a decimal coinage.

This fear is entirely without foundation. The change is very slight and simple; it is unnecessary to acquire a knowledge of decimal arithmetic to use it, and a child might be made to understand it in a few minutes.

We are convinced that if this were rightly understood, the inhabitants of Ceylon would be unanimous in their demand for it.

* See Mr. George Wall's paper on estate expenditure, July 1866, in which the calculations are made out in decimals.

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The decimal coinage, as we understand it, simply consists in dividing the rupee into 100 (instead of 96 farthings as at present) and calling these "cents" or any other convenient denomination.

It will be unnecessary to put a single coin out of circulation; all the silver coins will circulate at their present value, and the *copper coins only* at a very slightly altered value.

The rupee will consist of 10 cents or "siyas" (the Singhalese name for 100ths).

The shilling consists of	50 cents.	}	These will circulate unaltered in value.
„ Six pence	„ 25 „		
„ Three-pence	„ 12½ „		
„ Penny	„ 4 „	}	These may circulate altered in value only to the almost unappreciable extent of 4 per cent.
„ Half penny	„ 2 „		
„ Farthing	„ 1 „		
„ Challie	„ ½ „		

We do not think that it will be *absolutely necessary* to create any new coins; but to prevent any possible injustice or objection, two (or possibly three) new copper pieces might be coined, and made exchangeable at all the Government Cutcherries for an equivalent value (*viz.*, at the rate of 25 cents for 24 farthings).

Thus, it will be seen that the change is trifling, and the only difficulty would be a slight effort of memory to remember that the farthing equals one cent, the penny 4, and the shilling 50, &c., which might be mastered by any one in a few minutes.

The adoption of decimals will be followed by advantages too numerous to be mentioned. For example it will effect—

1*st.*—An immense saving of labour, trouble, and risk of error in all accounts.

2*nd.*—Persons possessing a limited knowledge of arithmetic will far more easily make a *practical* use of that knowledge.

3*rd.*—The education of the lower classes will be much assisted thereby.*

4*th.*—Simple multiplication and division will take the place of the intricate compound multiplication and division required by annas and pie.

5*th.*—It will help persons unacquainted with arithmetic in that mental computation (so common amongst small dealers in Ceylon) which is made without figures but by the aid of the fingers, and by dividing articles to be sold in small heaps of ten.

6*th.*—It will fall in with, and materially aid, the practice of selling by the hundred, so universally used in small transactions such as the sale of plantains, nuts, fish, and other articles innumerable.

Two examples will show the immense advantages of the decimal system in division and multiplication.

Ex. I.—*Multiply* 14 *annas* 7 *pie* (= †91 *cents*) *by* 365.

By Annas and Pie.

14 Annas 7 Pie.

365

70 12) 2555

84

42 16) 212 „ 11 pie (13) Rs.

16

16) 5110 (319 Rs.

84

52

48

31

16

4 Annas.

	Rs.	Annas.	Pie.
150	319	6	0
144	13	4	11
6 As.	332	10	11

By Decimals.

Cents.

91

365

4·55

54·6

273

Rs. 332·15 Cts.

* Professor deMorgan states that 1-20th of the time spent in primary education, and 1-4th of the time spent in learning arithmetic, is thrown away by the non-adoption of a decimal system.

† 91 cents does not exactly equal 14 annas and 7 pie, but the nearest decimal division has been taken as an example to shoow the difference of the two systems.

Ex. II.—*Divide* 759 *Rupees by* 425.

By Annas and Pie.	By Decimals.
425) 759 (1 Re.	Rs. Cents.
425	425) 759 (1·78
334	425
16	3340
2004	2975
334	3650
425) 5344 (12 annas.	3400
425	250
1094	
850	
244	
12	
425) 2928 (6 pie.	
2550	
378	

All civilized nations are endeavouring to adopt a decimal system, but none, we believe, possess such facilities as those afforded by the present state of the currency of Ceylon; while no opportunity can occur for its introduction more favourable than the present.

We beg, therefore, that your Excellency may be pleased to grant it in preference to the objectionable and inconvenient system of annas and pie.

APPENDIX II.

Extract from a translation of an article which appeared in the "Lakrivikirana" of 5th November 1869.*

According to the suggested change there will be 96 farthings in a rupee.

The petitioners request that it (the rupee) may be divided into 100 parts, and that cent, or "siya," or any other appropriate name may be given to them. Then

In	1	shilling	there will be	50	cents or siya.
	6*d*	,,	,,	25	,, ,,
	3*d*	,,	,,	12½	,, ,,
	1	,,	,,	4	,, ,,
	¼	,,	,,	1	,, ,,
	⅛	,,	,,	½	,, ,,

That 4 cents, 1 cent, and ½ cent, require no new coins, because the difference is very trifling.

When it is kept in mind that one penny is equal to 4 cents or siyas, farthing is equal to one cent, 1 copper challie equal to ½ cent, even a child would be able to understand this (method).

The advantages attainable by this are numerous. The following are some of them :—

1. Difficulties and errors in accounts will be avoided.

2. It would be easy for persons dealing in small articles of sale, who are only up to finger counting and do not understand arithmetic, to effect their sales by dividing their goods by portions of tens.

3. It will be very convenient and agreeable for the sales carried on by hundreds, *viz.*:—

If 100 cocoanuts are sold for Rs. 4, one cocoanut's value is 4 cents, 10 cocoanuts 40 cents; similarly, if 100 plantains are sold for Re. 1, 8 plantains' value is 8 cents, 15 plantains, 15 cents, &c.

In most of the countries in Europe such a method as this is adopted.

In consequence of the conveniences attained by this system of accounts they are trying to introduce such a system in other civilized countries also.

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*The *Lakrivikirana* is a Native Journal printed inthe Vernacular.

Proceedings of the Madras Government, Financial Department,
31*st August* 1871.

("*Ceylon Observer*," *November* 13, 1869.)

We are now very hopeful that, with the beginning of 1870, Ceylon will rank amongst the countries using a decimal currency, to be followed at no distant date by the same principle applied to weights and measures. A well-known planting correspondent writes: "I fancy no one now anticipates the possibility of the old denomination of currency being retained. There is a very *general strong* feeling in favour of a *decimal* currency. Almost every one with whom I have discussed the subject, whether favourable or not to a change, prefers the decimal system to the Indian of annas and pie or pice. Memorials now going round for signature will prove by the multitude of names attached how universal this feeling is. West Matale seems united like one man, in favour of a decimal currency. Still it is a curious practical commentary on all this arguing and discussion, the fact that the other day I got a sovereign at the bank for ten rupees! However, you and I both remember the time when we would have had to pay eleven-and-a-half rupees."

("*Ceylon Times*," 16*th November* 1869.)

As regards the currency, general opinion is decidedly in favour of a decimal monetary system as compared with the cumbrous rupees, annas, and pies of India, and memorials to this effect have been freely circulated and as freely signed.

If, therefore, the Secretary of State should not yield to the representation made in favour of retaining the existing system of £ *s. d.*, and there should be any real disposition on the part of Government to sanction such a change as the adoption of decimal coinage, the present expression of popular feeling backed up by an unanimous press will enable the Governor to carry it out.

("*Examiner*," 20*th November* 1869.)

As regards the third scheme, of decimalizing the rupee, we have already spoken out our mind, not only in favour of the rupee and its sub-divisions into cents, generally on its own merits, but even as preferable to the old and cumbrous system of pounds, shillings, and pence. For taking the original objectors on their own ground, *viz.*, that ten rupees should still be considered a "pound," the proposed decimal system meets their views entirely, except as to the substitution of 100 cents for 24 pence. For, if it really be the case that our leading merchants are so enamoured of the ten-rupee pound, or even so used to it, as to render an alteration undesirable or inconvenient, the adoption of the decimal system will obviate all inconvenience; for a stroke of the pen or a mere point will convert any number of rupees into pounds—to wit, pounds equalizing ten rupees each, so that 27,235 cents will not only represent 272·35, namely, Rs. 272 and 35 cents, but also (to please the 10-rupee partly) 27-2-35, namely, 72 pounds two rupees and 35 cents.

("*Kanady Herald*," 25*th November* 1869.)

The *Examiner* on Saturday last had another sensible article on the "Everlasting Rupee" in which, arguing in favour of the decimal system, it points out how easily the two opposing parties may be reconciled without sacrificing anything; if only cents be adopted, for instance, it shows that a total of 27,235 may by two touches of the pen be converted into pounds, rupees, and cents, thus, 27-2-35 (being 27 pounds, 2 rupees, and 35 cents.)

("*Observer*," 29*th November* 1869.)

The change in the currency is not to be proclaimed until 1st July 1870. We trust that by this time public opinion will have so unequivocally declared itself that the Governor may feel justified in giving us a simple decimal system in connexion with the rupee. We notice that Government is about to return a considerable quantity of bronze coins to Britain.

Note by COLONEL RICHARD STRACHEY, R.E., C.S.I., *dated* 28*th March* 1871.

The first point to consider is whether the Rupee is likely to remain the unit of Indian money account, or whether, within any period to which we can look forward, it is probable that it may be displaced by anything else.

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*The officer who is to arrange the information will, I believe, have occasion to visit many of the districts as the shortest way of clearing up matters which he does not understand thoroughly, and it will probably be thought advisable that he should do so even while the inquiries are in progress.

I conclude that it will continue to be the unit, and for the following reasons :—

I regard the expediency of having an international *coinage*, as something quite distinct from that of having a universal system of *money account*. The first I believe to be easily attainable, as regards Europe and America, by the modification of the existing *coins*, so as to render them all referrible to a 5-franc coin. But this by no means implies that the national systems of *account* should necessarily be changed, and I don't think that this will be done so as to lead to a uniform system for a long time to come. For our present purposes, in fact, I should regard the period as so remote as not to affect the question now at issue.

I thus arrive at the conclusion that we may regard the pound as likely to remain the account unit of England. From this I further argue that so long as this is the case, any modification of the Indian coinage and system of account, to bring it into better accord with the systems of Europe, must aim at conformity with the pound system of England, and not the franc system of the Continent of Europe.

And this seems to me to follow, because 10 Rupees are approximately equal to 1 pound, and because a conversion on this basis has become habitual, and is convenient, bringing the Indian system into a decimal relation with that of England. It would not be possible, without a great disturbance, to adopt the franc unit in India, and, further, it is generally admitted that the franc unit of *account* is too small.

I conclude, therefore, as before stated, that we may consider the Rupee unit of account as likely to be retained in India, and that any change is likely to be in the direction of making a Rupee a tenth of a pound. How all this may be brought about is a question not directly bearing on the present point; but, whether it ever happens or not, I consider that we shall be safe in working up to a Rupee unit of *account* in any decimalization of the sub-divisions of the Indian coinage.

The first thing that is apparent on looking into this subject is that a Rupee being divided now into 16 annas, each of which is divided into 12 pies, the total number of pies in a Rupee is 192. This number is so little different from 200, that there would be no appreciable difference, for purposes or retail trade, between 1 pie and one two-hundredth part of a Rupee. Here a possible basis for a decimal sub-division at once appears.

But a little consideration is necessary before determining what shall be the exact system of sub-division adopted. My conclusion is that we should simply divide the Rupee into 100 parts for purposes of *account*, calling them cents; 1 cent would thus be equal very nearly to 2 pies of the present scale. Hence 1 pie, if such a coin were retained, would be half a cent, and would be written ·005 Rupee. Any smaller fraction than ·005 Rupee could not be represented by coin, if the pie were the lowest in the scale, and such smaller fractions would be disregarded as fractions of pie now are.

To suit the coinage to this arrangement, we should have the existing 8-anna piece equal to 50 cents, the 4-anna piece equal to 25 cents, the 2-anna piece equal to $12\frac{1}{2}$ cents. These two last pieces are not proper members of a decimal coinage,

but it would be expedient to continue them for some time, until the new decimal coins were familiar. The new silver coins eventually to be substituted for the 4-anna and 2-anna pieces would be a 20-cent and a 10-cent coin. The last would be easily practicable. The franc silver coinage of Europe has a 20-centime piece, which is only a little more than 8 cents of the Indian scale.

For amounts below 10 cents the coins would be of copper. The largest copper coin now struck is the half-anna, or double pice, equal to about 3 cents of the new scale. I should think a 5-cent coin should be given, supplemented by 2 cents, 1 cent, and $\frac{1}{2}$ cent, the last of which would be the equivalent of the pie and the lowest in the scale.

But as a provisional arrangement, I think it would be well, instead of the 2-cent piece, to coin a $1\frac{1}{2}$ cent piece, which would practically be equal to the $\frac{1}{4}$ anna or common pice; the difference between the existing $\frac{1}{4}$-anna coin and a $1\frac{1}{2}$ cent would only be $\frac{1}{8}$th of a pie, and may be better stated perhaps by saying that 64 of the old coins go to the Rupee instead of $66\frac{2}{3}$ of the new ones.

I also think that, if such a system as this is adopted, occasion might be taken to give a more independent position to the 8-anna piece, and to assign to it a specific name, and endeavour to bring it into use as a unit for *payments*. It has long been said by those who have considered the subject, that the interests of all classes of society in India suffer by the inconveniently large value of the coin on which all transactions are based, and in terms of which all payments are made. No doubt, to make a change in this respect will not be very easy; but this, as I have said on other occasions, is all the more reason for setting about the thing at once.

The remedy would be a very simple and very innocent one, and I cannot conceive how the most tender conscience could be alarmed by it. All that is necessary is to give a *new* and *special name* to the 8-anna piece, or half rupee. I would suggest as a suitable name the term "*Hind*," which is a fair equivalent of "*Franc*."

The inquiry that has been suggested as to the probability of being able to get a decimalized system of minor coins adopted in India without difficulty, though it might lead to the accumulation of some interesting facts of which we now know nothing or little, seems to me of no sort of practical utility in relation to the essential point at issue. It is altogether impossible to adopt any conclusions at all on such a subject, excepting on somewhat abstract grounds, and all experience proves that whatever coins are issued are in point of fact brought into use. The state of the Indian copper coinage does not, to my mind, in the least militate against the general assertion I thus have made. Where the British pice are properly treated and can be got, they are used with complete readiness, and so it will be with all coins.

What we have to do is to see that the coins we issue will really be convenient, and this can only be ascertained by appealing to reason guided by experience, and not by interrogating ignorance and its consequences.

It is always reasonable to consider how ignorant people can be best got to leave off habits the result of ignorance; but beyond this I, for one, will never

be concerned in suggesting the adoption of anything which I know to be bad, only because it is in harmony with something else which I also know to be bad.

To summarize the specific proposals I should desire to make :—

I.—The Rupee, for purposes of account, should henceforth be divided into 100 parts to be called cents. The lowest fraction of a Rupee to be recognized in payments to be half a cent, or the two-hundredth part of a Rupee.

II.—The silver subsidiary coinage to consist of pieces of 50 cents, 20 cents, and 10 cents only.

III.—As a provisional arrangement, and until the new coins are familiar, 4-anna pieces of 25 cents and 2-anna pieces of 12½ cents may still be struck. But they should before long be withdrawn.

IV.—The 50 cent coin should hereafter be called the "*Hind*," and that name should be stamped upon it. This coin should be a legal tender on the same footing as the existing half-rupee.

V.—The copper subsidiary coinage should in future consist of pieces of 5 cents, 2 cents, 1 cent, and ½ a cent.

VI.—On the 5-cent piece, in addition to the inscription, "5 cents," should be added "10 to 1 hind."

VII.—As a provisional arrangement, instead of the 2-cent pieces, coins of 1½ cent should be struck, which would virtually be equivalent to the ¼-anna piece, and should be declared by law to be a legal tender for ¼ of an anna. The words "1½ cent or ¼ anna" should be impressed on these coins.

VIII.—Copper coins should be legal tender for all fractions of a "*Hind.*"

IX.—The relative values of the old and new coins should be declared to be as follows:—

8-anna piece	=	1	Hind 50 cents.
4-anna ,,	=	25	cents.
2-anna ,,	=	12½	,,
Double pice or ½ anna	=	3	,,
Pice or ¼ anna	=	1½	,,
Half-pice or ⅛ anna	=	1	cent.
1 pie	=	½	,,

As long as the old coins were in circulation, they should be receivable at the above rates, but the half pice or ⅛ anna should be withdrawn at once, as being not sufficiently near the 1 cent in value.

