MEMOIRS

OF THE

ASIATIC SOCIETY OF BENGAL

VOL. II.

1907—1910.

CALCUTTA:
PRINTED AT THE BAPTIST MISSION PRESS, AND PUBLISHED BY
THE ASIATIC SOCIETY, 1, PARK STREET.
1911.

DATES OF PUBLICATION.

Memoir No. 1	..	pp.	1-10	.. 9th February	1907
,, No. 2	..	,,	11-24	.. 5th June	,,
,, No. 3	..	,,	25-42	.. 2nd May	,,
,, No. 4	..	,,	43-84	.. 25th ,,	,,
,, No. 5	..	,,	85-120	.. 21st December	,,
,, No. 6	..	,,	121-154	.. 25th April	1908
,, No. 7	..	,,	155-168	.. 29th July	,,
,, No. 8	..	,,	169-252	.. 6th ,,	1909
,, No. 9	..	,,	253-340	.. 18th May	,,
,, No. 10	..	,,	341-346	.. 18th January	1910
,, No. 11	..	,,	347 430	.. 18th March	,,

INSTRUCTIONS FOR BINDING.

Insert pp. i-iv as a preface before p. 121, and those pages numbered 1-14 which have Chinese characters on them as an appendix after p. 340.

Plates i & ii to follow		..	..	..	p. 10
,, iii & iv	,,	..	..	..	,, 24
,, v & vi	,,	..	..	..	,, 84
,, vii to x	,,	..	..	..	,, 252
,, xi to xvii	,,	..	..	..	,, 346
,, xviii	,,	..	..	..	,, 430

Or all to be placed at the end of the volume.

ERRATUM.

Page 413 at the top of the Table, for 2327 read 1327.

CONTENTS.

MEMOIRS

OF THE

ASIATIC SOCIETY OF BENGAL

VOL. II, No. 1, pp. 1–10.

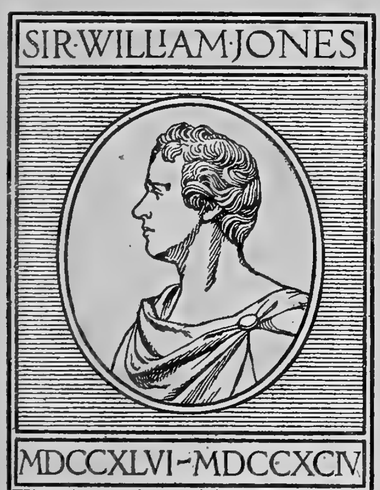
CIRRHIPEDES OPERCULES DE LE L'INDIAN MUSEUM DE CALCUTTA.

PAR

M. A. GRUVEL,

Maître de Conférences de Zoologie à la Faculté des Sciences (Université de Bordeaux).

WITH TWO PLATES.



CALCUTTA:

PRINTED AT THE BAPTIST MISSION PRESS, AND PUBLISHED BY

THE ASIATIC SOCIETY, 57, PARK STREET.

1907.

Price Rs. 2; or 2s. 10d.

9 2-07.

Cirrhipèdes operculés de l'Indian Museum de Calcutta
(avec deux planches).

Par A. GRUVEL, *Maître de Conférences de Zoologie à la Faculté des Sciences (Université de Bordeaux).*

[Lu le 7 Novembre, 1906.]

J'ai reçu au mois d'Août 1905, une assez belle collection de Cirrhipèdes Operculés, qui m'étaient amiablement envoyèe par le Prof. Annandale, Deputé Superintendant de l'Indian Museum Calcutta.

Il m'avait été jusqu'ici, impossible d'examiner ces echantillons, dont la plupart sont très intéressants et beaucoup même nouveaux pour la science.

On sait que le Dr. Annandale a déja publié la description de plusieurs espèces de Cirrhipèdes Pédonculés, provenant tous du même établissement et récoltés par l'"Investigator."

Les espèces de Pédonculés nouvelles, signalées par Annandale sont les suivantes: *Scalpellum inerme, Sc. sociabile, Alepas gigas, Al. malaysiana,*[1] et en outre: *Scalpellum gruveli, Sc. gruveli* var. *quadratum, Sc. alcockianum, Sc. laccadivicum, Sc. laccadivicum* var. *investigatoris, Sc. bengalense, Sc. woodmasoni, Sc. subflavum, Megalasma striatum* sub-sp. *minus* et enfin, *Alepas xenophoræ.*[2]

La série des Operculés n'est ni moins riche, ni moins interessante que celle des Pedonculés, car presque tous les espèces appartenant au genre *Verruca* sont nouvelles, ainsi qu'une espèce, appartenant au genre *Balanus.*

Mais le principal intérêt de cette collection réside dans la présence d'une forme tout à fait inédite, qui ne se rattache à aucun genre existant et que, à cause de la resemblance de sa muraille et de ses pièces operculaires avec les *Pyrgoma,* j'ai designé sous le nom de *Pyrgopsis* et j'ai dédié avec plaisir cette première espèce au savant Directeur de l'Indian Museum, qui a bien voulu me confier l'étude de cette intéressante collection, en le priant de m'excuser d'avoir tant tardé à repondre à son amabilité.

La plus grande partie des échantillons examinés proviennent du Golfe du Bengale, plus spécialement de l'Archipel des Iles Andamans, quelques uns du Golfe Persique et de la côté d'Arabie.

A. CIRRHIPEDES OPERCULES ASYMETRIQUES.

Genre VERRUCA, Schumacher.

