

REPORT  
ON THE  
THIRD SETTLEMENT OF THE THARRAWADDY DISTRICT  
SEASON 1913—15

BY  
J. I. McCALLUM, I.C.S.



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# RESOLUTION

ON THE

## REPORT ON THE THIRD SETTLEMENT

OF THE

### THARRAWADDY DISTRICT

### SEASON 1913-15.

Extract from the Proceedings of the Lieutenant-Governor of Burma in the Land Revenue Department,  
—No. 1S.-1 of 1917.

READ—

1. *Report on the Third Settlement of the Tharrawaddy District, Season 1913-15*, by Mr. J. L. McCallum, I.C.S.
2. *Review of the Report* as recorded in the Proceedings of the Committee assembled at Rangoon on the 3rd and 4th July 1916 to consider the Report.
3. *Note by the Financial Commissioner, Burma*, on the Report, submitted with his Secretary's letter No. 368—2S.-20 of the 15th March 1917.

**Resolution.**—The Lieutenant-Governor has approved \* the rates of assessment proposed by the Settlement Officer with the following modifications:—In the central paddy plain which falls into Assessment Tracts 2, 5, 9, 11 and 13, the rate on first class rice land is raised by four annas per acre in all five tracts; a similar increase is made in the second class rate in the first four of these tracts, and in the fifth class rate in Assessment Tract 11. The increases in Tract 2 are justified by comparison with the considerably higher rates imposed in 1913 in the adjoining area of the Insein District; the increases in the remaining tracts follow naturally on the increases in Tract 2, and all are justified by the economic conditions of the tracts as described by the Settlement Officer. His Honour does not consider it necessary to adopt the proposal of the Settlement Committee, which is endorsed by the Financial Commissioner, to reduce the Settlement Officer's rates for first and second class lands in Tract 4 or to raise the rates in the corresponding classes in Tracts 6 and 7, despite the fact that the new rates in the latter tracts involve a considerable reduction of the demand hitherto paid. The Settlement Officer has no doubt that in comparison with the rest of the District these tracts need relief. Both are liable to flood and it is desirable to leave some scope for the imposition of a drainage rate in order to justify expenditure on the construction of protective embankments. In the case of crops other than rice, the rates proposed by the Settlement Officer for onions and *thetkè* are each raised by eight annas to Rs. 4 and Rs. 2 respectively, and that for tobacco by a rupee to Rs. 5 per acre which is the rate sanctioned for tobacco in the adjoining Insein District. These rates are low judged by Upper Burma standards; a nearer approach to these standards must however be deferred till a subsequent settlement. Betel-vine will be assessed at the rate of Rs. 10 per acre subject to a minimum assessment on any one holding of a rupee. This rate is two-thirds of the rate sanctioned in recent Lower Burma settlements; but the area under betel-vine cultivation in the Tharrawaddy District is small, and it is not desirable to discourage it by too large an enhancement during the new settlement. Solitary fruit trees will be exempt from assessment. Any crop other than rice grown before or after rice in the same year will be assessed at a rupee an acre, unless it is a crop to which a special rate applies, when it will pay that special rate.

\* Revenue Department Notification No. 72, dated the 29th June 1917.

The rates sanctioned for dry crops will be applied to permanent and impermanent lands in the areas outside settlement, as proposed in paragraph 215 of the Report.

The rates will be current for a period of 21 years from the 1st July 1917 in those areas where the old rates expired on the 30th June 1917, in the 93 *kzins* brought under settlement for the first time and in the areas outside settlement, and for 20 years from the 1st July 1918 in the rest of the District. Intermediate rates will be imposed for the first five years under standing orders; and in addition any person who is required under the new settlement to pay in respect of the same holding an assessment exceeding the assessment at the old rates by more than 50 per cent. will, during the first five years of the new rates, be entitled on application to have the enhancement reduced by the amount of the excess over 50 per cent. The financial effect of applying the new rates to the area actually under assessment in the settlement year is an increase of Rs 2,29,222, or 19 per cent. above the old assessment of Rs. 11,95,670. This increase is moderate in view of the improvement in the economic conditions of the District during the years which have elapsed since the District was last under settlement in 1900-02. The occupied area has increased by over a fifth; rents and mortgage values have risen, while sale values have doubled and in some cases trebled. The standard of living which was one of substantial comfort at the last settlement has materially improved. The import of luxuries has increased largely, and the amount of indebtedness is not serious.

2. The rates proposed by the Settlement Officer purport to be based on the standard of one-fourth of the net produce which is the standard provisionally prescribed by the Settlement Instructions for Lower Burma Districts. He has gone below this proportion in the tracts lying on either side of the central plain which are either liable to flood or for other reasons call for specially lenient treatment. But in working out the nett produce standard, he has made a much larger allowance for cost of cultivation than is authorised by the Settlement Instructions. He has assumed a cost which represents not the average out-of-pocket expenses of the cultivator, but the amount for which a non-agriculturist can get all the operations of agriculture performed by hired labour in the case of a holding of 8·73 acres which he found to be the average area in Tharrawaddy worked by a yoke of oxen. A somewhat similar method was adopted in the Revision Settlement Reports of the Kyaukse and Mandalay Districts, Seasons 1902-03, and 1903-05. The Settlement Committee in paragraph 16 of their Review point out the objections to this method, and remark that the resulting figures are largely fictitious, very much in favour of the cultivator and higher than the rates which have been accepted in recent settlements of neighbouring districts. There is no doubt that the Settlement Officer in his departure from the Settlement Instructions exceeded the latitude which has been allowed in recent settlements with a view to obtain a closer approximation to the actual cost of cultivation than is permitted by the precise terms of the orders in the Instructions and that in consequence the rates of assessment proposed by him are generally on the low side. Orders have since issued directing that in future settlements the prescribed instructions should be followed.

3. Sir Harcourt Butler agrees with the Financial Commissioner that Mr. McCallum has made a detailed and careful study of the agricultural conditions of the Tharrawaddy District. He has written an interesting Report and has effected a settlement which, with the slight enhancement of some rates sanctioned by the Lieutenant-Governor, will produce an appreciable increase of revenue without imposing an undue burden on the cultivators.

By order of the Lieutenant-Governor of Burma,

W. J. KEITH,

*Revenue Secretary to the Government of Burma.*



## **Note by the Financial Commissioner on the Report on the Third Settlement of the Tharrawaddy District, Season 1913-15.**

The Report on the revision settlement of the Tharrawaddy District has been reviewed at length by the Settlement Committee, and as I agree generally in the comments of the committee on the agricultural and other economic conditions of the district, my remarks will be restricted mainly to matters bearing directly on the proposals for re-assessment.

2. A striking feature in the report is the growth in sale values of land since last settlement. Throughout the settled area of the district the price of rice land has doubled or more than doubled during the past fifteen years. This increase in the value of land has been accompanied, though not in every tract to such a marked extent, by an increase in the rental values of such areas as are held by tenants. The Settlement Officer records that during the same period a material increase is discernible in the standard of living of the cultivating classes, and it may safely be assumed therefore on general grounds that, since the existing rates of land revenue were imposed, there has been a substantial growth in the assessable value of the land under re-settlement. It should however be borne in mind, in determining the weight to be given to these considerations, that the increase in sale and rental values will have been due in part to the greater pressure of the population on the soil, for there is little room for further extension of cultivation in the district and there is evidence of an existing pressure in the attempts made during recent years to bring under cultivation land which is frequently flooded and from which a return is doubtful. The fact that the standard of comfort of tenants, as recorded by the Settlement Officer, is appreciably below the standard of the cultivating owner is a further indication in the same direction.

3. The tracting and soil classification and the calculation of outturns and local prices have been carefully thought out by the Settlement Officer and his proposals in regard to these matters may safely be accepted. I agree with the Settlement Committee that in the determination of the cost of cultivation Mr. McCallum would have been well advised to adhere more closely to the Settlement Instructions and that he should have based his assessment proposals on actual figures of expenditure rather than on theoretical calculations. The Settlement Officer's figures for expenditure on cultivation imply two assumptions, firstly that the same amount of time and labour are given per acre to the production of rice in the valleys to the east, in the rich plain in the centre and in the flooded area on the west of the district, and secondly that the whole of the labour employed on the cultivation is hired labour or in the words of the Settlement Officer (paragraph 131 of the report) the amount per acre is that for which "a non-agriculturist could get all the operations of agriculture performed." Figures for actual cost of cultivation, as ascertained by enquiries from individual cultivators, have been given in Statement 12, but I cannot find from the Report that these figures have been analysed with the object of ascertaining the reasons for variations from tract to tract and the relationship of actual figures to the figures assumed by the Settlement Officer.

4. Except in one or two small tracts the average cost of cultivation as given in Statement 12 varies between 12 and 18 rupees per acre, whilst the cost as taken by the Settlement Officer for calculation of the net produce is from 20 to 22 rupees per acre. In other recent re-settlements the cost of cultivation has been assumed to be the actual out-of-pocket expenses with an allowance for the value of the cultivator's own labour. The Settlement Officer's quarter net produce, on which his proposed rates are based, will represent roughly one-fifth the net produce if actual expenses only are allowed under cost of cultivation, and between one-fourth and one-fifth if some allowance is made for the labour of the cultivator and his family. A general increase in the rates of assessment proposed in the Report is needed therefore to bring the rates to the

full standard of assessment. Tharrawaddy is a district with considerable areas subject to flood and with a large proportion of small holdings which cannot be worked to the full economic advantage secured by the whole-time employment on the land of the cultivator and his cattle. In view of these considerations I am not prepared to recommend a general raising of the rates against the advice of the Settlement Officer and the Settlement Committee. I consider however that the proposed settlement will be lenient, and that there need be no hesitation in accepting the Settlement Officer's rates in the instances in which they exceed the one-fourth net produce as calculated by him.

5. I support the proposals of the Settlement Committee in paragraph 17 of their proceedings for reduction of the rates on first and second class soils in Assessment Tract 4 and for the enhancement of the rates on first and second class soils in Tracts 6 and 7 and on the lowest class soil in Tracts 11 and 14. These changes will result in a small increase in the total assessment and will give a more equitable distribution of the demand. I agree with the Committee that the rates proposed by the Settlement Officer for the small areas under special crops and other miscellaneous cultivation are suitable.

6. The Settlement Committee have not recorded their opinion on the proposal in paragraph 215 of the Report that the rates on dry crops in the areas in the district outside settlement should be assimilated to the rates recommended for these crops in the settled area of the district. The Settlement Commissioner will be further consulted on this proposal.\*

7. The proposals of the Settlement Officer (paragraph 217) for the assessment of double cropped areas are suitable. I agree with him (paragraph 220) that solitary fruit trees should be exempt from assessment in future.

8. Action will be taken, as recommended in paragraph 230 of the Report, to apply Land Revenue Rule 77, relating to fallow assessments, to all *kwins* in which the flooded classes of paddy land (R.-4 and R.-5) are found.

9. As proposed by the Settlement Committee, the revised rates may suitably be notified for a term of twenty-one years in the area in which the term of the existing rates expires on 30th June 1917, and for a term of twenty years where the present rates continue in force until the 30th June 1918.

10. Mr. McCallum has made a detailed and careful study of the agricultural conditions of the district in the course of re-settlement, and whilst the premises on which his revised rates are based are not entirely correct, I regard his conclusions as sound on the whole.

7th March 1917.

H. THOMPSON,  
*Financial Commissioner.*

**Proceedings of the Committee assembled at Rangoon on the 3rd and 4th July 1916 to consider the Report by Mr. J. L. McCallum, I.C.S., on the Third Settlement of the Tharrawaddy District, season 1913—15.**

**PRESENT.**

MR. R. E. V. ARBUTHNOT, I.C.S., *Commissioner of Settlements and Land Records, Burma.*

THE HON'BLE LIEUT.-COL. E. C. TOWNSEND, I.A., *Commissioner, Pegu Division.*

LIEUT.-COL. F. R. NETHERSOLE, I.A., *Deputy Commissioner, Tharrawaddy.*

MR. J. L. MCCALLUM, I.C.S., *Deputy Commissioner, Pakôkku.*

MR. A. P. P. L'ESTRANGE, *Superintendent of Land Records, Tharrawaddy.*

**Review.**

1. This report deals with the settlement of so much of the Tharrawaddy district as is at present under supplementary survey. The total area of the district is 2,863 square miles. The eastern portion of the district is, however, occupied by the Pegu Yoma running from north to south and largely covered by reserved forests, while in the west of the district, between the Myitmaka and the Irrawaddy, are large areas of swamps which are at present unculturable. The area under supplementary survey dealt with in the report comprises, therefore, less than half the district and amounts only to 1,285 square miles

2. The present is the third settlement of the Tharrawaddy district. At previous settlements, the district has been dealt with in a fragmentary fashion. The first settlement extended over four years and was carried out by Mr. (now Sir Harvey) Adamson between 1880 and 1884, the results of each year's work being embodied in a separate report and separately dealt with. The first settlement was confined to the area in the centre of the district lying on both sides of the railway. The second settlement of the Tharrawaddy district was undertaken by Mr. E. A. Moore, I.C.S., in 1900—02 the southern portion consisting of the Minhla and Letpadan Townships as then constituted in the year 1900-01 and the northern portion consisting of the Tapun (now Nattalin) and Gyobingauk townships in 1901-02. The work of each year was dealt with in a separate report. The new rates in the former area were notified for 15 years from the 1st of July 1902 and expire on the 30th of June 1917. The rates in the latter area were notified from the 1st of July 1903 for a similar period and expire on the 30th of June 1918. The gross area dealt with by Mr. Moore amounted to 1,039 square miles. In 1903-04 a further portion of the district comprising an area of 75 square miles on the west of the district between the Irrawaddy and the Myitmaka and a small area of 12 square miles in the eastern portion of the district adjoining the area already settled, was brought under settlement by Messrs. Webb and MacKenna. The new rates for these areas were notified for 13 years from the 1st of July 1905 and expire on the 30th of June 1918.

3. The gross area dealt with in the present report as already stated, amounts to 1,285 square miles, and comprises the whole of the area dealt with in 1900—04 together with certain areas, amounting altogether to some 150 square miles, adjoining the areas previously settled, which are now brought under settlement for the first time. The expansion of cultivation in the district during the past 40 years is indicated by the fact that the total occupied area dealt with at the first settlement amounted to 277,816 acres; the occupied area dealt with in 1900—04 was 421,449 acres,

while the occupied area dealt with in the present report is 509,398 acres comprising 62 per cent. of the whole present settlement area.

4. The area now settled consists of two separate blocks, the main portion containing a gross area of 1,165 square miles comprising the whole of the central portion of the district from the northern to the southern boundary and lying on both sides of the railway line. On the east, this tract includes the low hills which form the foot of the Pegu Yoma, interspersed with patches of fertile soil, and with laterite ridges in the vicinity of which the soil is bare and sandy. The central and main portion of the tract, extending from the hills to the railway line, is a flat and fertile plain with deep alluvial soil. West of the railway line, the land falls towards the Myitmaka river, which rises from an independent source just within the Prome district, and throughout the whole length of the Tharrawaddy district runs parallel to the Irrawaddy for which it serves as an escape channel, when the river is in flood. The tract is drained by streams running from east to west and falling into the Myitmaka. In the south of the district, the streams have well defined beds throughout their course, but in the centre and the north of the district while the streams have well defined beds east of the railway, west of the railway, where the water is held up by the spill of the Irrawaddy into the Myitmaka, their beds silt up and the streams divide and lose themselves in large stretches of stagnant or slow-moving water. The whole area west of the railway in the north and centre of the district is, therefore, liable to flood both from these streams and from the Myitmaka, and cultivation is precarious. The second and smaller block, containing some 120 square miles, comprises a portion of the area in the west of the district between the Myitmaka and the Irrawaddy. Mr. Webb described this area as a gentle slope extending downwards from the east bank of the Irrawaddy to the valley of the Myitmaka, the uniformity of which was broken by a slightly elevated discontinuous ridge, which operated, though imperfectly, as a watershed between the two rivers. Mr. McCallum remarked that there is no appreciable watershed between the two rivers. The Myitmaka in fact serves in the rainy season as an escape channel for the Irrawaddy water. When the Irrawaddy is in flood a large body of its water makes its way into the Myitmaka which then overflows its banks, thus rendering the whole area between the Myitmaka and the Irrawaddy liable to inundation. The settlement area may therefore be divided broadly into three tracts running parallel to each other from north to south distinguished by differing physical characteristics. On the east lies the strip of broken country at the foot of the Pegu Yoma, in the centre is the fertile paddy plain lying on both sides of the Rangoon-Prome railway line, while on the west, on the banks of the Myitmaka and between the Myitmaka and the Irrawaddy is the flooded land.

5. The annual flooding of the land is gradually effecting the reclamation of these areas by the deposit of the silt contained in the flooded waters. The reclamation, however, proceeds slowly. Mr. Moore noted that in the period that had elapsed between the first and second settlements, the permanent flood line east of the Myitmaka had receded westward for an average rate of about a mile. It now appears to be receding more slowly. The Settlement Officer notes that throughout the whole flooded area cultivation is proceeding faster than reclamation, and that much of the extension of cultivation since the last settlement is on land only partially reclaimed, on which cultivation is precarious. Altogether, he estimates that out of 509,398 acres, 138,573 acres or 27 per cent. are subject to floods.

6. So far as this flooding is due to the silting up of the beds of the streams draining into the Myitmaka from the Yoma, schemes have, after much discussion, been adopted for the double embankment of most of these streams. The main object of this work is to facilitate log extraction and the experiment is being conducted by the Forest Department. It is hoped to maintain sufficient velocity in the current to the stream beds and carry the silt and material in suspension past the ends of these embankments into these lakes that exist at the junction with scour the Myitmaka. Deposition owing to decrease of the velocity will result



eventually in these areas being reclaimed. Incidentally the area behind these embankments will in most cases be immediately protected against floods. So far the schemes are proving successful. The protection of the area from the flooding of the Irrawaddy and Myitmaka is a more difficult problem since it is affected by the general question of the policy to be followed in embanking the Irrawaddy in the delta. It was decided in 1882 that to prevent possible obstruction in cultivation and to secure the stability of the already existing embankments on the west bank of the Irrawaddy, all lands to the east of the Irrawaddy should remain unprotected. Cultivators were, however, permitted without interference to construct bunds to protect their lands. These bunds gradually increased in size and number and by 1899 a bund from two to three feet high had been erected along the bank of the Irrawaddy for a distance of several miles from Paukkôn northwards to Aingtalôk. North of Aingtalôk, there was no regular embankment, but the cultivation was protected by *kazins* of unusual size. Between 1899 and 1901, large schemes for the extension of protection were organized. The Public Works Department, however, intervened and eventually the policy of 1882 was reaffirmed; all fresh embankment extensions were stopped, and the strengthening or raising of the existing bunds was prohibited. The main embankment was destroyed by extensive floods in 1905 and 1906, but was to some extent repaired in the following years. In 1909, Government passed orders permitting the construction of embankments provided the height was not above the 1906 flood level. The existing bunds are shown by the Settlement Officer on Map No. 2 appended to his report. A portion of the area between the Irrawaddy and the Myitmaka is now protected by bunds running from Paukkôn (the terminus of the old bund) to Kabaing, a village situated on the *Zalôkgyi chaung*, an outlet channel of the Irrawaddy leading into the Myitmaka. Further north, between *Zalôkgalay* another small channel and the *Myitmaka chaung* which is the most important of the three channels another similar bund has been erected. Proposals to close the first two channels have, however, been vetoed by the authorities. So long as the channels remain open, these embankments can only afford partial protection from direct flood by the Irrawaddy, and the lands still remain subject to flooding from the Myitmaka, which through these channels continues to receive the spill of the Irrawaddy. The whole question of embanking the east bank of the Irrawaddy is at present under discussion in connection with the report on the feasibility of double embanking in the Upper Delta of the Irrawaddy prepared recently by Mr. B. M. Samuelson. Meanwhile, the whole area lying along both sides of the Myitmaka and between the Myitmaka and the Irrawaddy must be regarded as liable to flood.

