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THE BOMBAY
SURVEY AND SETTLEMENT MANUAL

BY
R. G GORDON, I. C. S.

VOLUME II

PART II.—TECHNICAL
PART III.—APPENDICES

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CONTENTS.

VOLUME II.

PART II.—TECHNICAL.

PART III.—APPENDICES

PART II.

TECHNICAL.

CHAPTER I.

INTRODUCTORY.

In Part I the subjects of Survey, Classification and Settlement were dealt with from the historical point of view, attention being paid, so far as possible, to principles rather than to detailed practice. In Part II the same three subjects are treated technically and in detail.

Survey.

In dealing with the subject of Survey one general description can be made to serve for all the four Surveys, as the methods employed in all were much the same. Each Survey, however, had its own rules regarding such subjects as the splitting up of large-sized numbers at Revision, for measuring roads and waste lands, etc., which are matters of detail such as cannot satisfactorily be summarised. For these the reader must be referred to the printed rules of the different Surveys, which are printed in Government Selection No. DXXXII, New Series, *i. e.*,

(1) The Deccan and Southern Maratha Country Revision Measurement Rules.

(2) The Gujarat Survey Revision Measurement Rules.

(3) The Konkan Survey Revision Measurement Rules.

(4) The Kanara Measuring Rules.

For the detailed work of Measurement as carried out in the field Captain Wingate's Measurement Rules of 1853 may be studied with profit.

The most important of the Measurement Records are described in Chapter X—"Survey Records."

Classification.

Under the head of "Classification" two subjects are dealt with, *viz.*, Classification proper (Chapters III—VI) and the Distance from Village Scale (Chapter VII). In dealing with Classification each Survey has been taken separately and the system of Classification employed

in the case of each class of land thereunder described in detail. In so doing the Classification Rules of the different Surveys, which were naturally not drawn up on one homogeneous system and are thus confusing in the mass, have, so far as possible, been reduced to one form and so, it is hoped, rendered easier of comprehension. Selected illustrations also are given of the system of working out the classification values as this is often of a complicated nature.

As the Classification Rules have been fully summarised in each case it is unnecessary to print the rules themselves in this volume. For purpose of reference, however, they are printed as they stand in Government Selection No. DXXXII, New Series. They comprise the following :—

(*1*) *The Gujarat Revision Classification Rules.*—These are not complete as they only describe the Classification work actually to be done at Revision and do not, therefore, give the system as applied, *e. g.*, to Dry-crop, which was not re-classed.

(*2*) *The Konkan Revision Classification Rules.*—These are the revised rules of 1885. For the Ratnagiri Survey the "Rules for the Classification of Sweet Rice Land in the Ratnagiri Zillah," which also includes the rules for the Classification of the other classes of land should be referred to.

(*3*) *The Kanara Classing Rules.*—For the qualifications with which these rules have to be read see under the chapter upon the "Kanara System of Classification" (Chapter VI).

(*4*) *The Deccan and Southern Maratha Country.*—There is unfortunately no detailed compilation of Rules for Classification in these Surveys beyond the "Wingate's Rules" of 1853, which are, of course, very incomplete. The sources of such detailed information are the circulars issued from time to time by various Superintendents, the Settlement Selections and the actual Classification Records contained in the Survey Offices. There are, it is true, certain so-called "Revision Classification Rules" for the Deccan Survey, which are printed in the Selection with other rules, but they refer mainly to the methods to be adopted in adjusting the old to the new classification and do not give detailed rules as to the system of classification itself.

As in the case of Measurement, the principal Classification Records are described in Chapter X.

Settlement.

Under the head of "Settlement" (Chapter VIII) are described the methods to be adopted by the Settlement Officer in submitting proposals for a modern Revision Settlement with the latest Government orders on the subject in the form of the "Instructions to Settlement Officers." A separate chapter (Chapter XII) is given to the "System of calculating the Assessment" which, though apparently of minor interest, is yet in point of fact a most important subject, as the method of calculation, has, in the past, had great influence upon the actual rates of assessment themselves.

The most important of the Settlement Records are also described in the chapter upon "Survey Records" (Chapter XIII).

CHAPTER II.

SURVEY.

THE objects of the operations included under the head of Survey were the following :—

(i) The measurement of the village lands and the preparation of the Survey Records based thereupon.

(ii) The construction of maps village, taluka and district.

(iii) The demarcation of boundaries by means of boundary marks.

Most of these questions have already been dealt with in sufficient detail in the course of the historical account given in Part I. A short summary, therefore, is all that is required here.

(i) *The Measurement of the Village Lands.*

The first operation incidental to the measurement of the village lands was that of preparing a "skeleton map" for the plotting of the village map. This operation was carried out in the different Surveys in one of two ways :—

(*a*) *By theodolite alone.*—Without going too deeply into technical details, the System was that known as a "traverse," by which the Surveyor measured round the village boundaries with the theodolite, thus producing a map of these outside boundaries : and then took angles by the same means to other conspicuous points within the village lands—and especially to stations of the Great Trigonometrical Survey—thus producing a "skeleton map" on which the measurers could plot the measurements of the survey numbers and so construct the village map.

(*b*) *By theodolite and base line.*—According to this system, while the outside boundaries were measured by the theodolite the internal skeleton was formed by running one or two main "base lines" across the village lands with subsidiary "base lines" therefrom. In measuring the village lands, the numbers situated upon these base lines were measured first and plotted and the remaining numbers fitted in subsequently upon the skeleton thus formed.*

The second operation was that of detailed measurement. This comprised—

* For practical field measurement *vide* the *Manual of Land Surveying.*

(*a*) the division of the village lands into survey numbers, with their sub-divisions, *pôt* or *phalni* numbers according to the rules of the particular Survey and their measurement either by chain and cross-staff or theodolite as the case might be:

(*b*) the measurement of lands not included in survey numbers, such as rivers, roads, *nalas*, forests, etc., either by theodolite, chain and cross-staff or by simply plotting them into the village map and taking out the area by scale.

As regards (*a*), the reader must be referred for full details to the Measurement rules of the various Revision Surveys. Here it is only possible to summarise the rules governing the division of lands into survey numbers.

(1) The minimum area of survey numbers was fixed as follows:—

Scale of minima

Name of district	Description of cultivation or class of land.	Minimum area a.	Minimum area g.	Authority
Gujarat (all districts)	Dry crop	1	0	G. R No. 2161, dated 29th May 1869.
	Garden	0	20	
	Rice	0	20	
Deccan (all districts)	Dry-crop	1	0	G R No 6577, dated 16th August 1905.
	Rice	0	10	
	Garden	0	10	
Thana	Rice	0	10	Government Notification dated 6th October 1869 (*B G G* Part I, page 1129).
	Garden	0	10	
	Jirayat	3	0	
Ratnagiri	Rice	0	5	
	Garden	0	5	
	Varkas	2	0	
Belgaum, Dharwar, Bijapur,	Dry crop	6	0	
	Rice	1	0	
	Garden	0	20	
North Kanara (settled talukas of the Below Ghat districts, viz, 1 Karwar, 2 Ankola 3 Kumtha 4 Honavar	Dry crop	5	0	G R No 5594, dated 11th November 1872
	Rice	0	5	
	Garden	0	5	
	Kumri	5	0	
Above-Ghat districts— 1 Haliyal. 2 Yellapur 3 Sirsi. 4 Siddapur	Dry crop	3	0	G. R. No. 8071, dated 13th October 1896.
	Rice	1	0	
	Garden	0	20	

The above table does not give the minima for the district of Kolaba, as that district was formed after 1869. The scale of minima in force in the several talukas of the district is, therefore, to be understood to be the same which is prescribed in the above table for the districts to which they originally belonged.

Holdings falling short of these *minima* were clubbed together to form a number of the standard size, exceptions only being made in cases where the Settlement Commissioner allowed sub-division into smaller numbers upon the personal application of the occupants, accompanied by pre-payment of the cost of measurement.

The *maximum* area was fixed by the rules of the various Surveys.

(2) Where sub-occupancies were clubbed together in this way they were formed into *pôt* numbers within the Survey.

(3) In the case of "mixed numbers," *i. e.*, those containing more than one class of land, such as Dry-crop and Rice or Rice and Garden, in the Konkan each class was separately demarcated and formed into a *pôt* number in the case of Rice and Garden and into a *phalni tukda* in the case of *varkas*. In the other Surveys, though each class was separately measured, no demarcation was made in the field.

(4) "*Inam*" holdings and lands set apart for public purpose were usually formed into separate survey numbers, though this rule was largely broken in the Southern Maratha Country and the Konkan.

As regards (*b*), made roads, canals, railways, etc., were measured either by the chain and cross-staff or theodolite or simply by scale from the map as was convenient and made the boundary of the survey numbers through which they passed. Cart-tracks and other unmade roads were usually included as *pôt-kharab* within the survey number through which they passed and shewn on the village map as a dotted line.

Forest areas were measured either by theodolite or by scale from the map.

(*ii*) *The construction of Maps.*

(*a*) *The Village Map.*—The village map was constructed by first laying down the traverse and base lines and then plotting thereupon the separate survey numbers. Three copies were prepared, one the so-called *kacha* or rough copy and then two *paka* maps or fair copies, one for the use of the classer and the other for printing purposes. The scale of these maps is usually 20 chains (660 feet) to the inch, though, where the survey numbers are unusually small, as in the Konkan, it is sometimes 10 chains. It must be noted that only the survey numbers

appeared in the body of the map, the *pôt* numbers being relegated, in Gujarat to the side of the map where they were shewn in separate sketches on a larger scale, in the Deccan to special books of such numbers called "Gat" books and in the Konkan to a special village record called the "Sud."