Les cinq groupes de *Verruca,* contenus dans la collection, contiennent quatre espèces nouvelles. L'une d'elles était fixée sur le scutum d'un *Scalpellum squamuli-*

1 *Memoirs of the Asiatic Society of Bengal,* Vol. I., No. 5, pp. 73–84.
2 *Annals & Mag. of Natural History,* Ser. F., Vol. XVII., April 1906.

ferum, Weltner, d'autres sur des tiges de Gorgonides et enfin, la plus grande partie, sur des spicules d'éponges (Hyalonema ou formes voisines).

1. Verruca plana—n. sp. (Pl. 1, fig. 5 et 6.)

Diagnose: Test non déprimé : plan scuto-tergal mobile, à peu près perpendiculaire au plan de la base : surface absolument lisse, avec quelques stries à peine visibles, même à la loupe. Il est difficile de reconnaitre la ligne de suture entre le rostre et la carène. Couleur d'un blanc absolument pur, sans aucune autre teinte, ni tâche. *Scutum mobile* à peu près triangulaire, sans arête articulaire, avec, à la surface, quelques stries d'accroissement peu visibles : bord tergal droit, sauf dans sa partie supérieure, ou il présente une légère encoche, destinée à reçevoir une petite dent articulaire de la partie correspondante du bord scutal du tergum. *Tergum mobile* de forme losangique presque régulière et de surface externe absolument plane : cette pièce porte deux sillons très légers, allant de l'apex à l'angle basi-scutal qui dilimitent un petite côté, en diagonale, absolument rectilique. Le bord scutal est droit et porte, à sa partie supérieure, la petite dent articulaire signalée plus haut. Le bord basal est légèrement concave et le bord carénal présente une convexité externe peu sensible. *Scutum fixe* à peu près triangulaire, très épaté à la base, avec des stries d'accroissement parallèles et un peu plus visibles que sur la pièce mobile correspondente. Pas de côtes longitudinales. *Tergum fixe* de forme quadrilatère irrégulière, avec une côte légèrement saillante, partant de l'apex et venant rejoindre la base à son point de soudure avec le scutun fixe. Pas d'apex ni à la carène ni au rostre, dont la forme est régulièrement arrondie. Les denticulations que l'on observe tout autour de la base très allongée dans le sens rostro-carènal, sont dûes aux saillies épineuses du Gorgonide sur lequel se trouve fixé l'animal.

Dimensions : Diamètre transversal moyen : 3 mm.
De l'apex du tergum fixe à la base : 3 mm.

Habitat: Passages des Iles Andamans par 380 à 465 m. de fond, deux échantillons entiers et quelques fragments, fixés sur des tiges de Gorgones, Explorations de l'"Investigator," Collections de l'Indian Museum de Calcutta.

Observations et affinités: L'impression qui se dégage le mieux de l'examen de cette espèce, est une régularité parfaite de toute la surface externe, qui est absolument lisse, très caractéristique par conséquent, et qui suffirait, à elle seule, à la distinguer de toutes les formes déja connues appartenant à ce genre. En l'absence complète de toute arête articulaire nette sur les pièces operculaires, *V. plana* vient donc se placer en tête de la famille, à côté de *V. erecta*, A. Gruvel, dont elle ne présente aucun des caractères spécifiques.

2. Verruca cristallina—n. sp. (Pl. 1, fig. 9 et 10.)

Diagnose: Test non déprimé. Plan scuto-tergal mobile à peu près perpendiculaire au plan de la base qui est généralement très allongée dans le sens rostro-carènal : surface générale rugueuse, d'une couleur blanche, legèrement teintée de jaune. *Scutum* *mobile* à apex pointu, de forme à peu près triangulaire, avec quatre arêtes articulaires, dont l'axiale, étroites. L'axiale est la plus étroite et aussi la plus saillante. La 3e (en partant du sommet) est la plus large. La première (supérieure) est assez difficilement visible et se confond presque avec le bord libre. La surface comprise entre l'arête axiale et le bord rostral n'est pas lisse, mais présente, une ou deux côtes longitudinales peu saillantes, du reste, avec des stries d'accroissement souvent peu nettes. *Tergum mobile* nettement losangique avec, aussi, quatre arêtes articulaires, dont l'axiale, très saillante. L'arête moyenne est la plus large; la seconde, la plus courte est de beaucoup la plus étroite, parfois à peine visible et le tergum semble, alors ne porter que trois arêtes. La surface comprise entre l'arête axiale et le bord carènal ne présente aucune côte longitudinale, mais les stries d'accroissement sont nettement accusées; l'apex est mousse. *Scutum fixe* avec trois arêtes articulaires, dont l'axiale saillante, la moyenne peu nette et la supérieure large: striés d'accroissement bien marquées. *Tergum fixe*, avec l'apex en pointe presque aiguë, présentant deux côtes articulaires, dont l'axiale. Apex du rostre, mousse et situé à une distance de la base égale environ à la moitié de celle qui sépare celle-ci de l'apex de la carène qui est également mousse. La limite entre ces deux pièces, du côté mobile, est reportée toujours du côté carènal, parfois très fortement, ce qui donne à cette espèce un aspect bien caractéristique. Le rostre et la carène portent, chacun, trois côtes articulaires très nettes, à stries d'accroissement saillantes. En outre, le rostre présente deux petites côtes articulaires supérieures qui viennent s'articuler avec la base de l'arête axiale du scutum mobile.

Dimensions: de l'apex du rostre à celui de la carène: 3·5 mm.
de l'apex du tergum fixe à la base: 4 mm.