7. The population of the settlement area is estimated at 394,691 giving a density of 290 to the square mile. The district is

**General conditions.**

mainly agricultural; there are no large towns, and 79 per cent. of the population are engaged in agriculture. The climate is good, extremes of heat and cold being absent, but malarial fever is prevalent to a slight extent in the terai country in the east. Good drinking water is, however, hard to obtain, the supply being from wells and tanks which, in the hot weather, yield a very scanty supply of turbid water. Good tube wells, however, exist in some of the towns and more will be sunk as funds are available. Rainfall is generally timely and sufficient though lighter in the north than in the south. The only crop of importance is rice, which accounts for 96 per cent. of the cropped area. The main trade of the settlement area is the export of the rice crop, mainly as paddy, though there is a substantial and gradually increasing export of husked rice from local mills. Communications are good. The main line of railway from Rangoon to Prome and the Rangoon-Prome road with numerous feeder roads connecting with the railway stations run right through the central area from south to north, while in the west, the branch railway to Henzada and Bassein runs across the riverine area and connects it with the main line. The Irrawaddy and the Myitmaka also provide communication by boat for the tracts along their banks.

8. The total occupied area is 509,398 acres or 62 per cent. of the total settlement area. In the central plain cultivation has generally reached its limit and there is little scope for

**Agricultural conditions.**

extension. Extension in the flooded area in the future will depend partly on its gradual reclamation by the deposit of silt, which is naturally slow, and partly on the extent to which the land can be protected from flooding. Throughout the district the small holder predominates and there are very few large estates. The figures given in paragraph 65 of the report show that out of 7,356 cultivators examined 52 per cent. worked only one yoke of oxen, which for the settlement area is estimated at an average of 8.73 acres; 35 per cent. two yoke of oxen and only 12 per cent. three yoke of oxen or more. The average area worked by the cultivators examined in regard to cost of living and cost of cultivation is about 15 acres for the whole district. If the figures for the different parts of the settlement area are examined, the average holding area is highest in the central part of Tharrawaddy township with 22 acres and lowest in the Nattalin township with 11 acres.

9. One hundred and ninety-four thousand five hundred and sixty-eight acres or 38 per cent. of the occupied area are rented, as compared with 21 per cent. in 1900-01, the first year of last settlement. The average tenant holding is 11 acres. Only 12 per cent. of the tenants had worked their lands for five years or more; 45 per cent. had worked their lands for only one year. Rents are high and take the form of fixed produce rents. The proportion of the gross produce generally demanded appears to vary from one-third to one-half. The rents so fixed are, however, often nominal and represent a certain proportion of the gross outturn which may be obtained from the holding in a good year. If the outturn falls below this amount, the rent actually paid is often less than the amount nominally agreed upon. The following statement shows the money value per acre of the rents paid in the different tracts:—

Assessment Tracts.	Percent- age of the occupied area rented.	Settlement Officer's figures,					Mixed holding.	Land Records figures.
		Single soil holdings.						
		Soil class.						
		1	2	3	4	5		
1	2	3	4	5	6	7	8	9
A.—Plains Tracts.								
2	61	Rs. 14	Rs. 13	Rs. 5	Rs. 11	Rs. 7	Rs. 13	Rs. 17
5	50	17	14	13	12	8	15	21
9	35	16	11	9	11	9	13	18
11	37	11	9	7	8	4	10	18
13	30	12	9	6	..	...	11	14
14	24	9	8	6	6	5	7	10
B.—Broken Tracts.								
1	36	...	8	...	...	...	...	12
4	31	8	10	6	...	...	9	21
8	40	10	8	5	...	...	8	11
10	44	12	8	5	...	...	9	11
12	25	8	5	4	..	...	6	6
C.—Riverine Tracts.								
3	20	...	5	...	...	...	...	9
6	25	...	9	6	...	...	7	9
7	17	...	9	3	...	...	7	7

The Settlement Officer's figures show the money value of the rents actually paid at the time of settlement, converted into money at the deduced prices calculated on a 20 years' average. In the last column is shown the average rental value in each tract as calculated by the Land Records staff. These figures show the actual value of the rent paid, converted into money at the actual price prevailing at the time of payment. These Land Records figures must, however, be accepted with reserve. As the Settlement Officer points out the revenue surveyors frequently record the rent nominally agreed on and not the rent actually paid. The figures may also include some privileged rents. Further in comparing the Land Records figures for the different tracts, it must be borne in mind that the Settlement Officer's figures for the tracts in the south of the area are for 1913-14 and for the tracts in the north and west for 1914-15, and that the prices prevailing in 1914-15 were considerably lower than in the previous year. The same factor has also to be considered in comparing the money value of the rents recorded by the Land Records staff in the various years during the term of settlement, as shewn in Statement 5. The Settlement Officer has recorded the total rents for mixed holdings, but has not, as has been done in other recent reports, deduced the proportionate rates for each class of soil. Hence the rent rates shown are for single soil holdings only. While the area of such holdings is fairly large in certain of the tracts, especially in the better soil classes in the central plain tracts, the area of such holdings in other tracts, and for the poorer classes of soil generally is very limited. In all tracts mixed soil holdings preponderate, and the figures for the rents of such holdings relate to a far larger area than the figures for the rents of single soil holdings, and the proportionate rates deduced from them serve as a useful check on the rates obtained for single soil holdings. The general conclusion to be arrived at from a study of the figures is that the rates are undoubtedly high especially in the central plains tracts, though comparison with the rents paid in the adjoining district of Henzada hardly bears out the Settlement Officer's statement that they are the highest in Lower Burma. It is also clear that there has been a considerable rise in the pitch of rents since last settlement. It seems further to be clear that rents have not yet arrived at economic stability, a conclusion which is supported by the large number of tenants who only hold the land for one year, indicating that the landlord lets the land annually to the highest bidder. The figures for rents are useful as a standard of comparison to check the proposed rates. It is impossible to base rates on rental value.

10. There has been a considerable rise in sale values since last settlement.

Sale and mortgage values.

The following statement shows the recorded values per acre in the different tracts :—

Land Records figures (Statement 6).				Settlement Officer's figures (Statement 17).		
A.—Plains Tracts.	1900—02.	1913—15.	...	...	1913—15.	
2	31	68	...	...	72	
5	34	82	...	...	88	
9	28	68	...	...	72	
11	13	88	...	...	86	
13	24	92	...	...	103	
14	20	52	...	...	61	
B.—Hill Tracts.						
1	10	36	...	...	38	
4	30	47	...	...	40	
8	12	35	...	...	34	
10	11	44	...	...	52	
12	...	49	...	...	43	
C.—Riverine Tracts.						
3	...	16	...	...	18	
6	21	40	...	...	39	
...	16	45	...	...	45	



extension. Extension in the flooded area in the future will depend partly on its gradual reclamation by the deposit of silt, which is naturally slow, and partly on the extent to which the land can be protected from flooding. Throughout the district the small holder predominates and there are very few large estates. The figures given in paragraph 85 of the report show that out of 7,356 cultivators examined 52 per cent. worked only one yoke of oxen, which for the settlement area is estimated at an average of 8.73 acres; 35 per cent. two yoke of oxen and only 12 per cent. three yoke of oxen or more. The average area worked by the cultivators examined in regard to cost of living and cost of cultivation is about 15 acres for the whole district. If the figures for the different parts of the settlement area are examined, the average holding area is highest in the central part of Tharrawaddy township with 22 acres and lowest in the Nattalin township with 11 acres.

9. One hundred and ninety-four thousand five hundred and sixty-eight acres or 38 per cent. of the occupied area are rented, as compared with 21 per cent. in 1900-01, the first year of last settlement. The average tenant holding is 11 acres. Only 12 per cent. of the tenants had worked their lands for five years or more; 45 per cent. had worked their lands for only one year. Rents are high and take the form of fixed produce rents. The proportion of the gross produce generally demanded appears to vary from one-third to one-half. The rents so fixed are, however, often nominal and represent a certain proportion of the gross outturn which may be obtained from the holding in a good year. If the outturn falls below this amount, the rent actually paid is often less than the amount nominally agreed upon. The following statement shows the money value per acre of the rents paid in the different tracts:—

Assessment Tracts.	Percent- age of the occupied area rented.	Settlement Officer's figures.					Mixed holding.	Land Records figures.
		Single soil holdings.						
		Soil class.						
		1	2	3	4	5		
1	2	3	4	5	6	7	8	9
A.—Plains Tracts.								
2	61	Rs. 14	Rs. 13	Rs. 5	Rs. 11	Rs. 7	Rs. 13	Rs. 17
5	50	17	14	13	12	8	15	21
9	35	16	11	9	11	9	13	18
11	37	11	9	7	8	4	10	18
13	30	12	9	6	..	...	11	14
14	24	9	8	6	6	5	7	10
B.—Broken Tracts.								
1	36	...	8	...	...	...	...	12
4	31	8	10	6	...	...	9	21
8	40	10	8	5	...	...	8	11
10	44	12	8	5	...	...	9	11
12	25	8	5	4	..	...	6	6
C.—Riverine Tracts.								
3	20	...	5	...	...	...	...	9
6	25	...	9	6	...	...	7	9
7	17	...	9	3	...	...	7	7

The Settlement Officer's figures show the money value of the rents actually paid at the time of settlement, converted into money at the deduced prices calculated on a 20 years' average. In the last column is shown the average rental value in each tract as calculated by the Land Records staff. These figures show the actual value of the rent paid, converted into money at the actual price prevailing at the time of payment. These Land Records figures must, however, be accepted with reserve. As the Settlement Officer points out the revenue surveyors frequently record the rent nominally agreed on and not the rent actually paid. The figures may also include some privileged rents. Further in comparing the Land Records figures for the different tracts, it must be borne in mind that the Settlement Officer's figures for the tracts in the south of the area are for 1913-14 and for the tracts in the north and west for 1914-15, and that the prices prevailing in 1914-15 were considerably lower than in the previous year. The same factor has also to be considered in comparing the money value of the rents recorded by the Land Records staff in the various years during the term of settlement, as shewn in Statement 5. The Settlement Officer has recorded the total rents for mixed holdings, but has not, as has been done in other recent reports, deduced the proportionate rates for each class of soil. Hence the rent rates shown are for single soil holdings only. While the area of such holdings is fairly large in certain of the tracts, especially in the better soil classes in the central plain tracts, the area of such holdings in other tracts, and for the poorer classes of soil generally is very limited. In all tracts mixed soil holdings preponderate, and the figures for the rents of such holdings relate to a far larger area than the figures for the rents of single soil holdings, and the proportionate rates deduced from them serve as a useful check on the rates obtained for single soil holdings. The general conclusion to be arrived at from a study of the figures is that the rates are undoubtedly high especially in the central plains tracts, though comparison with the rents paid in the adjoining district of Henzada hardly bears out the Settlement Officer's statement that they are the highest in Lower Burma. It is also clear that there has been a considerable rise in the pitch of rents since last settlement. It seems further to be clear that rents have not yet arrived at economic stability, a conclusion which is supported by the large number of tenants who only hold the land for one year, indicating that the landlord lets the land annually to the highest bidder. The figures for rents are useful as a standard of comparison to check the proposed rates. It is impossible to base rates on rental value.

10. There has been a considerable rise in sale values since last settlement.

**Sale and mortgage values.**

The following statement shows the recorded values per acre in the different tracts :—

Land Records figures (Statement 6).				Settlement Officer's figures (Statement 17).		
A.—Plains Tracts.	1900—02.	1913—15.	...	...	1913—15.	
2	31	68	...	...	72	
5	34	82	...	...	88	
9	28	68	...	...	72	
11	13	88	...	...	86	
13	24	92	...	...	103	
14	20	52	...	...	61	
B.—Hill Tracts.						
1	10	36	...	...	38	
4	30	47	...	...	40	
8	12	35	...	...	34	
10	11	44	...	...	52	
12	...	49	...	...	43	
C.—Riverine Tracts.						
3	...	16	...	...	18	
6	21	40	...	...	39	
...	16	45	...	...	45	

The above figures show that in the central plains tracts, excluding the tract of comparatively poor land in the north-west of the district, the values range from Rs. 72 to Rs. 103 per acre as compared with Rs. 13 to Rs. 34 in 1900-02. The sale value has, in fact, doubled and in some cases trebled since the last settlement. In the tracts along the foot of the hills, the values range from Rs. 34 to Rs. 52. In the riverine tracts, the sale values are lowest in the small flooded tracts in the south-west. In the other two tracts, the values range from Rs. 39 to Rs. 45. The sale values obtained from the figures recorded by the Land Records staff coincide fairly closely with the figures recorded by the Settlement Officer. The mortgage values recorded in Statement 7 must, as usual, be accepted with a good deal of reserve. Generally, however, they indicate a considerable rise since last settlement. The figures in Statement 17 show that only 12 per cent. of the total area is mortgaged, a fact which supports the conclusion that the total amount of indebtedness is not large.

**11. Mr. Moore** found that on the whole the condition of the cultivating classes was one of substantial comfort, and the present report shows that their standard of living has increased materially during the past fifteen years.

General condition of agricultural classes. It is highest in the plains tracts in the south and centre of the district where the average annual expenditure of Burman owners and owner-tenants varies from Rs. 315 to Rs. 357. It is somewhat lower in the tracts which lie along the foot of the Yoma and in the riverine tracts. It must be remembered that in both these tracts the agricultural income is supplemented by income from subsidiary occupations, in the former case from extraction of forest produce and in the latter case from fishing and rafting. The standard of living of tenants is generally rather lower than that of owners, but as a class they appear to maintain a fair standard of comfort. The details given in paragraph 23 of the report show a very large increase in the importation of luxuries as compared with ten years previously. The amount of indebtedness does not appear to be serious, though there is a good deal of floating debt. As the Settlement Officer points out the average Burman family not only spends all its available income but uses the credit of next year's income to live on for the last few months of the year. In other words, the agriculturist in I harrawaddy, like other agriculturists elsewhere, lives to a great extent on credit.

Effect of last Settlement.

**12.** The total enhancement of revenue at the previous settlement was as follows :—

	Percentage.
For the area settled in 1900-01 .. .. .	46.71
For the area settled in 1901-02 ... .. .	25.00
For the area settled in 1903-04 ... .. .	53.63

In the two areas settled in 1900-02 which comprise between them by far the greater portion of the district, the settlement has undoubtedly proved successful. The price of paddy, except in one year, has been higher than the price assumed at settlement, while the increase in the standard of living and in the sale value of land, and the general prosperity of the agricultural population, all indicate that the revised demand was moderate and well within the capacity of the people.

As regards the area settled in 1903-04, the Settlement Officer considers that the rates imposed were unduly high in comparison with the rates imposed in the remainder of the district. The statement in paragraph 90 of the report that in 1903-04 the assumed prices were based on a Rangoon price of Rs. 100 is not altogether correct. It should, in the first place, be qualified by the further statement that this was for a basket not of 46 lb. but of 50 lb. The Rangoon price taken by Mr. Webb was in fact the same as the price taken by Mr. Moore in 1900-01. Mr. Webb, however, in the end based his assumed prices, not on the Rangoon price but on the locally recorded prices. His prices were in fact very little higher than the prices assumed by Mr. Moore in 1900-01. It appears moreover that only in three years since the settlement was sanctioned has the actual price been below the price assumed at settlement, and the Settlement Officer

admits that the price assumed was moderate. It is true that the rates eventually sanctioned by the Local Government were considerably in excess of the rates proposed by the Settlement Officer as will be seen from the following table —

Tract.	Soil class.	Rates proposed by Settlement Officer.	Sanctioned
		Rs	Rs
I ... }	1	2.50	3.00
	2	1.25	1.75
II .. }	1	2.25	2.75
	2	1.125	1.50
III .. }	1	2.75	3.25
	2	1.875	2.25
IV ... }	1	2.50	3.00
	2	1.75	2.00

The effect of the sanctioned rates was to increase the enhancement obtained by the revision of the settlement from 28.66 per cent as originally proposed by the Settlement Officer to 53.53 per cent. The sanctioned rates, however, as already noted, were based on prices which were admittedly moderate and represented a proportion of the nett produce amounting to one-eighth and in the precarious tracts to one-tenth of the nett produce as compared with one-sixth in the rest of the district. On the other hand they were based on assumed outturns which were undoubtedly high while the resulting rates were certainly high as compared with the rates imposed in the remainder of the district. Unfortunately, by a regrettable oversight, the demand was from the first collected at the full sanctioned rates instead of being tempered by intermediate rates during the first five years. Further, the Settlement Officer in classifying the tract, had assumed that a considerable portion of the area would be permanently protected from flooding by the Aingtalök-Paukkön embankment. This embankment was however destroyed by the high floods of 1905 and 1906 shortly after the introduction of the new settlement. In these circumstances, the new rates must undoubtedly have pressed hardly on the people. A considerable relief was, however, afforded in 1910 by the reduction of the classification of some 10,000 acres from the first to the second class. The people are stated by the Settlement Officer to be poor, but the standard of living, judging from the statistics of cost of living, though certainly lower than in the plains tracts, is not appreciably less than in the tracts along the foot of the hills. The fact that cultivation has increased in the area to some extent is discounted by the fact that there is an increase in the gross area and that a good deal of land has been taken up speculatively in the hope that an extension of the present bunds would be sanctioned. It can, however, at any rate be said with confidence that the rates imposed in spite of the circumstances above referred to did not result in reducing the cultivated area. On the whole, there seems no reason to suppose that, with the relief afforded by the reduction of classification, the present settlement presses with undue severity on the people.

13. In the portion of the district settled in 1900-01, the area was divided into four soil tracts containing in all four grades of soil, a first class soil producing 40 baskets, a slightly inferior soil producing 35 baskets, a flooded soil class for which no outturn was assumed, and an inferior sandy soil for which the assumed outturn was 25 baskets. No one tract contained all four classes, as the sandy soil and the flooded soil did

not occur together in any one tract. The bulk of the area, comprising the whole of the central plain in the south of the district, fell into soil tract I with assumed outturns of 40 and 35 baskets. The total area of flooded land in this tract was only about 10,000 acres. In the portion of the district settled in 1901-02, the Settlement Officer formed four soil tracts of which the first three included the deltaic alluvial plain, while the fourth consisted of four *kwins* west of the Myitmaka in the north-west corner of the district. In the first three tracts, outturns of 42 and 35, 40 and 30 and 40 and 25 baskets were assumed on first and second class land with in addition a flooded class, for which no outturn was assumed. In soil tract IV, two soil classes were formed with an outturn of 30 and 25 baskets. In the area settled in 1903-04, the Settlement Officer formed three soil tracts, each tract containing two soil classes. In tracts A and C outturns of 40 and 25 baskets were assumed. In tract B, outturns of 45 and 35 baskets. No general reclassification of the soil was attempted at the revision settlement. Mr. McCallum has now divided the whole area into fourteen primary tracts each of which consists of a block of contiguous *kwins* with common physical and economic characteristics. These tracts fall into three main divisions. Tracts 2, 5, 9, 11, 13 and 14 comprise the central plain; tracts 1, 4, 8, 10 and 12 comprise the broken area situated along the foot of the Yoma, while tracts 3, 6 and 7 comprise the flooded riverine areas west of the Myitmaka. The soil has been reclassified throughout. The embanked rice land has been formed into five classes, two of which are confined to flooded lands. On ordinary classified land, there are three classes roughly corresponding to the best, the medium and the poorest land in each tract. In two small tracts (Tracts 1 and 3) the land has not been classified and all forms a single class. The assumed outturns for the various soil classes differ for each tract. The tracting and soil classification are described in paragraphs 104 to 108 of the report. The revised system of tracting adopted in conformity with the system followed in other recent settlements in adjoining districts necessarily involved some reclassification of the soil. In any case, however, extensive reclassification would have been necessary in view of the fact that the existing soil classification dated back to thirty years ago and was then carried out on very broad lines and that considerable physical changes had taken place since it was made. The introduction of third class comprising the poorest soil has effected a very considerable improvement in the classification, providing greater elasticity and enabling the poorest land to be assessed at suitable rates without undue sacrifice of revenue. We consider that the Settlement Officer's tracting and classification are suitable and may be accepted.