(*b*) *The Taluka Map.*—This map was constructed by piecing together the traverses of the individual villages in the manner already described. The scale of these maps is 2 miles to 1 inch.

(*c*) *The District Map.*- The taluka maps were pieced together to form the district map just as the village maps were combined to form the taluka map The scale is the same as for the taluka map.

(*iii*) *The Demarcation of Boundaries.*

The various descriptions of Boundary mark used in the different Surveys are as under :—

Mark	Length.	Breadth bottom	Breadth top	Height	In what Survey used.
Mound	.. 5 as.	$2\frac{1}{2}$ as.	.. $\frac{1}{3}$ anna	$1\frac{1}{2}$ as.	.. All.
Stone	.. $1\frac{1}{2}$ to 2 haths long		3 fingers thick		.. Deccan.
	$1\frac{1}{4}$ haths or over		3 inches thick		.. Konkan.
	$2\frac{1}{2}$ feet or over		8 inches thick		.. Gujarat.
	1 anna long, $\frac{1}{4}$ anna wide, 4 fingers thick				.. Kanara.
Stone cairn (Burnj).	At bottom	.. 2 as. square			.. Konkan only.
	At top	.. $1\frac{1}{2}$ as. square			
	Height	.. 2 as.			
Khunt: a mark made of bricks (25) and chunam (80 seers): 20 inches high, 1 foot square, 15 inches in ground.					Gujarat.
Hedge					Deccan. Gujarat.

These marks were erected or, in the case of hedges, allowed to count as a mark—by the measurers in accordance with rules that varied somewhat for the different Surveys. The main principles, however, were—

(*a*) that the main corners of survey numbers were marked by two or more mounds pointing the boundary with intermediate mounds where the boundary was of considerable length :

(*b*) that bends upon the boundary, not being main corners, were marked by stones, or a *khunt*.

The chief variation from these rules is to be found in the case of the Konkan where the main corners of small numbers were allowed to be demarcated by either a combination of a mound and one or two stones or in very small numbers by one single stone at each corner.

In the case of *pot* numbers the corners were demarcated either by 3 stones as in Gujarat or by single stones as in the Deccan and Konkan.

In the Deccan and Konkan it was customary in addition to demarcating the boundaries of survey numbers to mark the "tri-junction point" of two or more villages by means of stones with a cross or arrow cut in the top.

These boundary marks were shewn in the village map by the following conventional signs :—

Mound	■	Khunt	⊔
Stone	○	Hedge	-X-X-X-X-X-
Cairn	⊔	Tri-junction mark	△

	Konkan.	Deccan
Marks erected by the Forest Department	⊕	□
Topographical Survey Stations	△	

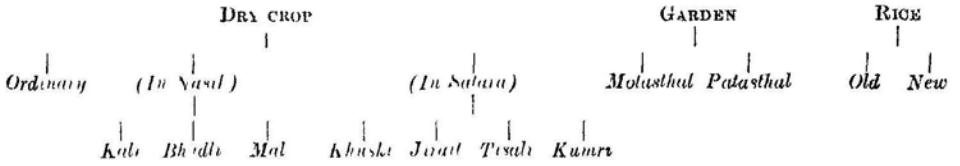
Note.—By Government Resolution No 7671 of 18th August 1914 the experiment has been ordered to be tried of reducing the number of boundary marks by substituting the single mound and single stone for the 2, 3 or 4 mounds or stones of the Survey Rules.

CHAPTER III.

THE DECCAN, INCLUDING THE SOUTHERN MARATHA, SYSTEM OF CLASSIFICATION.

UNTIL the year 1886 the Deccan and Southern Maratha Surveys were nominally distinct, but they had been virtually amalgamated 9 years before when the abolition of one of the Survey Commissionerships brought them both under the administration of Colonel Anderson. They will, therefore, be dealt with together in the present chapter.

The Land Classes of the Deccan Survey are the following :—



DRY-CROP.

The Dry-crop lands of the Deccan Survey fall into two large divisions, *viz.*, firstly, the Dry-crop of the "plain" talukas comprising lands in which dry crops are grown every year, and secondly, the shallow, poor soils of the "hill" talukas of Nasik and Satara, corresponding to the *varkas* of the Konkan, in which crops are usually grown only with long intervals. In Nasik the latter class was classified under rules which are practically the same as those applied in the Konkan, but in Satara a special code of rules was applied called the "Kolhapur Hill Rules" from having been first brought into operation at the Survey of the Kolhapur State.

The system of Classification in the case of Dry-crop will, therefore, be divided into three sections: *viz.*, first, that of the plain talukas, secondly, that of the hill talukas of Nasik, and thirdly, that of the hill talukas of Satara.

(*I*) *The Dry-crop of the plain talukas.*

In ordinary Dry-crop lands the chief factor of value is that of the Soil which, therefore, in the Joint Report and all subsequent systems, forms the basis of the classification. There are, however, Dry-crop lands which possess exceptional advantages over the ordinary class and

which, therefore, according to Survey principle, should receive a higher classification value. Such lands under the Deccan system are those—

(i) which are situated close to a *nala* or stream from which irrigation is practicable by means of a *bhudki;*

(ii) which have a deposit of silt from the overflow of rivers or streams;

(iii) which are favourably situated for receiving the drainage from higher grounds and so have a superior supply of moisture.

(iv) which, though not actually irrigated from a well, are yet clearly capable of being so irrigated.

In all these cases the "advantage" over the ordinary soils was allowed for by making an increase to the soil classification in accordance with a scale for each factor.

The Dry-crop scale.—The Dry-crop scale as given in the Joint Report, with the addition of the 10th class made by Wingate, was as follows :--

Classification Scale.

Class.	Relative value of class in annas or 16ths of a rupee.	Soil of the 1st Order. Of a fine uniform texture, varying in colour from deep black to dark brown	2nd Order. Of uniform but coarser texture than the preceding, and lighter also in colour which is generally red.	3rd Order. Of coarse, gravelly or loose friable texture, and colour varying from light brown to grey.
1	2	3	4	5
		Cubits in depth.	Cubits in depth	Cubits in depth.
1	16	$1\frac{3}{4}$	....	....
2	14	$1\frac{1}{2}$	$1\frac{3}{4}$	....
3	12	$1\frac{1}{4}$	$1\frac{1}{2}$	....
4	10	1	$1\frac{1}{4}$	....
5	8	$\frac{3}{4}$	1	....
6	6	$\frac{1}{2}$	$\frac{3}{4}$	1
7	$4\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
8	3	....	$\frac{1}{4}$	$\frac{1}{2}$
9	2	....	....	$\frac{1}{4}$
10	1	....	....	....

Of these classes the 10th was meant for application in the case of soil that cannot be cultivated throughout and, even where cultivable, is only capable of producing a fodder crop.

Faults.—The recognized deteriorating factors or "faults" with their conventional marks are the following :—

Faults.

No.	Mark.	Fault.	Description.
1	∴	Chunkhad	.. A mixture of minute fragments of nodules of limestone.
2	>	Gochu	.. The same as the above, only that the nodules are larger.
3	/	Utarvat	.. Sloping surface.
4	V	Valsar	.. A mixture of sand.
5	×	Resvat	.. Want of cohesion among the constituent particles of the soil, arising from the presence of fine sand.
6		Dupan	.. Liability to be swept over by running water.
7	▭	Upalvat	.. Excess of moisture from surface springs.
8	∧	Karal	.. Clayey soil, which when dry turns very hard, which does not easily absorb water, and which, if once wetted, does not dry soon. It is sometimes so bad that even grass will not grow on it. In this case it was entered as *parampok* (unculturable).

With respect to the method of applying these "faults" in actual practice the following explanations are given by the Survey Rules :—

1. Chunkhad .. In a wet climate minute fragments of lime counteract the effects of excess of moisture and should not, therefore, be considered and given as a fault.

2. Gochu — Large nodules of lime, when met with thickly strewn over a field, should be given as a fault, as they tend materially to diminish fertility.

3. Utarvat .. This fault may be given when the surface slopes so much as to prevent moisture being retained in the soil.

4. Valsai — As a rule, sand is found more or less in all except clayey soils. When the grains are large and there is such a quantity present as to cause clods of earth, when taken up, to crumble, then a fault should be given.

5. Resvat .. When fine sand is found to such an extent in the soil as to cause want of cohesion, a fault should be given.

6. Dupán .. In some cases, instead of being a fault, it is an advantage, as the moisture retained in the soil adds to fertility; when, however, the running water washes away the soil a fault should be given.

7. Upalvat .. Whenever this fault is met with, one or two faults, to meet the extent of damage caused, should be given.

8. Karal — One, two or three faults should be given according to its deteriorating effects. As a rule, when two or three faults of clay are in the soil, it is impervious to moisture except in very good seasons of rainfall. Argillaceous clay is the worst kind, on which even grass will not grow; in such a case the land should be entered as unarable. Heavy clods of earth denote the presence of clay and absence of sand: when this is found to be the case, half or one fault should be given according to its presence.