Habitat: Iles Andamans, Cap Bluff, par 768 m. de fond, Explorations de l'Investigator et Cinque Island (Andamans) par 785 m. de fond, Investigator: Une quinzaine d'exemplaires, Collections de l'Indian Museum, Calcutta.

Observations et affinités: Les *mandibules* portent trois dents, la supérieure étant la plus forte et séparée de la 2e par un intervalle égal environ à deux fois celui qui sépare la 2e de la 3e, laquelle est située très près de l'angle basal orné de deux groupes de pointes courtes et raides en lame de poignard (Pl. I, fig. 9). Les *machoires* ont le bord libre orné d'un groupe supérieur de pointes fortes et longues puis une encoche située entre deux pointes courtes et enfin, l'angle basal formant un mamelon saillant orné de quelques pointes fortes et longues, mêlées de soies plus nombreuses et moins fortes (Pl. I, fig. 10). Le bord libre du *labre* présente une légère encoche médiane mais pas de dents. Le *pénis* est court, trapu, annelé sur toute sa longueur sauf vers son extrémité libre qui est lisse et converte de quelques soies nombreuses et irrégulièrement disséminées. Les *appendices terminaux* (filamenteux) sont longs et grêles, atteignant environ la moitié de la longueur de la 6e paire de cirrhes et portent environ 25 articles allongés.

Par son scutum et son tergum mobiles à quatre arêtes articulaires et par sa forme générale, cette espèce se rapproche de *V. radiata*, A. Gruvel, mais le scutum et le tergum fixe, ainsi que la carène et le rostre sont tout à fait différents et la ligne de suture de ces deux dernières pièces se trouve reportée beaucoup plus du côté carènal.

3. VERRUCA MULTICOSTATA—n. sp. (Pl. 1, fig. 1 et 2.)

Diagnose: *Test* non déprimé. Plan scuto-tergal mobile à peu près perpendiculaire à la base qui est très allongée dans le sens carèno-rostral et dont les bord libres viennent en contact sur presque toute la longueur. Test de couleur générale jaunâtre, très rugueux. *Scutum mobile* avec cinq arêtes articulaires, dont l'axiale, toutes très rapprochées, saillantes et étroites. Surface en avant de l'arête axiale, avec des lignes d'accroissement très accentuées et moniliformes. Apex très pointu. *Tergum mobile* avec cinq arêtes articulaires, la supérieure se confondant avec le bord libre. Toutes ces arêtes sont saillantes, sourtout l'axiale. Surface située en arrière de l'axiale portant des lignes d'accroissement très nettes, légèrement denticulées, mais non pas moniliformes. Apex mousse. *Scutum fixe* triangulaire avec trois arêtes articulaires, dont l'axiale, la moyenne étroite et la supérieure large. Toute la surface est ornée de côtes longitudinales saillantes étroites, séparées par des sillons assez profonds. Les lignes d'accroissement sont nettement en relief. Apex pointu. *Tergum fixe* avec une arête articulaire large et divisée par des sillons longitudinaux, en plusieurs côtes étroites. Le reste de la surface est également convert de côtes saillantes avec des lignes d'accroissement accentuées. Apex du rostre et de la carène mousses et situées à peu près à la même distance de la base. Rostre plus large que la carène avec trois côtes articulaires principales, dont la supérieure est formée par la réunion de plusieurs côtes secondaires. Le reste de la surface est orné de nombreux plis saillants partant de l'apex et à stries d'accroissement en relief. La carène porte trois côtes articulaires simples et le reste de la surface comme pour le rostre.

Dimensions: de l'apex du rostre à celui de la carène: 9.5 mm.
de l'apex du tergum fixe à la base: 9 mm.

Habitat: Un seul échantillon fixé sur un spicule d'Hyalonema et recueilli aux environs au Détroit de Malacca (6° 18′ lat. N. et 90° 40′ long. E.) par 160 m. de fond, Explorations de l'"Investigator," Collections de l'Indian Museum, Calcutta.

Observations et affinités: Cette espèce vient se placer dans la classification que nous avons adoptée après *V. costata*, Auriv., dont elle se distingue très nettement par la multiplicité de ses côtes longitudinales et par les positions relatives des apex du rostre et de la carène.

4. VERRUCA KŒHLERI—n. sp. (Pl. 1, fig. 7 et 8.)

Diagnose: *Test* fortement déprimé: plan scuto-tergal mobile à peu près parallèle à la base qui est presque régulièrement circulaire. Test de couleur blanche, très rugueux. *Scutum mobile* avec quatre arêtes articulaires (dont d'axiale), très saillantes, avec des lignes d'accroisement très accusées; la 3^e (à partir du sommet) est la plus large, mais l'axiale est la plus saillante. La surface comprise entre l'arête axiale et le bord rostral, présente trois côtes longitudinales saillantes dont la moyenne est la plus étroite. Apex très pointu et fortement recourbé vers la base. *Tergum mobile* avec quatre arêtes articulaires saillantes surtout l'axiale qui est à peu près de la même largeur que la seconde. La surface située entre l'arête axiale et le bord carènal ne présente comme ornement que des lignes d'accroissement saillantes et pas de côtes longitudinales. Apex mousse. *Scutum fixe* irregulièrement triangulaire avec des plis longitudinaux plus ou moins réguliers. *Tergum fixe* avec la partie centrale triangulaire ornée de plis longitudinaux et deux ailes latérales bien developpées, surtout celle qui s'articule avec la carène. Apex de la carène et du rostre situés à peu près à la même distance de la base. Carène avec trois côtes articulaires, longitudinales, saillantes, dont la moyenne est la plus large. Le reste de la surface porte seulement quelques plis irréguliers. Quant au rostre, son aspect est tout à fait caractéristique et ne se retrouve dans aucune des formes actuellement connues. Non seulement, on aperçoit partant de l'apex, les trois côtes longitudinales qui viennent s'articuler avec la carène, mais au-dessus de ces trois côtes on trouve encore quatre côtes courtes étroites, mais saillantes, qui viennent s'articuler avec la base du scutum correspondant et une série de plis étroits et très courts, plus externes, qui s'articulent avec la base du scutum fixe.