14. The following table compares the average outturn as ascertained by crop measurements with the outturn assumed by the Settlement Officer for each tract :—

Assessment Tract.	Average acre outturn according to crop measurements.					Assumed outturn.				
	Soil class.					Soil class.				
	1	2	3	4	5	1	2	3	4	5
I	2	3	4	5	6	7	8	9	10	11
				<i>A.—Central Plains Tracts.</i>						
2	37'71	34'06	33'21	34'16	30'62	39	34	29	38	25
5	43'30	38'83	36'03	40'55	37'98	43	38	33	38	25
9	43'38	35'40	28'30	34'56	31'58	45	36	30	38	25
11	34'95	29'69	22'31	31'68	22'43	39	34	28	32	25
13	39'05	34'77	24'81	...	...	39	35	28	...	...
14	35'77	28'60	22'75	29'99	31'80	38	33	23	32	25



Assessment Tract.	Average acre outturn according to crop measurements.					Assumed outturn.				
	Soil class.					Soil class.				
	1	2	3	4	5	1	2	3	4	5
I	2	3	4	5	6	7	8	9	10	11
<i>B.—Hill Tracts.</i>										
1	39'51	...	...	...	...	36	...	...	...	...
4 } 8 } 10 } 12 }	42'50	34'61	28'60	...	...	42	35	28	...	...
<i>C.—Riverine Tracts.</i>										
3	27'02	...	..	...	...	28	..	...	...	...
6 } 7 }	32'05	28'40	...	..	...	{ 35 35	25 25	} ..	...	...

It will be seen that in certain of the tracts, the outturn assumed by the Settlement Officer is somewhat higher and in some cases considerably higher than the outturn as ascertained by crop reapings. Where this is the case, the figures of the assumed outturn are shown in italics. The question of outturns is dealt with by the Settlement Officer in paragraphs 110 to 117 of his report. The outturns assumed for individual tracts are also discussed in dealing with the rates proposed for that tract. Crop cuttings were carried out on a very extensive scale and though a considerable percentage amounting to 26 per cent. were subsequently rejected as abnormal, the average as tabulated embodied the results of no less than 3,335 reapings. The Settlement Officer expresses the view that the admitted outturns are a better guide to fertility than crop measurements, a view in which the Committee are not disposed to agree without considerable reservation. The Settlement Officer himself admits that the fertility of the admitted outturns is dependent on the condition that the truth of the admission can be assured, which involves in itself a very considerable assumption. It may be accepted that the cultivator rarely, if ever, overstates the outturn of his holding and where the admitted outturn is equal to or greater than the assumed outturn, it affords a valuable support of the assumption. Understatement of outturn is however the immemorial defence of the cultivator against overassessment, and admitted outturns, which fall considerably below the outturns as ascertained by measurement, must be accepted with caution. The Settlement Officer argues that it is impossible to draw reliable conclusions from the outturns of individual fields. But the assumed outturns are based not on the outturns of individual fields but on the consideration of the average of the outturns of a very large number of fields. The reliability of the deductions from the outturns taken as a whole is, in fact, shown to some extent by the results of the experiment described in paragraph 112, when although the individual fields showed considerable variation of outturn, the general average of the outturns of all the fields in each class gave a mean outturn which could be accepted as fairly representing the average outturn of that class. In paragraph 116, the Settlement Officer justifies the cases in which assumptions have been taken higher than the outturns indicated by the average of the crop measurements. In most of the tracts in which the assumed outturn is higher than the average outturn as ascertained by crop measurements, the higher assumptions are supported by the admitted outturn. This, however, is not the case in tracts 11 and 14 where the outturns on mixed soil classes at assumed

rates are 10·13 and 21·40 per cent. respectively above the admitted outturns. The outturns, however, now assumed in these tracts are less than those assumed at last settlement; the season was poor and we consider that the conclusions of the Settlement Officer, which are based on his knowledge of the tract and are justified by the reasons explained by him, may be accepted.

15. Mr. Moore divided the area settled by him in 1900-01 into three price or carriage tracts with assumed prices of Rs. 80, Rs. 76 and Rs. 70 based on a Rangoon price of Rs. 92 per 100 baskets of 46 lbs. equivalent to Rs. 100 per 100 baskets of 50 lbs. which he assumed as the standard weight of a basket of paddy in the Tharrawaddy district. The area settled by him in 1901-02 was similarly divided by him into three price tracts with assumed prices of Rs. 70, Rs. 66 and Rs. 62. These prices, however, were based not on the Rangoon price but on the local prices recorded by the Land Records staff. The area settled in 1903-04 was divided by the Settlement Officer into three price tracts with assumed prices of Rs. 85, Rs. 80 and Rs. 70 based on the locally recorded retail prices. Mr. McCallum has not divided the area into price tracts but has assumed a separate price for each of his primary tracts. Taking the average price of paddy during the first 13 weeks in each year for a period of 20 years as recorded in the *Burma Gazette*, he obtains a price at Rangoon averaging Rs. 103·26 per 100 baskets weighing 46 lbs. except for the three riverine tracts from which the paddy is exported to Rangoon by boat for which a slightly higher price of Rs. 104·47 is taken. In place of the general average weight of 50 lb. assumed at last settlement for the whole district, the Settlement Officer assumes a weight of 51 lbs. for the four tracts in the south, 50 lbs. for the four tracts in the centre and 48 lbs. for the three tracts in the north and for the three riverine tracts, and thus arrives at equivalent Rangoon prices of Rs. 116·17, Rs. 113·58, Rs. 109·69 and Rs. 108·42 for the four groups. From these amounts he deducts Rs. 11·39 per 100 baskets for handling, merchant's profits and loss in transit, for which items Mr. Moore in 1900-01 assumed a deduction of Rs. 8. For the riverine tracts the deduction made is Rs. 9·60 per 100 baskets. From the nett amounts thus arrived at the Settlement Officer has deducted the cost of carriage including the cart hire from the *kwin* to the railway station or shipping place to which it exports and the cost of carriage by rail or boat. On this basis, he obtains an assumed price for each of the fourteen primary tracts ranging from Rs. 67 to Rs. 94. The deductions have been calculated on a liberal basis and the prices assumed are favourable to the cultivator, but we think the prices assumed by the Settlement Officer may be accepted.

16. The Settlement Officer has calculated the cost of cultivation in two ways, the results of which are tabulated in Statements 12 and 12A. The figures recorded in Statement 12 show the average actual out-of-pocket expenses incurred by the cultivator, without making any allowance for the value of the labour done by himself or his family. The figures thus recorded range from Rs. 13·07 to Rs. 16·35 in the plains tracts, from Rs. 9·10 to Rs. 17·90 in the broken tracts, along the foot of the Yoma, and from Rs. 9·49 to Rs. 16·20 in the riverine area. The average for the whole settlement area is Rs. 14·36. The cost of cultivation for owners is, as might be expected, somewhat higher than that for tenants; the average for the whole area being Rs. 15·03 for owners and Rs. 12·88 for tenants.

These figures approximate fairly closely to the figures of cost of cultivation excluding the value of the cultivator's own labour obtained by Mr. Grant in the Pegu district. The Settlement Officer, however, expresses the view that the reliability of results arrived at by the examination of individual cultivators is doubtful, arguing that the cultivators examined are never representative and that this method of arriving at the cost of cultivation increases the taxation upon the industrious and thrifty while it lets off lightly the extravagant and lazy. It may, however, be noted that the results obtained show not the cost of cultivation of any individual cultivator, but the average cost incurred by several cultivators, and that if a sufficient number of cultivators are examined in each tract, their



numbers will include men of varying degrees of industry and thrift and figures should yield results from which a fair average figure representing the average cost of cultivation per acre in the tract can be deduced. The Committee fail to follow the Settlement Officer in his further statement that the prescribed method in arriving at the cost of cultivation increases the taxation upon the industrious and thrifty. The statement is certainly not true as regards the individual labourer in a tract since the rates are based not on individual statements but on the general average deduced from a consideration of all the statements. The statement is to some extent true as between different tracts, but the fact that this is the case has long been recognised and has been provided for either by varying the proportion of produce taken and taking a lower proportion of the nett produce in those tracts in which the cultivators provide more labour themselves, or by making an allowance for the value of the cultivators' own labour. The Settlement Officer, however, has discarded the figure set forth in Statement 12 and has arrived at his assumed cost of cultivation by estimating the cost of cultivating the average area worked by a yoke of cattle, namely, 873 acres assuming that everything is paid for. The results are set forth in Statement 12A. By following this method, he has arrived at a cost of cultivation varying from Rs. 17'98 to Rs. 21'96 per acre. The objections to the method followed by the Settlement Officer are first that the figure of 873 acres is in itself an arbitrary figure, while in some cases, the allowance made for one yoke would be the same if two yoke were worked; *e.g.*, it appears excessive to estimate that a separate herd would be employed for every yoke of cattle, or that the cultivator would have a separate cart for each yoke of oxen that he possessed. The figures are, in fact, largely fictitious. The results are certainly very much in favour of the cultivator. Generally speaking, the results of Mr. McCallum's method are to produce a cost of cultivation which is somewhat higher than the rates which have been accepted in recent settlements in neighbouring districts. While regarding them as extremely favourable to the cultivator, they may, we consider, be accepted.

17. The Settlement Officer has, with one or two exceptions, based his rates on the standard of one-fourth of the nett produce, except for the flooded lands for which he proposes a standard of one-sixth. The proposals relating to the following tracts appear to call for notice. In Assessment Tract 1, which is a small tract in the hills on the east of the Tharrawaddy township consisting of seven *kwins*, the Settlement Officer proposes to take one-fifth of the nett produce with a rate of Rs. 2. The statistics recorded would perhaps justify a rate based on the normal standard of a quarter, but the tract is poor, and the rate is a general one since the land has not been divided into classes. Moreover, only 11 per cent. of the gross area is at present under cultivation and it seems advisable to encourage further extension by a moderate rate. In Assessment Tract 3 which is a small tract on the west bank of the Myitmaka consisting of six *kwins* for original settlement, the Settlement Officer proposes to reduce the present rate from Rs. 1'50 to Re. 1'00 involving a reduction of 33 per cent. on the existing revenue. The land is poor and liable to constant floods and the agricultural population is badly off. The Deputy Commissioner strongly supports the reduction and reports that the Subdivisional Officer, who also has considerable experience of the area, concurs in this view. The Committee recommend that the Settlement Officer's proposals be accepted. The total reduction in revenue will be only Rs. 721. In Assessment Tract 4, which is a tract of seven *kwins* in the east of Letpadan township, the existing rates are low; the highest rate paid at present being Rs. 2'375, while the bulk of the land pays rates varying from Re. 1 to Re. 1'75. The Settlement Officer has proposed rates of Rs. 4 for first class land, Rs. 2'50 for second class land and Re. 1 for third class land—the areas in the respective classes being :—

542 acres in the first class,  
1,650 acres in the second class,  
2,933 acres in the third class.

The total increase on the existing rate is Rs. 1,803 or 24 per cent. This is not in itself large, but the Committee are doubtful whether the increase in the rates for first and second class land is not somewhat heavy and whether it would not be better to fix the first and second class rates at Rs. 3.50 and Rs. 2.25 respectively. At these rates the increase will amount to Rs. 1,120 or 15.09 per cent. In Assessment Tracts 6 and 7, which are the two riverine tracts between the Myitmaka and the Irrawaddy, the Settlement Officer has proposed rates which involve a reduction of 12 per cent. in the existing revenue in Assessment Tract 7. It is not clear to the Committee that this reduction is justified. As has already been pointed out there is no reason to suppose that the existing rates are now pressing heavily on the people, while the prices assumed in the present report are moderate and liberal allowance has been made for cost of cultivation. The Committee are disposed to think that the case for the reduction of revenue has not been made out and they would suggest rates for—

					Rs.
First class land	...	...	...	...	2.50
Second class land	..	...	..	...	1.25

At these rates the demand on paddy land in these tracts will be Rs. 36,860 in Tract 6 and Rs. 10,322 in Tract 7 which practically maintains the existing demand. In Tract 11 the rate for class 5 should, we consider, be raised to Re. 1. The lowest rate at present levied on the tract is Rs. 1-4-0 and the reduction of four annas should give sufficient relief. This will raise the new demand to Rs. 2,44,464, an increase of 2,102 or .86 per cent. on the old revenue. In Assessment Tract 12 the increase on the existing demand is nominally very large, namely, 93 per cent. The area, however, is a small tract now coming under settlement for the first time. The present rates are nominal, *viz.*, 0.50 and 0.25.

The proposed rates are:—

					Rs.
For first class	...	..	..	...	2.50
For second class	..	...	...	...	1.25
For third class	...	...	...	.	0.50

These rates are in themselves very moderate and we think that they may be accepted. Only about half the land will pay the two higher rates, the bulk of the land which falls into the third class will be assessed at the lowest rate of Re. 0.50. In Tract 14 the rate on the lowest class should, as in Tract 11, be Re. 1. Subject to the above remarks, we think that the rates proposed by the Settlement Officer, which have evidently been carefully thought out, may be accepted.

18. The total area of cultivation other than paddy is small, amounting altogether to 18,593 acres, of which 11,214 are garden land and the remainder miscellaneous crops. The gardens are all of the house-compound type in which fruit is grown usually for home consumption. The present rate varies from Rs. 1.75 in the riverine areas to Rs. 2.50 in the tracts nearest to the market. The Settlement Officer proposes a rate of Rs. 3 in the plains tracts (except Tract 14) and a rate of Rs. 2 in all other tracts. Special crop rates are proposed for sugar-cane, tobacco, betel vine and *thekke*. For sugar-cane the existing rate of Rs. 4 is to be retained. The crop rate proposed for tobacco is Rs. 4 which is very moderate. Rupees 8 is proposed for betel vine and Rs. 3.50 for onions. The proposals of the Settlement Officer for garden and miscellaneous cultivation which involve an increase of 26 per cent. on the existing revenue may be accepted.

19. The revised land revenue demand according to the rates proposed by the Settlement Officer would amount to Rs. 13,48,529 an increase of Rs. 1,52,859, or 12.78 per cent. on the old revenue of Rs. 11,95,670, as compared with an increase estimated in the forecast of 5 per cent. The demand at the rates recommended by the Committee is shown in annexures A and B attached to this Review. The rates may be notified for a period of twenty-one years in the case of the area the settlement of which expires in 1917 and for twenty years in the case of the remainder of the area the settlement of which expires in 1918 so that the settlement of the whole district may expire simultaneously.

20. Steps are being taken to split up the *kwins* which are of an unwieldy size. The improvement of the survey and the correction of the area statements are matters to which the Superintendent of Land Records should pay special attention.

21. Mr. McCallum has written a careful and interesting report based on a clear study of local conditions and his proposals, subject to the slight modifications which have been suggested, may be accepted with confidence.

R. E. V. ARBUTHNOT;  
*Commissioner of Settlements and Land Records, Burma.*

*Rangoon, 4th July 1916.*

## ANNEXURE A.

*Paddy land.*

Assessment Tract.	Existing demand.	Demand at rates proposed by the Settlement Officer.	Percentage of increase (+) or decrease (-) on existing demand.	Demand at rates recommended by Committee.	Percentage of increase (+) or decrease (-) on existing demand.	Remarks.
1	2	3	4	5	6	7
	Rs.	Rs.		Rs.		
1	2,102	2,671	+27'06	2,671	+27'06	
2	2,24,652	2,48,303	+ 10'52	2,48,303	+ 10'52	
3	2,191	1,470	-32'90	1,470	-32'90	
4	7,422	9,225	+24'29	8,542	+15'09	
5	1,84,120	2,49,739	+35'63	2,49,739	+35'63	
6	36,615	32,361	-11'61	36,860	+ '66	
7	9,753	8,978	- 7'94	10,322	+ 5'83	
8	26,545	29,398	+10'74	29,398	+ 10'74	
9	2,32,156	2,67,246	+15'11	2,67,246	+15'11	
10	35,417	41,958	+18'46	41,958	+18'46	
11	2,42,362	2,43,959	+ '65	2,44,464	+ '86	
12	1,313	2,537	+93'22	2,537	+93'22	
13	99,570	1,02,794	+ 3'23	1,02,794	+ 3'23	
14	48,812	53,968	+10'56	55,472	+13'64	
Total ...	11,53,030	12,94,607	+12'27	13,01,776	+12'89	

## ANNEXURE B.

*Total revenue demand.*

Existing demand.			Demand at rates recommended by Committee.			Increase or decrease per cent. on existing demand.
Paddy.	Garden and miscellaneous.	Total.	Paddy.	Garden and miscellaneous.	Total.	
1	2	3	4	5	6	7
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
11,53,030	42,640	11,95,670	13,01,776	53,922	13,55,698	13'39

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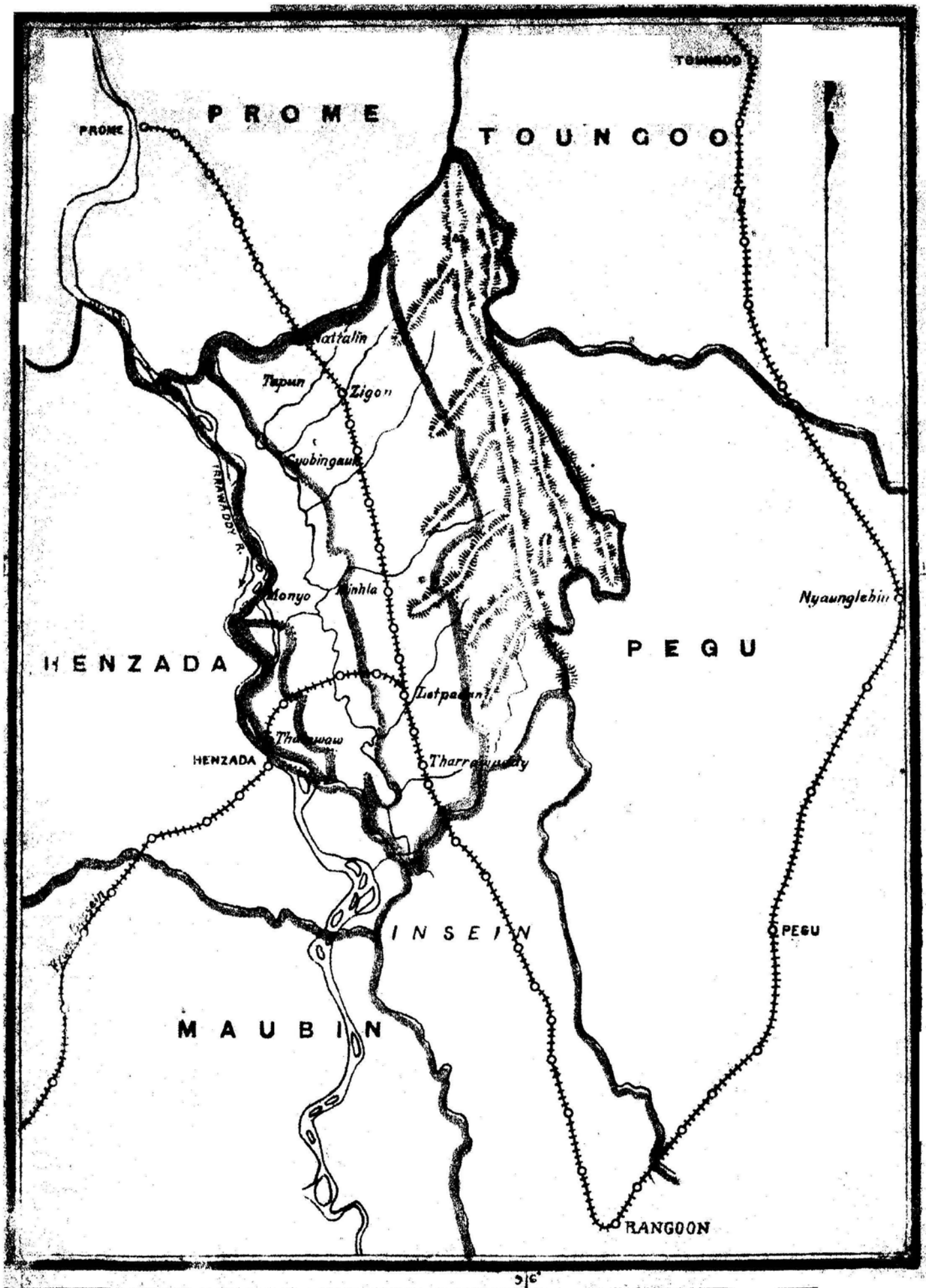
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# MAPS.