If a full fault was not present, half a fault might be given, which was denoted in the classification sketch by inclosing the conventional mark in a bracket thus:—⌊∴

Variations from this scale.

This soil scale was that adopted in the Belgaum, Dharwar and Bijapur districts. In the Deccan proper, however, the scale more generally used was one in which there was no 10th class of soil and the last three classes were—

Class.	Anna value.
7	4
8	2
9	1

There are, however, a good many variations in the scales applied to different talukas even in the same district; *e. g.*, the following different scales were used in the Poona district:—

Class.	Scale No. 1.	Scale No. 2.	Scale No. 3.	Scale No. 4.	Scale No. 5.
	Annas.	Annas.	Annas.	Annas.	Annas.
1	16	16	16		
2	14	14	15		
3	12	12	13	As No. 3.	As No. 3.
4	10	10	11		
5	8	8	8-6		
6	6	6	6		
7	4	4	4	4-6	4-0
8	3	2	2	3-0	2-6
9	2	1	1	2-0	1-6
10	1	....	....	1-0	1-0

Similar variations will be found in the scales employed in other districts.

Scale increases.

For reasons previously given, however (Part I, p. 145), the strict anna valuation according to the scale was altered in parts of the Satara and Bijapur districts by the addition of "scale increases," the object being to raise the classification value of the better class of soils in proportion to that of the poorer classes

in order to prevent the over-assessment of the latter. These increases were made according to the following scales :—

Scale.

	Original Bhig Annas.	Increase.	Where used.
	As. As.	As. p.	
1.	16 to 12	2 0	First used in the western districts of Satara where the better class lands were highly cultivated and maximum rates were high. Hence great danger of over-assessing poor soils.
	12 ,, 10	1 6	
	10 ,, 8	1 0	
	8 ,, 6	0 6	
2.	16 to 12	1 6	Used in the case of talukas possessing the same advantages, but in a minor degree than in the western talukas of Satara.
	12 ,, 10	1 0	
	10 ,, 8	0 6	
3.	16 to 12	1 0	Used in part of the Bijapur taluka.
	12 ,, 11	0 9	
	11 ,, 10	0 6	
	10 ,, 9	0 3	

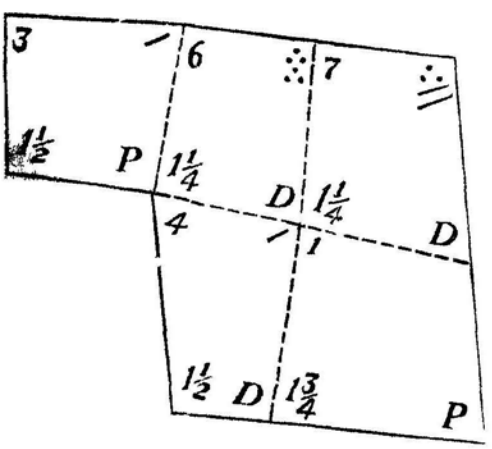
Scale decreases.

In the following talukas "scale decreases" were made in accordance with the scale given in order to carry out the orders of Government for a reduction of the assessment of these talukas for reasons explained in Part I, p. 196 :—

District.	Taluka.	Reductions made.	
		Soil annas.	Reduced by
		as. as.	as.
Poona ..	Indapur ..	10 to 4	1 0
	Bhimtadi ..	2 to 0	0 6
	Pandharpur ..	1 to 0	0 3
	Haveli ..		
Sholapur ..	Sholapur ..		
	Madha ..		
	Barsi ..		
	Pabal ..		
	Supa petha ..		
	Karmala ..		

Example No. 1.

Dry-crop.



Class	*Shares*	*Annas*
1'	*1*	*16*
3	*1*	*12*
4	*1*	*10*
6	*1*	*6*
7	*1*	*4½*
Total ..	*5*	*48½*

	as.	*p.*
Average bhag annas ..	*9*	*7*
Add scale increase (scale 1) ..	*1*	*0*
Total ..	*10*	*7*

	as.	*p.*
Kayam bhag annas ..	*10*	*6*

Working out of classification

On the opposite page can be seen the classification of a dry-crop number worked out according to the Joint Report scale with scale increase added. (*Vide* Example No. 1.) The only point that calls for special attention is the expression "kavam bhag annas." This means the final "bhag" or classification annas of the number after the elimination of fractions of annas, 10 annas 7 pies in the example becoming 10 annas 6 pies.

This elimination of fractions, or "dharsod" as it was called, was performed in accordance with the following scale :—

Dharsod Scale.

From		To		Annas to be confirmed		From		To.		Annas to be confirmed.	
as.	p	as.	p	as	p.	as	p.	as.	p.	as.	p.
15	7	15	11	16	0	7	10	8	3	8	0
15	1	15	6	15	6	7	4	7	9	7	6
14	7	14	11	15	0	6	10	7	3	7	0
14	1	14	6	14	6	6	4	6	9	6	6
13	7	13	11	14	0	6	0	6	3	6	0
13	1	13	6	13	6	5	6	5	11	5	6
12	7	12	11	13	0	5	0	5	5	5	0
12	1	12	6	12	6	4	6	4	11	4	6
11	10	12	0	12	0	4	0	4	5	4	0
11	4	11	9	11	6	3	6	3	11	3	6
10	10	11	3	11	0	3	0	3	5	3	0
10	4	10	9	10	6	2	6	2	11	2	6
9	10	10	3	10	0	2	0	2	5	2	0
9	4	9	9	9	6	1	6	1	11	1	6
8	10	9	3	9	0	1	1	1	5	1	0
8	4	8	9	8	6						

Lands possessing certain advantages.

It now remains to consider the case of those three exceptionally favoured classes of Dry-crop lands possessing the "advantages" referred to on page 300, *i. e.*, of irrigation by means of a *bhudki*, of silt deposit, of drainage from higher grounds or of irrigation from a prospective well.

(*a*) *Land irrigable by Bhudki.*

Dry-crop lands of this kind had an addition made to their ordinary soil classification annas according to the following rules :—

Lands situated within 5 chains of *nalas* (5 chains being considered the effective range of this kind of irrigation) which contain water till the end of December, and on which there would be no difficulty in drawing water by means of a *bhudki* or other contrivance, should have an increase added to the *bhag* (soil) annas as follows :—

Soil classification	Increase
From 16 to 10	.. One class, 2 annas.
9·11 to 6	.. Half class, 1 anna.
Under 6	.. No increase

The increase so made to the soil annas was technically known as "Nala Chad." The example (No. 2) will shew how the "Nala Chad" was worked out.

(*b*) *Land possessing the advantage of silt deposit.*

Two methods of classifying such lands exist: one, the system used before 1872, and the second, that employed after that date.

(*a*) *Before 1872.*—Previous to 1872 such alluvial lands were divided into 3 classes according to the amount of the deposit as follows : -

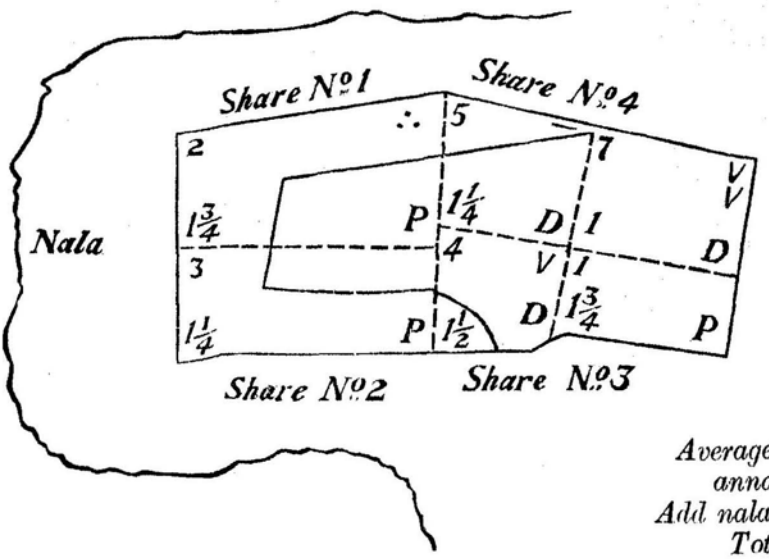
Class.		Anna valuation
1	..	20
2	..	18
3	..	16

Under this system these lands were classed solely according to their surface appearance, no depth being taken, as it was presumed that they were of full depth.

(*b*) *After 1872.*—After 1872 the soil classification of such lands was done in accordance with the ordinary soil scale, but additions were made thereto in accordance with the amount of the deposit according to the following rules :- -

Example No. 2.

Nala Chad.



Class.	Shares.	Annas.	Extra. as.	p.
1	1	16		
2	1	14	1	0
3	1	12	1	6
4	1	10	0	6
5	1	8	0	6
7	1	4½	..	
Total.	6	64½	3	6

	as.	p.	as.	p.
Average bhag annas	..10	9	0	7
Add nala chad	.. 0	7		
Total	..11	4		

Kayam annas	bhag ..	as.	p.
		11	6

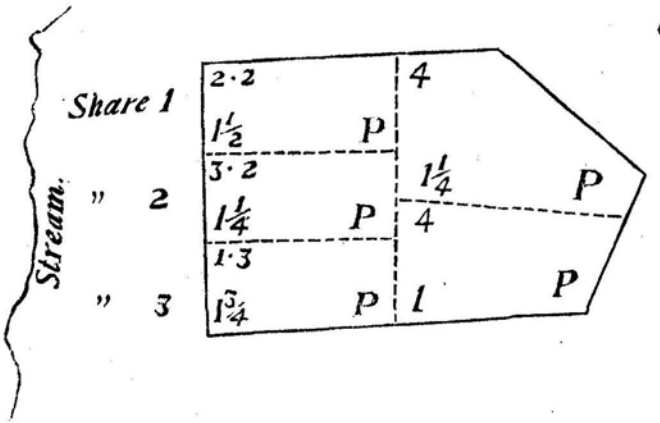
Note.—*The line to the west of the single line is within 5 chains of the nala.*

Explanation.