Dimensions : de l'apex du rostre à celui de la carène : 6.5 mm.
de l'apex du tergum fixe à la base : 2.5 mm.

Habitat : Iles Andamans par 435 m. de fond, Explorations de l'"Investigator," Un seul échantillon fixé sur le scutum d'un *Scalpellum squamuliferum*, Weltner., Collections de l'Indian Museum, Calcutta.

Observations et affinités : Par son test déprimé, ses quatre arêtes articulaires au scutum et au tergum mobiles et par son aspect général cette espèce vient se placer entre *V. magna*, A. Gruvel, et *V. imbricata*, A. Gruvel, sans pouvoir se confondre, du reste, ni avec l'une ni avec l'autre, à cause du nombre des arêtes articulaires qui est de trois chez la première, de cinq chez la seconde, et surtout à cause de la forme du rostre si caractéristique, qu'elle constitue un caractère spécifique de première importance.

Je dédie cette curieuse espèce à mon savant collègue et ami le Professeur Kœhler de la Faculté des Sciences de Lyon, dont on connait les très intéressants travaux sur l'anatomie et l'histologie des Cirrhipèdes.

B. OPERCULES SYMETRIQUES.

Deux familles sont représentées dans la collection par un certain nombre d'échantillons, ce sont : les Hexameridæ et les Tetrameridæ.

Famille des HEXAMERIDÆ.

Genre CHTHAMALUS Ranzani.

Ce genre est représenté par une seule espèce, la plus commune, *Ch. stellatus*, Ranz., fixée sur des Patelles recueillies sur les rochers de Penang.

Genre BALANUS.

Le genre Balanus est beaucoup mieux représenté que le précédent par les espèces suivantes, dont une nouvelle pour la science.

BALANUS PERFORATUS, Brug., var. ANGUSTUS, Gmelin.

Il provient des rochers d'Andamans dans une grotte qu'il tapissait, sans doute. Le test est assez déformé et peu reconnaissable.

BALANUS AMPHITRITE, Darw., var. COMMUNIS, Darw.

Côtés de Vizagapatam et Iles de Santapilly, ainsi que à la Station 336 des Explorations de l'" Investigator," 7° 37′ lat. N. et 41° 0′ long. E., par environ 1000^{m}. de fond.

BALANUS AMPHITRITE, Darw., var. NIVEUS, Darw.

Iles Andamans, Station 291 de l'" Investigator," 11° 49′ 30″ lat. N. et 92° 55′ 55″ long. E., sur de coquilles de Gastéropodes.

BALANUS AMPHITRITE, Darw., var. VARIEGATUS, Darw.

Nombreux échantillons mêlés à de petites Modioles, recueillés à la station 283 de de l' " Investigator " par 1750^{m}. environ de fond.

BALANUS CARENATUS—n. sp. (Pl. 2, fig. 1 à 6.)

Diagnose : *Parois* et *base* calcaires et poreuses, rayons non poreux. *Test* lisse, de cou'eur généralement rosé, avec, sur les parois, des bandes rosées, longitudinales, séparées par des bandes d'un blanc-jaunâtre plus étroites. *Carène* avec l'apex très fortement recourbé en arrière. Base entièrement poreuse. *Scuta* avec les stries d'accroissement saillantes ; la crête articulaire droite, très nette, saillante, mais n'atteignant pas le bord tergal de la pièce. Crête pour l'adducteur nette, mais peu saillante, régulièrement arrondie et située à peu près à égale distance du bord rostral et du bord terga'. Cavité pour le muscle adducteur des scuta presque nulle. Cavité pour le muscle dépresseur latéral assez profonde. *Terga* avec la crête articulaire courte, peu saillante, et le sillon articulaire éga'ement court et peu profond. Eperon très saillant, avec le bord postérieur arrondi, l'extrémité coupée carrément et une dent antérieurt très nette, séparée par une encoche étroite et profonde de l'angle basi-scutal qui ese pointu. L'éperon est séparé du bord scutal par une distance égale environ à la moit'é de sa propre largeur. Le bord basal en arrière de l'éperon est légèrement échancré et présente des crêtes saillantes pour le muscle dépresseur qui forment des dents accentuées le long du bord basal Sillon longitudina externe très net peu profond, mais occupant la presque totalité de la largeur de l'éperon qui égale presque la moitié de a largeur totale de la pièce. Le bord carènal des terga est régulièrement arrondi et l'apex est terminé en pointe presque aiguë.

Dimensions : Diamètre de base : 12 mm. Hauteur verticale : 9 mm.

Habitat: Akyab (Birmanie) sur coquilles, deux échantillons, Collections de l'Indian Museum, Calcutta.