X.—As soon as the new coins are issued, the public accounts should be drawn up with the decimal sub-division of the Rupee, and all sums due or claimable in the future, whether by the Government or private persons, should thereafter be dealt with under the new system on the foregoing basis.

Note by Mr. E. Gay, *Deputy Comptroller-General, dated 27th April* 1871.

I am glad to have the opportunity of submitting a note upon the question of decimalizing the Indian coinage.

Proceedings of the Madras Government, Financial Department,
31*st August* 1871.

There are two proposals in these papers—the first, that full inquiry should be made into the matter; the second, that without any inquiry the whole of the subsidiary coinage of the country should be revolutionised.

It is impossible to object to inquiry, but I hope to be able to show reason for at least pausing before any radical change is made.

It would be tedious to go through the whole of the arguments which induced Parliament to reject the proposal for a decimal coinage in England. I will only note certain points in which the reasoning would affect India differently from England, and then see whether by these differences the objections to a decimal coinage are strengthened or weakened so far as this country is concerned.

It will be admitted that a far larger proportion of calculations is made mentally in India than in England: this arises not only from the comparative scarcity of writing materials, but from the large number of petty purchases made by the poorer classes and the numerous calculations they make of discount, interest, daily rates, and other matters that are almost unknown to the English peasant; accordingly, as we might expect, we find far greater skill in mental arithmetic in proportion to other education in India than in England.

Thus where an English boy learns the multiplication table up to 12 times 12, the Indian boy learns it to 20 times 20, or even 30 times 30. He learns also tables in verse giving rates of daily pay at so much per month, and many other questions which in England could be solved on paper.

Altogether, then, more weight should be given comparatively in India than in England to the convenience which a system affords for mental calculations.

Now the argument that chiefly weighed with the English Commission in rejecting the decimal system was its inferiority for mental calculation; they admitted fully that for philosophers, actuaries, and all persons dealing with large and complicated accounts, decimals would be convenient; but even in England they considered this outweighed by the inconvenience a decimal system would cause to the masses.*

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* *Extract from Commissioner's report.*

7. "That as regards the comparative convenience of our present coinage and of the pound and mill scheme, for the reckonings of the shop and the market, and for mental calculations generally, the superiority rests with the present system, in consequence, principally, of the more convenient divisibility of 4, 12, and 20, as compared with 10, and the facility for a successive division by 2, that is, for repeated halving, in correspondence with the natural and necessary tendency to this mode of subdividing all material things, and with the prevalence of binary steps in the division of our weights and measures."

From Lord Overstone's *draft report.*

"The desirability of introducing decimals into the coinage must, therefore, mainly depend on the results which it would give under the remaining head of inquiry, relating to mental computations. The more the whole subject is considered, the more obvious does it become that facility of mental reckoning outweighs in importance all the other possible qualities of a system of coinage; so much so, indeed, that any decided superiority in this respect would suffice to compensate for very considerable inconveniences in other particulars. Although the superior convenience of our present coinage in some other respects is not, in our judgment, inconsiderable, the grand test of the value of the rival systems of coinage is the readiness with which they may be adapted to mental reckoning, specially to such short computations as occur on all retail purchases. Hundreds of transactions of this kind must be settled, without the aid of paper, for one calculation made with the pen. Many of these are worked, and often

Again, it can hardly be denied that the people in India are more suspicious of the action of Government than in England; but even there the resistance to change was expected to be formidable. The definite proposal now put forward is to introduce the change at once, and in doing so to assume "that there would be no appreciable difference for purposes of retail trade between 1 pie and one two-hundredth part of a rupee." The difference is precisely 4 per cent., and the extract from Lord Overstone, which I add in a note,* appears an exact answer

it is said, very well worked, by persons not only ignorant of the processes of paper arithmetic, but unable to read and write; and we think it important to bear in mind a circumstance specially dwelt upon by Dr. Gray, Mr. Bennett, and others, that any change which would interfere with the calculations of the unlettered classes would not only affect the great majority of the population, but would fall upon persons who have not the previous education necessary to enable them to adapt themselves to a new arithmetic.

"In attributing such conclusive importance to this part of the inquiry, we are but repeating the sentiments more or less distinctly avowed alike by the advocates and opponents of decimalization. The following remarks, extracted from the extremely valuable paper contributed by Mr. Bennett, are not in our opinion at all beyond the truth :—

"'I cannot hesitate for an instant to regard retail trade as the primary object to the uses of which the currency should be made subservient. The transactions of retail trade are in the proportion of at least a thousand to one to wholesale dealings; they are in a great majority of instances the subject of immediate payment in money; and they constitute the entire sum of the pecuniary dealings of the poorer and less instructed classes, as well as a large share of the dealings of all.

"'I pass over a great many other points connected with the educational part of the question; but there is one which is much too important to be omitted—I allude to the process of mental arithmetic, which many acquire by habit and practice alone, and which others derive from rules given by those who have deeply studied the properties of numbers. With a very large portion, unhappily too large a portion, of the community, this is the only arithmetic possible; and yet there are few men, women, or even children of ten years old, of ordinary capacity, who cannot (although entirely uneducated, in the school sense of the term) calculate in our existing coinage all the little money questions which occur to them in daily practice. The power of mental calculation necessary for this purpose has been gradually acquired, like their knowledge of most things around them, by experience; and it seems to me that nothing short of necessity should induce us to deprive them of the fruits of this experience, and to compel them, as it were, to begin the world again with a system of ideas to which they are strangers. The same thing may be said with reference to the peculiar mental calculations connected with almost every branch of trade, the facilities for which depend entirely on the varied relations which figures bear to each other in money, weights, and measures, and which would be abolished under a decimal system. Within the last twenty or thirty years specially, the art of mental calculation has been brought to great perfection with reference to almost all the purposes of life; its great advantages are manifest; it forms an important part of the education of all who are engaged in trade; and yet it is proposed, by way of improvement, to render all the commonly practised methods of this art useless or impracticable.'"

"Indeed, the emphasis with which almost every witness has asserted that the convenience of retail transactions would be best promoted by the system of coinage which he recommends, is in itself a very marked acknowledgment of the extreme importance of this part of the subject."

* *From* LORD OVERSTONE'S *draft report.*

"In his evidence before the late Parliamentary Committee (532), Sir John Herschel says of the proposal to introduce a decimal coinage,—'It cannot be expected that it should not present itself to the lower classes under a repulsive aspect; and without allowing a sufficiently long interval for preparation, and duly familiarizing these classes with the expectation of a change, and giving them an idea of what that change will consist in, it will be quite sure to encounter a very formidable resistance.' It is not easy to see how the people are to be familiarized with the change, except by the gradual

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by anticipation to both proposals even disregarding the special dislike to change on the part of an Indian population.

There are also in India considerations differing in kind as well as in degree from those which influenced the English Parliament.

In this country the names and relations of the present coins are applied to other matters of daily life in a way unknown in England: thus a person is not said to have "a quarter" but "a four-annas share;" in fact, ordinary fractions are expressed by means of money, the Rupee being taken as the unit, and its divisions representing the fractions, and for such a purpose a decimal division is notoriously ill-adapted.

A practical objection to any change of coins in India arises from the imposition always practised in such cases on the ignorant people. When we know that the money-changers took batta on the plea that the Rupee on which the Queen's head had curls was of different value from that on which there were no curls, it is easy to see the fraud that would be practised with coins of entirely new names and value.

The admitted objection that our stamps are calculated on the present coinage is no doubt important, but it is no more so in the case of the price of stamps than in the prices of all other commodities which have gradually conformed to the existing coinage; in that special case it would also inconvenience the Government, in the thousand other cases it would only inconvenience the people.

It is worth notice that, even where a decimal system has been long established, it is constantly ignored in common parlance. A peasant in France will speak of "6 sous" not "30 centimes;" this is still more universal in Belgium;* while even in America the lower orders speak of "a quarter" not 25 cents.

circulation of new coins intermixed with our present money. The confusion which would result from the co-existence of two copper coinages differing 4 per cent. in value, is a serious thing to contemplate; but the only other alternative is to disregard Sir John Herschel's warning, and make a sudden change by law in the value of the existing coins, in lieu of issuing new pieces to represent the new values. The requisite alteration in the legal value of the vast mass of copper coin in the country, and of the smaller silver coins, would involve a loss falling on the poorer classes, which may be estimated at 50,000*l.* This would be felt as an act of arbitrary injustice by every one who suffered by the change, and there would, therefore, seem to be no option but to call in the old coins and issue new ones, with such moderate speed as the extent and difficulty of the operation, and the necessity of avoiding harsh measures of compulsion, would allow. Two systems of coin would, therefore, remain for some indefinite period, circulating side by side, and our coinage would certainly, during all this time, be worse than that which we have at present. No one who has experienced the inconvenience of the current coinages met with in various parts of the continent would willingly admit the evil, for any considerable time, into this country, even though one of the rival systems should be theoretically perfect. How long this confusion would have to be endured we shall not attempt to predict, but it could scarcely fail to extend over many years."

* *From* LORD OVERSTONE'S *draft report.*

"In Belgium, where the French coinage was introduced in the last century, and finally established by the law of 1832, the transition has been so imperfectly effected, that we are informed that 'in usual life every man in Belgium is compelled to have constantly at hand is tables of reduction of the various moneys, both past and present.' At Antwerp goods are bought and sold in Netherlands money, though, in deference to the law, public sales take place in francs and centimes. The majority of merchants are said to have adopted the legal system of accounts; but small sums connected with the people's daily dealings are generally mentioned in Brabant guilders and stuyvers; farmers and all shopkeepers, specially in the Flemish provinces, still continuing to use the old denominations of coin."

It may be said that this fact removes part of the objection to the plan that, if the people found the change inconvenient, they would ignore it. Supposing, however, that the new system does no good, it will certainly do great harm; not only will the people be liable to extortion when they come in contact with the legal system, but anything which tends to widen the distance between the government and the governed in social matters is much to be deprecated.

On the other hand, it may be possible to enforce the adoption of the system, but if such competent judges as Lord Overstone and Sir J. Herschel (who take opposite sides on the decimal question generally) agree that a difference of 4 per cent. will cause a very appreciable loss to the poor, it may well be considered what would be the political effect of enforcing such a measure in India.

Memorandum on the decimal sub-division of the Rupee from GUILFORD L. MOLESWORTH, ESQ., *Consulting Engineer for State Railways.*

Introduction into Ceylon.

It is now more than five years since I first mooted the question of decimalizing the rupee in Ceylon. At first the measure was opposed, but the opposition gradually diminished as its fallacies were demonstrated; for, when the proposed change was clearly explained, both Europeans and Natives approved of it, and even many of those who had originally been its active opponents were converted into warm supporters, so that the memorial, praying His Excellency the Governor to adopt the decimal sub-division of the rupee, contained a larger number of signatures from all classes than any petition that has ever been laid before the Government of Ceylon, and I now learn that the measure has just received the sanction of the Secretary of State for the Colonies. I trust that India will soon inaugurate a similar policy. I admit that Ceylon is but a small country in comparison with India, and that changes can easily be made in it which in India are fraught with difficulty, owing to the magnitude of the country; but, on the other hand, India possesses, as I shall presently show, elements which afford greater facilities for decimalization than existed in Ceylon, or, in fact, in any other country in the world. At the same time the subject requires in India a treatment slightly different from that which has been adopted in Ceylon.

Difference between India and Ceylon.

Modifications proposed for India.

As I learn that my original paper on this question was last year officially laid before you, it is unnecessary for me to recapitulate the arguments therein used, or to show how the question of tolls, stamps, and contracts may be met without difficulty: it is sufficient for my present purpose to add that I would suggest for India a slight modification of the plan originally proposed for Ceylon. The present silver coinage should remain unaltered, and the coinage I recommend will then stand as follows:

Proposed Coinage.

Description of Coins.		Value in cents.	Value in fractions of a Rupee.
Existing Silver Coins ..	Rupee	100	1
	8-Anna piece	50	$\frac{1}{2}$
	4 „	25	$\frac{1}{4}$
	2 „	$12\frac{1}{2}$	$\frac{1}{8}$
New Copper Tokens ...	1 cent	1	$\frac{1}{100}$
	$\frac{1}{2}$ „	$\frac{1}{2}$	$\frac{1}{200}$

The lowest token would then be half a cent., or the 200th part of a rupee (the pie is the 192nd part of a rupee).

The Half-cent.

It may be objected that the coinage of a *half* cent is a violation of the decimal principle; but as Professor deMorgan has ably pointed out "the mere having of the lowest coin is no disadvantage, it is the abiding delusion of the opponent of decimals that he *will* suppose the decimalist to be under a contract, never to use common fractions." Moreover, the half cent is of so low a value that practically it will not be introduced into accounts. In the accounts of the Public Works of the Government of Ceylon, the farthing (which is about double the value of the half cent) was excluded, although a coin equivalent to the half farthing was in universal circulation.

Advantage in paper transaction.

Before I proceed to show how the decimal sub-division may be introduced without difficulty, I must premise that it is admitted even by the most stubborn opponents of change that for all "paper transactions" (that is, for all calculations on *paper*, in contradiction to *mental* calculation), the decimal system possesses great advantages. I must also meet the popular fallacy which so many even amongst the educated classes entertain, that, in the event of a decimal coinage being introduced, it will be necessary for those who have forgotten their school lore to learn again decimal arithmetic. Nothing can be more fallacious than such an idea. No special preparation is necessary to enable any one to understand and use a decimal sub-division, but those who do use a decimal coinage are unconsciously, and without an effort on their part, *taught* decimal arithmetic, the only difficulty is the slight effort of memory necessary to remember that the half-rupee represents 50, the quarter rupee 25 cents, &c.—a difficulty that could not be one of many days duration even with the most stupid.

Knowledge of decimal arithmetic not necessary.

Issue of Tokens.

Premising this, I propose for the introduction of the decimal system nothing more than the coinage of a small quantity of copper tokens, and an enactment to legalize their circulation. It may be asked what advantage is to be gained by this course? Simply that the fact of such tokens being in circulation would admit of agreement for rates of labour, contracts, and accounts under the decimal denomination; in fact, it would allow facilities for "paper transactions" in decimals. The plan might be

introduced first in one district on a small scale, and, when successful, it might be gradually extended, and finally adopted throughout India.

Machinery for introduction of Tokens.

Then comes the question: What machinery would you adopt for the introduction of such tokens, if minted, and what will be the practical working of such an introduction? To this I answer, that there can be no better opprtunity for a commencement than in the construction of one of the State Railways on which I would introduce them, but always with the proviso that if it would be found to be prejudicial to the labour market it should not be pressed. I would select that district which, after careful consideration, I found to afford the fewest obstacles to the introduction, and provide the treasuries in the vicinity of the railway with a supply of the new copper tokens; these tokens should not be used to make entire payments, but simply to meet the balance of those sums which may not exactly coincide with the old system. For instance, supposing 5R. 30Cts. to be due to a man, he would receive 5 Rs., a four-anna piece (25 cents), and 5 copper cents.

Reluctance to receive new Tokens.

It may be urged that the natives will receive such tokens with reluctance, but a little reflection will show that there is no ground for supposing that the new tokens will not be received by the natives as readily as the existing legal tokens, for so long as the natives are allowed to coin "dumps," and thus make a profit by usurping the prerogative of the Crown, the "dum" will be in favour rather than the legalized token, which circulates at a *nominal* value far higher than its *intrinsic* value; but in spite of the reluctance of the natives to receive the pie, it is evident that Government must make its payment by means of a *legalized* token, and I cannot think that the cents would be looked upon with less favour than existing tokens. On the contrary, it is probable that the natives will prefer tokens which they can get at the rate of 200 to the rupee to those which are only issued at the rate of 192, more especially if the former be made (as they can be made with profit) slightly more bulky than the pie tokens. Even should any reluctance be manifested on the part of the natives to receive the new tokens, they can be informed that 100 cents will be taken in exchange for a rupee at all the Government Treasuries and the Railway Pay Offices.

Necessity for using copper.

I lay a stress on the necessity for using *copper* and not bronze as the metal for these tokens, because the natives, as a rule, like as much metal as possible for their money, and this will account partially for the preference accorded by them to the "dum," which contains a larger proportion of metal than the legalized tokens. The "dumps," which I have examined, fluctuate in value from $2\frac{1}{2}$ to 3 pie per "dump," whilst in weight they equal 5 pie.

Feasibility.