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 Map No. 3.—Map of Tharrawaddy showing existing assessment tracts, 1 inch to 4 miles (index map).  
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### Explanation of vernacular, local and technical terms.

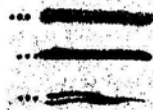
- Bund**=Embankment  
**Cnaung**=Stream.  
**Chetty**=Money-lending caste of Southern India  
**Dah**=Chopper.  
**Jaggery**=Unrefined sugar.  
**Kaung**=Impermanent land in the bed of streams  
**Kamauk**=Rain hat of palm leaf  
**Kaukkyi**=Generic name for long-lived varieties of rice.  
**Kauluge**=Generic name for short lived varieties of rice.  
**Kasin**=Small embankment round a rice field.  
**Kwin**=A compact block of land, demarcated separately for survey, to render assessment convenient  
Usually from one to two square miles in area.  
**Kyaung**=Building inhabited by Buddhist devotees.  
**Main Kind**=Primary division of occupied land according either to the soil or the nature of cultivation.  
**Myothk**=Township Officer  
**Ngachauk**=Dried fish.  
**Ngazpi**=Pounded fish preserved in brine  
**Paddy**=Unhusked rice.  
**Pongyi**=Buddhist devotee who has a *kyau*.  
**Revenue surveyor**=Government official who carries out supplementary survey over a group of *kwins*.  
**Squatter**=Recent occupier of Government land without special permit  
**Supplementary survey**=System by which the settlement maps are kept up to date by annual alteration and by which the annual fluctuating assessment is made.  
**Task-thugyi**=Headman of a group of village jurisdictions  
**Taungya**=Shifting hill cultivation.  
**Thetkè**=Strong grass used for thatching  
**Yo**=Small stream or drainage channel, usually broad and shallow.  
**Yoma**=Mountain range.



MAP  
THARRAWADDY  
AND  
SURROUNDING DISTRICTS  
Scale: 1 mile = 1 inch

REFERENCES.

District boundary  
Boundary of Settlement  
River and Streams



L. McCALLUM, I.C.S.,  
Settlement Officer,  
No. 3 Post

# REPORT

## ON THE

### THIRD SETTLEMENT OF THE THARRAWADDY DISTRICT

#### SEASON 1913-14.

### CHAPTER I.—THE COUNTRY.

#### (a) The Settlement Area.

1. The area dealt with in this report comprises rather less than half the total area of the district of Tharrawaddy, but contains 84 per cent. of the population. There are really two distinct areas for settlement, the larger in the centre of the district now being settled for the third time. The smaller area is in the west of the district between the Irrawaddy and the Myitmaka rivers, and is now being settled for the second time. The boundaries of the larger area are :—north, Prome district ; east, forest reserves on the Pegu Yomas ; south, Insein district ; west, swamps on the left bank of the river Myitmaka. The boundaries of the smaller area are :—north, the unsurveyed parts of the Mônyo township ; east, swamps on the right bank of the Myitmaka ; south, Insein and Henzada districts ; west, the river Irrawaddy.

2. The area of the whole district is 2,863 square miles. Excluding the area returned as unavailable for cultivation, which is about half the extent of the occupied area, the rest of the district falls into three roughly equal parts : (1) occupied area, (2) reserved forest and (3) culturable waste. The occupied area in the whole district was, in 1914-15, 817 square miles. The gross area for settlement is 1,285 square miles, of which 120 are in the smaller area and 1,165 in the larger. The settlement area is distributed over the subdivisions and townships of the district in the following proportions :—

Subdivisions.	Townships.	Village-tracts.	<i>Kwans.</i>
Tharrawaddy ...	Tharrawaddy ...	57	87
	Letpadan	92	201
	Minhla ...	138	136
Zigôn ...	Gyobingauk ...	136	106
	Nattalin ...	106	107
	Mônyo ..	9	29
Total ... .. 2	6	538	666

The main administrative change since last settlement is the creation in 1903 of the Tharrawaddy township which necessitated changes in the boundaries of all the other townships.



3. In the area for third settlement, the occupied area was at original settlement 277,816 acres; at second settlement it was 400,655 acres; and it is now 458,222 acres. In the eighteen or nineteen years between original settlement and first revision, there was an increase of occupied area by 44 per cent. The rate of increase in the thirteen years between second and third settlements has been 14 per cent.

The occupied area in the western block settled in 1903-04 was then 20,396 acres. It has now increased 28 per cent. to 26,166 acres. Besides these, there is an area of 25,010 now coming under settlement for the first time. The total occupied area for settlement is therefore 509,398 acres, or 62 per cent. of the total settlement area.

### (b) Unoccupied Lands.

4. Fifteen per cent. of the whole settlement area has at this settlement been classified as culturable, about half that amount as unculturable, and about five thousand acres as under water. A comparison with the classification of the unoccupied lands at last settlement is impossible, as no classification of the excluded lands was then attempted. The Settlement Officer however remarked that the unoccupied culturable land was mainly poor soil, and that it was improbable that cultivation would largely extend in the future. It may therefore be presumed that the main extensions since last settlement have been in this poor soil, and that the rate of extension will progressively diminish. Much of the area still classified as culturable is unavailable, as it consists of waste incidental and necessary to cultivation. It includes waste on the borders of streams and roads, outside villages and religious buildings, and many small patches not more definitely described. There is therefore little scope for extension in the central part of the area. In fact, extension has been suffered to proceed too far there already, and complaints from villagers of encroachments on roads, paths and village lands are common. The Deputy Commissioner has prohibited further extension on certain areas in a large number of fully cultivated *kwins* in the district, and with the help of the statistics now collected, this policy might be extended to entire *kwins*, and their number increased.

5. Statement 1 has been compiled from the statistics of original settlement with modifications in the areas of occupied land and culturable waste. The area appropriated to village sites has increased in thirty years from 7,900 to 8,755 acres; that of religious land from 394 to 1,677. The latter does not represent the area held revenue-free, as all areas appropriated to religious buildings were entered as religious land irrespective of tenure.

6. Some of the differences in area in this statement are due to different methods of record. Thus the area under roads, canals, streams, etc., has increased from 6,073 acres to 25,279. Unculturable waste has increased from 32,662 to 63,230 acres by a limitation of the meaning of unculturable to unculturable as rice land. Reserved grazing grounds occupy now double the area they occupied at original settlement. This is mainly due to the large areas reserved at second settlement. Flooded land has decreased; part of it has come under cultivation. Additional reservation has largely increased the area of reserved forests.

### (c) Physical Features.

7. The settlement area as a whole is part of the left bank of the Irrawaddy in its plain bed. It consists of alluvial soil deposited by the Irrawaddy and its eastern tributaries. The Myitmaka river which divides the settlement area runs parallel with the Irrawaddy

from an independent source just within Prome district to its emergence in the Insein district where it is known as the Hlaing. There is no perceptible watershed between the Irrawaddy and the Myitmaka, and the Myitmaka acts mainly as an escape-channel for Irrawaddy water. It is probable that the Myitmaka occupies an old channel of the Irrawaddy and remains in existence, because it has usurped the place of the Irrawaddy in receiving the eastern tributaries. It plays an important part in the reclamation of the low-lying lands by the facilities it affords for the distribution of silt over them when, full of Irrawaddy water, it overflows its banks and holds up the streams from the east which form at their junction with the Myitmaka large lagoons of stagnant or slowly-moving water. Cultivation however proceeds faster than reclamation, and the livelihood of the would-be cultivators of these swamps is precarious. A crop of paddy can rarely be secured, and when it fails, existence has to be maintained by cultivating a dry crop or by fishing. Besides these lagoons, there are no lakes in the settlement area. There are no hills except the small spurs of the Yomas along the valleys of which cultivation has extended in the east of the district.

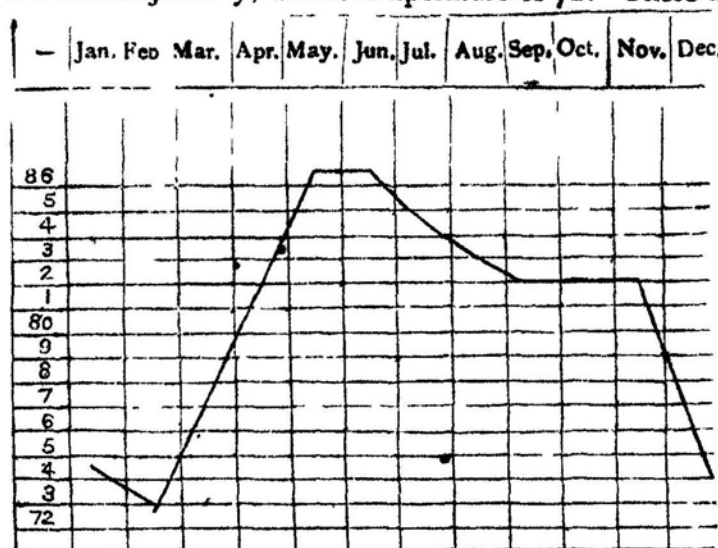
8. The main streams of the settlement area are more useful for the floating of timber than for agriculture. In the south of the district they have well-defined beds throughout their course, as the distance from source to mouth is shorter than in the north. In the centre and north of the district, the lower courses of the streams broaden out and shallow, and while creating new land with their deposits of sand and silt, at the same time often destroy large areas of cultivation. The western half of Nattalin township suffers most from this flooding. The Shwele, which enters the district west of the railway line, and the notorious Kantha or Taungyo cause most of the damage in this region. The names of the other main streams from north to south are the Myole, Gamôn, Minhla, Môkka, Biln and Thônzè. Besides these main streams and of much greater importance to agriculturists is a network of smaller streams and *yos* which are capable of manipulation by the cultivator. These supply most of the water required for the paddy crop and are trained by the cultivators with much skill across successive terraces. The drainage of the main area is from east to west, with a slight inclination southwards. The drainage of the smaller area is from west to east. The supply of water for drinking purposes is not good. It is mainly from wells, shallow and ill-constructed, but is also obtained from tanks and in many places streams are bunded to retain water during the hot weather.

9. Portions of the reserved forests on the east of the district, in cases where they have been reserved since survey, enter the settlement area. They will no doubt be excluded from it when the area under supplementary survey is resurveyed, and the boundaries of *kwins* remodelled. Besides these there are seven large fuel reserves, which are useful to the inhabitants of villages within reach of them. There are also about fifty "teak clump" reserves of small size. Altogether there are 57 square miles of reserved forests within the settlement area. Most of the inhabitants of the central plains have to go to the forests on the east for building materials, hard wood for their implements, and even for fuel.

10. From the description of the country already given, it will be evident that the settlement area contains every variety of alluvial soil in every variety of intermixture. A cutting seven feet deep in Letpadan township showed the following soils: at the base one foot of clay, resting on this  $1\frac{1}{2}$  feet of silty loam; then another three feet of clay; then six inches of fine sand, and on the surface another foot of clay. This soil is fairly representative of the whole settlement area. Clay sand and silt occur on the surface in varying proportions. The proportion of sand is generally higher the nearer the hills on the east are approached. The best soil for rice cultivation is a fairly porous surface soil, preferably of loam with a clayey subsoil.

## (d) Climate.

11. Three seasons are generally distinguished in Tharrawaddy, the cold weather from November to February, the hot weather from March to May, and the rains from June to October. The hottest month is May, with an average temperature of 86 degrees; the coolest January, with a temperature of 72. There is a rapid rise in temperature



in the first four months of the year to the maximum in April and May, then a gradual fall through the rest of the year. The accompanying diagram shows the average for the last nine years of the monthly mean temperature at Tharrawaddy town. The temperature probably does not vary much throughout the settlement area. The prevailing winds are from the south-west during the rains, and from the north

and the north-west during the rest of the year.

12 The amount of rainfall varies considerably. It is much greater in the south than in the north. From the artificial district average compiled from the averages of the nine recording stations, a figure of just under 65 inches is arrived at for the last twenty years. The average for the southernmost station, Tharrawaddy, is 20 inches more than the general average, while the rainfall at Tapun, the most northern station, is only 51 inches, 34 inches less than at Tharrawaddy.

Table showing the proportionate amount of monthly rainfall at Tharrawaddy and Tapun.

Month.	Tharra waddy.	Tapun
January to March ...	1	1
April ..	1	1
May ..	10	12
June ..	19	10
July ..	24	18
August ..	22	18
September ..	14	17
October ...	6	10
November and December.	3	4
Total	100	100

July is the rainiest month at all stations. The rainfall is sufficient in any part of the district for the rice crop provided that the distribution is suitable. A comparison of the proportionate amount of rainfall in the different months at Tharrawaddy and Tapun suggests that while the early and late rains are heavier in proportion in the north of the district, the middle rains are lighter. It is probable that the tracts along the foothills receive more rain than their counterparts in the plains.

13. There is a small area of porous soil in the north of the district where, in years when the rainfall is untimely, the cultivators are unable to raise a crop of paddy. A much larger proportion of the settlement area, about 16 per cent. in all, is liable to destruction from floods. Most destruction is caused by the flooding of the Myitmaka, and the banking up of the waters of the streams from the hills. Flooding of the Myitmaka means of course a rise in the Irrawaddy. Every rise in the Irrawaddy is followed by a corresponding rise in the Myitmaka. In addition to this, destruction is caused directly by the flood waters of the Irrawaddy, and to some extent also by hill streams before they reach the Myitmaka. The amount of destruction varies with the height of the floods, the time of the year, and the duration. It is less in some years than in

others, but no year is wholly exempt. Measured by the amount of remissions given during the expiring settlement, the years of greatest destruction by floods were 1902, 1903, 1905, 1906, 1909, 1910, 1911; of thirteen years, seven were years of high and destructive floods. The flood of 1905 was the highest and most devastating, but the flood of the following year, 1906, pressed more hardly on the cultivators.

14. Cholera, plague and small-pox appear sporadically in an epidemic form. Coughs and colds are epidemic in the cold weather.  
 Epidemic and other diseases. Malaria is epidemic, but judging by the percentage of cases that seek relief in the local hospitals, Tharrawaddy suffers less than most Lower Burma districts. The percentage of malaria cases to total treated varies from 3 in Rangoon and Insein to 19 in Arakan and Prome. The percentage in Tharrawaddy is 8 only. Venereal disease is prevalent, though few of the sufferers from it seek treatment at the hospitals. The total number of patients treated in 1913 in Tharrawaddy hospitals is greater than that of any other district in Lower Burma. The cost per patient is the smallest in Lower Burma with the exception of Sandoway. The percentage of Burmans treated to the total is 78. The main diseases for which relief was sought in 1913 were diseases of the digestive system, ulcers and other skin diseases, malaria, and minor diseases of the respiratory organs. The rate of mortality is slightly higher in Tharrawaddy than in the rest of Lower Burma, but on the whole the district is fairly healthy, and the facilities provided by Government for the treatment of disease are comparatively ample and popular.

#### (e) Irrigation and Protective Works and Fisheries.

15. The whole of the rice crop is irrigated. It is grown in small plots, with an average area of from one-third to half an acre, each surrounded by a small embankment about a foot high, and a foot or two broad. By means of these *kazins* the flow of water when it is available is regulated. These embankments form almost the sole mode of communication between village and village during the time the crop is on the ground, and also supply most of the grass on which the cattle are maintained during the same period.

Small irrigation embankments larger than *kazins* are numerous all over the settlement area, and small protective embankments are also sometimes found. The irrigation works commonly consist of a simple embankment across a small stream or *yo*. Their object is merely to divert the flow from the channel into the embanked rice fields. Elaborate channels to conduct the water to any distance are never found. Built with clay in the dry weather generally by hired Indian labour, they receive little further attention during the rains. They are easily destroyed by the force of the stream, by the owner if his land is getting too much water, or by a neighbour who is either deprived of his water-supply or has his land flooded.

16. Some of the large streams, notably the Kantha and the Bilin, have protective embankments originally made by Government to protect the railway line. For forest purposes a double protective embankment has been made during the present year along the Kantha stream in its lower course near Tapun. It is anticipated that this will afford great protection to agriculture. A private protective embankment on a larger scale has been put up within the last three years along the bank of the Irrawaddy from Kabaing to Tawkalat village, a distance of about nineteen miles, by a company of cultivators financed by a firm of chetties. The remains of the old Aingtalök-Pauk-kôn embankment described by the Settlement Officer of 1903-04 were utilised by the new company as the base of their bund, and the old name is also retained.

17. Fisheries are an important source of revenue in Tharrawaddy district, but lie mainly outside the settlement area. There are in all 281 fisheries and the revenue from them in 1914-15 was nearly two lakhs and a half.



## (f) Communications.

18. The settlement area is well provided with communications. The Irrawaddy is a useful waterway for the tracts which lie along its banks. The Myitmaka is navigable for fairly large boats up to Sanyue all the year round, and much higher during the rains. The Irrawaddy Valley Railway line runs through the centre of the settlement area the whole length of the district, a distance of about sixty-five miles. Indeed the settlement area is more the effect than the cause of the line. The Bassein branch runs from Letpadan through the central settlement area for six miles, and across the riverine area for about eight miles from Zibyugôn to Tharawaw. The Rangoon-Prome road runs through the settlement area from south to north alongside the railway for seventy miles, and from it run cross-roads to all the important railway stations. Besides these there are numerous branches and loop roads both to east and west. Apart from Government roads village communications are not good in the rains.

## (g) Towns and Villages.

19. There are fifteen railway stations on the Prome line and four on the Bassein branch, one of which is outside the settlement area, Gamônseik. Ten of these railway stations are large enough to be called towns, and maintain bazaars. For the purposes of the Towns Act, however, only three of them, Gyobingauk, Letpadan and Thônzè, are towns. Their period of growth was in the nineties when their population trebled itself. Between 1901 and 1911, it grew by 10 per cent. only. Tapun, an old township headquarters, is a considerable village, but otherwise off the railway there are few villages of any size.

## CHAPTER II.—THE PEOPLE.

## (a) Population.

20. The population of the settlement area was at last census 372,915, and if it has increased at the same rate as it did in the last decade, the population is now (1915) 394,691. The urban population which falls entirely within the settlement area forms 6 per cent. of the total. The following is a table showing the district population by races at the last three censuses. Probably the settlement area contains a greater proportion of the foreign element than the district taken as a whole, but for the indigenous races the proportion is probably much the same :—

Year.	Indigenous races,						Chinese.	Indians.	Europeans, etc.
	Burman.	Karen.	Chin.	Shan.	Yabein.	Talaing.			
1	2	3	4	5	6	7	8	9	10
1891 ...	319,469	16,791	56	4,491	143	55	1,307	4,545	535
1901 ...	355,551	21,244	936	4,333	30	45	1,605	11,452	374
1911 ...	390,719	23,360	1,522	4,006	..	14	2,133	11,290	276
Percentage, 1911.	97						0.48	2.61	...

The agricultural population was returned as 76 per cent. of the total in 1881, and at the last three censuses has varied between that figure and 79 at which it stood in 1911. Settlement statistics show the following proportions between owners, tenants and others over 50,000 families, for which figures were recorded :—Owners, 28 per cent. ; tenants, 18 per cent. ; others (mainly agricultural labourers), 54 per cent. An examination of the detailed statistics shows that the proportion of owners and tenants to the total, and the proportion of owners to tenants is greater in the north than in the south of the district, and generally greater in areas of least fertility, and recent occupation.

The relative density of population is slightly greater in the north than in the south, and for the whole area is 290 to the square mile, while for the occupied area, in the settlement years, it is 469 to the square mile.

21. Natives of Tharrawaddy do not stray very far afield. At the last census, only 7 per cent. were enumerated outside the district, and of these 91 per cent. were found in the neighbouring districts. Immigration figures are more interesting. Following on the construction of the railway a large number of settlers streamed in from Prome and Upper Burma. The height of this movement was probably attained in the decade 1891-1901 when the immigrants in the district amounted to 18 per cent. of the population. As the available waste came under occupation, immigration was checked, and at last census only 12 per cent. of the population were not natives. These immigrants come mainly from Prome and the nearest districts of Upper Burma. Natives of Prome, Thayetmyo and Magwe formed 59 per cent. of the immigrants at last census. Natives of the other districts in Upper Burma were numerous in 1891 (45 per cent.), but their proportions sank to 26 per cent. in 1901 and to 15 per cent. in 1911. The proportion of foreigners from other countries does not show much variation, but the tendency is towards a slight increase in the last thirty years.