The land possessing the "advantage" is situated in shares 1, 2, 3 and 4, and additions have, therefore, to be made to the soil classification of those shares. The soil classification value of share No. 1 is 14 annas, and, therefore, the addition by rule should be 2 annas. But the land possessing the advantage occupies only half the share. Hence the addition actually made is ½ of 2 annas = 1 anna. In share 2 the circumstances are the same except that ¾ of the whole share are occupied; therefore the addition is ¾ of 2 annas = 1 anna 6 pies. On share 3 it is ¼ of 2 annas or 6 pies. As regards share 4, the classification value is 8 annas and the increase by scale on land of this value is only 1 anna. Hence, as only ½ the share takes the increase, the addition comes to ½ of 1 anna or 6 pies. The additions so worked out are added to the soil annas of their respective shares, and are then averaged over the whole number as shewn above.

Example No. 3.

Alluvial Chad.



Class.	Shares.	Annas.	Extra.
1	1	16	6
2	1	14	4
3	1	12	4
4	2	20	..
Total	5	62	14

	as.	p.	as.	p.
Average bhag annas ..	12	5	2	10
Add alluvial chad ..	2	10		
Total ..	15	3		

	as.	p.
Kayam bhag annas ..	15	6

Notes.—(1) *The single line shows the limit of inundation.*
(2) *The additional figures in shares 1, 2 and 3 shew the class of alluvial deposit.*

Explanation.

Inundation and silt deposit extend over the whole of shares Nos. 1, 2 and 3: so additions have to be made according to rule to the soil annas of these shares. Now in shares 1 and 2 the additional figure '2' shews that the class of silt deposit thereon is the second and the figure '3' in the third that the class of deposit is the third. An addition of 4 annas is, therefore, made to the soil annas of the first two shares and of 6 annas to the third and the total addition is then averaged over the whole number.

Class 1.—Increase to soil annas : 2 annas—

When the land is overflooded once or twice during the rains, but there is not much alluvial deposit.

Class 2.—Increase to soil annas : 4 annas—

(*a*) Where there is a large alluvial deposit, but the land is not of an even surface, and retaining the water does not dry quickly and there is difficulty in sowing a crop.

(*b*) Where there is a large alluvial deposit, but it does not lie evenly over the land and in some places is liable to be washed away.

Class 3. -Increase to soil annas : 6 annas –

(*a*) Where there is a large alluvial deposit and the land being of an even surface dries quickly and there is no difficulty in sowing a crop.

(*b*) Where there is a large alluvial deposit and the land is of an even surface but does not dry until about a month after the close of the monsoon, yet owing to the proximity of the water *brinjals* and other garden crops and superior late Dry-crop can be grown.

The example (No. 3) shews how the classification was made. The increase so made to the soil annas was known technically as "Alluvial chad."

(c) *Land possessing the advantage of receiving drainage from higher lands.*

In a trap country, such as that of the Satara and Khandesh districts, the lands lying in the plains and valleys have an obvious advantage over those which lie on higher ground, owing to the greater amount of drainage which they receive, the effect of which is to raise the level of the sub-soil water and, therefore, to facilitate the construction of wells, and also to add to their stock of natural moisture. In 1885, therefore, Mr. Fletcher, the Superintendent, Deccan Survey, put forward a scheme for taking this advantage into account by making a graduated addition to the soil classification of lands possessing such advantages in accordance with a scale which was called technically the "General Position Class" scale. According to this scale 4 classes of position were recognized as follows : –

The "General Position Class."

Class.	Description.
1	Land flat, with no general slope, and situated as a rule on the lowest level of the cross-section of its own valley or depression, as it must receive plenty of drainage from the land above. (This class was sparingly used.)
2	The gently sloping lands in the bottom, as well as the flat or nearly flat lands which lie low, though not on the lowest level of the cross-section of a valley or line of drainage. (This class covered the largest portion of the areas in a plain country.)
3	Level or nearly level land in too high a situation to receive benefit from surface drainage and also moderately sloping lands which adjoin lands of the 2nd position and possibly intervene between them and 4th position.
4	Ridges and steep slopes where no moisture will lie.

Additions were then made to the soil annas of survey number in accordance with the following scale which was applied to all the talukas of the Satara and Khandesh districts, except Man of Satara for which a slightly different scale was employed : —

General Position Class Scale.

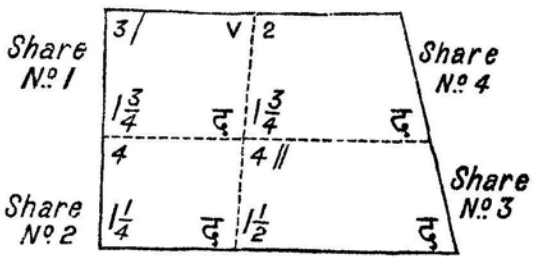
Soil Annas.	Addition.							
	1st Position.	Intermediate	2nd Position.	Intermediate.	3rd Position.	Intermediate.	4th Position
as. as.	as. p.	as. p.	as. p.	as. p.	as. p.	as. p.	as. p.
From 16 to 12	3 0	2 6	2 0	1 6	1 0	0 6	....
Under 12 „ 9	2 6	1 6	1 0	1 0	0 6	....	....
„ 9 „ 6	2 0	1 6	1 0	0 6	....	....	....
„ 6 „ 3	1 0	1 0	0 6	....	....	....	....
„ 3 „ 0	0 6	0 6	....	....	....	....	....

(*d*) *Lands capable of well-irrigation.*

These lands were classified by the system of "Position Class" as described on page 321.

Pôt-kharab.

Before proceeding to deal with the other " land classes " it is desirable to explain the Deccan system of calculating the area of *pôt-kharab* in the survey number. In the Deccan such areas were not measured, but were calculated by eye-estimate at the time of classification and reduced to figures in the following way :—



Suppose that the survey number given above to be 4 acres in area. Then, as it is divided into four shares, the area of each share will be about 1 acre. At the time of classifying share 1 the classer notes that it contains *pôt-kharab* equal to about quarter of the whole share : he, therefore, makes the vernacular sign for quarter (|) in the top left hand corner of the share. In shares 2 and 4 there is no *kharab*, but in share 3 it amounts to half the whole share : he, therefore, makes the sign for half (||) in the same way. The total area of *pôt-kharab* can then be calculated in the office, for, as the area of each share is 1 acre or 40 gunthas, the quarter share of share 1 is equal to 10 gunthas and the half share of share 3 to 20 gunthas, or a total *pôt-kharab* area of 30 gunthas.

Theoretically of course, as the assessment of survey numbers is supposed to be fixed upon the arable area only, the deductions of *pôt-kharab* in the shares should be taken into account in working out the total classification value of the whole number. Thus, in the example given above the working should be—

Share No.	*Class.*	*Shares.*	*As.*	
1	*3*	*¾*	*9*	(*¼ share deducted for kharab*)
2	*4*	*1*	*10*	
3	*4*	*½*	*5*	(*½ share deducted for kharab*)
4	*2*	*1*	*14*	
Total	..	*3¼*	*38*	

	as.	*p.*		*as.*	*p.*
Bhag annas ..	*11*	*8*	*Kayam bhag annas* ..	*11*	*6*

In some districts this was done; in others, however, no account was taken of the deductions of *pót-kharab* from individual shares, *e. g.*, in the above example shares 1 and 3 would be treated as whole shares and not as $\frac{3}{4}$ and $\frac{1}{2}$ in working out the classification value of the number. The point is not of much importance, but should be remembered when studying classification records.

(ii) The Hill talukas of Nasik.

In the Dangi villages of Nasik two systems of classification were employed in the case of Dry-crop lands: one for the talukas of Dindori and Nasik and the other for the taluka of Peint.

(1) Nasik and Dindori.—The classification of the Dry-crop lands in these talukas was carried out by Mr. Tytler in 1860 and his classification was confirmed at Revision. Mr. Tytler divided such lands into two classes, *viz.*, the *kali* or black soils cultivated every year with wheat, gram, etc., and the *mal* or red soils cultivated at intervals of several years with hill crops, such as *nagli*, *kumani*, *sava*, *udid*, etc. This division corresponds closely with that of the Konkan Dry-crop into *rabi* and *varkas*.

The scales applied in these two classes were as follows:—

Kali lands.

Class.	Anna valuation.	Order of soil		
		Kali munjal and tambur kevtal (fine black and dark red soils)	Korhal and tambur korhal (coarser than the 1st class)	Borkhat or barad (gravelly soil).
		Depth.	Depth.	Depth.
1	18	Over 1½ haths	...	....
2	15	,, 1 hath	Over 1½ haths	....
3	12	,, ½ ,,	,, 1 hath	. ..
4	9	Under ½ ,,	,, ½ ,,	....
5	6	....	Under ½ ,,	. .
6	4	....	....	All depths.