The introduction of new copper tokens presents no greater difficulty than the introduction of the three-penny and four-penny pieces in England; the Government of India cannot be compromised by such a step, as it is committed to nothing beyond the cost of minting the tokens. If successful, as I believe it must be, the introduction of a

Proceedings of the Madras Government, Financial Department,
31*st August* 1871.

decimal system will confer a great boon on India, and if not, the coinage of the small quantity of tokens necessary to make the experiment is a matter of no moment. We have at present an inconvenient system of copper tokens which are not acceptable to the masses in India. Why not change it for one that will be eminently valuable? I do not ask for any sudden alteration in the accounts of Government or in the stamp and tolls; the measure I propose will merely affect the internal working of the construction accounts of that State Railway upon which it may be adopted, but it will serve to demonstrate the possibility of extending the principle. Should the trial be successful, there will be no difficulty in gradually calling in the old copper tokens, and the final change may after a time be easily made.

Objections.

I will now deal with some of the most plausible objections that have been urged against decimalization. Four* commissions or committees in England have reported in favour of decimalization, but a fifth commission (Lord Overstone's, 1859,) arrived at conclusions adverse to its adoption.

* Standard Commission of 1841.
Decimal Commission, 1843.
Committee of House of Commons, 1853.
Standard Commission, 1869

Lord Overstone's Commission.

Lord Overstone, though an able man, was evidently strongly prejudiced against any change, and acted rather the part of the indiscreet partizan than that of the impartial judge. His questions were so palpably unfair that Sir John Herschel, Professor deMorgan, and others pointed out the "unfairness" and "one-sideness" of the questions put to them, and even Mr. Hemmings, the barrister employed by Lord Overstone to revise the evidence, and to attempt to weaken the weighty testimonies of such men as the Astronomer Royal, Sir John Herschel, and Professor deMorgan,—even he was forced to admit that they were unfair. The arguments used in the report of that commission will, therefore, be the strongest that can be urged against decimalization. Now, even admitting for the sake of argument, that the rejection of decimals by Lord Overstone was desirable in the case of England, the strongest reasons adduced by him have no force in India. The great and really the only real objection is in fact the general aversion of all classes to any change, and the attachment of the lower classes to the copper coinage, in consequence of their long use of it. A few ingenious arguments have been urged, such as the facilities afforded by the existing system for mental calculation, but they are simply raised to back up the main question, and are literally of no weight when compared with the difficulty of disturbing the existing copper tokens. Now, such a difficulty does not exist amongst the masses in India; the legalized copper tokens are rejected by the lower classes, and the illegal "dump" of fluctuating value, the native and spurious coins, and the cowrie are very generally substituted for it as the medium for circulation. Still we *must* have *legalized* copper tokens, and we might just as well adopt that form which is universally acknowledged to be the best.

The penny difficulty.

Mental calculations.

In the report of Lord Overstone there appears the following remarkable assertion: "For mental calculations generally the superiority rests with the present system in consequence principally of the more convenient divisibility of 4, 12, and 20 as compared with 10, and the

facility for a successive division by 2." Now, even without the assertion of the Astronomer Royal, that the present system is unsuited to mental calculation, whether small or great, it must appear startling to any unprejudiced mind that a system involving three distinct and different bases (or as Professor deMorgan rightly terms it the "quarto-deodecimo vicesimal coinage") should give greater facilities than that which involves but one base, and still more startling does it appear when one of the three favoured bases is practically the same as the single one which is condemned.

Lord Overstone appears to have overlooked the fact that in a decimal system it is possible to dispense with sub-division to a great extent, and to substitute the more easy process of multiplication for the more complicated process of division. Let facts speak for themselves. How many people in England are able to make use of mental calculations in any cases, but those of the most simple character? Not one in 100! even amongst the educated classes; the so-called "binary"* system does not admit of it. Contrast this with China where the decimal system is in full force. The lower orders of the Chinese perform mental calculation with a facility and rapidity that is impossible under the "binary" system even to well-educated men in England. To a mind accustomed to one system, that system, however imperfect it may be, gives the greatest facilities for mental calculation; and I have no doubt that to most Englishmen the so-called "binary" system is the most easy for such calculations; but any man will find, as soon as he has become accustomed to the change, that his power of dealing mentally with figures and numbers will be greatly increased by a decimal system.

Chinese calculation.

Basing an argument on Lord Overstone's startling assertion, one objector urges: "We find greater skill in mental arithmetic in proportion to other education in India than in England." Now this aptitude on the part of the natives appears to me to be the strongest argument possible in *favour* of decimalizing. I observed the same aptitude in Ceylon, and I even found that many of the natives who were entirely ignorant of the first principles of our arithmetic were able to deal with quantities and sums by means of a species of mental calculation with a rapidity that would be impossible on the "binary" system, and this they effect entirely on a system of rough decimals by means of their fingers, and by heaps or rows of *ten*. I had, moreover, occasion to introduce into the Public Works at Ceylon decimal measures of the foot, to supersede the existing medley of cubic yards, heaped bushels, struck bushels, gallons, &c., and I found that the Native Overseers, both Cinghalese and Malabar, evinced an aptitude that surprised me; for, though they were at first averse to the change, they soon became accustomed to it, and in a few weeks not only used the new measures easily, but actually preferred them to the old system to which they had been so long accustomed, and there is little doubt that the natives of India with their natural aptitude for figures will not be slow to appreciate and use the advantages afforded by the decimal system.

Aptitude of Natives for figures.

* I use the term binary though it is somewhat a misnomer, because there is no convenient term by which our tregeneous medley of 20, 12, and 4 may be described.

Another argument has been based on the fact that in France peasants still speak of "sous" instead of "centimes," and in America they adopt the term "quarter" in preference to 25 cents: this, however, proves nothing except that they adhere to the old nomenclature; but even admitting this difficulty to be real, can Lord Overstone deny that the introduction of the decimal system in those countries has conferred benefits far outweighing any such difficulties? On the contrary, he admits that "the reports which have been received from foreign countries, where the decimal principle has been introduced, *concur generally in the statement that the system has been found to work satisfactorily*, and to be an improvement on their previously existing forms of coinage." Whilst admitting so much, an endeavour is made to weaken the force of this concession on the following points:—

Advantage in other countries.

First that in most countries where a decimal coinage has been introduced, decimal weights and measures have been adopted also, and these give great facilities for a decimal coinage; it is admitted, however, elsewhere that, even without this uniformity, the decimal coinage has not worked inharmoniously in America. But even were it not so, this argument has no force in India where the decimal weights and measures have received the approval of the Legislature.*

Harmony with Decimal weights and measures.

The second reason for modifying the verdict in favour of decimals is that those countries which have adopted it have contrasted it with their previous coinage which has been very imperfect; and to the Englishman, averse to change, the £ *s. d.* system *is* perfect until he has had sufficient experience in a country where decimals are used to enable him to appreciate the practical results of that system. Certainly the £ *s. d.* system is perfect when compared with the Indian "anna," "pie," and "dump" system.

Contrast with imperfect systems.

The third objection was that the foreign systems generally consisted of an unit comprising 100 sub-divisions, whereas the system proposed for England contemplated 1,000 sub-divisions. The plan I propose is not open to this objection, as it only comprises 100 sub-divisions like those adopted in the majority of foreign countries.

Number of sub-divisions.

The commission also objected to the proposed system, because it consisted of four distinct denominations, *viz.*, "Pounds," "Florins," "Dimes," and "Mils," whereas other decimal coinages in existence consist of two denominations only. This objection is again inapplicable to the system I propose for India which contains only two denominations, *viz.*, Rs. and Cents.

Number of denominations.

It has been objected that the new tokens of $\frac{1}{100}$ in value, if introduced, would practically take the place of the existing tokens $\frac{1}{64}$ and that the difference of 4 per cent. would probably fall

Retail transactions.

* I see by the papers that a Bill is now about to be brought before Parliament for the introduction of decimal weights and measures into England, and that it is warmly supported by the Chambers of Commerce.

APPENDIX.

The following List of some of the Native Coins and their value will suffice to show how small an element of the so-called "binary" system exists in India. Even the legalized tokens are not "binary," but fluctuate in India!

District or Presidency.	Name of Native Coins in circulation.	Number usually exchanged for a Rupee. From	To	Remarks.
North-West ...	Agra pice	72	100*	*Equal to a cent.
	Alumghini	.....	.....	Sold by weight.
	Balashahee	63	63½	
	Bhurtpore	.....	.....	
	Delhi	80	84	
	Ghisla	50*	.....	* Equal to 2 cents.
	Goruckpore	64½	71	Fluctuates to 3 cents.
	Jhardar	41	44	
	Munsoorie...	66*	84	* Fluctuates to 3 cents in value.
	Nawabee	64½	65	
	Pukka pyce	48	.....	
Punjab ...	Cabullee pice	120	128	
	Chukle	79	.....	
	Jummoo	95	.....	
	Munsoorie...	66	68	Fluctuates to 3 cents in value.
	Nanuckshahee	80	100*	* Equal to the cent in value.
	Takkas	41½	42	
	Thova	47½	.....	
Oudh ...	Mudhooshahee	50*	.....	* Equal to 2 cents in value.
	Munsoorie...	66	74	Fluctuates to 3 cents in value.
	Nawabee	64½	70	Fluctuates to 3 cents.
	Nepal	71	.....	
Rajapootana ...	Jeypore pyce	47	50*	* Equal to 2 cents.
	Jodpore			
	Kolah			
	Munsoorie...	64	66	Fluctuates to 3 cents in value.
Central India ...	Balashee	58	59	
	Chowdoree	60	.....	
	Guzashee	58	.....	
	Gwalior	86	.....	
	Indore gundas	10	.....	Equal to 10 cents.
	Kotah	42	.....	
	Kutcha pyce	80½	.....	
	Moharaja	67	67½	
	Nunda	80	86	
Bengal ...	Badsahee	65½	.....	
	Goruckpore	68	70	
	Lohya	100	.....	Equal to 1 cent.
	Nepaulese...	96	.....	
Bombay ...	Babasayee	66	.....	Equal to 3 cents nearly.
	Dhaboo	32	.....	
	Ghatty paisa	48	.....	
	Mysore	60	64	
	Shewrai	66	.....	Equal to 3 cents nearly.

In the Madras Presidency very little native coin appears to circulate, but the value of the Government pie fluctuates in the bazaars from 192 to a rupee up to 200, or *exactly half a cent.* (at Malabar, Calicut, and Poonamally).

Throughout India the Government pie fluctuates considerably in value, from 192 to 204 pies per rupee, so that in some places (Berar, Mahoda, Bhundara, Lakolee, Chundah, and Nagpore) the pie circulates at a value *lower than the half cent.*

GUILFORD L. MOLESWORTH.

Proceedings of the Madras Government, Financial Department,
31st *August* 1871.

Extract from a letter from G. L. Molesworth, Esq., *to* M. E. Foster, Esq., *of the Treasury, on the subject of the Ceylon Coinage, dated* 11*th March* 1871.

"The contemplated changes in the currency of India must be confined to one of two alternatives; and to either of these alternatives the decimal sub-division proposed for Ceylon would be admirably adapted.

"The first alternative would be to introduce British sovereigns into India, and make the rupee a token (instead of a coin) representing $\frac{1}{10}$th of the sovereign. The rupee having intrinsically a value very slightly in excess of the English two shilling piece, though as a *coin* its value is less than $\frac{1}{10}$th of a sovereign.* As, however, there appears to be a financial difficulty in this course, the second alternative would probably be adopted, *viz.*, to coin a gold piece worth Rs. 10 or about 6 per cent. less value than the sovereign, and to keep the rupee as at present, a coin unchanged in value. In the former alternative if the rupee were considered a *token* presenting $\frac{1}{10}$th of a sovereign, the copper tokens would still retain their relative value to the rupee; whilst in the second alternative both the rupee and the copper tokens would remain unaltered, but in both cases the copper tokens would be decimals of the gold coin.

* The Rupee contains 178½ grains of silver, whereas the florin contains only 174½ grains.

"Nearly all changes in currency tend towards decimalization, and even should some other denomination than the rupee be adopted in India (which it is difficult to conceive), the change from one decimal system to another would be easy, and the fact of a decimal system existing in Ceylon would pave the way to any movement in that direction in India."

Keepwiths of the paper on the Decimal sub-division of the rupee published in the supplement to the Gazette of India, *dated* 12*th August* 1871.

My dear Harrison,

Will you consult Hyde, and, at your early convenience, let us have your joint opinion on the expediency of extending to India the decimalization of our subsidiary coinage proposed in the accompanying papers from Ceylon? Sir W. Mansfield has left on record in a minute that the scheme is worthy the best consideration of the Financial Department; and the only objection which he notices is that affecting our stamp-duties which he proposes to overcome by a "give-and-take" arrangement such as is proposed for Ceylon.

To all Englishmen the convenience of decimalizing our system below the rupee would obviously be immense, and there would be apparently little *difficulty* in carrying out the measure; but the habit of our entire population is to work with the 16 multiple, and I suppose that habit would not be overcome in a generation. The "ganda" notation is, I believe, in universal use. Would you mind consulting Babu Rajendra Lal Mittra upon that particular point confidentially, asking his opinion as to how far the decimal system is in truth intrinsically superior to the quaternal, and whether the people might be expected eventually to prefer it. You may know some other native experts whose opinion at this early stage of the discussion would be valuable. When I said above that there would be little difficulty in making the change, I spoke of the mechanical difficulty only. It would probably be a work of long time and great difficulty to change what is to the masses of our people almost their entire currency. It is one thing to deal with what is after all a foreign currency in a small island like Ceylon, and another to revolutionise the ancient currency of a continent like India. It would be so far in our favour that our copper token coinage has little hold on the *nation*. So

far, I dare say, the people would take readily enough to cents, liking them as well or as ill as our annas and pies. But to induce them to substitute cents for their old accustomed values in their accounts, and as the measure of value of all the transactions of their daily life would be in a country so wedded to habit and so impermeable to intelligence as India, a large business !

Supposing your opinion and Colonel Hyde's and Babu Rajendra Lal's and that of any one else whom you might consult to be favourable, we might proceed to discuss the subject in a formal way. It is, as Sir W. Mansfield says, well worth consideration.

Yours faithfully,
R. B. C·

23-4-70.

My dear Chapman,

In talking to Colonel Hyde of the decimalization of money, I said that, as far as the public accounts are concerned, I should be very glad to see the rupee divided decimally, but that I did not think it ought to be hastily assumed that the arrangement was, on the whole, best for the public convenience.

I incline to think that it is best; but certain points require to be carefully investigated before this can be considered as established.

You are probably aware that it is held on high authority that money calculations can be made mentally much more readily with the present denominations of English money than if the pound were divided decimally; this I may say is open to question, as (as far as mental calculation can be reduced to a system) one of the most thorough systems now in use is essentially decimal.

No one doubts the advantage of decimal sub-divisions for paper work, but I think we should indeed pause before doing anything which should render the innumerable calculations of the market and of the homes of the millions less easy in order that those who reckon on paper should receive some benefit: nor will all educated clerks have reason to thank us for a change that drives them to pencil and paper for what they would otherwise do without that aid. I, therefore, suggested that, as a preliminary, we should try to examine carefully the exact process by which the uneducated reckon so easily, as we all know they do, the amount of wages for any number of days at a given monthly rate, and similar questions of prices. Colonel Hyde quite agreed with me that the advantages of a decimal system should not be taken for granted, but should be patiently investigated, and said that Major Tennant had already given attention to the subject in which he took great interest, and that he thought Major Tennant was specially qualified to conduct the inquiry.

Colonel Hyde tells me to-day that Major Tennant will be very glad to undertake the inquiry, but would prefer to do so at the request of the Government of India.

Can you arrange that it should be committed to him?

I will write again on the subject of my own conclusions.

4-5-70. E. F. H.

Dear Hyde,

Will you look at these papers, and let me have a Note stating precisely what is it that you think Tennant should undertake to inquire into.

Yours faithfully,
R. B. CHAPMAN.

17-12-70.

Treasury, 25th February 1871.

My dear Hyde,

I feel quite ashamed of my delay in returning these papers.

I am very glad that Colonel Tennant proposes so patient and thorough an inquiry, as I entertain the greatest objection to such a question being decided on merely theoretical grounds, without a full recognition of the magnitude of the task involved in a change affecting the entire population of India.

The mere decimalization of our coinage might, I think, do great mischief unless we are prepared to carry out such measures as may be necessary to secure the adoption of a habit of decimal computation.