### (b) Occupations.

22. At last census 79 per cent. of the population were returned as agriculturists. Of the remaining 21 per cent., about half are engaged in the distribution of commodities as traders, shopkeepers and transport workers. Rather over one-third are engaged in various industries ; of these the most important is fishing ; much smaller numbers are engaged in wood-cutting (including basket—and mat-weavers), cattle-breeding, dress-making, domestic service, production of articles of food and of luxury, metal-working and forestry. The remaining sixth comprises the professional classes of medicine-men, lawyers, teachers, religious devotees and Government officials.

A few of the residents within the settlement area seek a livelihood or a subsidiary occupation outside the settlement area on the east in the forests and on the west in fisheries. A few labourers go outside the district altogether to help in the harvest further south, after the harvest here is finished. In the flooded areas on the west of the district, the population is a fluctuating one, increasing in years of freedom from flood, and decreasing after a series of flooded years. There are six saw-mills and thirteen rice-mills within the settlement area, and most of them have been established since last settlement.

### (c) Internal and External Trade.

23. Rice is the chief commercial product of the settlement area. It is exported to Rangoon mainly as paddy, but there is a substantial and gradually increasing export of husked rice

Exports and imports.



from the local mills. The paddy exports in tons for fourteen years ending 1912 were :—

Year.	Tons.	Year.	Tons.	Rice exports.	
				Year.	Tons.
1899 ...	119,424	1906 ..	142,804	1903 ...	3,306
1900 ...	128,768	1907 .	213,126	1904 ...	3,032
1901 ...	196,747	1908 .	201,546	1912 ..	25,745
1902 ...	215,489	1909 ...	193,779		
1903 ..	168,178	1910 ...	164,070		
1904 ...	214,584	1911 ...	147,978		
1905 .	197,012	1912 ...	177,264		

and for 1914, 170,338. The rice exports were, in 1914, 41,247 tons. Rice and timber are practically the only exports. There is a slight excess of exports over imports of hides and fodder. The former are of small value, and the latter is accounted for by the rice-bran from the local mills. In spite of the large fishing industry of the district, large quantities of fish, prawns and *ngapi* are imported. Tobacco too is an import, though on a decreasing scale. So are fresh fruits and vegetables, though there is an area of garden land within settlement limits alone which could easily supply the district wants and leave a surplus. For the following comparative table of some of the leading imports in the years 1903 and 1914, I am indebted to Mr. W. P. Pratt, District Traffic Superintendent, Burma Railways. It is compiled from railway statistics of inward and outward traffic at the various stations within the settlement area :—

Name of commodity.						Excess of imports over exports in tons in year ending.	
						December 1903.	March 1914.
Apparel ...	...	...	..	.	...	19	109
Cotton goods ..	...	...	...	...	...	618	627
Drugs ...	...	...	..	...	...	18	58
Dyes and tans ...	...	...	.	.	...	38	236
Fodder .	...	...	...	..	...	614	<i>Nil.</i>
Fresh fruits and vegetables	...	...	...	...	...	479	2,095
Jute ...	...	...	..	...	...	2,015	2,731
Liquors ..	...	...	...	...	...	470	594
Metals ..	...	...	.	...	...	898	1,785
Mineral substances .	...	...	...	...	...	7,584	5,892
Oils—Kerosine ...	...	...	..	...	...	1,465	1,905
Oils—Others ...	...	...	...	...	...	1,744	2,225
Oil-seeds ...	...	...	.	...	...	334	1,700
Opium ..	...	...	...	..	...	5	4
Paper .	...	...	.	...	...	44	152
Provisions—Dried fruit and nuts	...	...	...	...	...	124	81
Provisions—Ghi ..	...	...	..	...	...	17	23
Provisions— <i>Ngapi</i> ...	...	...	..	...	...	80	1,138
Provisions—Dried fish and prawns	...	...	..	...	...	382	682
Provisions—Cocoanuts	...	...	...	...	...	405	248
Provisions—Betel leaves	...	...	...	...	...	252	344
Provisions—Others ...	...	...	...	...	...	1,327	1,860
Salt ...	...	...	..	...	...	1,481	1,895
Spices ..	...	...	.	...	...	1,082	909
Sugar ...	...	...	...	...	...	2,434	2,515
Tea ...	...	...	...	...	...	27	304
Tobacco .	...	...	..	...	...	464	208
All other articles ...	...	...	.	...	...	1,198	904

The imports of apparel, drugs, dyes, fruit and vegetables, liquors, metals, oil-seeds, paper, *ngapi*, dried fish and tea have substantially increased. Most of these articles may be regarded as luxuries. The increase is more than in proportion to the increase of population, and the only conclusion possible is that the standard of comfort has substantially increased since last settlement,

24. The prices in this statement were recorded during March in each year at the principal bazaars. They show considerable variations of price for the same or similar articles. This is mainly due to the difference in the date of enquiry, the quality of the article and the quantity in the bazaar at the time of enquiry. The best eating rice is imported from Rangoon, as is the best fish. Vegetables are produced locally and imported from Insein, Rangoon, Henzada and Prome. The products of Upper Burma such as cheroot wrappers, ground-nuts, tobacco, chillies and pickled tea are imported through Prome.

25. There are markets at all the eight main towns along the railway line, and also at Tapun; these are the main produce-distributing agencies, but there are shops at all large villages often kept by Chinamen where the principal articles of consumption are retailed. Pedlars are also frequently met with.

#### (d) Average incomes and standard of living.

26. The cost of living is shown in Statement 13, compiled by status and by races. The heads of over a thousand families were examined in this enquiry. They were all agriculturists, and represent a fairly high standard as the average holding was over fifteen acres. The number of Shans, Chins and Indians who were examined is too small to give representative results. The Karens generally seem to be more prosperous than the Burmans. The agricultural income was arrived at by subtraction of the actual expenses of the examinee from the value of the total outturn admitted by him, converted into money at the actual price obtained by him for the produce he sold in the year of enquiry. The average over the whole area is for Burmans Rs. 284 and for Karens Rs. 404. The income from other sources is respectively Rs. 92 and Rs. 59. This income includes the amount of debt incurred in the year of enquiry, less repayments. From the statistics it appears that the average agricultural income is lower in the north of the district than in the south, but comparison is obscured by various factors. One is the difference in the year of enquiry. Prices were high in 1914 and low in 1915. The crop was short in 1915. Another is the class of cultivators who predominate among those examined.

Small holders of from seven to sixteen acres predominate in the settlement area. Their incomes do not differ widely over the whole of it. An attempt may be made independently of the cost of living enquiry to calculate the agricultural income of the worker of a yoke unit. This is 8.73 acres. In Tract 2 (Tharrawaddy township) at the assumed outturn and price, an owner of first class land ploughing one yoke has a gross income of Rs. 320. Expenses of cultivation from Statement 12 amount to Rs. 14 per acre. This amount must be regarded as a maximum for the small holder, and the minimum could probably be reduced to Rs. 6 per acre. His expenses therefore vary between Rs. 52 and Rs. 122, and his nett agricultural income between Rs. 198 and Rs. 268. Calculated on the same method, with the maximum rate of expenditure, the worker of two yokes has a nett agricultural income of Rs. 396. The worker of three yokes has Rs. 593. A tenant gets less than this by the value of the rent paid. It is desirable to raise the standard of living, but not by eliminating the small holder or by reducing him to the condition of a serf. Extensive cultivation on present conditions simply means the multiplication of agricultural labourers. The one yoke man is the man who ought to be most encouraged on the land. His standard of living, however, must be raised, and can only be raised in one of two ways; extensively by the use of machinery to increase the working area and reduce expenditure; intensively by better cultivation.

27. The average cost of living for the families examined is Rs. 284. There is an average of 5.18 persons in each family, so that the cost per head is Rs. 55. The average for tenants alone is Rs. 247 per family or Rs. 49 per head. The average Burman family

not only spends all its available income, but uses the credit of the next year's income to live on for the last few months in the year.

28. The average cost of living for a family working 14·40 acres of land last settlement was Rs. 180. If the paddy provision were converted at the present assumed price, the cost of living at last settlement would be Rs. 196. Paddy provision per family has slightly decreased from 103 baskets per family to 100 baskets. The other detailed expenditure for which comparative figures are available do not greatly differ; thus expenditure on clothes decreased from Rs. 33 to Rs. 32; on house repairs from Rs. 9 to Rs. 8; on charity from Rs. 22 to 20. The increase at this settlement is therefore due to expenditure on other food, Rs. 42 to Rs. 100, and this is accounted for by the general rise in prices during the period.

29. Rice is the staple food grain, and the average provision per family is about 5,000 lbs. of unhusked rice, or about 1,000 lbs. per annum per head. The kind of rice preferred for eating is *kaukkyi*, but most people cannot afford it. The amount of *kaukkyi* grown in the district is not enough to go round, and when imported, the price is high. I am indebted to my wife for the following statistics of the food in common use by the people. Enquiry was made from housewives by visits to their houses at the time of cooking. Of 113 meals recorded, only 35 per cent. were of *kaukkyi* rice; the remainder were of *kaukngè* of various kinds. For the curry, the cooking medium was oil in 72 per cent. of the meals and water in the rest. This enquiry was of course conducted at the most plentiful season of the year. Oil is expensive and will be dispensed with oftener in the rains. Practically everyone uses *ngapi* and the ordinary condiments, chillies, onions, salt and saffron powder. Only 6 per cent. cooked *ngachauk*. After *ngapi*, some kind of vegetable matter is essential. It is sometimes bought if procurable; 45 per cent. made purchases of vegetables such as brinjals, radishes, gourd, tomatoes, pease, cucumbers and pumpkins. More usually, the vegetable is merely leaves of trees available everywhere for the picking. The leaves of the gourd, mango, *kauk-yo-nwè*, tamarind, *tama*, *myu*, *yindaik* and of many other trees and plants are eaten. After these essentials come extras such as fish and flesh. In only forty-four cases was such a dish prepared. Of these, fish numbered thirty-nine; the remaining nine were—six dried beefs, one dried prawns, and two fresh tortoises.

30. Tobacco is smoked and betel chewed everywhere. The average expenditure per family is Rs. 25. Pipes are common among all classes. Most of the clothing bought is of cheap imported cotton cloth. Weaving is almost a lost art.

31. Bamboo houses predominate. Of 57,971 houses of which the construction was recorded, 81 per cent. were of bamboo and the remainder of wood. Only seventeen brick houses altogether were enumerated in the villages. There are many more of course in the railway towns. There are two varieties of bamboo houses; one a mere hut, entirely of bamboo; the other, as in the majority of cases, a substantial house with wooden posts and bamboo walls and floor. Wooden floors are less common than bamboo floors. The proportion of the better class of houses is greatest in the south of the district. Seven per cent. of roofs are of corrugated zinc; the rest are of thatch, *thetkè* grass, except in the small hill tract of Tharrawaddy township, where they are of *salu* leaves.

Pagodas are scarce, but *kyaungs* (monasteries) are fairly common and well built. The average expenditure of the district on works of public utility for the last twenty years was Rs. 19,349; it was highest in 1913, when Rs. 36,357 were spent, and lowest in 1898 with Rs. 8,560.

**(e) Indebtedness.**

32. It is the general custom of the Burman cultivators of the settlement area to spend their incomes before they get them, living on credit during the rains and spending freely after harvest. It may be presumed that the ordinary cultivator is in debt during the rains, and if there has been a series of bad years, all the year round. When a good harvest comes, there is a general settling of accounts. Old debts are cleared off, and no more debt is incurred till the following rains. This system of living accounts for practically all the debt of the settlement area. There are some unfortunates, who spend too much or have less luck in outturns and prices, and these become hopelessly involved, sell their land and drop out of the category of settlement examinees. But that the main body of owners and tenants are able so to live and survive is proved by a comparison of indebtedness at last settlement and at this. The percentage of indebtedness is much the same, and if the average debt is a little higher, that is accounted for by the poorer seasons this settlement. Mr. Moore found in the south of the district a proportion of 56 per cent. of cultivators indebted, and in the north 60 per cent. with average debts of Rs. 200 and Rs. 156. The proportion in debt over the whole area is now 59 per cent. with an average debt of Rs. 261, but the distinction between north and south still holds good. Mr. Webb found in the riverine area that only 10 per cent. of his examinees were indebted, but he apologises for his statistics which certainly do not correspond to present conditions, as in the same area at this settlement more than eighty out of every hundred cultivators are in debt. The time of year at which settlement enquiries are usually held accounts for the low proportion of debts returned. If the enquiry were held in the rains, the proportion would be almost 100 per cent.

33. Most of the loans are taken in cash and are repayable in cash. Only 8 out of 1,514 were taken in produce, and a very small proportion are repayable in produce. Loans in cash repayable in produce (*sabape*) are common in the settlement area, but are mainly taken by labourers who are not often examined by settlement. The calculated rate of interest on the few loans of that kind that were recorded amounts to 60 per cent. at the deduced price of paddy for the year of enquiry. The commonest rates of interest on loans repayable in cash are Rs. 1-8-0, Rs. 1-12-0 and Rs. 2 per cent. per month. The rate has increased since the outbreak of the war, and in many cases creditors, particularly chetties, have demanded immediate repayment or in default a revision of the rate of interest. Nine per cent. of the debt is advanced by friends and relatives and bears no interest.

34. The chief money-lenders are wealthy Burmans, usually resident at railway towns, and owners of land in the district, living on their rents and interest, sometimes indulging in a little gambling on the paddy market. Sixty-seven per cent. of the total debt was advanced by such Burmans in average loans of Rs. 147. The borrowers are mainly their tenants, or residents in the *kwins* where the lender's land is situated. For larger sums the chetty is resorted to. Natives of India, mainly chetties, lent 33 per cent. of the total amount recorded, in average amounts of Rs. 274.

35. It may be placed to the credit of the honesty of the ordinary Tharrawaddy cultivator that the usual security for loans is personal. Only 22 per cent. of the loans are secured; 16 per cent. on land, and 6 per cent. on moveables. The loans are chiefly loans of small amounts to substantial cultivators where the risk is small.

36. The reasons assigned by the cultivators for their debts show that most of the debt is incurred in the rains when the proceeds of the preceding harvest have been spent. Lack of money for housekeeping and for expenses of cultivation are the main reasons given;



purchase of cattle and purchase of land in fewer instances ; other reasons include house-building and payment of the capitation-tax. Money is even borrowed for payment of interest and instalments of principal to co-operative societies when these fall due in the rains.

37. There is a fine field for co-operation open in the settlement area. The character of the people is frank and honest, and they can combine well together. Already a beginning has been made. There are three unions embracing nineteen societies, and eight unattached societies in the district. Of these twenty-seven societies, twelve are in the Nattalin township, twelve in Letpadan, and the other three in Gyobingauk. The oldest society is that of Oktwin in Letpadan township, founded in 1907. Most of the other societies are less than three years old. The total membership is 722, the total capital Rs. 1,22,132, of which Rs. 23,720 consists of the shares of the members. Progress in the district is purposely retarded, because of the need for careful supervision. The Mandalay Central Bank finds some difficulty in meeting the needs of the societies. An agricultural bank either within the district or at any rate in Lower Burma will probably be found necessary in the near future.

38. The following are the annual amounts of loans issued to cultivators in the district under the Agriculturists' Loans Act since last settlement. Separate figures cannot be obtained for the settlement area :—

Year	Rs.	Year.	Rs.
1901-02	19,050	1908-09	63,135
1902-03	13,250	1909-10	88,995
1903-04	17,095	1910-11	95,645
1904-05	39,325	1911-12	93,495
1905-06	69,330	1912-13	58,820
1906-07	1,02,085	1913-14	37,190
1907-08	1,36,910	1914-15	20,995

The advances were high in years succeeding disastrous floods, but variations from year to year depend more on the policy favoured by the head of the district than on anything else.

## CHAPTER III.—AGRICULTURE.

### (a) Occupied and Other Areas.

39. The settlement area includes an area for resettlement, and a new area of 93,727 acres, of which only 25,010 acres or 27 per cent. are occupied. When the total area for settlement is considered, the increase in occupied area since last settlement appears to be 21 per cent. When the old area is considered alone, the increase is only 15 per cent. from 421,862 acres to 484,388, and whereas the occupied area at last settlement amounted to 57 per cent. of the gross area, it now amounts to 66 per cent. When the areas of *kwins* coming under supplementary survey are deducted for the years in which they first appear, from the total area, the average annual extension for the last twelve years is found to be 4,160 acres. The first two years of the period show the greatest increases, the additions to the occupied area in those years being over 8,000 acres. The only other years in which the extensions measured over 5,000 acres were the two settlement years, in both of which extensions of just over that figure were recorded. In order to discover the localities in which these increases have occurred, I have divided the settlement area into two parts, one free from flood, and the other a flooded area which comprises all those *kwins* in which one or both of the flooded classes of

rice land occur. The areas for each year in the *kwins* of these divisions have then

*Table showing relative increase of occupied area in flooded and unflooded kwins.*

	Settlement Area.	Area not subject to floods.	Area subject to floods.
1902-03 ...	443,034	343,018	100,016
1914-15 ...	510,800	372,227	138,573
Newly surveyed ...	17,842	4,111	13,731
Annual average increase acres ...	4,160	2,091	2,069
Percentage increase in 12 years ...	15	7	25

been extracted from the Township Books. The result, which appears in the marginal table, shows that the increase in the flooded areas, though absolutely a little less, has been relatively greater than in the uplands. The increase in the upland tracts has taken place mainly on the borders of the tracts on the east where the land is infertile and sandy. The expansion in the flooded tracts has been

partly due to natural reclamation, but in the main has been obtained by the inclusion of land only partially reclaimed on which cultivation is most precarious. The area of culturable waste in Statement 1 is shown as 124,857 acres, but a study of the extensions since last settlement shows that this area is probably of little fertility, or, if fertile, subject to heavy floods. Extension by 4,000 acres per annum is at a rate of less than one per cent., and at this slow rate may still continue for some time. But it is clear that the most fertile lands have already come under the plough, and that land brought under cultivation in the future will be of diminishing productiveness.

### (b) Deterioration of Soils.

40. It is impossible to assert definitely that there has been any deterioration of soils since last settlement. The available evidence

Nature of soil.

consists of a general comparison of outturns then and now; more particular comparisons of crop-reaping experiments conducted on the same fields at the past and present settlements; and the record of crop-reapings by local officers during the existing settlement. (1) The results obtained from crop-reapings this settlement are generally much lower than at last settlement. (2) Two hundred and eighty-two fields reaped at last settlement

Year.	Last settlement.			Present settlement.	
	1900.	1901.	1903.	1913.	1914.
Number of Fields ...	182	136	29	14	268
Average acre outturn, baskets.	47'82	48'38	59'26	41'52	44'64

have been re-reaped now with the result shown in the annexed table. No deductions have been made for dryage in any of the results since none were made last settlement. It appears from this table that the experiments all round show

a smaller outturn by four or five baskets per acre. (3) The results of crop-reaping in intervening years by local officers are as follows:—

Year.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
Fields reaped	12	7	7	5	7	6	9	Re-cords have been destroyed.	17	22	16	15	16
Average acre outturn, baskets.	38'85	45'30	47'19	43'20	36'87	44'72	42'23		40'88	53'51	44'65	47'56	37'68



With regard to the high outturns at last settlement, it must be remembered that there was no deduction for dryage then made. Experiments were less numerous than now. The average area of fields cropped was less. Tracting was on a different system. The efficiency of cultivators has probably deteriorated somewhat. Most important of all are seasonal differences; the years of the present settlement were neither of them good. The evidence is somewhat inconclusive. My own opinion is that there has been no general deterioration.