Description : Les canaux longitudinaux des parois de la muraille sont à la base de section carrée et chacun d'eux présente du côté interne de la paroi externe, des dissépiments plus ou moins nombreux et développés, mais qui ne viennent jamais au contact de la face interne. Le *labre* porte une forte encoche médiane avec, de chaque côté sur son bord libre, *trois* dents fortes mais courtes ; le bord libre et la face interne sont garnis de soies courtes. Les *mandibules* portent trois dents, à peu près de même force avec l'angle inférieur carré et mousse, non pectiné La 1ere et la 2e dent sont à une distance un peu plus grande que celle qui sépare la 2e de la 3e qui est contiguë à l'angle basal. Les *machoires* ont le bord libre droit, mais l'angle inférieur est très saillant, conique, et porte trois soies fortes, dont la supérieure est la plus longue. L'angle supérieur présente aussi 2 à 3 pointes fortes, plus 7 ou 8 plus fines, allant rejoindre l'angle inférieur. Il n'y-a pas de véritable échancrure sur le bord libre. Les *palpes* de la lèvre inférieure sont très développés, très aplatis latéralement, et garnis sur leur bord libre de nombreuses soies longues et flexibles. Les *branchies* sont foliacées et bien développées. Première paire de cirrhes : rame antérieure un peu plus longue que la postérieure dont les articles forment, du côté antérieur, des sortes de mamelons coniques ornés de touffes de soies nombreuses et barbelées. Seconde paire : rame antérieure un peu plus longue que la postérieure, avec, toutes deux, à partir de la moitié terminale, des prolongements coniques antérieurs, moins saillants que dans la 1ere paire. Troisième paire : même caractères, mais un peu plus de différence entre la longueur des rames. Quatrième, 5e et 6e paires : longues flexibles, à rames presque égales et à nombreux articles. Pas d' appendices terminaux. *Pénis* très long, flexible, avec une partie basilaire courte et lisse, armée d'un éperon dorsal pointu très net, et une partie annelée, d'abord renflée, puis s'amincissant régulièrement jusqu'à son extrémité libre, avec quelques soies irrégulièrement disseminées à sa surface et un peu plus nombreuses vers le sommet.

Affinités : Cette espèce à cause des caractéres de ses parois, de sa base, et de ses rayons, se place dans la Section C. Par le sillon longitudinal des terga, l'échancrure du bord basal, en arrière de l'éperon et la forme générale du test, elle vient se placer à côté de *Balanus amphitrite*, Darw., mais elle s'en distingue facilement par la forme très recourbée en arrière de la carène très développée et celle de ses pièces operculaires en particulier des terga, par les des machoires, etc.

Je propose le nom de *carenatus* pour rappeler une particularité intéressante de la carène.

BALANUS AMARYLLIS, Darw.

Nombreux échantillons de petite taille et de couleur très blanche provenant d'Akyab (Birmanie), ainsi que de grands exemplaires probablement detachés d'un bateau ou d'un cable sous-marin et provenant des Iles Nicobar.

Genre CHELONOBIA, Leach.

CHELONOBIA TESTUDINARIA, Ellis.

Deux beaux exemplaires provenant de tortues capturées aux Iles Andamans.

CHELONOBIA PATULA, Ranz.

Un échantillon provenant d'Akyab en Birmanie.

Famille des TETRAMERIDÆ.

Genre TETRACLITA, Schumacher.

TETRACLITA POROSA, Gm. var. COMMUNIS, Darw.

Deux échantillons jeunes fixés sur une coquille de Patelle, de Muscat (Arabie).

TETRACLITA POROSA, Gm. var. PATELLARIS, Darw.

Un seul exemplaire fixé sur une énorme coquille de Patelle provenant des Iles Andamans, Explorations de l' "Investigator."

Genre PYRGOPSIS, n. gen.

PYRGOPSIS ANNANDALEI—n. sp. (Pl. 2, fig. 7 à 13.)

Enfin une forme qui ne resemble à aucune de celles connues et qui constitue un genre et une espèce nouveaux.

Diagnose du Genre: *Muraille* sub-conique (ressemblant à s'y méprendre à celle de Pyrgoma) d'une seule pièce, sans trace de soudure. *Base membraneuse* formant un véritable petit pédoncule servant d'organe de fixation.

Diagnose de l'espèce: *Muraille* sub-conique, d'une seule pièce, légèrement striée à la surface et recouverte d'une cuticule chitineuse parfois assez épaisse; mince friable, et d'un blanc légèrement rosé. *Orifice externe* supérieur, ovalaire, allongé dans le sens antéro-postérieur comme l'ensemble de la muraille et placé beaucoup plus près du bord carènal que du bord rostral. *Base membraneuse* très développée, avec un prolongement inférieur musculeux, parfois assez long, formant pédoncule et par lequel l'animal est fixé à son support. *Scutum* et *tergum* d'un même côté, non soudés. *Scuta* allongés et étroits, environ cinq fois aussi longs que hauts. Bord tergal avec une crête articulaire très nette, quoique peu saillante. Arête pour l'adducteur peu développée; cavité pour l'adducteur allongée et assez profonde. Bord basal droit. *Terga* courts et étroits. Bord articulaire (scutal) droit, légèrement denticulé vers la base; bord carènal légèrement courbe; bord basal droit, avec un éperon saillant, tronqué carrément, dirigé du côté de la carène et placé à une distance de l'angle basi-scutal, égale environ au tiers de la longueur totale du bord basal.

Dimensions : Diamètre careno-rostrale : 8 mm.
Diamètre transversal : 3·5 mm.
Hauteur verticale 7 mm.

Habitat: Iles Andamans sur les récifs (11° 49′ 30″ lat. N., et 92° 55′ 55″ long. E.) par environ 90 m. de fond, station 239 de l' "Investigator," Trois échantillons, Collections de l'Indian Museum, Calcutta.