What such measures may be, or whether the object is attainable at all, can only be ascertained by a very widely extended inquiry, and I do not think any better course can be adopted by the Government than to follow the course sketched by Colonel Tennant, and to place it under his direction.

Yours sincerely,
E. F. HARRISON.

My dear Chapman,

The memorandum by Tennant on the "Inquiry into Indian Arithmetic" shows exactly what should be done. See also Harrison's Note to me (25th February).

Yours sincerely,
H. HYDE.

1*st March* 1871.

Inquiry into Indian Arithmetic.

The object of the proposed inquiry I consider to be the ascertaining methods in use by the general population (as distinguished from the trading classes) in making the calculations involved in the everyday transactions of life, and further to ascertain how far they are generally capable of making these for themselves.

The methods in use by the trading classes are probably pretty uniform throughout the country where the weights are divided into sixteenths as in Bengal as well as the coin; but there must be some difference in those places where the divisions of current weights are different, and still more where the rupee and its sub-division into annas are only of recent introduction. These differences or any traces of them should be inquired into, and the processes of both written and mental compound arithmetic recorded with translations of any tables which are committed to memory. This can only, I believe, be done by men acquainted with the local vernaculars, and the Educational Department should, I think, have a suitable agency.

In each place an effort should be made to find out what proportion of the non-traders can calculate well enough to conduct ordinary transactions, such as purchases of food for daily use, and reckoning of its price at varying rates; also whether any considerable portion of the people, who are not in the habit of trafficking, can make the more extensive calculations which are required (book-keeping of course is not in question). This too should be done by a Local Agency, and there will be some check by the comparison of adjacent places and districts.

There may be a necessity for supplementing the usual Educational Agency by one or two special appointments, and for these I apprehend there would be good material in the graduates of the Universities at the Presidencies who are seeking employment. It may be more difficult in such countries as Sindh and the Central Provinces, but I believe that the Educational Department would be the one most likely to succeed in getting the information. Attention might be directed to Dr. Colebrooke's account of the arithmetic of Bombay as a standard as to the subjects it includes out of these.

Such information, when collected, should be referred to a Central Office for arrangement into a general account of the Indian processes of calculation, which will be no mere curiosity, but will enable the Government of India to know precisely where the introduction of the simple processes which alone are involved with a decimal system of weights and coinage are likely to be difficult of introduction, how strong the opposition is likely to be, and how it may best be met. I speak of course as one who believes the result will be to show that commerce of all kinds labours under the disadvantage of a burthen of knowledge which is necessary to enable the smallest business to be transacted, and which it is in the power of the Government to remove.

J. F. TENNANT.

No. 141. ORDER THEREON, 31st August 1871, No. 414.

Communicated to the Board of Revenue, the Accountant-General, the Chamber of Commerce, and the Directors of the Bank of Madras, with a request that they will favour Government with their views regarding the decimal sub-division of the Rupee.

(True Extract.)

Captain, R. E.,
Under Secretary, P. W. D.,
for *Chief Secretary.*

To the Board of Revenue.
,, Acting Accountant-General.
,, Chairman, Chamber of Commerce.
,, Directors of the Bank of Madras.

Exd. J. Wright.

Govt. of Madras.

FINANCIAL.

To

THE BOARD OF REVENUE,
&c., &c., &c.

Dated August, 31*st*.

Recd.

Encl.

G. O., 31*st August* 1871, *No.*414.

AUGUST.
Nos. 140-141.

Forwarding to certain Officers, for their opinion, the papers received from Government of India, respecting the decimal sub-division of the Rupee.

GOVERNMENT OF INDIA.

FINANCIAL DEPARTMENT.

DECIMAL SUB-DIVISION OF THE RUPEE.

Note by Lieutenant-General His Excellency the Hon'ble SIR W. R. MANSFIELD, K. C. B., K. C. S. I., *dated 7th March* 1870.

I TAKE the liberty of circulating some official papers on the Currency of Ceylon which were lately forwarded to me by His Excellency Sir Hercules Robinson, the Governor of that Island.

The second set of papers refers to a project for the decimalization of the subsidiary inferior coinage of the rupee, according to which the rupee being divided in 100 cents :—8 annas = 50 cents, 4 annas = 25, 2 annas = $12\frac{1}{2}$, 1 anna = $6\frac{1}{2}$, cents.

It is proposed that the two first should remain in circulation, *viz.*, the 8 anna and 4 anna piece, and that for the inferior sums, these should :—

Silver	...	...	1	...	... 10th rupee.
Copper	...	...	1	...	... 20th „
			1	...	... 50th „
			1	...	... 100th „
			1	...	... 200th „

For the argument and the scheme, I refer to Mr. Molesworth's paper which has been very carefully worked out.

With regard to the simplification of account-keeping and the petty calculations which occur daily in every shop and bazaar, and further to the expediency of having metallic coins which may take the place of cowries, &c., &c., it appears to me that the scheme is worthy the best consideration of the Financial Department.

The objection which meets us at once is that the anna is the basis of our stamp-duties. The difficulty does not appear to be insurmountable, if some "give and take" arrangement be adopted in the lowest priced stamps, such as that suggested for Ceylon.

No. 1133, dated Colombo, 2nd September 1869.

From the DIRECTOR OF PUBLIC WORKS, to the HON'BLE THE COLONIAL SECRETARY.

[DECIMAL COINAGE.]

SIR,—In compliance with the wishes of His Excellency the Governor, I have the honor to submit in a connected form the views which I discussed with him in the year 1866 respecting the introduction of a subsidiary decimal coinage of the Rupee.

The value of the decimal system is too well known and appreciated to render it necessary for me to enter minutely into its advantages; it may, however, be as well to combat an abstract and somewhat unpractical objection which is sometimes urged against it on the ground of the number 10 not being readily divisible without remainder by certain numbers—an objection not only to decimals but to the whole system of arithmetic now in use, and which, were it a forcible one, could only be met by entirely upsetting the present system, and adopting one based on the powers of 8 or 12; the former basis rendering it necessary to eliminate the figures 8 and 9 from our arithmetic, the latter rendering the creation of two additional figures necessary. Professor Airy (the Astronomer Royal) has,

however, after a careful consideration of this question, expressed his opinion that the adoption of a multiple capable of easy division practically gives no advantage, though at first sight it may appear to do so, and he strongly recommends the decimal system as the best; and Mr. Babbage, before he commenced the construction of his calculating machine, found it necessary to enter into an examination to ascertain whether it would be possible to simplify the mechanism, or accelerate its effects by the use of an arithmetic arranged on other powers than 10; but after a patient investigation of the various bases, particularly those of 8, 12, and 16, he arrived at the conclusion that a system of arithmetic having the number 10 as its basis was, on the whole, the best; and the efforts now made by nearly all civilized nations to introduce decimal coins, weights, and measures, afford the best proof of the value of the system.

Those, however, who have not been in the habit of using decimals can scarcely appreciate the advantages they afford when compared with annas and pie. The pie is the $\frac{1}{192}$nd part of a rupee, a very awkward fraction, and the following Table shows that the decimal equivalents of annas and pie are scarcely less cumbrous:

Table of the value of annas and pie in cents. or $\frac{1}{100}$ths of a Rupee from 1 *pie to* 15 *annas* 11 *pie.*

	P 0	P 1	P 2	P 3	P 4	P 5	P 6	P 7	P 8	P 9	P 10	P 11	
Annas.													Annas.
0	0	·521	1·041	1·562	2·083	2·604	3·125	3·646	4·166	4·687	5·208	5·729	0
1	6·25	6·771	7·292	7·813	8·333	8·854	9·374	9·895	10·416	10·937	11·458	11·979	1
2	12·5	13·02	13·541	14·062	14·583	15·104	15·625	16·146	16·666	17·187	17·707	18·228	2
3	18·75	19·27	19·791	20·312	20·832	21·353	21·874	22·395	22·916	23·437	23·958	24·479	3
4	25·	25·521	26·041	26·562	27·083	27·604	28·125	28·646	29·166	29·687	30·208	30·729	4
5	31·25	31·771	32·292	32·813	33·333	33·854	34·374	34·895	35·416	35·937	36·458	36·979	5
6	37·5	38·02	38·541	39·062	39·583	40·104	40·625	41·146	41·666	42·187	42·707	43·228	6
7	43·75	44·27	44·791	45·312	45·833	46·353	46·875	47·395	47·916	48·437	48·958	49·479	7
8	50·	50·521	51·041	51·562	52·083	52·604	53·125	53·646	54·166	54·687	55·208	55·729	8
9	56·25	56·771	57·292	57·813	58·333	58·854	59·374	59·895	60·416	60·937	61·458	61·979	9
10	62·5	63·02	63·541	64·062	64·583	65·104	65·525	66·146	66·666	67·187	67·707	68·228	10
11	68·75	69·27	69·791	70·312	70·832	71·353	71·874	72·395	72·916	73·437	73·958	74·479	11
12	75·	75·521	76·041	76·562	77·083	77·604	78·125	78·646	79·166	79·687	80·208	80·729	12
13	81·25	81·771	82·292	82·813	83·333	83·854	84·374	84·895	85·416	85·937	86·458	86·979	13
14	87·5	88·02	88·541	89·062	89·583	90·104	90·625	91·146	91·666	92·187	92·707	93·228	14
15	93·75	94·27	94·791	95·312	95·833	96·353	96·875	97·395	97·916	98·437	98·958	99·479	15
	0 P	1 P	2 P	3 P	4 P	5 P	6 P	7 P	8 P	9 P	10 P	11 P	

The following example will serve to illustrate the difference between the two systems:

EXAMPLE 1.

Required the cost of 7 *yards of cloth at* 7 *rupees* 6 *annas and* 5 *pie per yard.*

BY ANNAS AND PIE.		BY DECIMALS.
7 Rs.	6 annas	R. Cts.
7	7	
49 Rs.	16)42(2 Rs. 32 10 annas	7·40
2 10 0	5 pie	7
2 11	7	51·80
51 12 11	12/35	
	2 11	

In this example 8 figures and simple multiplication alone are required by the *decimal* system, whilst 36 figures and division as well as multiplication are entailed by the system of *annas and pie.*

EXAMPLE 2.

Required the cost of 56 *superficial feet of Zinc, at* 13 *annas* 11 *pie per foot.*

BY ANNAS AND PIE.			BY DECIMALS.
	11 Pie		87 Cents.
13 annas	56		56
56	66		522
78	55		435
65	12/616		48·72
16)728(45 Rs. 64 88 80 8 annas	16)51 + 4 (3 Rs. 48 3 annas	Rs. A. P. ... 3 3 4 ... 45 8 0	
		48 11 4	

In practically converting annas and pie, all the figures might not be set down in the manner of the foregoing examples, but the comparative amount of arithmetic is in each case fairly represented; such cases are of constant occurrence in all business transactions, and though ready reckoners are used to diminish the labour, it is far better to adopt a system requiring no such appliances.

The coins at present in use in Ceylon are as follows:

	Decimal of Rupee.	Value, assuming the Rupee = 24 pence.	Fraction of Rupee.
Rupee	1·	24*d.*	1
½ Rupee	·5	12	½
¼ „	·25	6	¼
4 penny piece	·166	4	1-6
2 anna piece	·125	3	1-8
One penny	·0416	1	1-24
Two Stiver piece	·0312	¾	1-32
Half-penny	·0208	½	1-48
One Stiver	·0156	⅜	1-64
Farthing	·0104	¼	1-96
Challie or pie	·0052	⅛	1-192

I would propose that the rupee, ½ rupee, and ¼ rupee should remain in circulation, and that the rupee should be divided into 100 parts, which I may term "cents" for convenience. The coinage for Ceylon would then stand as follows:

PROPOSED NEW CURRENCY.

		Fraction of Rupee.	Cents.	Equivalent value at 24 pence to a Rupee.
EXISTING COINS ...	Silver ...	Rupee ...	100	24
	„ ...	½ rupee ...	50	12
	„ ...	¼ „ ...	25	6
NEW COINS ...	Silver ...	1-10 rupee ..	10	2·4 or 2½*d.* nearly.
	Copper ...	1-20 rupee ..	5	1·2 or 1¼*d.* „
	„ ...	1-100 rupee	1	·24 or ¼ „
	„ ...	1-200 rupee	½	·12 or 1 challie nearly.

The foregoing table is calculated on the assumption that 24 pence equal the rupee, because the practice in this Colony renders it necessary to make the comparison between the proposed and the present coinage on this basis.

The lowest coin might be half a cent, and accounts might then be kept in two columns only, *viz.*, rupees and cents. Should it be considered necessary to carry out the decimal system to its full extent, this coin might be called a five mil piece; but it is scarcely desirable, for practically the five mil piece would never be used in accounts, and anything smaller than five mils or about half a farthing would be too small for coinage.

It may be desirable to convey an idea of the value of the $\frac{1}{100}$ part of a rupee to the Native mind more easily, by using the term siya (hundred) instead of cents, and the Singhalese character for this term could be impressed on the coins.

The two-anna piece might, or might not, remain in circulation as 12½ cents, but I think it would be more convenient to discourage its use, as the 10-cent piece would be a far more convenient coin, and some confusion would exist in the use of two coins so nearly of the same size and value. On the other hand, this might be obviated to some extent, by milling the edge of the 10-cent piece to distinguish it more readily, as the three-penny and four-penny pieces were distinguished in England.

The introduction of the new coinage would naturally be attended with considerable difficulties; it becomes, therefore, necessary to consider the character of such difficulties, and the best method of meeting them.

The principal of these difficulties are—

I.—The adjustment of stamps and tolls.

II.—The circulation of coins of the two systems at the same time, and the adjustment of small rates.

The first of these difficulties alone require serious consideration. The penny stamps being 4·166 cents, it is clear that the stamp by the altered coinage must be made either four or five cents in value. If it be made five cents, private individuals will have to pay 20 per cent. more for their penny stamps, whilst if it made four cents, there will be a loss to the revenue of about four per cent. on stamps of the value. This difficulty may, however, be easily overcome by an adjustment based on the present issue of stamps, which would give the advantage to the private individuals in some instances, and to the Government in others; the total result remaining nearly the same as at present, without inflicting an injustice on the individuals or entailing a loss in revenue.

The following adjustment, based on the stamp issues of 1868, will serve to illustrate my meaning. I would recommend that the penny postage stamps should be made four cents, the half-penny postage stamps two cents, whilst the present penny receipt or draft stamp should be made five cents.

A new stamp ordinance will be necessary to carry into effect this alteration.

The adjustment on the proposed rates only give a loss of £13 on the total value of stamps issued in 1868, which amounts to about £108,000.

Table showing the proposed adjustments of rates for stamps on the decimal system.

Character of Stamp.	Number issued in 1868.	Value at present rates.		Value at proposed rates.	
		d.	Amount.	Rate.	Amount.
		Pence.	Rupees.	Cents.	Rupees.
Postage ...	265,303	½	5,527	2	5,306
Ditto ...	1,224,938	1	51,039	4	48,997
Ditto ...	68,694	2	5,724	8	5,495
Ditto ...	56,963	3	7,120	12	6,835
Ditto ...	18,699	4	3,116	16	2,992
Ditto ...	32,017	5	6,670	20	6,403
Ditto ...	8,175	8	2,725	30	2,452
Ditto ...	10,880	9	4,080	35	3,808
Ditto ...	21,624	10	9,010	40	8,649
Ditto ...	103	21	90	85	87
Receipt, draft, or judicial ...	385,688	1	16,070	5	19,284
Ditto ...	58,368	2	4,864	10	5,837
Ditto ...	18,340	3	2,292	14	2,567
Ditto ...	27,156	4	4,526	18	4,888
Ditto ...	3,657	8	1,219	30	1,097
Ditto ...	39,958	9	14,984	35	13,985
Ditto ...	2,295*	3	287	14	321
Ditto ...	5,235*	4	872	18	942
Ditto ...	4,438*	8	1,479	30	1,331
Ditto ...	519*	9	194	35	181
TOTAL ...	2,253,050	.....	141,888	.....	141,457

The stamps marked* represent those above the value of a shilling, such as 1*s.* 3*d.*, 3*s.* 4*d.*, &c., but the fractional portion alone has been dealt with, because the value of the shilling may remain unaltered as 50 cents, and needs no adjustment.

The total number of stamps issued during the year 1868 was 3,112,184, but this includes a large number of six penny, shilling, and other stamps of higher value, which, as they will remain unaltered in value, I have omitted in dealing with the question of adjustment.