Faults.—As under the ordinary Dry-crop scale.

With reference to this scale Colonel Taverner remarks :—

" From the classification scale above shewn, it is manifest that the relative value of *kali* land in the Dang districts was not supposed to decrease so rapidly with reference to decrease of depth as that of the *rabi* land of the Desh, or open country of the Deccan, for which the Joint Report scale was made applicable. The reason is doubtless that with four times the amount of rainfall (the rainfall at Igatpuri and the line of the *ghats* averaging 100 inches or more) the productive power of the shallower soils is relatively greater, with reference to the deeper soils, than is that of the lower classes of soils according to the classification scale of the Desh country." *

Colonel Taverner gives in his report an extract from an old classification book, shewing how the classification of *kali* land was carried out.

Mal lands.

The classification scale for this class of land was the following :—

Class.	Name.	Anna value.	Description.
1	Aval.	7	1. Red level land, with or without small round stones; destitute of *muram* and of good fine soil. 2. Red soil like the above sloping from west to east, but not so that its substance is washed out. 3. Land formed by the alluvion of rivers or *nalas* or by rain in hollow ground. 4. Blackish land, if level.
2	Dum.	5	1. Reddish shallow soil tolerably level with small stones and *muram* mixed. 2. Blackish soil, sloping, clayey or tough.
3	Sim.	4	1. Good red soil, but so sloping that, if ploughed, its substance is washed out and lost. 2. Black soil, so sloping as not to retain moisture.
4	Charsim.	3	Sloping sides or peaks of hills only fit for *dhalli* and not admitting of the plough.
5	Kharab.	..	Rocky or stony ground, totally unfit for cultivation.

(2) *The Peint Taluka.*—This taluka was settled in batches of villages between the years 1889-1896. As the conditions of the

* Paragraph 25 of Lieut.-Colonel Taverner's letter No. 893 of 15th October 1895, Appendix B to Second Revision Settlement Report of the Dindori Taluka.

hill tracts were rather those of the Konkan than of the Deccan, the Konkan system of classification was ordered to be applied to the hill lands. They were, therefore, divided into two classes, *viz.*, *bhadli* and *mal*, corresponding to the Konkan *bhatle* and *varkas*, the former comprising the superior, the latter the inferior kinds of these soils.

The classification system applied to these two classes was exactly the same as that of the Konkan *bhatle* and *varkas* (*vide* p. 376). From the Peint Settlement Report, however (p. 41), it would appear that the work was not done as satisfactorily as it might have been, owing to the fact that the Deccan classers who carried it out did not understand the Konkan system.

(iii) The Hill talukas of Satara.

"The Hill Rules," says Mr. Ozanne, "were meant to apply to villages at the heads of valleys, and on the slopes and plateaux of hills, in which, owing to excessive rainfall, only such hill grains, as *nachni*, *sava* and *vari* are grown. In villages partly on the hills and partly in the plain they were applied to the hilly portions, the low-lying lands being classed under the Joint Report scale. In doubtful cases the hill lands were classed under both scales, the Superintendent deciding which should be used in assessment." *

The hill talukas of Satara are Wai, Javli, Patan and Satara. Just as in Nasik, the Dry-crop lands of these villages correspond rather to those of the Konkan than the Deccan, and in the system of classification which was applied to them the division of lands is on all fours with that of the Konkan, as Mr. Ozanne shews: "Dry-crop was divided into 'khuskhi' (the Kanarese for dry-crop), 'jirayat' (the corresponding Marathi equivalent), 'tisali' and 'kumri.' These very nearly correspond to the divisions of the Konkan Survey, *viz.*, rabi and varkas. Khuskhi corresponds to 'bandhi,' and 'jirayat' to 'malkhandi rabi,' and 'tisali' and 'kumri' to 'bhatle' and ordinary 'varkas' respectively." †

With reference to the conditions which the Hill Rules were intended to meet Mr. Ozanne remarks: "The rainfall is very heavy, too heavy for the successful cultivation of the better cereals. Cultivation of dry-crop land, as well as of rice, is most profitable when the seedlings are raised on a seed-bed prepared under the now well known *rab* system. Dry-crop was also largely kumried" (that is, by burning

* Paragraph 11 of Mr. Ozanne's Report, No. S.-1650 of 9th July 1894: SS. No. CCXCIII, Patan, p. 52.

† Paragraph 9 of the same report.

the undergrowth on the spot to serve as manure), "but kumri is, after all, only wasteful *rab*, and destined to die out with increased population. The value of dry-crop was small, and its classification according to the strict rules of the Joint Report would have been too costly. Moreover, these rules were largely inapplicable. It would have clearly been an error to class hill-slopes by dividing the fields into compartments and digging to ascertain the average depth The depth varies so suddenly and irregularly that, to get the average, the number of compartments would have been enormous, altogether out of proportion to the importance of the question of depth of soil in such land. As in the case of varkas, so in that of usali and kumri, the depth was largely judged by eye, and the classification made more with reference to slope and position than to depth." *

The rules under which these four classes of land, *viz.*, *khuskhi, jirayat, usali and kumri*, were classified were as follows :—

(*i*) *Khuskhi.*

As explained above, *khuskhi* is the ordinary Deccan Dry-crop and was classed under the ordinary Deccan scale for Dry-crop lands (*vide* p. 300).

(*ii*) *Jirayat.*

According to the Kolhapur Rules "*jirayat*" is "land not being *khuskhi*, garden or rice, but owing to heavy rainfall only cultivated yearly with such hill grains as *nachni, sava* and *vari*." It is compared by Mr Ozanne to the Konkan "*malkhandi rabi*"

The soil scale used for the classification of *jirayat* is as follows :—

Class.	Depth	As	
1	1 hath	11	Black and dark brown soils only according to depth and faults.
2	$\frac{3}{4}$,,	9	
3	$\frac{1}{2}$,,	$7\frac{1}{2}$	
4	....	6	*All* red soils, whatever the depth.

The deteriorating factors or "faults" taken account of are :—

	Conventional mark.
1. Valsar (Gravelly sand)	V
2. Utarvat (Sloping surface)	/
3. Resvat (Fine sand)	×
4. Chopan (Deccan-Karal) (Clay)	∧
5. Chunkhad (Fragments of limestone)	∴
6. Nibarpana (Hardness)	

* Paragraph 9 of the same report.

(*iii*) *Tisali.*

Tisali is described by Mr. Ozanne as being "land which is cultivated with short fallows with *nachni* from seedlings raised in a *rab* seed-bed," and in the Kolhapur Rules as "land with a tolerably level surface which cannot be cultivated yearly." It was divided for classification purposes into two classes :—

Class.	Description.	Anna value.
1	Land red in colour, not less than ½ *hath* in depth, which is level and has small embankments similar to those in rice fields to prevent the soil being washed away.	5
2	(*a*) Land red in colour, depth same as above with slightly sloping surface and in which there is no difficulty in using the plough.	4
	(*b*) Land similar in quality to class 1, but the embankments are close together, or there is difficulty in using the plough owing to large boulders being scattered over the land.	

(*iv*) *Kumri.*

Kumri is described by Mr. Ozanne as being "poorer land cultivated at long intervals by allowing the scrub to grow, cutting and burning it *in situ* and then sowing the crop." In the Kolhapur Rules it is simply called "hill cultivation." It also is divided into two classes, *viz.*—

Class.	Description.	Anna value.
1	Land which is red in colour and ½ *hath* or more in depth, which can be ploughed, but with slight difficulty owing to the steepness of the hill or to large boulders scattered over it.	3
2	Land red in colour which cannot be ploughed owing to the steepness of the hill, but is dug up with a pick, or which being level enough to be ploughed is less than ½ *hath* in depth.	2

Notes.—

(i) In *kumri* numbers pieces of clear level land like *tisali* were classed—

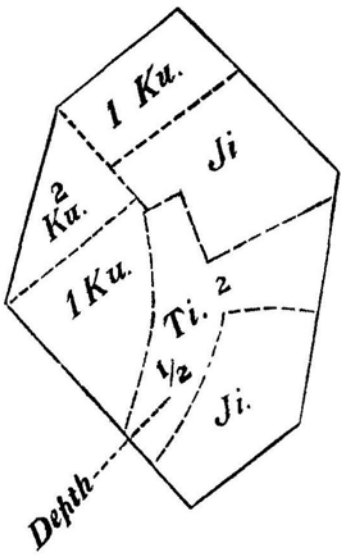
(*a*) if less than about ⅛ of the total area, as 1st *kumri* ;

(*b*) if more than ⅛, as 2nd *tisali.*

(ii) Occasionally small pieces of land which cannot be cultivated yearly, from 2 to 4 gunthas in extent, were found at the sides and corners of rice numbers and included therein. These were classed—

Example No. 4.

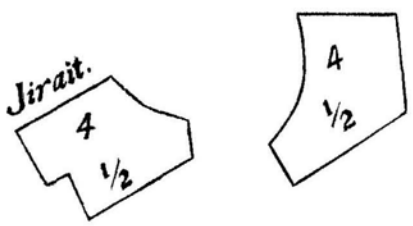
Jirayat, Tisali, Kumri.



Tisali and Kumri.