### (c) Climatic Conditions.

41. The average area annually fallowed for the last thirteen years over the whole settlement area is 5.47 per cent. In the up-lands alone which are not subject to flooding, the average is only 3 per cent., while on the flooded areas it is as much as 16 per cent. The acreage of fallows on the uplands remains fairly constant; it never rose above 4 per cent. and was only one per cent. in the second settlement year, 1914. In the flooded areas the proportion of fallows is much more variable. The area fallowed never fell below 9 per cent. and in 1910 was as much as 31 per cent. Fallows in the uplands are due to ordinary natural causes, while in the inundated tracts they are mainly due to the uncertain element of floods and the dread of floods, and to lack of seedlings after destruction. The average area of failures for the same period is 20,226 acres, and was lowest in 1913 with 478 acres, highest in 1905 with 65,372 acres.

42. The seasons since last settlement have been classed as follows:—

Character of seasons					
1902	...	Good.	1909	...	Fair.
1903	.	Fair.	1910	..	Bad.
1904	...	Good.	1911	...	Bad.
1905	...	Fair.	1912	...	Fair.
1906	...	Bad.	1913	...	Fair.
1907	...	Good.	1914	...	Bad.
1908		Good.			

The settlement area is of course not homogeneous, and what is a good season for one part of it may be a bad one for another. There is a large flooded area within the settlement area, and the unsurveyed area outside of settlement is mainly flooded land, so that the district returns naturally lay much stress on the occurrence of floods in the determination of the nature of the year. For the inundated area the year is classified at once as bad or good by the occurrence or absence of floods. But even within that area a bad year for paddy is a good year for *kaing* crops. *Kaing* crops however occupy but a small proportion of the inundated area, being on an average only about 5 per cent. of it in the *kwins* under settlement. Of the last thirteen years, seven have been years of extensive and destructive riverine floods. Thus in the riverine area there have been seven bad years and six good years, while in the settlement area as a whole, there have been four good, five fair and four bad.

### (d) Irrigation and Protective Works.

43. There are no Government irrigation works, and there are no public works definitely designed for protection of cultivation. Certain Government embankments do however fulfil that function to a greater or less extent. Apart from road and railway embankments which alter the drainage and protect one area at the expense of another, there are some embankments for the protection of the railway line, and some for the facilitation of log extraction which indirectly serve to protect cultivation as well. Much is expected from the double embankment of the *Kantha chaung* by the Forest Department near Tapun in Nattalin township, but as it has just been constructed, no statistics are yet forthcoming. The destruction caused by that stream is due to the change of bed described by Mr. Moore in his second settlement report.

Matters have got worse instead of better during the current settlement, as the stream has formed a large *thègaw*, or deposit of sand and silt in its bed, near Tapun, which banks up its waters and causes them to spread over the face of the country, so that in large areas for many years cultivation has not been even attempted. After many years of deliberation and correspondence on numerous proposals put forward for the reclamation of these lands, a scheme has at length been adopted for embanking the stream through the energy of Mr. Leete, Conservator of Forests, Pegu Circle, and it is hoped that the stream may gain sufficient headway to wash away its *thègaw*.

44. Most of the private irrigation works are small embankments owned by a single individual, and designed to irrigate his land only. Government has never found it necessary to interfere with these except by local orders to destroy an embankment when it has been found to injure land other than the owner's. No loans under the Lands Improvements Loans Act nor exemptions of revenue for improvements have ever been granted in the district.

45. The past history of the Aingtalòk-Paukkôn embankment is related in Chapter IV of Mr. Morgan Webb's settlement report. At settlement an embankment two to three feet high was in existence from Paukkôn to Aingtalòk. North of Aingtalòk, the cultivators had no regular embankment, but protected their lands by internal embankments, that is, by *kazins* of unusual size. The extensive floods of 1905 and 1906 practically destroyed the main embankment. During the succeeding two years of freedom from floods, the embankment began to be repaired. In 1909, however, the first of a series of three flood years, the embankment was again breached. In the middle of 1909, the Local Government had reversed their previous policy and had passed the important order that embankments might be constructed on the east bank of the Irrawaddy provided that the height was not above the 1906 flood level. Meanwhile the cultivators of the flooded area petitioned the Deputy Commissioner that Government should take over, repair, and maintain their bund. On this, the Deputy Commissioner obtained the sanction of the Local Government to the reduction in classification from first to second class of over 9,000 acres of the land affected. These orders were conveyed to the people in the end of 1910. The next year, 1911, was also a year of flood. Embankments were repaired spasmodically and a bigger scheme was contemplated. In the end of 1912 this scheme took shape by a combination between U Ba Kaw, a retired Myoòk, and a firm of chetties who had large interests in the area to be protected. A company was formed, but the whole proceedings were confused from the beginning. It was probably the intention of U Ba Kaw that the cultivators were to be shareholders, but he was killed shortly after the initiation of the company as a result, it is said, of a quarrel as to who was to have the disposal of the reclaimed land rendered culturable by the bund. The cultivators are now more in the position of individuals who have severally entered into an agreement with the company to build the embankment for them, and they are bound by the terms of their separate agreements with the company. The main thing was that the company found the money and actually did in the years 1913 and 1914 spend about one and a half lakhs in the construction of a substantial bund, in most places above the 1906 flood level, but with the possibility of settling down in a few years to about that level. This embankment (shown in Map No. 2) now extends from the village of Kabaing, eight miles north of the old terminus, Aingtalòk, to Tawkalat, a distance of about nineteen miles. For three miles of this distance no embankment was necessary, as the railway embankment covered that part of the ground, and the Railway Company apparently gave permission for the use of their bund. Paukkôn, the southern end of the old embankment, is three and a half miles south of Tawkalat, but this distance is protected by a fairly efficient bund built by the cultivators of the vicinity. The embankment stops on the north at the Zalòkkyi, an outlet channel of the Irrawaddy leading into the Myitmaka, which it was the intention of the company to close.

North of this is a smaller channel called the Zalökkale, and still further north the deepest and most permanent connexion between the two rivers, called the Myitmaka *chaung*. Between the Zalökkale and the Myitmaka *chaung*, there is a little paddy cultivation, which is protected by a small embankment made by the cultivators.

46. The protection afforded by the chetties' embankment is of course against direct flooding by the Irrawaddy. As the land slopes rapidly towards the Myitmaka, the area protected is not large, the low-lying lands being still subject to the flooding of the Myitmaka, reinforced by the waters of the Irrawaddy through the inlets above mentioned. Actual flooding by a rise of the Myitmaka is not so much dreaded as are the waters of the Zalökkyi. The water which enters at the Zalökkyi and Zalökkale remains in a permanent channel for a short distance only, and then flows broadly over the face of the country forming large lagoons and swamps. The closure of these openings was therefore desired and contemplated by the cultivators and the chetty company, but this has been vetoed by the local authorities.

The embankment has been built too recently to allow definite conclusions to be drawn as to its effects. The occupied area in the three circles which it protects has not yet shown any appreciable increase, and is now practically the same as it was in 1907. It may, however, be predicted that very little new land will be reclaimed and rendered culturable by reason of the embankment, and the protection afforded will be mainly in the direction of reducing fallows and remissions in years of moderate floods. None of the land under it can be said to be permanently protected, and the classification of soils in these tracts has proceeded on the assumption that the lands are still liable to flooding. For this reason several printed petitions for exemption signed by cultivators and forwarded by the Embankment Company have not been entertained. Since the scheme has stopped where it has, there seems no reason why Government should step in either to make proposals for taking over or maintaining the bund, or to help the company to recover its money from the cultivators, until the larger scheme of bunding the Irrawaddy from Yandoon to Tayokhmaw is in progress, when arrangements will have to be made with the company.

### (e) Crops.

47. The accompanying table shows the relative areas under the principal crops in the settlement area during the existing settlement and at present settlement.

Statement 3.

Crop.				Average area for 13 years.	At present settlement.
				Acres.	Acres.
Rice	...	...	..	959	960
Other cereals and pulses	...	...	...	4	7
Sessamum	...	...	...	1	1
Tobacco	...	...	...	4	3
Plantains	...	...	...	13	10
Other gardens	...	...	...	16	16
All others	...	...	...	3	3
Total				1,000	1,000

48. Rice is the main crop of the settlement area. It has more than held its own in this position during the existing settlement and occupies a still larger percentage of the cultivated area than it did at last settlement. The kind of rice grown is determined by the Rangoon demand, subject to local climatic conditions. *Kaukkyi*, long-lived varieties, weigh heavy but are not prolific, and require rather more water than

is generally available in the settlement area. The only *kaukkyi* grown, therefore, is for eating purposes. Short-lived paddies are not suitable for milling, therefore they are not bought by the dealers, or sown by the people except for food. The glutinous varieties known as *kaukhnyin* are appreciated for early breakfast, and, stuffed in short lengths of bamboo, for consumption on journeys. The paddy, therefore, which has evolved as the fittest to survive under existing conditions is the medium-lived variety known to the cultivators as *kaukge*. It is at once prolific, heavy, and suitable to the climatic conditions. The main division of *kaukge* is into red and white paddies. The white is the more popular, and, since the cultivators do not take much trouble in the selection of their seed, generally comes into the hands of the brokers mixed, and is divided by them into *lônbu* and *lônthwe*, meaning simply short fat grains and long thin grains. The cultivators themselves distinguish numerous varieties of which *letyuesin* is by far the commonest. About forty different varieties were reaped among our experimental reapings. After *letyuesin*, *êmata* is the next most popular variety, as it is esteemed for eating next to *kaukkyi*. It is largely grown in Nattalin township and milled in the local mills (none is milled in Rangoon) for export to Upper Burma and via Rangoon to India, where it is much in demand among Calcutta and Bombay natives. Besides *letyuesin* and *êmata*, *hnanwa*, *ngasein*, *hnikkadun*, *ngakyauk*, *kauksan*, *myosan*, *lemanaing*, *thadunbyu*, *taungbaw*, *pawtun*, Chittagong, *hnanbwa*, *yodaya*, *kauktun*, *salun* and *ngamyauksan*, are, judging by the number of fields reaped, the commonest varieties in the order named. Nearly half the total reapings were of *letyuesin*, and about 9 per cent. were of *êmata*.

49. The variety of sugarcane most fancied is a yellowish cane here called *kyanwa*. The *kaing* crops grown are said to be generally of inferior varieties. Thus Indian tobacco (Bengala se) is said not to flourish here, and the names of the main varieties given are *pilama*, *lettanshe*, *naban*, *ywetkyun*, and *myauktaing*. It is the same with chillies; the *paleit* and *kyungale* varieties do not succeed and *yebawyelè* is the main variety grown. The varieties of sessamum are *hnannet* and *kadipa*.

50. On one occasion the *sitpo* was met with in a flooded *kwin*, but this insect is rare. The *daung-dè-bo* caused a lot of destruction in the west of Nattalin and Gyobingauk townships in the second settlement year. The fields of many *kwins* were strewn with the ears of paddy nipped off by it, and many poor families found it worth while to gather up the fallen grains. Rats are numerous throughout the area, and especially in sandy and loamy soils. Crabs are also everywhere met with, and are said to be destructive of the plants in nurseries. Birds do some damage, and in the *kwins* on the east the ravages of pig and deer are much complained of. On the whole, however, the district is remarkably free of crop pests.

#### (f) Methods of Cultivation.

51. The general mark of the period that has elapsed since first settlement is the greater efficiency of implements and a reduced efficiency in cultivation. The plough and the clod-crusher, or *settun*, are both new and efficient implements, but the cultivator of thirty years ago did more with his only implement, the harrow, than his successor does with his more effective instruments. This is mainly due to the change in the character of the workers. The old cultivators were mainly cultivating owners, while the new are mainly discontented hirelings. Cultivation in Tharrawaddy is said to be less careful than in Toungoo. Broadcasting is very rare and is only practised in the worst flooded *kwins*. Winnowing is now done by brokers' cartmen, and is probably less carefully performed than when it used to be done by the cultivators themselves.



52. The cultivation of sugarcane has been described in the revision report. It is a correct account of present methods except that the setts are now planted at the end of the rains, not the beginning, and the crop is on the ground for 14 or 15 months instead of 18.

Other crops.

Tobacco is a new crop to settlements in this district. Seeds are sown in October. The seedlings are transplanted in ploughed and hand-turned land in late December. Transplanting is an art difficult to acquire. The weeding and the clipping off of the head and all superfluous shoots is the most troublesome process, and takes place in February and March. The leaves are gathered about the middle of April. There are two processes of drying, the more rapid, in which the fibres are broken by mangling (*yuet pya*) and the leaves dried in the sun, and the longer in which the leaves are dried in the shade, the fibres gradually contracting, the more expensive *e-se* resulting. The upper leaves are the best, and when picked out, fetch a much higher price than the lower and coarser leaves.

Much the same process is followed with other *kaing* crops as with tobacco, but less care is devoted to the less valuable.

53. The plough and *settun* are used more widely than at last settlement, but no other changes have been noticed. The *settun* is a log with iron blades (*zaung-yathi*) or with iron hasps (*gwin-set*). Manure is used everywhere, mainly on nurseries. Farm yard manure is the commonest kind, but burnt paddy husk is sometimes seen. No instance of purchase of manure was recorded.

Implements and manure.

### (g) Disposal of Agricultural Produce.

54. Paddy is sold to the brokers at the railway stations, or to their agents, jungle brokers, for transport to Rangoon. Some is sold to local mills for milling there and exported to Rangoon as rice. Paddy is still mainly sold by capacity, by the village basket, which varies much in size and always is larger than the Government nine-gallon measure. It reaches its maximum size of 13 *sales* or about one-fifth larger than the Government measure in the hill tract on the east of Gyobingauk township. As a rule the basket increases with distance from Rangoon, and from the railway line, the reason probably being the tendency of the market quotation to remain constant over considerable areas so that the basket further from the railway has to be larger to secure the same rate as at the railway station. The old measures have disappeared. The commonest division of the basket now is the viss and the preserved-milk tin. The capacity of a milk-tin of 12 oz. is about half a *sale*, so there are 128 of them in a Government measure. The intermediate measure, the viss or *beiktha*, contains six and a half milk-tins, and of these the basket contains from 20 to 24. Often a village has a larger and a smaller basket, the larger being used for sales to brokers, payment of rents and payment of hire for ploughing whether of cattle or of labourers, the smaller for payments of daily labourers. There has probably been development in this direction since last settlement, but there are no materials for comparison. Another development which is certainly recent is purchase by weight which has now firmly established itself at the northern markets of the district, Nattalin, Zigôn, Gyobingauk and Okpo. In all other markets purchase by capacity is the rule, but allowances are made for weight. The change to weight purchase has been made by the mills which now determine the rate for each railway market where they are situated. It is a change in the right direction, and will probably spread southward. Jaggery is sold to local dealers, and most of the produce of the *kaing* land is sold and consumed locally.

Disposal of paddy and paddy brokers.

(h) Cattle.

55. The accompanying table shows the numbers of cattle in the district in 1902-03, and in the second settlement year. The numbers of oxen have increased, while the numbers of buffaloes have declined. There has however been a decrease in the numbers of oxen as well as buffaloes other than plough animals showing that there is less breeding than formerly, both of oxen and buffaloes. The falling off in breeding is due to the increase in the occupied area, leaving less waste land available for grazing.

Number of cattle in district.			
—		1902-03.	1914-15.
Plough cattle	{ Oxen	59,187	76,982
	{ Buffaloes	28,177	25,781
Other cattle	{ Oxen	43,600	41,463
	{ Buffaloes	15,438	10,383
Total		146,402	154,609

From land records statistics the acreage of cropped paddy land ploughed per yoke of plough cattle was, in 1902-03, 9.71 acres, and now it is 9.54 acres. The area however rose in 1904-05 to as much as 12.15 acres, and in six other years is over 10 acres. These figures are for the whole district, not for the settlement area. Figures from agricultural statistics now recorded show an average area per yoke of 8.73 acres. This is probably nearer the truth than the district figure.

56. Tharrawaddy is favourably situated for the purchase and disposal of cattle. It is a forwarding district for Upper Burma cattle to the delta. The examination of cultivators for cost of cultivation showed that there was often little loss on re-sale, and sometimes even a profit. This was particularly the case in the north of the settlement area. There are cattle markets at Nattalin, Zigôn, Minhla and Tharrawaddy, but probably the majority of cattle sales are effected by the vendors as they pass along from village to village. The average price of a pair of plough oxen from cost of cultivation enquiries is Rs. 140, and for a pair of plough buffaloes Rs. 130. The average rate of hire for a pair of bullocks for ploughing is 48 baskets of paddy, and for a pair of buffaloes 60 baskets. These amounts are usually paid at harvest.

57. The district is never free from the serious diseases rinderpest, anthrax and foot-and-mouth disease. For the last eight years, however, there has been comparative immunity from these diseases, the average mortality from rinderpest for example being in those years only 300 per annum, while the average for the last 24 years is 1,543. In 1904-05, there were over 8,000 deaths from rinderpest, and in 1905-06 over 5,000, whereas the worst year since has been 1909-10 with 912 deaths only. The average annual mortality from all causes is returned as 5.724 or about 40 per thousand, but the actual mortality is probably more than this.

58. Oxen are stall-fed during the rains, mainly with grass only. Sometimes a grass-cutter is hired for the season. Thirty-five per cent. of the examinees for cost of cultivation spent money on fodder. The average expenditure was Rs. 6. Sessamum oil-cake is often bought and given to the oxen. Buffaloes are not stall-fed.



59. The total area of grazing grounds in the settlement area is 47,787 acres, an increase over the original settlement area of 23,571 acres. No definite statistics of the area at last settlement are available. There are 154,609 head of cattle in the district, consequently the area of reserved grazing grounds is quite inadequate, even if the grazing were distributed evenly over the district, which it is not. On the borders of the area, however, it is possible to graze cattle in the reserved forests on payment of fees, and in parts of the district, especially in the west, there are large unreserved areas suitable for grazing when they are not flooded.

The grazing grounds in the district were reserved at original settlement, at first revision and in the intervening period. Cattle paths were not at the same time reserved and this has detracted greatly from the utility of the grounds. Cultivation has gradually extended over many of the paths, and very many villages are shut off from their grazing grounds when the crops are on the ground. After harvest the cattle graze everywhere. It is mainly during the ploughing season that the cattle can use the grounds, while their greatest need is during the ripening of the crop. The custom, noted at original settlement, may now be said to be universal with oxen of stall-feeding during the three months before harvest. The grass on the *kazins* of the cattle owner is ordinarily sufficient for the needs of his cattle. While the custom tends to increase the expenses of cultivation, there is much to be said for it. Grass grows further when cut than when trampled. The cattle are on the whole healthier when stall-fed. There is less danger from snakes, wild animals and thieves. For the proper tending of oxen, therefore, grazing grounds are not necessary, and might be abolished altogether with advantage. The case is different with buffaloes. They eat more and apparently need more exercise and an occasional wallow to keep them healthy. It is ordinarily in villages where oxen predominate that the cry for abolition of grazing grounds is raised. Buffalo-owners generally desire to retain the reserves. The abolition of grazing grounds would encourage the replacement of buffaloes by oxen, just as their scarcity has already started that tendency. Apart from grazing considerations altogether it is possible that the present reserves might become useful as fuel reserves. At present much of the fuel is cut outside the settlement area and has to be carted a considerable distance. Regarded as grazing grounds alone the majority of the reserves in the district are failures. One reason is that many are subject to excessive flooding just at the season when they ought to be of most use, and another is that the brushwood in them grows so fast that it chokes the grass, and often renders the grazing ground quite impenetrable.

60. In the course of the present settlement operations an enquiry has been held as to the position, condition and suitability of each grazing ground, and this record together with the recommendation of the section officer is to be found in Field Forms C and D, which have been sent to the district office in bound volumes. In a few cases, when prompt action was desirable, the records were sent immediately to the Deputy Commissioner.

61. The case of each grazing ground should be considered on its merits and the ground should either be opened to cultivation, or, if maintained, cleared of undergrowth and provided with cattle paths to the villages it is meant to serve. Permission to cultivate for short periods might be freely given if the grazing ground only is considered. Nothing but good could result to the grazing ground itself. Economic considerations however suggest that it is unwise to encourage by grants of land the increase of small owners who on their ejection after a few years would again swell the ranks of tenants and labourers and tend to increase competition and the power of the landlords. I would therefore advocate the permanent throwing open of unsuitable grounds and the clearing of those that are suitable. If possible, land thrown open should be rendered inalienable either by granting licenses to work for short terms, or, preferably, by handing the land over to a co-operative society. I propose no new grounds for reservation, but all existing cattle paths to grazing grounds it is decided to retain should at once be reserved. The original settlement maps, or

at least the maps of twelve years ago, should be used for the reservation so as to include all land formerly road land which is now cultivated, but on which the rights of a landholder have not yet accrued. The magic powers of formal reservation in preserving paths might be counterfeited at once by departmental orders to revenue surveyors to mark all paths whether formally reserved or not in burnt sienna on the maps.