The stock of stamps in hand, with the exception of those which would bear a higher value, might remain in circulation at their adjusted value even after the introduction of the decimal system, for instance, the ½*d.* and 1*d.* postage might pass current for two and four cents, respectively; and inconvenience to the existing holders of such stamps might be obviated by a proclamation, that, after a specified date, certain stamps would pass current for specified values in cents,—a period after that date being allowed to enable holders to return their stamps and receive an equivalent in other stamps. But to prevent fraud, no stamps of that class should be issued from the treasury during that period, or, if issued, that they should be so marked as to prevent their being exchanged for an equivalent to their nominal value.

It would be necessary that the 1*d.* draft, receipt, and other stamps, the value of which would be raised by the adjustment, should cease to be current; but a period should be allowed during which the holders of such stamps might be allowed to exchange them for other stamps equivalent to their original value.

The tolls would be but little affected by the new system, as all the more important toll rates might remain unchanged; but as a new ordinance to fix the rates would in any case be required, new rates on the "give and take" principle might be adopted.

The following rates might require alteration :

Nature of Toll Rates.	Present rates.		Proposed rates.
	In pence.	In cents.	In cents.
Loaded canoe	16	66⅔	70
Passenger vehicle, 2 wheels	15	62½	60
Cart drawn by one animal			
Unloaded canoe			
Unloaded elephant cart	9	37½	40
Loaded elephant			
Unloaded dhoney	8	33⅓	30
Unloaded cart	4½	18¾	20
Unloaded canoe	4	16⅔	16
Additional horse			
Loaded ox			
Additional bullock	3	12½	10
Unloaded one horse cart			
Additional canoe			
Leaguer or cask	2	8⅓	10
Additional ox to passenger cart			
Unloaded ox	1½	6¼	6
Additional animal to cart			
Foot passengers at ferries	½	2·08	2·00
Pigs, goats, &c.	¼	1·04	1

The difficulties inseparable from the transition to the new coinage would, I believe, in practice, be less than might be imagined at first sight. I speak from personal experience on this subject, having resided in Portugal for a short time immediately after the introduction of the decimal system of mil-reis coinage in that country; and though the transition was far more complicated than that which I propose (the Crusado and Testoon, with their subsidiary coins, being in full circulation), I was astonished to find how soon the people became accustomed to it, how little inconvenience was caused by the change, and how much the decimal system was appreciated.

The difficulties might, I think, be much mitigated by issuing beforehand a proclamation, that, after a specified date, the existing copper coinage would not be lawful money; and the calling in of the coin might be facilitated by the offer of a small premium on all sums in copper exceeding, say, Rupees 40 paid into the treasury, the cost of such premium might be recovered from the profits on the issue of the new copper coinage.

With contract, based on states of the existing coinage, I believe there would be no difficulty; such contracts will be few, and they would in all probability expire before the new system could be brought into operation; but, if not, the calculations might be made on the rates of the old coinage, and the gross accounts so calculated would not be affected to any appreciable extent.

The prices paid for different retailed articles would very soon adjust themselves without any special provision.

I have, &c.,

GUILFORD L. MOLESWORTH.

The Standard Commissioners' Report of 1841 contains the following statement: "The "first point, which has called for our special notice, is the general question of decimal "scale. In introducing this subject, we beg leave to invite the attention of the Govern- "ment to the advantage and facility of establishing in this country a decimal system "of coinage. In our opinion no single change, which it is in the power of a Government "to effect in our monetary system, would be felt by all classes as equally beneficial with "this, when the temporary inconveniences attending the change had passed away."

Commissioners appointed in 1843 stated that "they felt it their duty to represent "that they were strongly impressed with the advantages of a decimal system of coinage."

The Standard Commission, recommended in August 1869 "That the decimalization "of the (British) system of coinage, should be undertaken by Government."

Mr. S. S. Lloyd, Chairman of the Association of Chambers of Commerce, states in evidence before the Royal Commission on International Coinage, July 1868: "I think "the recognition of the advantages of the decimal system of accounts is growing very "much amongst the commercial community:" and before the same Commission, E. K. Mespratt, Esq., Member of the Council of the Liverpool Chamber of Commerce, in reply to the question, "does the quotation of the prices of cotton by eighths of a penny militate against the expression of a desire for a decimal division?" says: "Considering "that Liverpool has very prominently come forward in favor of decimalization, it would "not seem as if the decimalization created any difficulty in the way of the quotation of "the cotton—and considering that they have in America a decimal system as regards "their money, and that they got over the difficulty of expressing the eighth in a very simple "manner, I do not see that it is any real difficulty. I think it is only a fancied difficulty "put forward by men who are in favor of the duodecimal system. I do not think there "is any practical difficulty about it."

"Liverpool merchants have, I think, been more prominently than any others in "favour of the decimalization. I suppose, you know, that they altered the scale of corn "to the cental, the 100lbs., in order to facilitate transactions."

Proceeding of Meeting of the Association for the Introduction of the Decimal System into Ceylon, 1st December 1869.

Members Present:

The Hon'ble the Queen's Advocate, Hon'ble T. B. Stephen, G. D. B. Harrison, Esq., M. L. C., H. W. Gillman, Esq., C. C. S., C. A. Lorenz, Esq., G. L. Molesworth, Esq., H. Dias, Esq., C. L. Ferdinands, Esq., Lieutenant C. Woodward.

The meeting then proceeded to the election of a Chairman and Secretary.

It was proposed by Mr. Molesworth, and seconded by Mr. Lorenz that Mr. Harrison be elected Chairman. *Carried unanimously.*

Proposed by the Hon'ble R. F. Morgan, Q. A., seconded by Mr. Dias that Lieutenant Woodward be elected Secretary. *Carried unanimously.*

The following gentlemen were added to the list of Members:

A. Wise, M. L. C., D. Wilson, M. L. C., A. M. Ferguson, T. Steele, and J. A. Martensz.

The following members proposed by Mr. Lorenz were elected:

James Van Langenbery, Kandy, J. H. Tennekoon, Kurunegala, Solomon, John Pulle, Jaffna Edremanisinger, Durasamy, Colombo, E. H. Dehigama, M. L. C.

The Chairman then called on the Secretary to read the report.

Proposed by the Hon'ble T. B. Stephen.

Seconded by Mr. Lorenz.

That this report be adopted. *Carried unanimously.*

Proposed by Mr. Dias.

Seconded by Mr. Gillman.

That a deputation should wait on His Excellency the Governor to present a copy of this report, and such of the petitions as shall have been received up to date with an abstract of the signatures.

The Secretary was directed to communicate with the Private Secretary to learn from His Excellency what day next week would be convenient for him to receive the deputation after Wednesday.

The meeting was adjourned till this day week at 3-30 P. M.

C. WOODWARD, *Lt., R. E.*

First Report of the Association for the Introduction of a Decimal System into Ceylon.

THE Association sees much reason for congratulation in the present aspect of the decimal question in Ceylon.

The past efforts of the Association have met with the most unequivocal success. The paper drawn up and published by the Association for the purpose of explaining to the masses the proposed decimal currency and its advantages, has been widely circulated, and has produced a strong and universal feeling throughout the country in favor of the decimal sub-division of the rupee.

The planting community, already prepared for decimals by their use in working out estate expenditure,* at once appreciated its advantages and signed the memorials very numerously.

The Native traders whose natural aptitude for computation has enabled them readily to grasp and appreciate the explanation given by the Association, have come forward most readily in support of the decimal currency.

Numerous petitions are daily pouring in from all parts of Ceylon, and the signatures attached to them show that the feeling in favor of the decimal system is shared by all classes alike.

In Jaffna, where Indian proclivities and proximity to India might be supposed to prejudice them in favor of the anna and pie, the inhabitants have come forward even more readily then elsewhere in support of the movement for decimals.

The missionaries and others engaged in education, seeing the advantages such a system must give them in their labors, are also active supporters of the movement.

The public journals are now unanimous in the advocacy of the decimal system, and a few extracts from the different journals are annexed to this report.

The Association has further cause for congratulation in the accession to their strength of several members of the Executive and Legislative Councils and other gentlemen of high position and standing in Ceylon.

The Association has carefully avoided entering upon the question of whether any change from the present system is necessary. Amongst their members are some who hold that no change is required—others consider that a change is desirable—but all are unanimous in favor of a decimal currency, should the present system be abolished.

APPENDIX No. 1.

Memorial to His Excellency SIR HERCULES ROBINSON, K. C. M. G., *Governor and Commander-in-Chief of the Island of Ceylon and its Dependencies, &c., &c. &c.*

MAY IT PLEASE YOUR EXCELLENCY,—We the undersigned having heard that the present currency of £ *s. d.* is to be abolished, and that rupees substituted for it, most earnestly request that if such a change be necessary, the subsidiary divisions may be decimals of the rupee, and *not annas and pie.*

We have every reason to believe that the term "decimal" is not generally understood in Ceylon, and that many erroneously fancy a decimal coinage must involve some great and difficult change, and that it will be necessary for those who do not understand decimal arithmetic to learn it before they can comprehend and use a deimal coinage.

This fear is entirely without foundation. The change is very slight and simple; it is unnecessary to acquire a knowledge of decimal arithmetic to use it, and a child might be made to understand it in a few minutes.

We are convinced that if this were rightly understood, the inhabitants of Ceylon would be unanimous in their demand for it.

The decimal coinage, as we understand it, simply consists in dividing the rupee into 100 (instead of 96 farthings as at present) and calling these "cents" or any other convenient denomination.

It will be unnecessary to put a single coin out of circulation; all the silver coins will circulate at their present value, and the *copper coins only* at a very slightly altered value.

The rupee will consist of 10 cents or "siyas" (the Singhalese name for 100ths.)

The shilling consists of	50	cents.	}	These will circulate unaltered in value.
„ six-pence	„ 25	„		
„ Three-pence	„ 12½	„		
„ Penny	„ 4	„	}	These may circulate altered in value only to the almost unappreciable extent of 4 per cent.
„ Half-penny	„ 2	„		
„ Farthing	„ 1	„		
„ Challie	„ ½	„		

We do not think that it will be *absolutely necessary* to create any new coins; but to prevent any possible injustice or objection, two (or possibly three) new copper pieces might be coined, and made exchangeable at all the Government cutcheries for an equivalent value (*viz.*, at the rate of 25 cents for 24 farthings).

Thus, it will be seen that the change is trifling, and the only difficulty would be a slight effort of memory to remember that the farthing equals one cent, the penny 4, and the shilling 50, &c., which might be mastered by any one in a few minutes.

The adoption of decimals will be followed by advantages too numerous to be mentioned. For example it will effect—

1*st.*—An immense saving of labor, trouble, and risk of error in all accounts.

2*nd.*—Persons possessing a limited knowledge of arithmetic will far more easily make a *practical* use of that knowledge.

* See Mr. George Wall's paper on estate expenditure, July 1866, in which the calculations are made out in decimals.

3*rd.*—The education of the lower classes will be much assisted thereby.*

4*th.*—Simple multiplication and division will take the place of the intricate compound multiplication and division required by annas and pie.

5*th.*—It will help persons unacquainted with arithmetic, in that mental computation (so common amongst small dealers in Ceylon) which is made without figures but by the aid of the fingers, and by dividing articles to be sold in small heaps of 10.

6*th.*—It will fall in with, and materially aid, the practice of selling by the hundred, so universally used in small transactions such as the sale of plantains, nuts, fish, and other articles innumerable.

Two examples will show the immense advantages of the decimal system in division and multiplication.

Ex. I.—*Multiply* 14 *annas* 7 *Pie* (=†91 *cents*) *by* 365.

By Annas and Pie.			By Decimals.
14 Annas	7 Pie,		Cents.
365	365		91
			365
70	12)2555		
84			4·55
42	16)212	„ 11 pie (13) Rs.	54·6
	16		273
16)5110 (319 Rs.			
84	52		Rs. 332·15 Cts.
	48		
31			
16	4 Annas.		
Rs.	Annas.	Pie.	
150	319	6	0
144	13	4	11
6 Ans.	332	10	11

Ex. II.—*Divide* 759 *Rupees by* 425.

By Annas. and Pie.	By Decimals.
425) 759 (1 Re.	Rs. Cents.
425	425) 759 (1·78
	425
334	
16	3340
	2975
2004	
334	3650
	3400
425) 5344 (12 annas.	
425	250
1094	
850	
244	
12	
425) 2928 (6 pie.	
2550	
378	

* Professor deMorgan states that 1-20th of the time spent in primary education, and 1-4th of the time spent in learning arithmetic, is thrown away by the non-adoption of a decimal system.

† 91 cents does not exactly equal 14 annas and 7 pie, but the nearest decimal division has been taken as an example to show the difference of the two systems.

All civilized nations are endeavouring to adopt a decimal system, but none, we believe, possess such facilities as those afforded by the present state of the currency of Ceylon; while no opportunity can occur for its introduction more favourable than the present.

We beg therefore that your Excellency may be pleased to grant it in preference to the objectionable and inconvenient system of annas and pie.

APPENDIX II.

Extract from a translation of an article which appeared in the "Lakrivikirana" of 5th November 1869.*

According to the suggested change there will be 96 farthings in a rupee.

The petitioners request that it (the rupee) may be divided into 100 parts, and that cent, or "siya," or any other appropriate name may be given to them. Then

In 1	shilling there will be	50	cents or siya.		
6*d*	„	„	25	„	„
3*d*	„	„	12½	„	„
1	„	„	4	„	„
¼	„	„	1	„	„
⅛	„	„	½	„	„

That 4 cents, 1 cent, and ½ cent, require no new coins, because the difference is very trifling.

When it is kept in mind that one penny is equal to 4 cents or siyas, farthing is equal to one cent, 1 copper challie equal to ½ cent, even a child would be able to understand this (method).

The advantages attainable by this are numerous. The following are some of them:

1. Difficulties and errors in accounts will be avoided.

2. It would be easy for persons dealing in small articles of sale who are only up to finger counting and do not understand arithmetic, to effect their sales by dividing their goods by portions of tens.

3. It will be very convenient and agreeable for the sales carried on by hundreds, *viz.*—

If 100 cocoanuts are sold for Rs. 4, one cocoanut's value is 4 cents, 10 cocoanuts 40 cents; similarly, if 100 plantains are sold for Re. 1, 8 plaintains' value is 8 cents, 15 plaintains, 15 cents, &c.

In most of the countries in Europe such a method as this is adopted.

In consequence of the conveniences attained by this system of accounts they are trying to introduce such a system in other civilized countries also.

("*Ceylon Observer*," *November* 13, 1869.)

We are now very hopeful that with the beginning of 1870 Ceylon will rank amongst the countries using a decimal currency, to be

* The *Lakrivikirana* is a Native Journal printed in the Vernacular.

followed at no distant date by the same principle applied to weights and measures. A well-known planting correspondent writes: "I fancy no one now anticipates the possibility of the old denomination of currency being retained. There is a very *general strong* feeling in favor of a *decimal* currency. Almost every one with whom I have discussed the subject, whether favorable or not to a change, prefers the decimal system to the Indian of annas and pie or pice. Memorials now going round for signature will prove by the multitude of names attached how universal this feeling is. West Matale seems united like one man, in favour of a decimal currency. Still it is a curious practical commentary on all this arguing and discussion, the fact that the other day I got a sovereign at the bank for ten rupees! However, you and I both remember the time when we would have had to pay eleven and a half rupees."

("*Ceylon Times*," 16*th November* 1869.)

As regards the currency, general opinion is decidedly in favour of a decimal monetary system as compared with the cumbrous rupees, annas, and pies of India, and memorials to this effect have been freely circulated and as freely signed.

If, therefore, the Secretary of State should not yield to the representation made in favour of retaining the existing system of £ *s. d.*, and there should be any real disposition on the part of Government to sanction such a change as the adoption of decimal coinage, the present expression of popular feeling backed up by an unanimous press will enable the Governor to carry it out.

("*Examiner*," 20*th November* 1869.)