		Class	Shares.	Annas.
Tisali	..	*2*	*3*	*12*
Kumri	..	*1*	*3*	*9*
,,	..	*2*	*2*	*4*
	Total	..	*8*	*25*

	as.	p.
Average bhag annas ..	*3*	*1*
Kayam bhag annas ..	*3*	*0*



Jirayat.

Class.	Shares	Annas.
4	*2*	*12*
Total ..	*2*	*12*

	as.	p.
Kayam bhag annas ..	*6*	*0*

Explanation.

The above is an example of a mixed number of jirayat, tisali and kumri lands, the tisali being of the 2nd class and the kumri of both 1st and 2nd. The classification of these two classes of land is worked out together, the "shares" being determined by the area of each class judged roughly. The classification of the jirayat is worked out separately below.

(*a*) as 1st *kumri* if habitually cultivated,

(*b*) as 2nd *kumri* if never cultivated,

except that, if part were cultivated and part uncultivated, then, if the cultivated area exceeded the waste, it was classed as 1st *kumri*, but if the reverse was the case, then as 2nd *kumri*.

(iii) Land which could not be cultivated and would not grow grass was considered *kharab*; as was also cultivable land covered by large boulders the size of grass stacks, and hence practically uncultivable.

Mixed Tisali and Kumri.

In the case of numbers containing *tisali* and *kumri* lands mixed the following rules of classification were observed : –

Instead of dividing each separate piece of land into classification shares as would have been done in the case of more valuable lands, all that was done was to estimate the area of each class roughly in acres or fractions of acres according to the size of the number, treat each acre or fraction as a share and work out the total classification value accordingly.

Jirayat lands were combined into one and the same number with *tisali* and *kumri* as will be seen from Example No. 4, in which the classification of a mixed number of this kind is illustrated.

The Dongar class.

In dealing with the classification of Dry-crop lands under the Kolhapur Hill Rules in Satara it is necessary to take into account another factor which, though nominally falling under the head of assessment, was yet in reality a method of classification. This factor is the application to the hill lands of the district in 1891 of the so-called " Dongar class " rules by Mr. Fletcher.* The object of these rules was to make a very necessary differentiation between lands situated on the tops or spurs of hill ranges and those situated at a lower elevation, the relative agricultural value of which must clearly differ considerably. In order to provide for this factor of value, therefore, Dry-crop lands situated in hill villages were assigned a *dongar* or hill class at the time of classification in accordance with the following rules :—

* Paragraph 15 of Mr. Ozanne's Report.

Class	Description.
1	Lands situated in the plains.
2	Lands on minor spurs at no great elevation.
3	Lands situated on elevated spurs of hills or on the tops of the main ranges.

The " class " of every field was noted in the classification book.

The necessary allowance was made at the time of assessment in the following way :—

(1) Lands in the first *dongar* class were rated under the maximum rate of the group in which they were placed.

(2) Lands in the second *dongar* class were rated at the maximum of the next lowest group.

(3) Lands in the third *dongar* class were rated at the maximum of the still lower group.*

Garden.

Garden lands are divided into two classes, *viz.*, *Motasthal* and *Pátasthal*.

Motasthal.

The classification system applied in the case of *motasthal* lands is very complicated and varied considerably at different times. For this reason it will be necessary to consider the Deccan and Southern Maratha systems separately.

(*1*) *The Deccan system.*

The Deccan system falls into two parts, *viz.*, firstly, that employed in the Revision Surveys previous to 1877, and secondly, that introduced after that date. The innovations made after that year were due to the amalgamation of the Deccan and Southern Maratha Surveys under the sole charge of Colonel Anderson.

Previous to 1877.

In Poona, Ahmednagar and Sholapur.—In accordance with the orders of Government that wells constructed since the Original Settlement were to be assessed as Dry-crop, the special system of *motasthal* classification in the Poona and Sholapur districts was applied to land under Old or " assessed " wells only, *i. e.*, those which had been assessed at the Original Settlement. Land under " New " wells, *i. e.*, those which

* Paragraph 9 of the same report.

had been constructed after the declaration of the Original Settlement, were assessed as ordinary Dry-crop. In Ahmadnagar, however, the same system of classification was employed in the case of New as well as of Old wells. This system was briefly as follows :—

(i) In the case of a survey number the whole of which was irrigated, the soil classification was done in the ordinary way according to the *jirayat* scale. Then in the office the classification annas of each classification "*hissa*" were increased by 25 per cent. and the increased classification worked out accordingly. The effect of this addition was to raise the classification value, and therefore the assessment, by 25 per cent. above that of the ordinary Dry-crop assessment when the Dry-crop *jantri* was applied.

(ii) In the case of a survey number only partially irrigated, the classer, at the time of doing the soil classification, marked out the field into separate *jirayat* and *bagayat hissas*. The 25 per cent. addition was then made to the *bagayat hissas* only, and the increase in the classification distributed over the whole field.

According to this system, it will be seen, there was no separate *bagayat rating*. The fact that a field was wholly or partially irrigated was treated as an "advantage" over the ordinary Dry-crop and the soil classification raised, therefore, to allow for it on the same principle as those followed in the case of "*nala chad*" and "alluvial *chad*" previously described. (*Vide* pp. 306-307.)

(iii) At the same time, though there was no separate *bagayat* rating and *motasthal* land was really treated as a superior Dry-crop, it was considered as a separate class of land and entered as such in the Survey Records. For this purpose it was necessary to discover its area. This was done, not by measurement, but "*hissavar*" on the system previously described in the case of *kharab*; *e. g.*, if the total area of the field were 5 acres, then the area of each of the five classification *hissas* would be approximately 1 acre, and if two of these were *bagayat hissas*, the area of the *bagayat* would be 2 acres.

In Nasik.—In the Nasik district the system in essence was the same. Instead, however, of adding 25 per cent. to the soil classification annas in respect of the *bagayat* area the additions were made according to the two scales given below, the first of which was employed in the case of the Chandvad and Niphad talukas, and the latter for the Sinnar, Nandgaon, Yeola and Nasik talukas :—

Scale 1.

Soil annas.	Addition
16	*Nil*
14	2
12-8	4
6-4	2
below 4	*Nil*

Scale 2.

According to this scale an addition of 4 annas was made to *every* class of soil, from the 1st to the 7th class, no addition being made below that class.

In Satara.—In the Satara district a different system was in vogue, by which the *jirayat* and *bagayat* areas were separately measured and classed—both according to the Dry-crop scale—and the *bagayat* area assessed by means of a separate maximum rate.

After 1877.

Under Colonel Anderson the system of *motasthal* classification was completely changed. The innovations made referred, not merely to the methods of classification, but also to the system of calculating the irrigated area.

(*a*) *The method of classification.*

Under Colonel Anderson wells were divided into three classes, called 1st, 2nd and 3rd class wells. Of these —

1st class wells were those situated within two chains of a large Government tank, canal or other irrigation work, from which their water supply was derived by percolation

2nd class wells were those situated over two but within five chains of a similar work.

3rd class wells were all other wells, wherever situated.

The first two classes were really *semi-pátasthal*, as their supply came from an external source. The system of classification employed in the case of these two classes differed, therefore, from that used in the case of 3rd class wells.

A.—1st and 2nd class wells.—In accordance with the policy of Government of exempting improvements from taxation a differentiation was made in the classification system adopted in the case of those

constructed after the Original Settlement, called New, and those assessed at the Original Settlement, called Old wells, as follows :—

New wells.—The soil classification of the irrigable area was done in the ordinary way. Then in the office additions were made to the soil annas in accordance with the following " A table " scale :—

A table.

Soil annas.				1st class well.	2nd class well.
as.	p.	as.	p.	as.	as.
16	0	10	1	6	4
10	0	7	1	5	3
7	0	4	1	4	2

Old wells.—The necessary differentiation between Old and New wells was made by adding to the soil classification of the former a special increase called " B table chad " in addition to that given by A table. This increase was added, before giving the A table increase, according to the scale shewn below, with, however, the proviso that the soil classification must not thereby be raised above 18 annas :—

B table.

Soil classification.					Increase.
as.	p.		as.	p.	as.
16	0	to	10	1	4
10	0	,,	7	1	3
7	0	,,	4	1	2

Thus, if the soil classification of the field were 15 annas the addition of the full 4 annas would raise it to 19 ; hence the actual addition made was only 3 annas which would bring the total to the maximum allowable of 18 annas.

To this total was added the increase made according to A table for the advantage of percolation.

B.--3rd class wells.—Under this head also Old and New wells were treated differently as follows :—

Old wells.—In this case the soil classification was raised by the addition of " B table chad " as described above, though, of course, without the addition of " A table chad."

New wells. —An addition was made to the soil annas of the irrigable area by the following scale which was divided into two classes in accordance with the depth of the water from the surface or the crop grown. The addition so made was technically called " Position class."

Position class scale.

Soil classification.	1st Position class	2nd Position class.
as. p. as.	as. p.	as. p.
From 16 0 to 8	2 0	1 0
,, 7 11 ,, 6	1 6	0 9
,, 5 11 ,, 4	1 0	0 6
Below 4 annas	*Nil*	*Nil*

First and second " Position " were assigned as follows :—

1st Position.—To all land under sugarcane (grown quadrennially or triennially).

To other well-watered lands when the depth of the water from the surface was within 12 yards.

2nd Position.—When the depth from the surface was between 12 and within 18 yards.