### (i) Other Domestic Animals.

62. Ponies are not numerous in the settlement area. Their numbers have increased from 800 at last settlement to 1,400, one sign of increased prosperity. Goats are not common, and their breeding is confined to natives of India. Pigs are common especially in the Chin and Karen villages; 13,340 were enumerated in the district by headmen and revenue surveyors in 1914-15. Sheep are luxuries confined to railway towns. Poultry are bred over the whole area, and are common in every village.

## CHAPTER IV.—OCCUPANCY.

### (a) Land Tenures.

63. The following is a return furnished by the land records office of the

Varieties of tenure	areas under different tenures in the settlement area :—				
Under permanent occupation—					Acres.
1. Landholder's right	...	...	...	...	483,436
2. Grant	...	...	...	...	294
Under temporary occupation—					
1. By squatters	...	...	...	...	24,533
2. By licensees	...	...	...	...	2,065
3. By purchasers at annual auction	...	...	...	...	296
4. By headmen under lease	...	...	...	...	343 (thugyisa)
Total	...	...	...	...	510,967

This return is compiled by revenue surveyors from entries in the remarks columns of the Register of Holdings. The acreage shown as under temporary occupation by squatters and that shown as occupied by landholders is probably incorrect. Statement 2 shows that there has been an increase of 67,766 acres within the last twelve years, so the area on which landholder's rights have not yet been acquired must be nearer that figure than 24,533.

64. Tenure enquiries were held in all *kwins* which are now being settled for the first time. These *kwins* number 89 and contain an occupied area of 25,010 acres. The statement of the occupier as to the length of his occupation was accepted in most cases. The enquiry was somewhat unsatisfactory, as difficulty was experienced in securing the attendance of all the registered occupiers.

65. The accompanying table shows the average holding in each township. The land records figures are obtained by dividing the occupied land by the number of different persons assessed to revenue *kwin* by *kwin*. The settlement average is the average of holdings of the persons examined in the cost of cultivation enquiries. Neither of

Township.	Average holding area ? (Acres).	
	Settlement	Land Records.
Tharrawaddy ... ..	21'42	13'33
Letpadan ... ..	15'33	7'58
Minhla ... ..	15'72	7'91
Gyobingauk ... ..	13'41	6'70
Nattalin ... ..	11'56	5'33
Monyo ... ..	15'27	3'89
Settlement area ...	15'47	7'32

them can be regarded as accurate. The settlement figures may not be representative, and the land records figures ignore any land that the assessee in one *kwin* may own in another. The second table presents the size of holding in another way. It shows the

proportion of cultivators of different classes determined by the number of yokes worked. The average area ploughed by a yoke of cattle all over the settlement area is 8.73 acres. The table shows that the worker ploughing with one yoke only predominates in the district. This is the main class that ought to be considered in estimating the incidence of taxation. The table also brings out the fact which was evident from former

Township.	Workers of		
	1 Yoke.	2 Yokes.	3 Yokes and over.
Tharrawaddy ...	30	92	64
Letpadan ...	274	262	149
Minhla ...	74	87	30
Gyobingauk ...	1,620	1,342	425
Nattalin ...	1,692	756	204
Monyo ...	161	76	18
Settlement area	3,851	2,615	890

reports that the holdings in the north of the district are smaller than those in the south.

From cost of cultivation enquiries it appears that the average area of a garden holding is 0.86 of an acre, of a sugarcane plot 1.11 acres, and of an island holding, 6.08 acres.

66. The number of large estates in the settlement area is not great. The following is a table showing the six largest estates.

Large estates. It is compiled from the settlement registers and does not pretend to absolute accuracy :—

	Acres.
Maung Po Seik, Thônzè ...	1,401 (1,256 from I and Records statistics)
Hamid Ali or Maung Baba, Rangoon and Gyobingauk	1,267
Narayanan Chetty, Ôthegôn ...	1,263
Maung Po Sein, Thônzè ...	1,163 (since divided)
U Tun Zan, Zigôn ...	940
Ma Shwe U, Letpadan ...	804

### (b) Tenancies.

67. In the year 1900-01, the first year of last settlement, for which the statistics have been extracted by us from the land records registers, 21 per cent. of the total occupied area was rented at an average rent per acre of Rs. 8. At this settlement, figures extracted from the same sources show that 38 per cent. of the occupied area is now rented at Rs. 16 per acre. There has thus been a considerable increase in the area rented and the rate per acre. The statement also shows that the increase has been gradual and progressive.

At last settlement the average size of a tenant holding was 10 acres. It has slowly increased during the intervening period and is now 11 acres.

In all the tracts for which the settlement year is 1914-15, Statement 5 shows for that year a considerable reduction in the rental value per acre from the rental value recorded for 1910-11. This is mainly due to the low prices prevailing in 1914-15, at which the produce rents have been converted into money. The recorded price was, for example, in Tract 11 (Gyobingauk) 96 in 1910-11 and 78 in the year 1914-15. Converted back into paddy, the rental rate per acre for 1910-11 in this tract was 17.71 baskets, and for 1914-15 it is 16.67 baskets. The fall of one basket per acre may be accounted for by the unwitting inclusion in the later year of some reduced rents.

Statement 5 shows the rental value as calculated by the Land Records staff. It is their custom to record on their first visit to a *kwin* the rent at which the land was let at the beginning of the cultivating season. On their second visit they are supposed to correct their records by the insertion of the actual rents paid at harvest,

but this correction is often neglected. In Statement 16, the actual rents paid are shown, and the low level of rents in tracts for which 1914-15 was the settlement year is due to the remission of rent on account of the poor season, not to the prices at which paddy has been converted into money.

68. A few instances of partnership and share produce tenancies were met with in the settlement area, but the combined area rented in this way does not amount to one per cent. of the total rented area. The predominating kind of tenancy in rice land is the fixed produce tenancy. Tenants paying a pre-arranged amount of paddy occupy 96 per cent. of the total rented area of rice land. The rent is paid after harvest. Tenants paying a fixed amount of money occupied 4 per cent. of the rented area. The rent in these cases is usually paid after harvest in the year before the land is worked. Some cases of mixed tenancies were found, a certain amount of money being paid before cultivation, and the remainder of the rent in produce after harvest. These have been treated as fixed cash tenancies. Cash tenancies are the rule for dry cultivation whether on embanked or unembanked land. Privileged tenancies have been excluded from Statement 16; they are those in which the tenant pays either no rent at all, or an amount considerably below the usual rent for lands of the same class, in most cases because the parties to the contract are relatives. The rental values remaining do not however represent pure economic rents; sentimental reasons often affect the amount of rent paid or demanded.

69. The prices at which paddy rents have been converted for Statement 16 are deduced prices founded on a twenty years' average and consequently are uniform all over the settlement area. Calculated in this way the rental values are more suitable for comparison with nett produce values which are calculated on the same prices. The revenue when paid by the tenant has been included in the rent. The general custom is that the landlord pays the revenue, a reversal of the practice common at last settlement. Sometimes the tenant contracts to deliver the rent in paddy at the landlord's house and in such cases, the expense of conveying the produce has been included in the rent.

70. The average rental value of paddy land throughout the settled area is Rs. 12. Unembanked land is generally let at lower rents than embanked land but the proportion of unembanked land rented is small, amounting to only one per cent. of the total area of permanent, and to three per cent. of impermanent land.

Variations in rental value

Soil class.	Percentage rented
R-1	48
R-2	43
R-3	31
R-4	36
R-5	17

The variations in rental values between soil classes of rice land confirm the classification throughout. On the worst soil classes the rental value is probably unrepresentative of most of the land within those classes. Only the best of such land can be let to tenants. The worst of it is worked by its owners. A larger proportion of the good land is let to tenants than of the bad. The proportions for the whole settlement area are shown in the marginal table.

71. Rents have been used only as a standard of comparison to check the proposed rates. They have not influenced the calculation of the rate in any case. The rents adopted for this purpose are the fixed produce rents alone. Fractions of one-half and one-third of these rental values are shown side by side of the proposed rates. The rates proposed in no case amount to one-half of the rental value, and in few cases do they approach one-third. Rates based upon a proportion of one-third of the rental value would give an increase on the present rates which would be insupportable. Rents in Tharrawaddy are the highest in Lower Burma and assessments based on rental values would therefore be disproportionately high in Tharrawaddy.

Utilisation of rents for determining assessments



72. It seems to be the ambition of the rising landowner to get to a railway town where the amenities of life are greater, security of person and property are more assured, and where he has better opportunities of educating his children. At present the landlords who habitually let all their lands are distributed between their original homes in the villages and the railway towns. Probably a larger proportion of land habitually rented is owned in the towns than in the villages. The owners are mainly Burmans who have either acquired lands as cultivators, or have invested in land money made in various ways. Some naturalised Indians also prefer land as an investment. Chetty firms do not care to invest in land as a permanency, but if it chances to come into their hands either by foreclosure of mortgages or insolvency of debtors, they are willing to undertake the management of it, and even to improve it. The class of non-agriculturist landlords who live in the railway towns are traders, brokers and money-lenders, and often speculate on the rice market by storing paddy, sometimes in combination. Those who live in the villages are old Burmans who have lived an agricultural life and do not feel inclined to change their residence. Their descendants will probably migrate to the towns.

73. The rent charge is the first claim to be met out of a tenant's outturn after payment of cultivating expenses. It is usually paid on the threshing floor and the landlord has to make his own arrangements for receiving and removing it. Laxity in this may mean the loss of the whole or part of the rent, therefore landlords are usually vigilant. Payment is ordinarily made in village baskets, but in some cases the landlord arranges for payment in his own basket, and one landlord at least, in Gyobingauk, insists on payment by weight at 60 lbs. per basket. In rare cases, the tenant delivers the rent at his landlord's house.

74. Of the total number of tenants of rice land in the settled area, 46 per cent. had worked their holdings in the year of enquiry only. Twenty-one per cent. had worked the same land two years, 15 per cent. three years, 6 per cent. for four years, and 12 per cent. five years and over. About 4 per cent. had formerly owned the land they tenanted. Lands are sometimes given up in satisfaction of debts, on condition that the vendor is allowed to work the land as a tenant for the rest of his life. Short tenancies are the commonest and this must be put down to competition among tenants. It is a tendency which makes for rapid increase of rents.

75. The Burman makes a good and lenient landlord and the second settlement year afforded an example of his readiness to reduce rents in a poor season. A comparison of Statement 5 with Statement 16 shows that while the lands in Tract 11 (Gyobingauk) were let in that year at an average of 16.67 baskets per acre, an average of 11.77 baskets or 5 baskets less per acre was accepted by the landlords in satisfaction. Of course, in many cases, the landlord had to take what he could get.

The transition from the status of a labourer to that of a landowner which was a comparatively simple matter some years ago is now almost impossible. The tenant and the labourer are in the same class, and their standard of living is about the same, much below that of a landowner. A tenant frequently has a smaller income as a tenant than he would have as a labourer, but prefers a tenant's life as he is then his own master. No lavish expenditure on luxuries even by owners was observed, and as the tenant's ordinary agricultural income is about half that of a landowner, his fare must be a good deal plainer. While rents are high and competition is severe I do not think that the situation calls for tenant-protective legislation. Education, intensive cultivation, introduction of new staples and the increase of opportunities open to youth to earn a livelihood are the remedies indicated. A beginning might be made with an experimental farm.

**(c) Sales of land.**

76. As was to be expected, the price of land has risen considerably since last settlement. The increase for paddy land is from Rs. 22 per acre to Rs. 67. The price has risen progressively everywhere except in Tharrawaddy and Letpadan townships, where there has been a fall of a few rupees since 1910. The area sold, however, decreased considerably between 1905 and 1910, and has never since been so high as it was in 1905. This feature is common to most districts in Lower Burma and is usually and probably correctly ascribed to the shock to the market administered by the proposed legislation restricting alienation of land.

77. The sale values of land by main kinds and soil classes for the three years ending with the settlement year are shown in Statement 17. The average value of all classes and kinds of land occupied is Rs. 72 per acre. The rates proposed show an incidence per occupied area of Rs. 2.65 and the value of land is therefore 27 years' purchase of the land revenue proposed. The comparative figures for the different classes support the classification in all cases. The relative value of land in the different parts of the settlement area does not appear clearly from the statistics. The highest average for first class land appears to be in Nattalin township, but the prices are really highest in the most fertile townships which are Minhla and Letpadan. Garden land is valuable from its use as house sites. House and site are frequently sold together. Sale statistics have been utilised in the field as a minor indication of fertility, but the circumstances of each sale must be known to appreciate the true value of each in this respect. As here compiled all kinds of sales are included, and the resulting average is not very valuable.

**(d) Mortgages of land.**

78. The statistics in Statement 7 are compiled from land records registers. They show that both the area mortgaged and the mortgage value declined between 1905 and 1910. This is due to the same causes as depressed the sale of land at the same period. Mortgages entered into in the settlement year show the high value of Rs. 49 per acre. This is more than double the value recorded at last settlement. The area under mortgage at last settlement was 8 per cent. of the occupied area in the south and 5 per cent. in the north. At this settlement the percentage has increased to 12.

79. Simple mortgage is the rule in the settlement area, only 4 per cent. of the mortgaged area being held on usufructuary mortgage. Usufructuary mortgages are more popular in the north than in the south of the district, the northernmost township (Nattalin) containing about one-third of the total area under this kind of mortgage. The mortgage value per acre for rice land in simple mortgages is Rs. 44, for garden land Rs. 148 and for impermanent land Rs. 25. The high value obtained on garden land is due to the inclusion of houses on most of the small sites that are mortgaged. The statistics are not of much value for assessment purposes.

**(e) Agricultural customs.**

80. Enquiries were made in each village headman's jurisdiction into the existence and maintenance of village customs. Most of the old and considerate customs of a less strenuous



age have passed away with the entrance of Tharrawaddy into the world market. The old custom of *letsa* or mutual help in agricultural operations has disappeared. The custom of giving up occupied land for house sites is quite forgotten. There has still to be a certain amount of give and take in allowing the owner of an interior holding to have access to it during transplanting and reaping, but even these concessions are grudgingly allowed. In cases of succession to and division of ancestral property, custom has been replaced by the law as administered in the courts of the district. Revenue surveyors are often asked to divide inheritances when measurement is necessary. When division is impossible, one heir usually buys out the others. The appreciation in the value of paddy land, and the increase of the pressure of population are causes of the disappearance of old rights and customs. Another reason is the replacement of the *taikthugyi* by village headmen. The new men have not yet acquired sufficient influence and status to enforce their decisions, and thus many small customs which a villager formerly feared to disregard are now neglected with impunity. In this way many old paths and bits of grazing have come under the plough and claims of a public or private right-of-way ignored. The revenue surveyor has unfortunately taken the place of the *taikthugyi* to some extent in the people's minds, since he now makes the assessments once made by the *taikthugyi*. The possession of the map is a valuable asset and the most is made of it. More frequent touring of the township and subdivisional officers would be appreciated by the people.

## CHAPTER V.—THE EXPIRING SETTLEMENT.

81. Some notice of the assessments prior to original settlement is necessary, as no account of them is to be found in previous settlement reports. In Burmese times the district corresponded roughly to the divisions known later to us as Tharrawaddy and Sarawah. The population lived along the river bank, and the main central paddy plain was almost all virgin forest. In B.E. 1213 (1851-52), the revenue of these two divisions amounted to 695 viss of silver. Of this, which included forest and timber duties, about 584 viss, or Rs. 75,878, were the equivalent of our present land revenue and capitation tax. The main taxes in Burmese times were land and house taxes, and a capitation tax on Shans and Karens. The land tax was levied on the yoke of buffaloes. The British continued this system of taxation for one year, but in 1854 acre-rates were introduced. These were assessed by the Deputy Commissioner after enquiry, and varied in this locality from eight annas to one rupee. Up to 1858, the circle was the unit for assessment purposes. The *kwin* unit was introduced into Rangoon district in 1858, and about 1863-64 was extended to Tharrawaddy. New rates were then assessed by settlement officers who based them on—(1) fertility, (2) prices, (3) proximity to markets, and (4) the current rates. The new rates varied between one and two rupees per acre. Garden land and miscellaneous cultivation were assessed at the highest rates on paddy land within the circle. The lease system, practically a settlement for a term of years on an individual's estate, was introduced about this time. The system was popular in Tharrawaddy, and most of the landowners took out ten years' leases in 1863-64, and would have liked to renew them on expiry, but no renewals were granted, and the system was abolished altogether on the approach of regular settlement in 1878.

In 1865 a cess of 5 per cent. of land revenue was imposed. In 1879 a summary enhancement of 25 per cent. on the 1863-64 rates was made, because of the high price of paddy. In 1880 the cess was increased to 10 per cent.

82. The settlement area was demarcated and cadastrally surveyed by the Survey of India in 1880-82, and concurrently the regular settlement of the area was undertaken. Sir Harvey Adamson was the Settlement Officer, and the settlement was completed in 1884. The area settled is shown in Map No. 2. The highest rate imposed on

paddy land was Rs. 2.25 in the centre of the area ; in the south as well as in the north, the highest rate was Rs. 2. Gardens were assessed at Rs. 2 and Rs. 2.25, and miscellaneous cultivation at the same rates, except in the area settled in 1883-84 where the rate was Re. 1. This settlement was not revised till 1900-02, but the rates were summarily enhanced in 1899 by two or four annas per acre.

83. Capitation tax was levied in Burmese times, and was continued under the British administration at rates of Rs. 4 on married and Rs. 2 on single men. Karens paid only half these rates, and continued to hold this favoured position till 1906. In 1861-62, the rates were raised to Rs. 5 and Rs. 2-8-0, and these rates are still in force. In 1906 the rates on Karens were raised in most villages to full rates, and in 1910 this was extended to more villages. At present only 36 villages in the hills outside settlement pay Rs. 3 and Rs. 1-8-0 and in the rest of the district normal rates are in force.

84. The expiring settlement was carried out in three blocks in three separate years with separate reports for each block. The Duration, local extent and method of the expiring settlement. southern part of the main area, containing the upland *kwins* of what are now the southern three townships, was settled in 1900-01 by Mr. E. A. Moore. The northern part, consisting of the cadastrally surveyed area of the Gyobingauk and Nattalin townships, was settled on the same system by the same officer in 1901-02 (except that recorded prices were utilised instead of deduced prices as in the previous year). The riverine area, consisting of such *kwins* in the Letpadan and Mōnyo townships west of the Myitmaka river as were cadastrally surveyed and contained paddy land, together with an isolated *kwin* in the hills on the east of Tharrawaddy township, was settled in 1903-04 by Messrs. MacKenna and Webb. The methods were the same in all three settlements, but it was unfortunate that the whole of the district was not settled together, as the pitch of rates proposed and adopted in the riverine area was much higher than that of the main area. Since that time there have been many changes in the method of settlement. One of the main differences is that a soil tract has changed its name to primary tract, and its meaning from a group of blocks of land having the same general characteristics, wherever occurring in the settlement area, to a single block of contiguous *kwins* with common characteristics. There are numerous other differences in the methods of collecting and recording statistics and in the statements prescribed. These will be referred to when important enough to affect comparisons.

The settlement of 1903-04 was an original settlement. In Mr. Moore's revision settlements, the same number of classes was used as at original settlement, and, as in many *kwins*, the original classification was accepted *en bloc*, no new settlement maps were made for those *kwins*, and no new statistics of area compiled.

85. The settlement of 1900-01 by combination of soil tracts with price tracts introduced seven assessment tracts with ten different Existing rates. rates for paddy land varying from Re. 1 to Rs. 3.25. It was sanctioned for fifteen years, took effect from 1st July 1902, and expires on 30th June 1917. Gardens and miscellaneous cultivation were assessed at the same rates, Rs. 2.50 and Rs. 2, and a special crop rate of Rs. 4 was imposed on sugarcane.