As regards the third scheme, of decimalizing the rupee, we have already spoken out our mind, not only in favor of the rupee and its sub-divisions into cents, generally on its own merits, but even as preferable to the old and cumbrous system of pounds, shillings, and pence. For taking the original objectors on their own ground, *viz.*, that ten rupees should still be considered a "pound," the proposed decimal system meets their views entirely, except as to the substitution of 100 cents for 24 pence. For, if it really be the case that our leading merchants are so enamoured of the ten-rupee pound, or even so used to it, as to render an alteration undesirable or inconvenient, the adoption of the decimal system will obviate all inconvenience; for a stroke of the pen or a mere point will convert any number of rupees into pounds—to wit, pounds equalizaing ten rupees each, so that 27,235 cents will not only represent 272·35, namely, Rs. 272 and 35 cents, but also (to please the 10-rupee partly) 27-2-35, namely, 72 pounds two rupees and 35 cents.

("*Kanady Herald*," 25*th November* 1869.)

The *Examiner* on Saturday last had another sensible article on the "Everlasting Rupee" in which, arguing in favor of the decimal system, it points out how easily the two opposing parties may be reconciled without sacrificing anything; if only cents be adopted, for instance, it shows that a total of 27,235 may by two touches of the pen be converted into pounds, rupees, and cents, thus, 27-2-35 (being 27 pounds, 2 rupees, and 35 cents).

("*Observer*," 29*th November* 1869.)

The change in the currency is not to be proclaimed until 1st July 1870. We trust that by this time public opinion will have so unequivocally declared itself that the Governor may feel justified in giving us a simple decimal system in connection with the rupee. We notice that Government is about to return a considerable quantity of bronze coins to Britain.

Note by COLONEL RICHARD STRACHEY, R. E., C. S. I., *dated* 28*th March* 1871.

THE first point to consider is whether the Rupee is likely to remain the unit of Indian money account, or whether, within any period to which we can look forward, it is probable that it may be displaced by anything else.

I conclude that it will continue to be the unit, and for the following reasons.

I regard the expediency of having an international *coinage*, as something quite distinct from that of having a universal system of *money account*. The first I believe to be easily attainable, as regards Europe and America, by the modification of the existing *coins*, so as to render them all referrible to a 5-franc coin. But this by no means implies that the national systems of *account* should necessarily be changed, and I don't think that this will be done so as to lead to a uniform system for a long time to come. For our present purposes, in fact, I should regard the period as so remote as not to affect the question now at issue.

* The officer who is to arrange the information will, I believe, have occasion to visit many of the districts as the shortest way of clearing up matters which he does not understand thoroughly, and it will probably be thought advisable that he should do so even while the enquiries are in progress.

I thus arrive at the conclusion that we may regard the pound as likely to remain the account unit of England. From this I further argue that so long as this is the case, any modification of the Indian coinage and system of account, to bring it into better accord with the systems of Europe, must aim at conformity with the pound system of England, and not the franc system of the Continent of Europe.

And this seems to me to follow, because 10 Rupees are approximately equal to 1 pound, and because a conversion on this basis has become habitual, and is convenient, bringing the Indian system into a decimal relation with that of England. It would not be possible, without a great disturbance, to adopt the franc unit in India, and, further, it is generally admitted that the franc unit of *account* is too small.

I conclude, therefore, as before stated, that we may consider the Rupee unit of account as likely to be retained in India, and that any change is likely to be in the direction of making a Rupee a tenth of a pound. How all this may be brought about is a question not directly bearing on the present point; but, whether it ever happens or not, I consider that we shall be safe in working up to a Rupee unit of *account* in any decimalization of the subdivisions of the Indian coinage.

The first thing that is apparent on looking into this subject is that a Rupee being divided now into 16 annas, each of which is divided into 12 pies, the total number of pies in a Rupee is 192. This number is so little different from 200, that there would be no appreciable difference, for purposes or retail trade, between 1 pie and one two-hundredth part of a Rupee. Here a possible basis for a decimal subdivision at once appears.

But a little consideration is necessary before determining what shall be the exact system of sub-division adopted. My conclusion is that we should simply divide the Rupee into 100 parts for purposes of *account*, calling them cents; 1 cent would thus be equal very nearly to 2 pies of the present scale. Hence 1 pie, if such a coin were retained, would be half a cent, and would be written ·005 Rupee. Any smaller fraction than ·005 Rupee could not be represented by coin, if the pie were the lowest in the scale, and such smaller fractions would be disregarded as fractions of pie now are.

To suit the coinage to this arrangement, we should have the existing 8-anna piece equal to 50 cents, the 4-anna piece equal to 25 cents, the 2-anna piece equal to $12\frac{1}{2}$ cents. These two last pieces are not proper members of a decimal coinage, but it would be expedient to continue them for some time, until the new decimal coins were familiar. The new silver coins eventually to be substituted for the 4-anna and 2-anna pieces would be a 20-cent and a 10-cent coin. The last would be easily practicable. The franc silver coinage of Europe has a 20-centime piece, which is only a little more than 8 cents of the Indian scale.

For amounts below 10 cents the coins would be of copper. The largest copper coin now struck is the half-anna, or double pice, equal to about 3 cents of the new scale. I should think a 5-cent coin should be given, supplemented by 2 cents, 1 cent, and $\frac{1}{2}$ cent, the last of which would be the equivalent of the pie and the lowest in the scale.

But as a provisional arrangement, I think it would be well, instead of the 2-cent piece, to coin a $1\frac{1}{2}$ cent piece, which would practically be equal to the $\frac{1}{4}$ anna or common pice; the difference between the existing $\frac{1}{4}$ anna coin and a $1\frac{1}{2}$ cent would only be $\frac{1}{8}$th of a pie, and may be better stated perhaps by saying that 64 of the old coins go to the Rupee instead of $66\frac{2}{3}$ of the new ones.

I also think that if such a system as this is adopted, occasion might be taken to give a more independent position to the 8-anna piece, and to assign to it a specific name, and endeavour to bring it into use as a unit for *payments*. It has long been said by those who have considered the subject, that the interests of all classes of society in India suffer by the inconveniently large value of the coin on which all transactions are based, and in terms of which all payments are made. No doubt, to make a change in this respect will not be very easy; but this, as I have said on other occasions, is all the more reason for setting about the thing at once.

The remedy would be a very simple and very innocent one, and I cannot conceive how the most tender conscience could be alarmed by it. All that is necessary is to give a *new* and *special name* to the 8-anna piece, or half rupee. I would suggest as a suitable name the term '*Hind*,' which is a fair equivalent of '*Franc*.'

The enquiry that has been suggested as to the probability of being able to get a decimalized system of minor coins adopted in India without difficulty, though it might lead to the accumulation of some interesting facts of which we now know nothing or little, seems to me of no sort of practical utility in relation to the essential point at issue. It is altogether impossible to adopt any conclusions at all on such a subject, excepting on somewhat abstract grounds, and all experience proves that whatever coins are issued are in point of fact brought into use. The state of the Indian copper coinage does not, to my mind, in the least militate against the general assertion I thus have made. Where the British pice are properly treated and can be got, they are used with complete readiness, and so it will be with all coins.

What we have to do is to see that the coins we issue will really be convenient, and this can only be ascertained by appealing to reason guided by experience, and not by interrogating ignorance and its consequences.

It is always reasonable to consider how ignorant people can be best got to leave off habits the result of ignorance; but beyond this I, for one, will never be concerned in suggesting the adoption of anything which I know to be bad, only because it is in harmony with something else which I also know to be bad.

To summarize the specific proposals I should desire to make:—

I.—The Rupee, for purposes of account, should henceforth be divided into 100 parts to be called cents. The lowest fraction of a Rupee to be recognised in payments to be half a cent, or the two-hundredth part of a Rupee.

II.—The silver subsidiary coinage to consist of pieces of 50 cents, 20 cents, and 10 cents only.

III.—As a provisional arrangement, and until the new coins are familiar, 4-anna pieces of 25 cents and 2-anna pieces of $12\frac{1}{2}$ cents may still be struck. But they should before long be withdrawn.

IV.—The 50 cent coin should hereafter be called the '*Hind*,' and that name should be stamped upon it. This coin should be a legal tender on the same footing as the existing half-rupee.

V.—The copper subsidiary coinage should in future consist of pieces of 5 cents, 2 cents, 1 cent, and $\frac{1}{2}$ a cent.

VI.—On the 5-cent piece, in addition to the inscription, '5 cents,' should be added '10 to 1 hind.'

VII.—As a provisional arrangement, instead of the 2-cent pieces, coins of $1\frac{1}{2}$ cent should be struck, which would virtually be equivalent to the $\frac{1}{4}$ anna piece, and should be declared by law to be a legal tender for $\frac{1}{4}$ of an anna. The words '$1\frac{1}{2}$ cent or $\frac{1}{4}$ anna' should be impressed on these coins.

VIII.—Copper coins should be legal tender for all fractions of a '*Hind*.'

IX.—The relative values of the old and new coins should be declared to be as follows:

8-anna piece	=	1 Hind 50 cents.
4-anna „	=	25 cents.
2-anna „	=	$12\frac{1}{2}$ „
Double pice or $\frac{1}{2}$ anna	=	3 „
Pice or $\frac{1}{4}$ anna	=	$1\frac{1}{2}$ „
Half-pice or $\frac{1}{8}$ anna	=	1 cent.
1 pie	=	$\frac{1}{2}$ „

As long as the old coins were in circulation, they should be receivable at the above rates, but the half pice or $\frac{1}{8}$ anna should be withdrawn at once, as being not sufficiently near the 1 cent in value.

X.—As soon as the new coins are issued, the public accounts should be drawn up with the decimal sub-division of the Rupee, and all sums due or claimable in the future, whether by the Government or private persons, should thereafter be dealt with under the new system on the foregoing basis.

Note by Mr. E. Gay, *Deputy Comptroller General dated 27th April* 1871.

I am glad to have the opportunity of submitting a note upon the question of decimalising the Indian coinage.

There are two proposals in these papers,—the first, that full inquiry should be made into the matter; the second, that without any inquiry the whole of the subsidiary coinage of the country should be revolutionised.

It is impossible to object to inquiry, but I hope to be able to show reason for at least pausing before any radical change is made.

It would be tedious to go through the whole of the arguments which induced Parliament to reject the proposal for a decimal coinage in England. I will only note certain points in which the reasoning would affect India differently from England, and then see whether by these differences the objections to a decimal coinage are strengthened or weakened so far as this country is concerned.

It will be admitted that a far larger proportion of calculations is made mentally in India than in England: this arises not only from the comparative scarcity of writing materials, but from the large number of petty purchases made by the poorer classes and the numerous calculations they make of discount, interest, daily rates, and other matters that are almost unknown to the English peasant; accordingly, as we might expect, we find far greater skill in mental arithmetic in proportion to other education in India than in England.

Thus where an English boy learns the multiplication table up to 12 times 12, the Indian boy learns it to 20 times 20, or even 30 times 30. He learns also tables in verse giving rates of daily pay at so much per month, and many other questions which in England could be solved on paper.

Altogether, then, more weight should be given comparatively in India than in England to the convenience which a system affords for mental calculations.

Now the argument that chiefly weighed with the English commission in rejecting the decimal system, was its inferiority for mental calculation; they admitted fully that for philosophers, actuaries, and all persons dealing with large and complicated accounts, decimals would be convenient; but even in England they considered this outweight by the inconvenience a decimal system would cause to the masses.*

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* *Extract from Commissioner's report.*

7. "That as regards the comparative convenience of our present coinage and of the pound and mill scheme, for the reckonings of the shop and the market, and for mental calculations generally, the superiority rests with the present system, in consequence, principally, of the more convenient divisibility of 4, 12, and 20, as compared with 10, and the facility for a successive division by 2, that is, for repeated halving, in correspondence with the natural and necessary tendency to this mode of subdividing all material things, and with the prevalence of binary steps in the division of our weights and measures."

From LORD OVERSTONE'S *draft report.*

"The desirability of introducing decimals into the coinage must therefore mainly depend on the results which it would give under the remaining head of inquiry, relating to mental computations. The more the whole subject is considered, the more obvious does it become that facility of mental reckoning outweighs in importance all the other possible qualities of a system of coinage; so much so, indeed, that any decided superiority in this respect would suffice to compensate for very considerable inconveniences in other particulars. Although the superior convenience of our present coinage in some other respects is not, in our judgment, inconsiderable, the grand test of the value of the rival systems of coinage is the readiness with which they may be adapted to mental reckoning, specially to such short computations as occur on all retail purchases. Hundreds of transactions of this kind must be settled, without the aid of paper, for one calculation made with the pen. Many of these are worked, and often, it is said, very well worked, by persons not only ignorant of the processes of paper arithmetic, but unable to read and write; and we think it important to bear in mind a circumstance specially dwelt upon by Dr. Gray, Mr. Bennett, and others, that any change which would interfere with the calculations of the unlettered classes would not only affect the great majority of the population, but would fall upon persons who have not the previous education necessary to enable them to adapt themselves to a new arithmetic.

"In attributing such conclusive importance to this part of the inquiry, we are but repeating the sentiments more or less distinctly avowed alike by the advocates and opponents of decimalization. The following remarks, extracted from the extremely valuable paper contributed by Mr. Bennett, are not in our opinion at all beyond the truth:—

"'I cannot hesitate for an instant to regard retail trade as the primary object to the uses of which the currency should be made subservient. The transactions of retail trade are in the proportion of at least a thousand to one to wholesale dealings; they are in a great majority of instances the subject of immediate payment in money; and they constitute the entire sum of the pecuniary dealings of the poorer and less instructed classes, as well as a large share of the dealings of all.

"'I pass over a great many other points connected with the educational part of the question; but there is one which is much too important to be omitted,—I allude to the process of mental arithmetic, which many acquire by habit and practice alone, and which others derive from rules given by those who have deeply studied the properties of numbers. With a very large portion, unhappily too large a portion, of the community, this is the only arithmetic possible; and yet there are few men, women, or even children of ten years old, of ordinary capacity, who cannot (although entirely uneducated, in the school sense of the term) calculate in our existing coinage all the little money questions which occur to them in daily practice. The power of mental calculation necessary for this purpose has been gradually acquired, like their knowledge of most things around them, by experience; and it seems to me that nothing short of necessity should induce us to deprive them of the fruits of this experience, and to compel them, as it were, to begin the world again with a system of ideas to which they are strangers. The same thing may be said with reference to the peculiar mental calculations connected with almost every branch of trade, the facilities for which depend entirely on the varied relations which figures bear to each other in money, weights, and measures, and which would be abolished under a decimal system. Within the last twenty or thirty years specially, the art of mental calculation has been brought to great perfection with reference to almost all the purposes of life; its great advantages are manifest; it forms an important part of the education of all who are engaged in trade; and yet it is proposed, by way of improvement, to render all the commonly practised methods of this art useless or impracticable.'"

"Indeed, the emphasis with which almost every witness has asserted that the convenience of retail transactions would be best promoted by the system of coinage which he recommends, is in itself a very marked acknowledgment of the extreme importance of this part of the subject."

Again, it can hardly be denied that the people in India are more suspicious of the action of Government than in England; but even there the resistance to change was expected to be formidable. The definite proposal now put forward is to introduce the change at once, and in doing so to assume "that there would be no appreciable difference for purposes of retail trade between 1 pie and one two-hundredth part of a rupee." The difference is precisely 4 per cent, and the extract from Lord Overstone, which I add in a note,* appears an exact answer by anticipation to both proposals even disregarding the special dislike to change on the part of an Indian population.

There are also in India considerations differing in kind as well as in degree from those which influenced the English Parliament.

In this country the names and relations of the present coins are applied to other matters of daily life in a way unknown in England: thus a person is not said to have "a quarter" but "a four annas share;" in fact, ordinary fractions are expressed by means of money, the Rupee being taken as the unit, and its divisions representing the fractions, and for such a purpose a decimal division is notoriously ill adapted.

A practical objection to any change of coins in India arises from the imposition always practised in such cases on the ignorant people. When we know that the money changers took batta on the plea that the Rupee on which the Queen's head had curls was of different value from that on which there were no curls, it is easy to see the fraud that would be practised with coins of entirely new names and value.

The admitted objection that our stamps are calculated on the present coinage is no doubt important, but it is no more so in the case of the price of stamps than in the prices of all other commodities which have gradually conformed to the existing coinage; in that special case it would also inconvenience the Government, in the thousand other cases it would only inconvenience the people.