Above 18 yards no Position class was assigned and the well was left unassessed.

As has been noted on p. 309, with the view of making some slight addition to the assessment of lands which, though not actually irrigated, were yet obviously capable of being irrigated were a well to be sunk, and hence possessed an " advantage " over the ordinary Dry-crop lands,

"Position class" was ordered to be assigned to Dry-crop land in the following cases:—

1st Position.—Where springs breaking out on the surface shew that water could be reached within a short distance.

2nd Position.—To lands situated within 10 chains of an existing well, from the level appearing capable of being irrigated were a well to be sunk.

Satara and Khandesh.—In the districts of Satara and Khandesh, however, this "Position class" was not applied. For it was substituted the "General Position class" described on p. 308, which, by taking into account the natural access to sub-soil water due to drainage from higher grounds, treated the possession of sub-soil water advantages on the same principles as those adopted in Gujarat (for which *vide* p. 342) and so did away with the necessity of the special system of well assessment employed in the rest of the Deccan districts.

(*b*) *The calculation of the irrigable area.*

Under the old system the irrigable area had been calculated roughly by the "*hiszavar*" method. Under Colonel Anderson's system, however, an attempt was made to arrive at this area more accurately by the following methods:—

(*a*) The area under command of the well, *i. e.*, that area which, looking to the level of the ground and the capacity of the well itself, could be considered capable of irrigation, was divided into two parts, *viz.*, Permanent (Sálosál) Bagayat and Pherpali or Rotation Bagayat. Of these, Permanent Bagayat was that area which was annually irrigated—which in practice would seem to have been fixed at the area actually irrigated in the year of settlement; while Pherpali was that area which was irrigated only occasionally according to the season. The extent of this latter area could only be estimated roughly after inquiries of the cultivators, examination of the crop registers and by looking to the capacity of the well, etc.

(*b*) The area of Permanent Motasthal was measured on the ground by the classer and that of Pherpali estimated by him.

(*c*) The area to be classed as Bagayat was then fixed as the Permanent area *plus* a share of the Pherpali which was not to exceed $\frac{1}{3}$ of the Permanent area and $\frac{1}{2}$ of the Pherpali, whichever was less.

(*d*) The remainder of the Pherpali area was then added to the Dry-crop.

To give a simple example of this process. Suppose a survey number, the respective areas of the Dry-crop, Permanent Bagayat and Pherpali within which were fixed by the classer as follows :—

Dry-crop	Permanent bagayat	Pherpali
5 acres.	3 acres.	30 gunthas.

Then $\frac{1}{3}$ of the Permanent Bagayat is 1 acre and $\frac{1}{2}$ of the Pherpali is 15 gunthas. The latter area being the less is added to the Permanent Bagayat, which, therefore, becomes 3 acres 15 gunthas, and the remaining 15 gunthas are added to the Dry-crop which becomes 5 acres 15 gunthas.

It will be seen that according to this system of calculation the Bagayat area within such a survey number is not a fixed, but, what may be called, a "floating" area, comprising the average area which may be expected to be irrigated from the particular well.

On the opposite page is given an example (No 5) of the classification system described above in the case of a mixed number of Motasthal and Dry-crop land.

(*ii*) *The Southern Maratha Country System.*

Different systems were adopted in each of the Belgaum, Dharwar and Bijapur districts.

Belgaum.

In this district the land under *all* wells, both 1st, 2nd and 3rd class, were classed in the same way, *i.e.*, by the addition of "position class" to the soil annas according to the scale already given (*vide* p. 320). The difference between the three classes was made at the time of calculating the assessment, for which see Chapter IX, p. 419. Nor was any difference made between old and new Bagayat which was assessed at exactly the same rates.

Dharwar.

1st and 2nd class wells.

Land under these classes of wells, of which there are very few, were classed as Dry-crop, the difference in value being allowed for in calculating the assessment (*vide* Chapter IX, p. 420).

3rd class wells.

Old wells.—Lands under such wells were given "Position class" in accordance with the ordinary rules.

New wells.—The land was classed as ordinary Dry-crop without any addition to the classification.

Bijapur.

In this district two systems of classification were employed :—

(i) That described above in the case of the Belgaum district.

(ii) The Deccan system, through the medium of the A and B tables (*vide* p. 319).

PA'TASTHAL.

As has been explained in Part I (*vide* p. 107) the rating of Pátasthal land was far more of an individual and less of a mechanical matter than was the case with other classes of land. The assessments of the land under each *pát* were fixed by the Superintendent personally on the spot after a careful consideration of a variety of circumstances bearing upon the question of what a suitable rate should be. In fact, apart from the classification of the soil, which was done according to the ordinary soil scale, the "classification" of Pátasthal land was really a process of collecting information from which the Superintendent could come to a conclusion as to the proper rate of assessment. The information so gathered by the classer was embodied in the Pátasthal Takta—or Pátasthal Register and used by the Superintendent for the purpose of assessment.

The main heads under which information of this character was usually gathered were the following :-

1. The nature of the crops grown.
2. The character and duration of the water-supply.
3. The area irrigable.
4. The distance of the field from the *pát*.
5. The cost of constructing the *pát*, and whether it was *pakka* or *kacha*.
6. The presence or absence of well assistance and the class of the well.

Of these 6 main heads the two which call for attention here are 2 and 3 ; *viz*, the character of the water-supply and the area irrigable.

The system of dealing with these two subjects differed considerably, not only in different districts, but also at different times within the same district. It will, therefore, be necessary to deal separately, first with the systems employed in the Deccan exclusive of Khandesh, then with that of the Khandesh district, and lastly with that of the Southern Maratha Survey. In doing so it will be convenient to describe the Deccan system first as a whole, and then to note the variations from this system exhibited by those of the other districts.

(*1*) *The Deccan system.*

(*a*) *The Pátasthal water-supply.*—The chief point to which attention was directed was the duration of the supply, since the character of the crops grown depends mainly upon this factor. For this purpose, therefore, the water-supply of Pátasthal lands was divided into a certain number of classes accordingly. As in the case of Motasthal, there is a difference in the system of division adopted before and after 1877.

Before 1877.

There were 6 water classes as follows :—

Class.	Description.
1	.. Water carried by a *pát* from a *pakka* built *bandhara* in good repair and affording a perennial supply of water.
2	.. Water-supply perennial, but decreasing in quantity during the hot months of April and May.
3	.. Water-supply lasting throughout the year, except in bad seasons when there is a total failure for about a month or two. Sugarcane customarily grown.
4	.. *Pát* affords water-supply until the 15th March and does not therefore suffice for sugarcane, but is sufficient to grow *khapli* wheat, *bhuimug*, etc.
5	.. *Pát* affords water-supply till the 1st or 15th February and does not suffice to grow *khapli* wheat, but is sufficient to raise a second crop of chillies, onions, carrots, etc.
6	.. *Pát* affords water-supply annually during the months of November and December.

A reduction of one class was made—

(*a*) in the case of the 4th and 5th classes when the area was larger than could be properly irrigated ;

(*b*) when the irrigated lands were at a distance from the source of water-supply.

After 1877.

Under Colonel Anderson the water classes were revised as follows :—

Class	Duration of flow.	Crops cultivable.
1	Perennial	.. Superior kinds of garden produce, such as sugarcane, with a triennial or quadrennial rotation of oranges, figs, grapes, plantains, limes sweet or sour, or *panvel*, without any fear of deficiency of water.
2	Till end of April	.. Same kinds as above, as also guavas, pomegranates and ginger, but owing to insufficiency of water-supply the produce is inferior to that of the 1st class.
3	Till 15th of March	.. Two good garden crops, such as chillies, potatoes, *ratali* or *bajri*, with an after-crop of wheat or vegetables, or one good garden crop of turmeric.
4	Till the 1st February	.. One good garden crop, such as *bhuimug*, or two inferior ones, such as *bajri*, Indian corn, *vari* or *mug*, with an after-crop of gram, *vatana*, *masur*, coriander, *methi*, lucern or vegetables.
5	Till the 1st December	.. One good garden crop, such as chillies, rice or vegetables.
6	Till the 1st November	.. One inferior crop of rice, or any other ordinary crop aided by a *pát*.

(*b*) *The determination of the irrigable area.*—Previous to 1877 the irrigable area was determined in some cases by the "*Hissavar*" system and in others by an approximate measurement. After that year, however, the "Pherpali" system previously described under the head of Motasthal (*vide* p. 321) was introduced. In its main details the system applied to Pátasthal lands was exactly the same as that for Motasthal, and it need not, therefore, be described again. Owing, however, to the greater complexity of the Pátasthal system of irrigation the determination of the area which should be taken as irrigable was a far more delicate matter than in the case of Motasthal. The principles in accordance with which this should be done are clearly explained in Mr. Fletcher's *memorandum* on the "rating of Pátasthal" (printed as Appendix VII (*a*)) under the head of "Area," to which the reader is, therefore, referred for further information on the subject.

An illustration of Pátasthal classification is given in Example No. 6.

(2) *The Khandesh system.*

As has previously been shewn the irrigational system of Pátasthal lands in Khandesh differs in certain ways from that of the rest of the Deccan. So also does the system of classification applied in these districts, which was devised by Mr. Pedder. This was the case, not only with respect to the methods employed of ascertaining the irrigable area, but also regarding the soil classification and the division of the water-supply into classes.