Description: Si l'on n'aperçevait de cette curieuse forme, que la partie supérieure de la muraille, on en ferait, sans hésitation possible, une espèce de *Pyrgoma* et spécialement *P. milleporæ*, Darw., bien que l'orifice externe soit un peu plus grand et la forme de la muraille un peu plus allongée et plus étroite que dans cette dernière espèce. Mais, la présence d'une base membraneuse très nette, en rapport direct avec la cuticule qui recouvre la muraille et se prolongeant inférieurement par un véritable petit pédoncule, place cette forme en dehors des *Pyrgoma* et, du reste, de tous les Operculés actuel ement connus.

A cause de la resemblance de sa muraille et de ses pièces operculaires avec celles des *Pyrgoma* je propose de lui donner le nom de *Pyrgopsis* et je dédie avec grand plaisir cette première espèce au savant Superintendant de l'Indian Museum de Calcutta, le Dr. Annandale, qui a bien voulu m'envoyer à étudier cette très interessante collection.

L'enveloppe chitineuse de la base et du pédoncule est lisse, mince, mais résistante. Elle est doublée intérieurement dans toute la partie pédonculaire, par une couche de fibres musculaires longitudinales lisses, caractéristiques des muscles du pédoncule de tous les Pédonculés en général.

Le muscle adducteur est formé de fibres striées très nettes, comme chez tous les Operculés, sauf le *Xenobalanus* et chez quelques Pédonculés comme *Conchoderma aurita, C. virgata* et *Scalpellum velutinum*. Pas de branchies. Les *ovaires* sont très intriqués et semblent ne former qu'une seule masse. Ils sont situés au fond et sur les parois de la cuvette membraneuse formant la base et une partie même s'engage jusque dans la région supérieure du petit pédoncule. La *muraille* est percée de canaux radiaires à section rectangulaire partant de l'orifice externe et se dirigeant vers la périphérie. Il-y a des stries parallèles d'accroissement recouvertes d'une cuticule chitineuse qui forme entre chaque strie de petits cones membraneux portant une soie assez rigide à leur extrémité. Le *labre* présente une encoche médiane profonde sans dents latérales sur le bord libre. Les *mandibules* portent cinq dents, dont la cinquième se confond presque avec l'angle basal garni de soies. Les *machoires* ont le bord libre droit, sans encoche, avec deux grandes pointes chitineuses à l'angle supérieur et sept ou huit un peu moins fortes, mélangés à des soies raides dans l'intervalle. *Première paire de cirrhes*, rame antérieure très courte (8 à 9 articles) par rapport à la postérieure (19 à 20 art.) Ces rames sont garnies de soies glabres du côté dorsal, barbelées, au contraire, du côté ventral. *Deuxième paire*: la rame postérieure égale environ les $\frac{2}{3}$ de la longueur de la rame antérieure, mais le nombre des articles est à peu près le même pour les deux (8 à 10). *Troisième paire*: rame postérieure égale aussi environ les $\frac{2}{3}$ de l'antérieure. *Quatrième, cinquième* et *sixième paires*: rames longues et flexibles à nombreux articles et respectivement de longueur à peu près égale. *Pénis* très long, flexible, sans éperon à la base, trés annelé avec quelques soies irrégulièrement disséminées, surtout sur les articles terminaux. Un peu avant l'extremité libre l'annulation cesse ; de chaque côté de la pointe on trouve un bouquet de soies courtes et glabres mais très flexibles. Quant au sommet, il se prolonge par une sorte de forte papille hérissée de crochets chitineux recourbés en arrière et qui occupent toute la moitié de la papille du côté libre. Pas d'*appendices terminaux*.

Affinités: Cette forme tout à fait nouvelle pour la science se rapproche beaucoup, indubitablement du genre *Pyrgoma* avec lequel on serait tenté de la confondre, si on n'aperçevait que la muraille. Par son aspect extérieur, la coalescence des pièces du test, la forme de l'orifice externe, celle des pièces operculaires, la présence de cinq dents aux mandibules, l'absence d appendices terminaux, etc., c'est un *Pyrgoma ;* mais par sa base membraneuse et nettement pédonculée, 'absence d'éperon à la base du pénis, de dents sur le bord libre du labre, etc., elle se distingue nettement, et sans doute possible, du genre précédement indiqueé.

Le genre *Pyrgopsis* semble constituer un type plus évolué que les *Pyrgoma* dans le sens de la mobilité. Il s'est passé pour lui des faits que nous avons déja signa'és à propos de l'appareil de protection du pédoncule chez les Pédonculés et du genre *Xenobalanus* pour les operculés.

En même temps que se développe un pédoncule chez *Pyrgopsis* l élément musculaire réduit encore, il est vrai, fait son apparition et présente histologiquement tous les caractères des muscles du pédoncule des Pédonculés normaux

PLANCHE I.

Fig. 1. *Verruca multicostata,* n. sp. Côté de l'opercule mobile.

,, 2. ———————— Vue du côté fixe.

,, 3. *Verruca cristallina,* n. sp. Vue du côté mobile.

,, 4. ———————— Vue du côté fixe.

,, 5. *Verruca plana,* n. sp. Côté mobile.

,, 6. ———————— Côté fixe.

,, 7. *Verruca kœhleri,* n. sp. Côté mobile.

,, 8. ———————— Vue du côté fixe

,, 9. *Verruca ristallina,* n. sp Machoire.

,, 10. ———————— Mandibule.