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* *From* LORD OVERSTONE'S *draft report.*

"In his evidence before the late Parliamentary Committee (532), Sir John Herschel says of the proposal to introduce a decimal coinage,—'It cannot be expected that it should not present itself to the lower classes under a repulsive aspect; and without allowing a sufficiently long interval for preparation, and duly familiarizing these classes with the expectation of a change, and giving them an idea of what that change will consist in, it will be quite sure to encounter a very formidable resistance.' It is not easy to see how the people are to be familiarized with the change, except by the gradual circulation of new coins intermixed with our present money. The confusion which would result from the co-existence of two copper coinages differing 4 per cent. in value, is a serious thing to contemplate; but the only other alternative is to disregard Sir John Herschel's warning, and make a sudden change by law in the value of the existing coins, in lieu of issuing new pieces to represent the new values. The requisite alteration in the legal value of the vast mass of copper coin in the country, and of the smaller silver coins, would involve a loss falling on the poorer classes, which may be estimated at 50,000*l*. This would be felt as an act of arbitrary injustice by every one who suffered by the change, and there would therefore seem to be no option but to call in the old coins and issue new ones, with such moderate speed as the extent and difficulty of the operation, and the necessity of avoiding harsh measures of compulsion, would allow. Two systems of coin would therefore remain for some indefinite period, circulating side by side, and our coinage would certainly, during all this time, be worse than that which we have at present. No one who has experienced the inconvenience of the current coinages met with in various parts of the continent would willingly admit the evil, for any considerable time, into this country, even though one of the rival systems should be theoretically perfect. How long this confusion would have to be endured we shall not attempt to predict, but it could scarcely fail to extend over many years."

It is worth notice that, even where a decimal system has been long established, it is constantly ignored in common parlance. A peasant in France will speak of "6 sous" not "30 centimes;" this is still more universal in Belgium;* while even in America the lower orders speak of "a quarter" not 25 cents.

It may be said that this fact removes part of the objection to the plan that, if the people found the change inconvenient, they would ignore it. Supposing, however, that the new system does no good, it will certainly do great harm; not only will the people be liable to extortion when they come in contact with the legal system, but anything which tends to widen the distance between the government and the governed in social matters is much to be deprecated.

On the other hand, it may be possible to enforce the adoption of the system, but if such competent judges as Lord Overstone and Sir J. Herschel (who take opposite sides on the decimal question generally) agree that a difference of 4 per cent. will cause a very appreciable loss to the poor, it may well be considered what would be the political effect of enforcing such a measure in India.

Memorandum on the decimal sub-division of the Rupee from GUILFORD L. MOLESWORTH, ESQ., *Consulting Engineer for State Railways.*

IT is now more than five years since I first mooted the question of decimalizing the rupee in Ceylon. At first the measure was opposed, but the opposition gradually diminished as its fallacies were demonstrated; for, when the proposed change was clearly explained, both Europeans and Natives approved of it, and even many of those who had originally been its active opponents were converted into warm supporters, so that the memorial, praying His Excellency the Governor to adopt the decimal sub-division of the rupee, contained a larger number of signatures from all classes than any petition that has ever been laid before the Government of Ceylon, and I now learn that the measure has just received the sanction of the Secretary of State for the Colonies. I trust that India will soon inaugurate a similar policy. I admit that Ceylon is but a small country in comparison with India, and that changes can easily be made in it which in India are fraught with difficulty, owing to the magnitude of the country; but, on the other hand, India possesses, as I shall presently show, elements which afford greater facilities for decimalization than existed in Ceylon, or, in fact, in any other country in the world. At the same time the subject requires in India a treatment slightly different from that which has been adopted in Ceylon.

Introduction into Ceylon.

Difference between India and Ceylon.

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* *From* LORD OVERSTONE'S *draft report.*

"In Belgium, where the French coinage was introduced in the last century, and finally established by the law of 1832, the transition has been so imperfectly effected, that we are informed that 'in usual life every man in Belgium is compelled to have constantly at hand his tables of reduction of the various moneys, both past and present.' At Antwerp goods are bought and sold in Netherlands money, though, in deference to the law, public sales take place in francs and centimes. The majority of merchants are said to have adopted the legal system of accounts; but small sums connected with the people's daily dealings are generally mentioned in Brabant guilders and stuyvers; farmers and all shopkeepers, specially in the Flemish provinces, still continuing to use the old denominations of coin."

As I learn that my original paper on this question was last year officially laid before you, it is unnecessary for me to recapitulate the arguments therein used, or to show how the question of tolls, stamps, and contracts, may be met without difficulty: it is sufficient for my present purpose to add that I would suggest for India a slight modification of the plan originally proposed for Ceylon. The present silver coinage should remain unaltered, and the coinage I recommend will then stand as follows:

Modifications proposed for India.

Proposed Coinage.

DESCRIPTION OF COINS.		VALUE IN CENTS.	VALUE IN FRACTIONS OF A RUPEE.
Existing Silver Coins ...	Rupee	100	1
	8 Anna piece	50	$\frac{1}{2}$
	4 „	25	$\frac{1}{4}$
	2 „	12½	$\frac{1}{8}$
New Copper Tokens	1 cent	1	$\frac{1}{100}$
	½ „	½	$\frac{1}{200}$

The lowest token would then be half a cent., or the 200th part of a rupee, (the pie is the 192nd part of a rupee).

It may be objected that the coinage of a *half* cent. is a violation of the decimal principle; but as Professor de Morgan has ably pointed out, "the mere having of the lowest coin is no disadvantage, it is the abiding delusion of the opponent of decimals that he *will* suppose the decimalist to be under a contract, never to use common fractions." Moreover, the half cent is of so low a value that practically it will not be introduced into accounts. In the accounts of the Public Works of the Government of Ceylon, the farthing (which is about double the value of the half cent) was excluded, although a coin equivalent to the half farthing was in universal circulation.

The Half-cent.

Before I proceed to show how the decimal sub-division may be introduced without difficulty, I must premise that it is admitted even by the most stubborn opponents of change that for all "paper transactions" (that is, for all calculations on *paper*, in contradiction to *mental* calculation), the decimal system possesses great advantages. I must also meet the popular fallacy which so many even amongst the educated classes entertain, that, in the event of a decimal coinage being introduced, it will be necessary for those who have forgotten their school lore to learn again decimal arithmetic. Nothing can be more fallacious than such an idea. No special preparation is necessary to enable any one to understand and use a decimal sub-division, but those who do use a decimal coinage are unconsciously, and without an effort on their part, *taught* decimal arithmetic, the only difficulty is the slight effort of memory necessary to remember that the half-rupee represents 50, the quarter rupee 25 cents, &c.—a difficulty that could not be one of many days duration even with the most stupid.

Advantage in paper transaction.

Knowledge of decimal arithmetic not necessary.

Premising this, I propose for the introduction of the decimal system nothing more than the coinage of a small quantity of copper tokens, and an enactment to legalize their circulation. It may be asked what advantage is to be gained by this course? Simply that the fact of such tokens being in circulation would admit of agreement for rates of labor, contracts, and accounts under the decimal denomination; in fact, it would allow facilities for "paper transactions" in decimals. The plan might be introduced first in one district on a small scale, and, when successful, it might be gradually extended, and finally adopted throughout India.

Issue of Tokens.

Then comes the question: What machinery would you adopt for the introduction of such tokens, if minted, and what will be the practical working of such an introduction? To this I answer, that there can be no better opportunity for a commencement than in the construction of one of the State Railways on which I would introduce them, but always with the proviso that if it would be found to be prejudicial to the labor market, it should not be pressed. I would select that district which, after careful consideration, I found to afford the fewest obstacles to the introduction, and provide the treasuries in the vicinity of the railway with a supply of the new copper tokens; these tokens should not be used to make entire payments, but simply to meet the balance of those sums which may not exactly coincide with the old system. For instance, supposing 5R. 30Cts. to be due to a man, he would receive 5 Rs. a four anna piece, (25 cents,) and 5 copper cents.

Machinery for introduction of Tokens.

It may be urged that the natives will receive such tokens with reluctance, but a little reflection will show that there is no ground for supposing that the new tokens will not be received by the natives as readily as the existing legal tokens, for so long as the natives are allowed to coin "dumps," and thus make a profit by usurping the prerogative of the Crown, the "dum" will be in favour rather than the legalized token, which circulates at a *nominal* value far higher than its *intrinsic* value; but in spite of the reluctance of the natives to receive the pie, it is evident that Government must make its payment by means of a *legalized* token, and I cannot think that the cents would be looked upon with less favor than existing tokens. On the contrary, it is probable that the natives will prefer tokens which they can get at the rate of 200 to the rupee to those which are only issued at the rate of 192, more especially if the former be made (as they can be made with profit) slightly more bulky than the pie tokens. Even should any reluctance be manifested on the part of the natives to receive the new tokens, they can be informed that 100 cents will be taken in exchange for a rupee at all the Government Treasuries and the Railway Pay Offices.

Reluctance to receive new Tokens.

I lay a stress on the necessity for using *copper* and not bronze as the metal for these tokens, because the natives, as a rule, like as much metal as possible for their money, and this will account partially for the preference accorded by them to the "dum," which contains a larger proportion of metal than the legalized tokens. The "dumps," which I have examined, fluctuate in value from 2½ to 3 pie per "dump," whilst in weight they equal 5 pie.

Necessity for using copper.

The introduction of new copper tokens presents no greater difficulty than the introduction of the three-penny and four-penny pieces in England; the Government of India cannot be compromised by such a step, as it is committed to nothing beyond the cost of minting the tokens. If successful, as I believe it must be, the introduction of a decimal system will confer a great boon on India, and if not, the coinage of the small quantity of tokens necessary to make the experiment is a matter of no moment. We have at present an inconvenient system of copper tokens which are not acceptable to the masses in India. Why not change it for one that will be eminently valuable? I do not ask for

Feasibility.

any sudden alteration in the accounts of Government or in the stamp and tolls; the measure I propose will merely affect the internal working of the construction accounts of that State Railway upon which it may be adopted, but it will serve to demonstrate the possibility of extending the principle. Should the trial be successful, there will be no difficulty in gradually calling in the old copper tokens, and the final change may after a time be easily made.

I will now deal with some of the most plausible objections that have been urged against decimalization. Four* commissions or committees in England have reported in favour of decimalization, but a fifth commission (Lord Overstone's, 1859,) arrived at conclusions adverse to its adoption.

Objections.

* Standard Commission of 1841.
Decimal Commission, 1843.
Committee of House of Commons, 1853.
Standard Commission, 1869.

Lord Overstone, though an able man, was evidently strongly prejudiced against any change, and acted rather the part of the indiscreet partizan than that of the impartial judge. His questions were so palpably unfair that Sir John Herschel, Professor deMorgan, and others pointed out the "unfairness" and "one-sideness" of the questions put to them, and even Mr. Hemmings, the barrister employed by Lord Overstone to revise the evidence, and to attempt to weaken the weighty testimonies of such men as the Astronomer Royal, Sir John Herschel, and Professor deMorgan,—even he was forced to admit that they were unfair. The arguments used in the report of that commission will, therefore, be the strongest that can be urged against decimalization. Now, even admitting for the sake of argument, that the rejection of decimals by Lord Overstone was desirable in the case of England, the strongest reasons adduced by him have no force in India. The great and really the only real objection is in fact the general aversion of all classes to any change, and the attachment of the lower classes to the copper coinage, in consequence of their long use of it. A few ingenious arguments have been urged, such as the facilities afforded by the existing system for mental calculation, but they are simply raised to back up the main question, and are literally of no weight when compared with the difficulty of disturbing the existing copper tokens. Now, such a difficulty not exist amongst the masses in India; the legalized copper tokens are rejected by the lower classes, and the illegal "dump" of fluctuating value, the native and spurious coins, and the cowrie are very generally substituted for it as the medium for circulation. Still we *must* have *legalized* copper tokens, and we might just as well adopt that form which is universally acknowledged to be the best.

Lord Overstone's Commission.

The penny difficulty.

In the report of Lord Overstone there appears the following remarkable assertion: "For mental calculations generally the superiority rests with the present system in consequence principally of the more convenient divisibility of 4, 12, and 20 as compared with 10, and the facility for a successive division by 2." Now, even without the assertion of the Astronomer Royal, that the present system is unsuited to mental calculation, whether small or great, it must appear startling to any unprejudiced mind that a system involving three distinct and different bases (or as Professor deMorgan rightly terms it the "quarto-duodecimo vicesimal coinage") should give greater facilities than that which involves but one base, and still more startling does it appear when one of the three favoured bases is practically the same as the single one which is condemned.

Mental calculations.

Lord Overstone appears to have overlooked the fact that in a decimal system it is possible to dispense with sub-division to a great extent, and to substitute the more easy process of multiplication for the more complicated process of division. Let facts speak for themseles. How many people in England are able to make use of mental calculations in any cases, but those of the most simple

character? Not one in 100! even amongst the educated classes; the so-called "binary"* system does not admit of it. Contrast this with China where the decimal system is in full force. The lower orders of the Chinese perform mental calculation with a facility and rapidity that is impossible under the "binary" system even to well educated men in England. To a mind accustomed to one system, that system, however imperfect it may be, gives the greatest facilities for mental calculation; and I have no doubt that to most Englishmen the so-called "binary" system is the most easy for such calculations; but any man will find, as soon as he has become accustomed to the change, that his power of dealing mentally with figures and numbers will be greatly increased by a decimal system.

Chinese calculation.

Basing an argument on Lord Overstone's startling assertion, one objector urges: "We find greater skill in mental arithmetic in proportion to other education in India than in England." Now this aptitude on the part of the natives appears to me to be the strongest argument possible in *favour* of decimalizing. I observed the same aptitude in Ceylon, and I even found that many of the natives who were entirely ignorant of the first principles of our arithmetic were able to deal with quantities and sums by means of a species of mental calculation with a rapidity that would be impossible on the "binary" system, and this they effect entirely on a system of rough decimals by means of their fingers, and by heaps or rows of *ten*. I had, moreover, occasion to introduce into the Public Works at Ceylon decimal measures of the foot, to supersede the existing medley of cubic yards, heaped bushels, struck bushels, gallons, &c., and I found that the Native Overseers, both Cinghalese and Malabar, evinced an aptitude that surprized me; for, though they were at first averse to the change, they soon became accustomed to it, and in a few weeks not only used the new measures easily, but actually preferred them to the old system to which they had been so long accustomed, and there is little doubt that the natives of India with their natural aptitude for figures will not be slow to appreciate and use the advantages afforded by the decimal system.

Aptitude of Natives for figures.

Another argument has been based on the fact that in France peasants still speak of "sous" instead of "centimes," and in America they adopt the term "quarter" in preference to 25 cents: this, however, proves nothing except that they adhere to the old nomenclature; but even admitting this difficulty to be real, can Lord Overstone deny that the introduction of the decimal system in those countries has conferred benefits far outweighing any such difficulties? On the contrary, he admits that "the reports which have been received from foreign countries, where the decimal principle has been introduced, *concur generally in the statement that the system has been found to work satisfactorily*, and to be an improvement on their previously existing forms of coinage." Whilst admitting so much, an endeavour is made to weaken the force of this concession on the following points:

Advantage in other countries.

First that in most countries where a decimal coinage has been introduced, decimal weights and measures have been adopted also, and these give great facilities for a decimal coinage; it is admitted, however, elsewhere that, even without this uniformity, the decimal coinage has not worked inharmoniously in America. But even were it not so, this argument has no force in India where the decimal weights and measures have received the approval of the Legislature.†

Harmony with Decimal weights and measures.

* I use the term binary though it is somewhat a misnomer, because there is no convenient term by which our heterogeneous medley of 20, 12, and 4 may be described.

† I see by the papers that a bill is now about to be brought before Parliament for the introduction of decimal weights and measures into England, and that it is warmly supported by the Chambers of Commerce.

The second reason for modifying the verdict in favor of decimals is that those countries which have adopted it have contrasted it with their previous coinage which has been very imperfect; and to the Englishman, averse to change, the £ *s. d.* system *is* perfect until he has had sufficient experience in a country where decimals are used to enable him to appreciate the practical results of that system. Certainly the £ *s. d.* system is perfect when compared with the Indian "anna," "pie," and "dump" system.

Contrast with imperfect systems.

The third objection was that the foreign systems generally consisted of an unit comprising 100 sub-divisions, whereas the system proposed for England contemplated 1,000 sub-divisions. The plan I propose is not open to this objection, as it only comprises 100 sub-divisions like those adopted in the majority of foreign countries.

Number of sub-divisions.

The commission also objected to the proposed system, because it consisted of four distinct denominations *viz.*, "Pounds," "Florins," "Dimes" and "Mils," whereas other decimal coinages in existence consist of two denominations only. This objection is again inapplicable to the system I propose for India which contains only two denominations, *viz.*, Rs. and Cents.