(*a*) *The soil classification.*—In Khandesh, while the actual field classification was done according to the ordinary soil scale, only three classes of soil were recognized for the purposes of Pátasthal classification, *viz.*—

Class 1 comprising the first three classes of the soil scale.

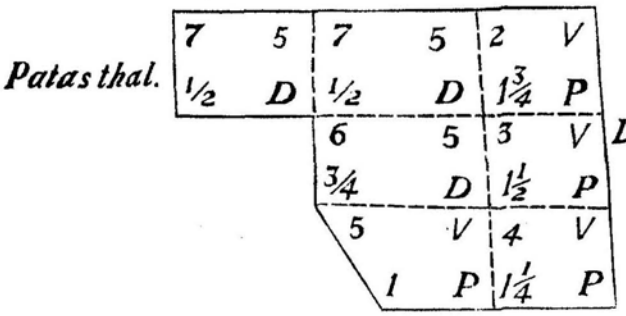
„ 2 comprising next two classes of the soil scale.

„ 3 comprising the remaining classes of the soil scale.

(*b*) *The Water classes.*—As with the soil classification, so in the case of the water-supply three classes were arranged. They were not, however, as in the Deccan, based on any particular duration of the

Example No. 6.

Mixed Dry-crop and Pátasthal.



Dry-crop.

Class.	Shares.	Annas.
2	1	14
3	1	12
4	1	10
5	1	8
Total ..	4	44

	as.	p.
Kayam bhag annas ..	11	0

Pátasthal.

Water Class.

Class.	Shares.	Annas.
5	3	15

Average Water Class .. 5

Soil.

Class.	Shares.	Annas.
6	1	6
7	2	9
Total	3	15

	as.	p.
Kayam bhag annas ..	5	0

Area (by measurement)—

	A.	g.		A.	g.
Bagayat ..	4	27	Permanent ..	0	21
			Pherpali ..	4	6
Dry-crop .	7	30			

Area (as finally settled)—

		A.	g.
Bagayat ..	Permanent ..	0	21
	Add ⅓ from Pherpali	0	7
	Total Permanent ..	0	28

	A.	g.	Soil classification. As.	Reduced value Rs.	a
Dry-crop	7	30	11	5	5
Add remainder Pherpali	3	39	5	1	4
Total ..	11	29	..	6	9

	As.
Average bhag annas of Dry-crop	9

Explanation.

The calculation of the classification values and areas was done in exactly the same way as that described in Example No. 5 for Motasthal.

supply, but were settled individually for each *pát*, the rules stating that " the best water-supply under each *bandhara* is to be put in the 1st class of water-supply, no matter how inferior that supply may be to that from another *bandhara*, even in the same village, and that the Superintendent will meet the difference in the rates." According to the rules, therefore, all fields were put into the 1st class, except those in which the water-supply was deficient, which were placed in the 2nd or 3rd classes according to the extent of the deficiency. It must, however, be noticed

(*a*) that lands with the help of a well in addition to the *pát* were invariably put into the 1st class;

(*b*) that conversely, where it was necessary to use a *bhudki* to lift the water from the *pát* the supply was reduced to 2nd or 3rd class.

(*c*) *The determination of the irrigable area.* -In the Khandesh districts the elaborate Pherpali system of calculating the irrigable area was not introduced. Owing to the Phad system of cultivation (*vide* Part I, p. 105) the areas actually irrigated were found to be very clearly defined. Within every survey number, therefore, all the Pátasthal land was divided up into *pot* numbers in accordance with occupation, thus making the Pátasthal area in Khandesh a fixed and not a floating area as it is in the Deccan.

(*3*) *The Southern Maratha Country system.*

The Southern Maratha system, in so far as the determination of the irrigable area and the method of assessment are concerned, is the same as that of the Deccan. The principle of division into water classes, however, differs considerably. The Pátasthal water classes of the Southern Maratha system are the same as those for Rice lands, which in this part of the Presidency partake rather of the nature of Garden land than of ordinary Rice. The rules for the water classification of Rice lands are given in paragraph 13 of section XII of Wingate's Survey Rules of 1853, and by paragraph 18 of this section it is ordered that " the supply of water to purely Pátasthal Bagayat should be classed in the same manner as if the field were cultivated with rice and supplied with water by a *pát*; but care must be taken that the 6th class is never

entered for garden cultivation, because it does not relate to water conveyed by a *pát.*" To which it may be added that neither do some of the sub-classes of the higher classes of water-supply. In the following table, therefore, only those water classes are given which relate properly to Pátasthal irrigation. A necessary change also is made by the substitution of the words " garden crop " for " rice " whenever the latter word appears :—

Class	Sub class	Source of supply	Duration of supply	Situation of land	Crops grown
1		By *pát* from a good tank, river or *nala*	Till end of March or April	Low lying	Better class of sugarcane every second or third year
2	. .	Do	Do	Rather elevated with less moisture	A second rate crop of sugarcane with certainty
3	1	Do	Do	Elevated	Sugarcane cultivable only when rains very favourable
	2	Do	Till end of December or January	Low lying	
4	.	Do		Elevated	(A garden) and after green crop in one season
5	1	Do		Very high	No after crop possible
	2	Small tanks			

Rice.

(*A*) *Old Rice.*

The systems of Rice classification employed in the Deccan Survey are four in number, *viz.*—

(1) The Dangi system of Mr. Tytler, used in the Dang tracts of the Nasik districts.

(2) The Deshi system, used in the plain talukas of Nasik, Poona, Ahmadnagar and Sholapur.

(3) The Dharwar system, employed in the Southern Maratha Country from the first, and subsequently introduced by Colonel

Anderson in parts of the Poona, Nasik, Satara, Sholapur and Ahmadnagar districts.

(4) The Satara system, employed in that district alone.

(1) *The Dangi system.*

The principles upon which this system were based have already been explained in Part I (*vide* p. 60).

The three factors of value taken into account were soil, *jhil* (moisture) and embankments, which were classed according to the following scales :—

Soil.

Class.	Anna value	Order of soil			
		Yellow and yellowish red soils	Dark red soils	Very dark red soils.	Coarse and gravelly soils.
		Depth			
1	8	1 hath and over			
2	5	Under 1 hath, over ½ hath	1 hath and over		
3	3	Under ½ hath	Under 1 hath over ½ hath	1 hath and over	
4	1		Under ½ hath	Under 1 hath	All depths.

The only *fault* taken into account was *Valsur*—a mixture of coarse pebbly soil and sand

Moisture.

Class	Anna value	Condition as found		
		up to end of February	in March	in April and May.
1	4	Surface water or soil very muddy	Moist to the surface.	Fairly moist below the surface.
2	2	Slightly moist on the surface with firm, concrete mud below.	Dry above but moist below the surface.	Slightly moist below the surface.
3	.	Dry surface and slightly moist below	Dry above and below	Dry above and below.

Embankment.

Class.	Anna value.	Description.
1	4	.. An embankment only slightly broken, so that little or no expense of labour will repair it at sowing time.
2	2	.. Such an embankment as is a good deal injured, has somewhat less than half of it carried away, or has a *nala* running through it, and will require some expense and labour for its repair.
3	..	Such an embankment as has more than half of it carried away or is totally destroyed, or, by the continued accumulation of soil, is on a level with the field.

For an illustration of the method of classification a reference may be made to paragraph 11 of Lieut.-Colonel Taverner's letter No. 893 of 15th October 1875, Appendix R, to Second Revision Settlement Report of the Dindori taluka of Nasik.

(2) *The Deshi system.*

The factors of value were soil and water which were classed under the following scales :—

Soil.

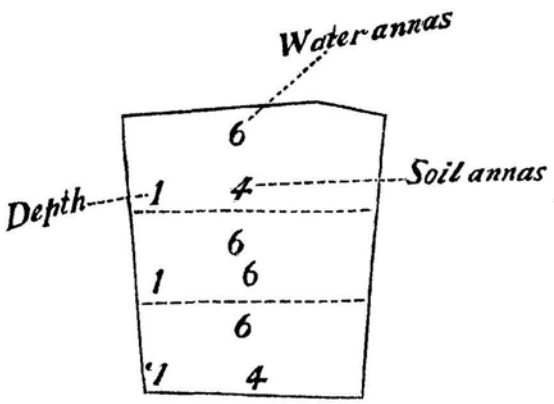
Class.	Anna value.	Kind of soil		
		Darkish red and reddish-yellow.	Reddish black and black	Clayey black and grey
		Depth.		
1	8	1 cubit	...	...
2	6	¾ ,,	1 cubit.	....
3	4	½ ,,	¾ ,,	1 cubit.
4	3	¼ ,,	½ ,,	¾ ,,
5	2	....	¼ ,,	½ ,,
6	1½	....	....	¼ ,,

Faults.

1st order of soil.— To be reduced to 2nd when large admixture of sand, unless *alluvial* when to be retained as 1st class.

Example No. 7.

Old Rice (Deshi system).



Class.	*Shares.*	*Annas.*
10	*2*	*20*
12	*1*	*12*
Total..	*3*	*32*

	as.	*p.*
Average bhag annas.	*10*	*8*
Kayam bhag annas.	*10*	*6*

Explanation.

Under the Deshi system of rice classification the soil and water annas were added together to form the "class." Neither the order of soil nor the faults, if any, were shewn in the classification tippan.