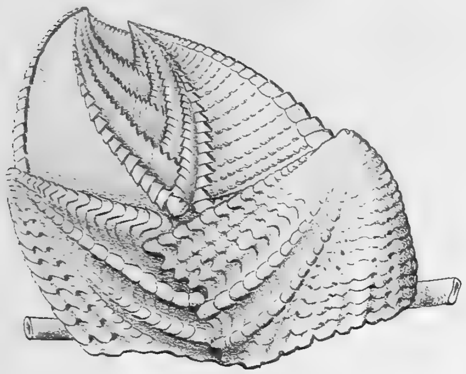


Fig. 1.

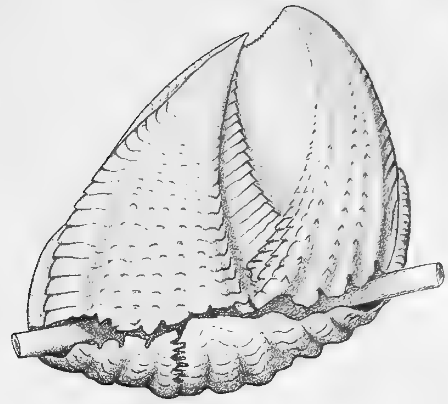


Fig. 2

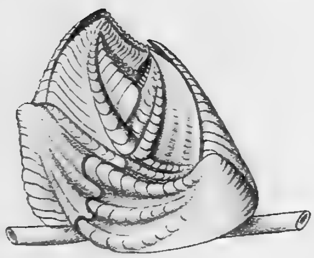


Fig. 3.

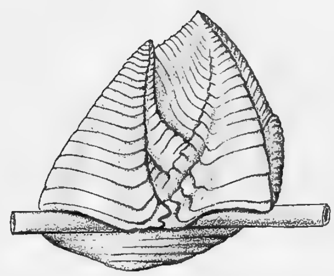


Fig. 4.

Fig. 9.

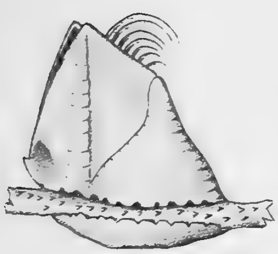


Fig. 6.

Fig. 5.

Fig. 10.

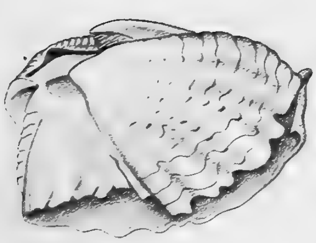


Fig. 8.

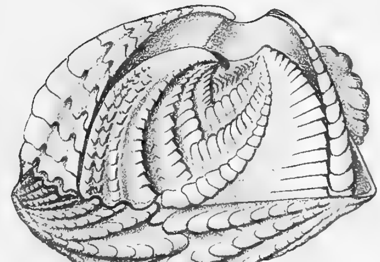


Fig. 7.

A. Gruvel ad. nat. del. Imp. L. Lafontaine, Paris. A. Bénard, lith.

1.2 Verruca multicostata. n. sp. _ 3.4.9.10 _ V. cristallina, n. sp. _ 5.6 V. plana, n. sp. _ 7.8 V. Kœhleri, n. sp.

PLANCHE II.

Fig. 1. *Balanus carenatus*, n. sp. Vue d'ensemble.

,, 2. ———————— Scutum, vu extérieure.

,, 3. ———————— Scutum, vu du côté interne.

,, 4. ———————— Tergum, vu du côté externe.

,, 5. ———————— Tergum, vu du côté interne

,, 6. ———————— Machoire.

,, 7*a*. *Pyrgopsis annandalei*, n. sp. Vue d'ensemble.

,, 7*b*. ———————— Vue en dessus.

,, 8*a*. ———————— Fragment de la muraille, × 16.

,, 8*b*. ———————— Partie de la même plus grossie, × 33

,, 9. ———————— Scutum, vu du côté interne.

,, 10. ———————— Tergum, vu du côté interne.

,, 11. ———————— Mandibule.

,, 12. ———————— Machoire.

,, 13. ———————— Extrémité libre du pénis.

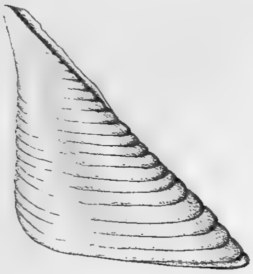


Fig. 2.

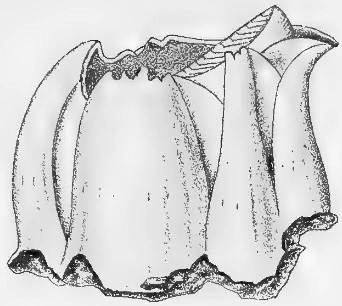


Fig. 1.

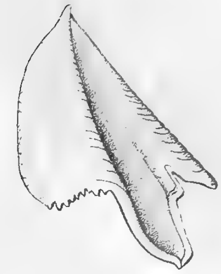


Fig. 4.

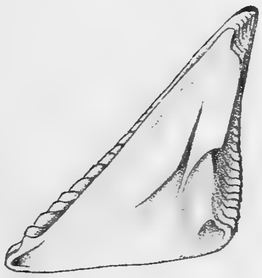


Fig. 3.

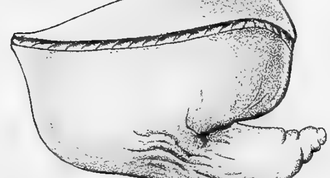


Fig 7.a


Fig. 5.


Fig. 9.


Fig. 10.

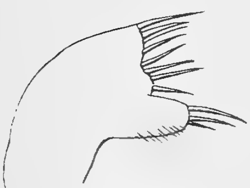


Fig. 6.