Number of denominations.

It has been objected that the new tokens of $\frac{1}{100}$ in value, if introduced, would practically take the place of the existing tokens $\frac{1}{96}$, and that the difference of 4 per cent. would probably fall on the lower classes in the minor commercial transactions. Such an argument *might* have weight in England where the legalized penny is universally accepted at an unvarying rate; here, however, it has no force because the "dump" is practically (though not legally) the copper coinage of India, and it is subject to fluctuations of more than 12 per cent. Nor can the "dump" be said to be a "binary" division, for it is now being circulated in Simla at the rate of 70 to a rupee. It is evident, then, that the change from the pie to the cent could not affect the smaller transactions of trade. It has been said that a new coin will give opportunity for the buniahs to oppress the poorer classes, but can anything give greater opportunities for oppression than the "dump system."

Retail transactions.

I presume that the Indian Government look forward to the ultimate education of the masses, and a decimal system is a valuable auxiliary in education, because it enables the partially educated man to reach by means of *simple* arithmetic—a point which, under the "binary" system, he cannot attain without the aid of *compound* arithmetic. It has often been asserted that the "decimal system is admirable for the mathematician, but it is of no advantage to the poor man." On the contrary, it is merely a luxury for the mathematician, whilst it is a positive necessity for the man at the foot of the educational ladder; in fact many a man stops short in education daunted by the difficulties of compound arithmetic, but yet unable to make a practical use of his knowledge under the "binary" system.

Education.

It has been urged that the Native mind has been so long accustomed to "binary" sub-divisions that the decimal system would be a hindrance to him; but, on the other hand, there are indications of a tendency to decimalization amongst the natives which show that there is not much weight in this argument. The larger divisions of money, the rupee, the sau, the lakh, and the crore are essentially decimal and thoroughly Indian. Again, I learn that it is a very common practice to sell by the *hundred* produce that cannot be sold by weight. I am informed that the freight of boats is by the *hundred* maunds. The proprietors charge royalty on their jungle produce at so much per *hundred*, and I have no doubt that this practice enters largely into small commercial

Native tendency towards decimalization.

transactions; at all events it shows that the Native mind is not averse to decimal notation in spite of the difficulties under which he labours in consequence of the existing coinage.

To sum up my arguments—

(1.)—The decimal sub-division of the rupee has been approved for Ceylon.

(2.)—India offers special facilities for its adoption.

(3.)—The change necessitates no alteration whatever in the existing silver coinage.

(4.)—All that is necessary is to mint a small quantity of copper tokens.

(5.)—The change may be made gradually.

(6.)—No sudden alteration is necessary in the accounts, stamps, or tolls.

(7.)—The natives will receive the new tokens as readily as they receive the existing tokens.

(8.)—The great objections urged against the adoption of decimals in England are inapplicable here.

*(9.)—The lower classes have no attachment to the existing copper tokens.

(10.)—The copper circulating medium in India is virtually not even "binary," but fluctuating.

(11.)—The adoption of the decimal coinage will harmonize and work well with the proposed decimal weights and measures.

(12.)—The coinage I propose is free from the objections urged against that proposed for England both as regards the number of sub-divisions and denominations.

(13.)—The introduction of decimal tokens will not affect retail transactions.

(14.)—The decimal system will be a valuable auxiliary in education.

(15.)—The natural aptitude of natives for figures will facilitate the adoption of decimals.

(16.)—The native mind is not averse to decimalization.

No doubt there will be difficulties as there must be difficulties in every change; but are they of such a nature as to justify us in allowing them to be a bar to progress? The advantages of decimalization are self-evident, and the tendency of all civilized nations is to adopt it. The question ought not to be regarded from a narrow point of view, but in a wide liberal spirit, contrasting the minor difficulties of introduction with the benefits that must accrue from the change not merely to the present race, but to future generations.

SIMLA;
The 10th July 1871.

GUILFORD L. MOLESWORTH.

* See the List of Native coins appended hereto.

APPENDIX.

The following list of some of the Native Coins and their value will suffice to show how small an element of the so-called "binary" system exists in India. Even the legalized tokens are not "binary," but fluctuate in India:

District or Presidency.	Name of Native Coins in circulation.	Number usually exchanged for a Rupee. From	To	Remarks.
North-West ...	Agra pice	72	100*	* Equal to a cent.
	Alumghini	...	...	Sold by weight.
	Balashahee	63	63½	
	Bhurtpore	...	...	
	Delhi	80	84	
	Ghisla	50*	...	Equal to 2 cents.
	Goruckpore	64½	71	Fluctuates to 3 cents.
	Jhardar	41	44	
	Munsoorie	66*	84	Fluctuates to 3 cents in value.
	Nawabee	64½	65	
	Pukka pyce	48	...	
Punjab ...	Cabullee pice	120	128	
	Chukle	79	...	
	Jummoo	95	...	
	Munsoorie	66	68	Fluctuates to 3 cents in value.
	Nanuckshahee	80	100*	* Equal to the cent in value.
	Takkas	41⅓	42	
	Thova	47½	...	
Oudh ...	Mudhooshahee	50*	...	Equal to 2 cents in value.
	Munsoorie	66	74	Fluctuates to 3 cents in value.
	Nawabee	64½	70	Fluctuates to 3 cents.
	Nepal	71	...	
Rajpootana ...	Jeypore pyce	47	50*	Equal to 2 cents.
	Jodpore			
	Kolah	64	66	Fluctuates to 3 cents in value.
	Munsoorie	58	59	
Central India	Balashee	60	...	
	Chowdoree	58	...	
	Guzashee	86	...	
	Gwalior	10	...	Equal to 10 cents.
	Indore gundas	42	...	
	Kotah	80½	...	
	Kutcha pyce	67	67½	
	Moharaja	80	86	
	Nunda	65½	...	
Bengal ...	Badsahee	68	70	
	Goruckpore	100	...	Equal to 1 cent.
	Lohya	96	...	
	Nepaulese	66	...	Equal to 3 cents, nearly.
Bombay ...	Babasayee	32	...	
	Dhaboo	48	...	
	Ghatty paisa	60	64	
	Mysore	66	...	Equal to 3 cents nearly.
	Shewrai			

In the Madras Presidency very little Native coin appears to circulate, but the value of the Government pie fluctuates in the bazaars from 192 to a rupee up to 200, or *exactly half a cent.* (at Malabar, Calicut, and Poonamally).

Throughout India the Government pie fluctuates considerably in value, from 192 to 204 pies per rupee. so that in some places (Berar, Mahoda, Bhundara, Lakolee, Chundah, and Nagpore) the pie circulates at a value *lower than the half cent.*

GUILFORD L. MOLESWORTH.

Extract from a letter from G. L. MOLESWORTH, ESQ., *to* M. E. FOSTER, ESQ., *of the Treasury, on the subject of the Ceylon Coinage,—dated 11th March* 1871.

"THE contemplated changes in the currency of India must be confined to one of two alternatives; and to either of these alternatives the decimal sub-division proposed for Ceylon would be admirably adapted.

"The first alternative would be to introduce British sovereigns into India, and make the rupee a token (instead of a coin) representing $\frac{1}{10}$th of the sovereign. The rupee having intrinsically a value very slightly in excess of the English two shilling piece, though as a *coin* its value is less than $\frac{1}{2}$ th of a sovereign.* As, however, there appears to be a financial difficulty in this course, the second alternative would probably be adopted, *viz.*, to coin a gold piece worth Rs. 10 or about 6 per cent. less value than the sovereign, and to keep the rupee as at present, a coin unchanged in value. In the former alternative if the rupee were considered a *token* representing $\frac{1}{10}$th of a sovereign, the copper tokens would still retain their relative value to the rupee; whilst in the second alternative both the rupee and the copper tokens would remain unaltered, but in both cases the copper tokens would be decimals of the gold coin.

* *Note.*—The Rupee contains 178½ grains of silver, whereas the florin contains only 174½ grains.

"Nearly all changes in currency tend towards decimalization, and even should some other denomination than the rupee be adopted in India (which it is difficult to conceive), the change from one decimal system to another would be easy, and the fact of a decimal system existing in Ceylon would pave the way to any movement in that direction in India."

Keepwiths of the paper on the Decimal sub-division of the rupee published in the supplement to the Gazette of India *dated* 12*th August* 1871.

MY DEAR HARRISON,

WILL you consult Hyde, and, at your early convenience, let us have your joint opinion on the expediency of extending to India the decimalization of our subsidiary coinage proposed in the accompanying papers from Ceylon? Sir W. Mansfield has left on record in a minute that the scheme is worthy the best consideration of the Financial Department; and the only objection which he notices is that affecting our stamp-duties which he proposes to overcome by a "give and take" arrangement such as is proposed for Ceylon.

To all Englishmen the convenience of decimalizing our system below the rupee would obviously be immense, and there would be apparently little *difficulty* in carrying out the measure; but the habit of our entire population is to work with the 16 multiple, and I suppose that habit would not be overcome in a generation. The 'ganda' notation is, I believe, in universal use. Would you mind consulting Babu Rajendra Lal Mittra upon that particular point confidentially, asking his opinion as to how far the decimal system is in truth intrinsically superior to the quaternal, and whether the people might be expected eventually to prefer it. You may know some other Native experts whose opinion at this early stage of the discussion would be valuable. When I said above that there would be little difficulty in making the change, I spoke of the mechanical difficulty only. It would probably be a work of long time and great difficulty to change what is to the masses of our people almost their entire currency. It is one thing to deal with what is after all a foreign currency in a small island like Ceylon, and another to revolutionise the ancient currency of a continent like India. It would be so far in our favour that our copper token coinage has little hold on the *nation*. So far, I dare say, the people would take readily enough to cents, liking them as well or as ill as our annas and pies. But to induce them to substitute cents for their old accustomed values in their accounts, and as the measure of value of all the transactions of their daily life would be in a country so wedded to habit and so impermeable to intelligence as India, a large business!

Supposing your opinion and Colonel Hyde's and Babu Rajendra Lal's and that of any one else whom you might consult, to be favorable, we might proceed to discuss the subject in a formal way. It is, as Sir W. Mansfield says, well worth consideration.

Yours faithfully,

R. B. C.

23-4-70.

MY DEAR CHAPMAN,

IN talking to Colonel Hyde of the decimalization of money, I said that, as far as the public accounts are concerned, I should be very glad to see the rupee divided decimally, but that I did not think it ought to be hastily assumed that the arrangement was, on the whole, the best for the public convenience.

I incline to think that it is best; but certain points require to be carefully investigated before this can be considered as established.

You are probably aware that it is held on high authority that money calculations can be made mentally much more readily with the present denominations of English money than if the pound were divided decimally; this I may say is open to question, as (as far as mental calculation can be reduced to a system) one of the most thorough systems now in use is essentially decimal.

No one doubts the advantage of decimal sub-divisions for paper work, but I think we should indeed pause before doing anything which should render the innumerable calculations of the market and of the homes of the millions less easy in order that those who reckon on paper should receive some benefit: nor will all educated clerks have reason to thank us for a change that drives them to pencil and paper for what they would otherwise do without that aid. I therefore suggested that, as a preliminary, we should try to examine carefully the exact process by which the uneducated reckon so easily, as we all know they do, the amount of wages for any number of days at a given monthly rate, and similar questions of prices. Colonel Hyde quite agreed with me that the advantages of a decimal system should not be taken for granted, but should be patiently investigated, and said that Major Tennant had already given attention to the subject in which he took great interest, and that he thought Major Tennant was specially qualified to conduct the enquiry.

Colonel Hyde tells me to-day that Major Tennant will be very glad to undertake the enquiry, but would prefer to do so at the request of the Government of India.

Can you arrange that it should be committed to him?

I will write again on the subject of my own conclusions.

4-5-70.

E. F. H.

DEAR HYDE,

WILL you look at these papers, and let me have a Note stating precisely what is it that you think Tennant should undertake to enquire into.

17-12-70.

Yours faithfully,

R. B. CHAPMAN.

Treasury, 25*th Feb.* 1871.

MY DEAR HYDE,

I FEEL quite ashamed of my delay in returning these papers.

I am very glad that Colonel Tennant proposes so patient and thorough an enquiry, as I entertain the greatest objection to such a question being decided on merely theoretical grounds, without a full recognition of the magnitude of the task involved in a change affecting the entire population of India.

The mere decimalization of our coinage might, I think, do great mischief unless we are prepared to carry out such measures as may be necessary to secure the adoption of a habit of decimal computation.

What such measures may be, or whether the object is attainable at all, can only be ascertained by a very widely extended enquiry, and I do not think any better course can be adopted by the Government than to follow the course sketched by Colonel Tennant, and to place it under his direction.

Yours sincerely,

E. F. HARRISON.

MY DEAR CHAPMAN,

THE memorandum by Tennant on the "Enquiry into Indian Arithmetic" shows exactly what should be done. See also Harrison's Note to me (25th February).

1*st March* 1871.

Yours sincerely,

H. HYDE.

Enquiry into Indian Arithmetic.

The object of the proposed enquiry I consider to be the ascertaining methods in use by the general population (as distinguished from the trading classes) in making the calculations involved in the everyday transactions of life, and further to ascertain how far they are generally capable of making these for themselves.

The methods in use by the trading classes are probably pretty uniform throughout the country where the weights are divided into sixteenths as in Bengal as well as the coin; but there must be some difference in those places were the divisions of current weights are different, and still more where the Rupee and its sub-division into annas are only of recent introduction. These differences or any traces of them should be enquired into, and the processes of both written and mental compound arithmetic recorded with translations of any Tables which are committed to memory. This can only, I believe, be done by men acquainted with the local vernaculars, and the Educational Department should, I think, have a suitable agency.

In each place an effort should be made to find out what proportion of the non-traders can calculate well enough to conduct ordinary transactions, such as purchases of food for daily use, and reckoning of its price at varying rates; also whether any considerable portion of the people, who are not in the habit of trafficking, can make the more extensive calculations which are required (book-keeping of course is not in question). This too should be done by a Local Agency, and there will be some check by the comparison of adjacent places and districts.

There may be a necessity for supplementing the usual Educational Agency by one or two special appointments, and for these I apprehend there would be good material in the graduates of the Universities at the Presidencies who are seeking employment. It may be more difficult in such countries as Sindh and the Central Provinces, but I believe that the Educational Department would be the one most likely to succeed in getting the information. Attention might be directed to Dr. Colebrook's account of the arithmetic of Bombay as a standard as to the subjects it includes out of these.

Such information, when collected, should be referred to a Central Office* for arrangement into a general account of the Indian processes of calculation, which will be no more curiosity, but will enable the Government of India to know precisely where the introduction of the simple processes which alone are involved with a decimal system of weights and coinage are likely to be difficult of introduction, how strong the opposition is likely to be, and how it may best be met. I speak of course as one who believes the result will be to show that commerce of all kinds labours under the disadvantage of a burthen of knowledge which is necessary to enable the smallest business to be transacted, and which it is in the power of the Government to remove.

J. F. TENNANT.

G 6 31. Aug. 1/51 p. 140-141

In Fink 452/91.

GOVERNMENT OF INDIA.

FINANCIAL DEPARTMENT.

ACCOUNTS.

To

C. 30/8

CIRCULAR No. 2767.

Dated Simla, August 1871.

Received

1871

Financial Department

From

The Government of India

Dated 12.
Rec'd 28. } August 71

No 2767.

1 Enc
45C.

No. 452-

Inviting attention to certain papers published in a Supplement of the Gazette of India, regarding the decimal sub-division of the Rupee - &c.

With an extract

Bd of Revenue
Ac Accountant
Chamber of Commerce
Bank of Madras

Copy

Coll accounts. 31 Augt 1871. No 1114

Communicated to the Board of Revenue, the Accountant General, the Chamber of Commerce, and the Directors of the Bank of Madras, with a request that they will favor Government with their views regarding the decimal Rt. division of the Rupee.

By Order

To the Board of Revenue - Accountant General - Chamber of Commerce - Directors of the Bank of Madras

Entered 1/9

Govt. of {1871} Madras.

Financial

To The Board of Revenue.

Dated Dec. 31.
Recd
Encl.

G. O. 31 Dec. 1871, No. 414

Nos. 140. 141

Forwarding to certain Officers for their opinion, the papers recd. from G. of I. respecting the decimal Sub-Division of the Rupee.