The settlement of 1901-02 with seven assessment tracts introduced eleven different rates for paddy land varying from Re. 1 to Rs. 3, was sanctioned for fifteen years, took effect from 1st July 1903, and expires on 30th June 1918. Gardens, miscellaneous cultivation, and sugarcane were assessed at the same rates as in the previous year.

The settlement of 1903-04 introduced five assessment tracts and eight rates for paddy land varying from Re. 1 to Rs. 3.25, was sanctioned for thirteen years and

took effect from 1st July 1905. It expires on the 30th June 1918. Garden and miscellaneous cultivation were assessed at the same rates, Rs. 2 and Rs. 1-12-0, but no special rate was imposed on sugarcane, so that sugarcane in *kwin* 69 and in the riverine area bears a rate of Rs. 2 only, while in the rest of the settlement area the rate is Rs. 4. In all three settlements, solitary fruit trees were assessed at 4 annas per tree. The increase of revenue on the 1900-01 settlement was 46·71 per cent., on the 1901-02 settlement 25 per cent., and on the 1903-04 settlement it was 53·63 per cent.

86. The fluctuations in the occupied area, in fallows, and in non-matured areas have been referred to in the chapter on agriculture. Remissions were high in 1903-04, 1905-06, 1906-07, and in 1910-11, years of flood. The average proportion of remissions to the total demand is 1·59 per cent. for the last thirteen years. The average of non-matured to total occupied area during the thirteen years is 4 per cent. The discrepancy is most noticeable in the years 1906 to 1910; in those years the amounts remitted were small in comparison with the area that failed.

87. The amount of capitation tax per head of population from 1902 to 1905 varied between Re. 0·91 and Re. 0·95. There was a sudden drop in 1906-07 to Re. 0·82, a gradual rise till 1910-11, then a drop again, and finally a gradual rise to the present figure of Re. 0·86 in this year. These statistics are based on an estimate of the population from 1901 to 1911 calculated on the rate of increase shown in the census returns for those years. These figures do not allow for the exodus which almost certainly took place in 1906-07, but they show that the capitation tax has not yet recovered from the fall it experienced in that disastrous year. The ratio of exemptees to assesses is high and has remained constant at 15 per cent. throughout the settlement.

88. The average over thirteen years shows that annually 3,164 processes were issued, 125 persons arrested, 4 imprisoned, and that there were 5 sales of movable and 128 of immovable property. To judge by the number of processes issued, the years in which most difficulty was encountered were 1906-07, 1910-11 and 1911-12, years of flood. The average sum to collect which process had to be applied for was largely exceeded in the years 1905, 1906 and 1914, two years of heavy floods, and one year of war. The high average of persons arrested is due to the years 1909 and 1910 when 546 and 379 persons were arrested. If these years are omitted, the average is only 61. The persons imprisoned were all sentenced during the years 1908 to 1911. The commonest form of realisation is the sale of immovable property. The amount of coercion resorted to depends to a great extent upon the *personnel* of the district revenue administration. On a general view of the whole period, it may be confidently said that the revenue has been usually collected without difficulty.

89. Except in the case of the riverine area more fully dealt with below, natural extension was not hindered in any way by the rates imposed. The period was one of rising prices in which the revenue could easily be paid. In bad years there was probably some difficulty in meeting the revenue demand as well as other demands, but there is no indication that the existing rates prevented the cultivation of land which was otherwise suitable and available. Most of the *kaing* land in the present settlement area is being brought under settlement for the first time. Present rates imposed in 1884 are small. Fluctuations in their area from year to year are due to seasonal differences. Sugarcane has steadily decreased from 731 to 192 acres during settlement. The decrease is due to the extension of paddy cultivation, especially by the Shans who are the chief cultivators of sugarcane.

90. In 1900-01, the assumed price of unhusked rice was deduced from a Rangoon price of Rs. 92. That price has been exceeded in each year of the expiring settlement except 1904, when the price in Rangoon sank to Rs. 88. The general average has been over Rs. 106. In 1901-02 prices recorded locally were utilised for the assessment. These prices are lower than any prices recorded since in the same *kwins*. In 1903-04, the assumed prices were based on a Rangoon price of Rs. 100. Prices have been lower than this in Rangoon in three years 1905, 1910 and 1915, but never more than Rs. 6 below. On the whole the prices assumed were moderate, and are now, on a twenty years' average, substantially enhanced. Prices in the riverine tracts assumed for assessment were relatively higher than in the rest of the district, and to that is partly to be referred the disproportionately high rates there imposed.

91. Owing to the destruction by floods of the protective embankments in the riverine area immediately after settlement, 9,245·10 acres of paddy land were reduced from the first to the second class. The very potent reasons advanced by the Deputy Commissioner for the reclassification were that the security afforded by a purely private embankment had been utilised by Government at settlement to raise the classification, and to increase the revenue by nearly 54 per cent.; that some of the land had even been classed as exempt from inundation, though its immunity depended solely on the bund; that the bund had now been breached, and the cultivators were too poor to repair it; and that cultivation had become so precarious that the high rates could no longer be paid, and unless they were reduced, large areas would be abandoned. The date of this recommendation is 1909. Further enquiry ordered by Government revealed the fact that the intermediate rates prescribed by Revenue Department Notification No. 35 of 1906 had been overlooked, and that the people had been paying the full rates imposed in Revenue Department Notification No. 453 of 1905 from the commencement. This discovery strengthened the case, and while it was decided that the revenue collected in excess need not be refunded, the recommendations of the Deputy Commissioner were accepted. Orders were passed in 1910 sanctioning the reclassification, and presumably the lower rates came into force in the revenue year, 1910-11.

92. Except for the unfortunate experience of the riverine area due to the exaggerated importance attached to the protective embankment, the existing settlement has been successful. The classification of paddy land was generally good, and the rates even in their incidence. In the course of the present operations it was found that none of the cultivators had taken the trouble to find out the classification of their land or the acre-rate at which it was assessed, and from this it may be inferred that the rates were not unduly burdensome. When questioned as to the incidence of the present taxation, they usually stated that while the present rates were not unbearable any increase would be oppressive.

## CHAPTER VI.—THE NEW SETTLEMENT.

### PART 1.—INTRODUCTORY.

#### (a) Grounds for New Settlement.

93. The existing settlements expire in 1917 and 1918. Revision was therefore undertaken in the ordinary routine of the programme of settlements. The main general grounds which justify revision are the general rise of prices since last settlement, the necessity for a settlement of the district as a whole, the increase in occupied area and of *kwins* under supplementary survey, and the



anticipation that a readjustment of rates would result in an enhancement of revenue without unduly increasing the burden upon tax-payers.

94. A regular financial forecast was prepared by the Deputy Commissioner, in which he estimates that an increase of 3·51 per cent. on the present revenue might be expected. This result is obtained on a survey of the existing classification, mainly by a suggested increase of the rates on second class paddy lands, and in the riverine area of the rates on gardens and miscellaneous cultivation. The Commissioner remarked that the enhancement was not likely to exceed 5 per cent., and that it was abundantly evident that the economic condition of Tharrawaddy needed further enquiry.

### (b) Duration, Extent and Method.

95. Settlement operations were commenced in November 1913 and occupied two years. The area settled was the area settled in former years together with a newly surveyed area and certain *kwins* in the riverine tracts which were not settled formerly because they contained no paddy land, the gross additional area being 93,727 acres. This addition makes the gross area for settlement 822,306 acres. Settlement operations were conducted by Settlement Party No. 5 at full strength.

96. Owing to the changes in the methods of settlement introduced since last settlement, and to the system of classification adopted, it was found necessary to approximate to the methods of an original settlement. The scope of the resettlement therefore includes a complete reclassification of all the lands in the area, the record and compilation of a complete set of fresh statistics, and the calculation of new rates. Tenure enquiries have been held in the *kwins* coming under settlement for the first time.

97. Errors in survey or in holding marking that were met with in the field were entered in the prescribed form, and these forms were sent altogether to the Superintendent of Land Records in July of each year. In the recess, the settlement staff co-operated with the revenue surveyors in bringing their area statements up to date.

98. The open season began with crop selection and crop reaping in each year. For these purposes the settlement area was divided into small charges under an inspector or settlement clerk. After the crop was off the ground the work of soil classification and the record of statistics began, and in the rains the statistics collected were compiled. In the first year the party was in the field season divided into four sections under the Settlement Officer and the three assistants. In the second year the Settlement Officer had no independent section, but visited each section in turn, inspecting and co-ordinating the classification, and helping in classification where help was needed. Each section was assigned one or more primary tracts and conducted all the settlement operations within those tracts independently. Primary tracts were formed by the Settlement Officer in each year by visit and inspection of the boundary *kwins* while crop selection was going on.

In the routine of section work, each *kwin* was visited three times: first by a clerk who recorded statistics of tenancies, sales and mortgages; then by an inspector who made a preliminary sketch of the proposed classification, recorded admitted outturns, and examined selected cultivators for expenses of cultivation, of living, and for indebtedness; he also examined the village elders in each head-man's jurisdiction for general agricultural statistics; finally by the section officer, who checked all the work already done, completed and passed the classification, held enquiries into agricultural customs and village requirements, disposed of



petitions, and if there was time, made additional enquiries into cost of cultivation, living and indebtedness.

99. The maps used by the field clerks were the working maps of the revenue surveyor for the latest available year. For classification in the first year, blank copies of the *kwin* map were used, but as it was found that most inspectors marked their classification on the holding marked map, and subsequently copied it on to the blank map, thus giving rise to much possibility of error, for the second year, maps were prepared by copying on to them the holding marking of the previous year in blue, and the old classification in red. This was found to be an improvement. The latest land records maps could not be dispensed with altogether, but it was necessary to refer to them much less frequently.

### (c) Settlement Year.

100. The year adopted as the new settlement year was the year in which the classification was done and enquiries made. For the south of the area it is therefore 1913-14, and for the north and west, 1914-15. The first year has already been described as fair and may be taken as an average year. The second year was distinctly bad and below average. There was a record rainfall at Tharrawaddy town, but no rain at all fell during the critical period of October and early November, so that the crop suffered from drought, and the outturn generally was scanty and light. It is possible from an examination of admitted outturns to arrive at a somewhat clearer knowledge of the nature of the seasons in the settlement years, and it is rather important to do so, as, in certain tracts, I have assumed a higher outturn than the crop reapings justify. Admitted outturns are recorded by taking the average of the three latest outturns of a particular holding. In the first year, therefore, the record was for the three years 1911, 1912 and 1913. It happened that the outturns in individual years were recorded in one tract only the first year. This was the main tract in Minhla township, the centre of the district. The total amounts recorded were for the whole tract :—

1911	1912	1913
452,758	564,112	538,365 (baskets).

If the second of these years be regarded as an average year (it was perhaps a little above average) and assigned the value of 100, then the percentages for the three years are :—1911, 80 ; 1912, 100 ; and 1913, 96.

In the second settlement year, statistics for individual years were taken throughout, and again assuming that the year 1912 was an average or normal year, the results are as follows :—

Tract.	Nature.	1912.	1913	1914.
10	Hill	100	110	86
12	Hill	100	104	113
11	Plain	100	93	86
13	Plain	100	97	82
14	Flooded plain	100	107	99
6	Riverine	100	123	123 (due to extensions).
7	Riverine	100	116	126 (due to extensions).

These figures show from the cultivators' own mouths their estimates of the three seasons. Lying ought not to affect the figures much, as the probability is that the same proportion of outturn would be deducted in each year. It seems from this table that the drought did not affect the hill tracts and the riverine tracts as much it did the plains. Tract 10 is really not an exception, as it partakes of the nature of a plains tract. The two years' crop-reapings in Gyobingauk and Nattalin will therefore represent about 90 per cent. of a normal crop.

## PART 2.—REVENUE PRINCIPLES AND BASIS OF PROPOSED ASSESSMENT.

### (a) Nature of assessment proposed.

101. The nature of the assessment proposed is the ordinary fluctuating assessment, such as is at present in existence. There are no areas where a fixed assessment would be appropriate. The main kinds at present existent in the settlement area are rice land, gardens, and miscellaneous cultivation. Gardens and miscellaneous cultivation are unclassified. There is a special crop rate on sugarcane, and solitary fruit trees bear a crop rate. Double cropped land pays one rate only. Rice land has been classified in all tracts but two, and soil rates based on a proportion of the nett produce are proposed for each class. Gardens, dry cultivation on permanent and impermanent land it is also proposed to assess as far as possible in the same way. Certain crops are selected for special treatment, and crop rates are proposed for them wherever grown. These crop rates are based partly on a consideration of the nett produce, and partly on general considerations. The crops selected for such special treatment are sugarcane, tobacco, onions, betel-vine and *thetkè*. Double cropped land will pay one assessment only except when one of the crops grown is a crop assessed to a special crop rate.

102. On rice land generally it is proposed to take one quarter of the nett produce after allowing the full cost of cultivation. In the case of flooded rice land it is proposed to take one-sixth, since no allowances are made for the uncertainty of the crop or for the extra cost of cultivation on such lands. This proportion of one-sixth is departed from in certain localities where there are indications that the crop measurements do not represent average fertility. In such localities, the proportion is raised to one-quarter. On some infertile soils where the nett produce is too low to allow a quarter to be taken, or where there appears to be no nett produce, the rates proposed are based on general considerations, having regard mainly to the general pitch of the rates proposed in the district. It has been thought unnecessary to attempt to work out a separate cost of cultivation for such soils, principally because there seems to be little difference between the cost of cultivation on these soils and the cost on all other soils. They are worked and their cultivators can afford to pay revenue on them because the cost of cultivation is paid by the labour of the worker in greater proportion than on better soils. Most of the land classed in the lowest classes is land on the borders of holdings consisting of better soils, and some of it, wittingly or unwittingly, is worked at a loss if the expenses of the cultivator are high. A capitalist who hired all his labour and did no work himself could not undertake to work such lands at a profit. Divergencies from the standard proportion proposed will be discussed more fully in the description of each assessment tract.

103. The proportion proposed to be taken on garden lands is one-sixth of the nett produce in those tracts which are near a market. In the more remote tracts, one-ninth is proposed. The rate proposed on ordinary unembanked lands is based on general considerations. On tobacco the proportion taken is one-eleventh, on betel-vine one-quarter, and on other special crops the rates are based on general considerations.

### (b) Primary Tracts.

104. The settlement area is easily divisible into primary tracts. Township boundaries form natural and convenient boundaries north and south, and the nature of the country forms the eastern and western boundaries. Disregarding

for the moment the boundaries of townships, the country falls into three main divisions: hills, plains and swamps. The central paddy plain is the one main tract of the area, consisting of the same kind of soil throughout, but differing considerably in the amount of rainfall, the pressure of population, and in fertility from north to south. The fertility is greatest in the centre and least in the north and south. At the north-west of this main tract a small area has been marked off because it suffers severely from flooding by the lower courses of several hill streams. The second tract is the line of low hills along the east where cultivation is situated in valleys, and the intervening hills are unculturable or support a scanty dry crop. The rainfall does not probably differ much from north to south in this tract; though there are no rainfall statistics to support this statement, so much can be inferred from crop cuttings. The third main division of the settlement area is the western low-lying land subject to flooding from the Irrawaddy, the Myitmaka and the banked up waters of the eastern streams. Two main divisions of this flooded land must be distinguished. One is the land east of the Myitmaka, a mere fringe of the central paddy plain, and the other is the land west of the Myitmaka, between that river and the Irrawaddy, and subject to flooding from both rivers. The fringe on the central plain has not been treated as a separate tract, simply because it would be inconvenient to do so for demarcation and survey reasons. The system adopted at both previous settlements of treating this land by a separate soil class or by separate soil classes has been followed in the present settlement. The three main tracts then running from north to south of the settlement area are divided into primary tracts by the boundaries of townships cutting them at right angles. There are five townships east of the Myitmaka, consequently ten primary tracts. The flooded area on the west of Nattalin township already described makes the eleventh. West of the Myitmaka are three townships, consequently three tracts, making fourteen in all. Differences in the plain tracts make it necessary to treat them all separately for statistical purposes, but all the hill tracts except the southernmost have been combined for calculation of fertility statistics. The *kwin* is the unit for the formation of primary tracts, but in some cases, a *kwin* has been split up to give a more suitable boundary.

### (c) Soil Classification.

105. At revision settlement no general reclassification of soils was attempted.

Reasons for reclassification. In many cases therefore the existing soil classification goes back for thirty years and the alterations in conditions during that period have been innumerable. The new system of tracting prescribed involves a reclassification of soils within the new tracts. Changes in the courses of streams, new irrigation works, the erection of roads and railway embankments, changes in the direction of drainage, the extensions of cultivation are a few of the other reasons which made expedient an entire reclassification of soils.

106. Four main kinds have been distinguished:—Embanked rice-land (R), gardens (G), dry cultivation on permanent land (Y), and dry cultivation on impermanent land (K).  
Main kinds. Some of the dry cultivation on permanent land (Y) has been marked on the maps as *taungya* (TY), but no separate rate is proposed for this kind of cultivation.

107. Embanked rice land has been divided into five classes, two of which are confined to flooded land. There are therefore on ordinary unflooded rice land three classes only.  
Classes. These correspond to the two unflooded classes in the existing settlement. The third class was introduced to give greater elasticity to the classification; with two classes only, very poor land is apt to be assessed at too high a rate, and on the other hand much mediocre land finds its way into the best class, bringing down its assessable capacity. None of the other main kinds have been divided into classes, as no reason for differentiation appeared in the course of the operations.

108. All the indications of fertility possible were made use of in classification, but the most useful were nature of soil, facilities for receiving water and admitted outturns. The minor indications included rents, sales, and crop-reaping experiments. Throughout the classification the classifying inspector and the section officer were accompanied by four village assessors, who were referred to constantly. Very often the ideas of the assessors did not stray far beyond the limits of their own holdings, but sometimes they proved to be shrewd and observant and gave considerable assistance in the classification. The assumptions at last settlement were used for purposes of comparison with the admitted outturns, but, as three classes were introduced in place of two, the standard of first class land was higher than at last settlement. The proportion of first class land in the new classification is 46 per cent. of all rice land, while at last settlement it was 55 per cent. Lands formerly in the second class were, if it was possible to avoid it, not raised to the new first class.

#### (d) Crop Measurement and Fertility Assumptions.

109. Rice is the staple crop adopted for assessment purposes on rice land. All varieties are included among the crop measurements. Beans is the staple for permanent (Y) and impermanent (K) unembanked land.

110. Measurements were obtained in both settlement years in all classes of rice land (R) with the exception of soil class 3 in Tract 2 in the first year. In the first year the Settlement staff alone were engaged on this work, but in the second year the land records staff of the district undertook the reaping of 600 fields and performed their work satisfactorily. In all, excluding those measurements rejected in the field for various reasons, 4,884 measurements were obtained, of which 4,529 were on rice land. One measurement to 243 cropped acres was made in the first year, and one to 195 acres in the second year.

111. Of these results 1,194 or 26 per cent. were rejected. The method of rejection employed was the exclusion of all results which showed outturns varying more than ten baskets above or below the normal outturn for the class. The average acre outturn obtained from admissions of outturns in single soil class holdings was assumed to be the normal outturn of that class. Possibly the normal outturn so assumed may be a basket or two on the low side, but the variation allowed on either side is large enough to ensure the inclusion of all relevant outturns. Admitted outturns are a better guide to fertility than crop measurements. As might be expected from the nature of the seasons in the settlement year, more measurements were rejected on the low side than on the high side. The actual numbers were 517 rejected as too high, and 677 as too low. No measurements of rice crops on flooded lands were rejected, and no measurements of other crops than rice were rejected.

112. In the first year, inspectors and the most experienced field clerks were entrusted with the selection of suitable fields for crop reaping, and subsequently the whole staff reaped those fields. Experience showed that by this method of selection, only the best fields were reaped. Since settlement can only reap about one in 500 of the fields cropped with rice, the reapings will represent the outturns only if the fields selected be representative. It has been pointed out in various settlement reports that the acre outturn varies from field to field within a holding, and on the same field from year to year from a variety of causes, the most important being the supply of water at the different stages of the cultivation. There are many other minor causes, such as good or bad cultivation, the use of