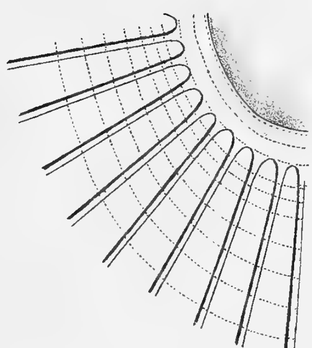


Fig 8.a.

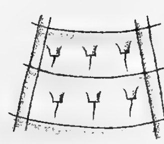


Fig. 8.

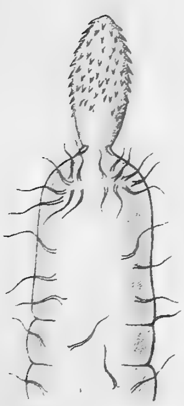


Fig. 13.


Fig. 7.b.


Fig. 11.

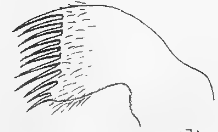


Fig. 12.

A. Gruvel ad. nat. del. Imp. L. Lafontaine, Paris A. Bénard, lith.

1 à 6 _ Balanus carenatus, n. sp. _ 7 à 13 _ Pyrgopsis Annandalei, n. g., n. sp.

Memoirs of the Asiatic Society of Bengal.

Vol. I.

I. *On certain Tibetan Scrolls and Images lately brought from Gyantse.—By* Prof. Satis Chandra Vidyābhūṣaṇa, M.A., M.R.A.S. (Price Re. 1-8; or 2*s.* 3*d.*)

II. *Sal-Ammoniac: a Study in Primitive Chemistry.—By* H. E. Stapleton, B.A., B.Sc. (Price Re. 1; or 1*s.* 6*d.*)

III. *The Similarity of the Tibetan to the Kashgar-Brahmi Alphabet.—By* The Rev. A. H. Francke. (Price Rs. 2; or 2*s.* 10*d.*)

IV. *Alchemical Equipment in the Eleventh Century, A.D.—By* H. E. Stapleton and R. F. Azo. (Price Re. 1-8; or 2*s.* 3*d.*)

V. *Malaysian Barnacles in the Indian Museum, with a list of the Indian Pedunculata.—By* N. Annandale, B.A., D.Sc. (Price Re. 1-8; or 2*s.* 3*d.*)

VI. *Ashrafpur Copper-plate Grants of Devakhadga.—By* Ganga Mohan Laskar, M.A. (Price Annas 8; or 10*d.*)

VII. *Festivals and Folklore of Gilgit.—By* Ghulam Muhammad. (Price Rs. 2; or 2*s.* 10*d.*)

VIII. *Notes on the Bhotias of Almora and British Garhwal.—By* C. A. Sherring, M.A., F.R.G.S., I.C.S. (Price Re. 1-5; or 2*s.*)

IX. *Religion and Customs of the Uraons.—By* the late Rev. Father Dehon, S.J. (Price Rs. 2; or 2*s.* 10*d.*)

X. *Notes on the Fauna of a Desert Tract in Southern India* (Herpetology and Entomology).*—By* N. Annandale, D.Sc., C.M.Z.S., with a list of Mammals by R. C. Wroughton, F.E.S. (Price Rs. 2; or 2*s.* 10*d.*)

XI. *Amulets as Agents in the Prevention of Disease in Bengal.*—Compiled in the Office of the Superintendent of Ethnography, Bengal. (Price Annas 12; or 1*s.* 2*d.*)

XII. *Earth-Eating and the Earth-Eating Habit in India.—By* D. Hooper and H. H. Mann. (Price Re. 1; or 1*s.* 6*d.*)

XIII. *On a Cup-Mark Inscription in the Chumbi Valley.—By* E. H. C. Walsh, I.C.S. (Price Re. 1; or 1*s.* 6*d.*)

XIV. *A Descriptive List of the Sea-Snakes* (Hydrophiidæ) *in the Indian Museum, Calcutta.—By* Captain F. Wall, I.M.S., C.M.Z.S. (Price Re. 1; or 1*s.* 6*d.*)

XV. *Common Saws and Proverbs collected, chiefly from Dervishes, in Southern Persia.—By* Lieut.-Col. D. C. Phillott. (Price Re. 1; or 1*s.* 6*d.*)

XVI. *The Common Hydra of Bengal: its Systematic Position and Life History.—By* N. Annandale, B.A., D.Sc., C.M.Z.S. (Price Re. 1; or 1*s.* 6*d.*)

XVII. *Animals in the Inscriptions of Piyadasi.—By* Monmohan Chakravarti, M.A. (Price Annas 12; or 1*s.* 2*d.*)

XVIII. *Some current Persian Tales told by Professional Story-Tellers.—By* Lieut.-Col. D. C. Phillott. (Price Re. 1; or 1*s.* 6*d.*)

XIX. *The Dards at Khalatse in Western Tibet.—By* Rev. A. H. Francke. (Price Re. 1-6; or 2*s.*)

Supplement, Miscellanea Ethnographica. 1. *The Blow-Gun in Southern India.* 2 *Miscellaneous objects from the Rámanád subdivision of the Madura district.* 3. *Indian Weighing-beams.—By* N. Annandale, D.Sc. (Price Re. 1.)

MEMOIRS

OF THE

ASIATIC SOCIETY OF BENGAL

VOL. II, No. 2, pp. 11–23.

THE COINAGE OF TIBET.

BY

E. H. C. WALSH.

CALCUTTA:

PRINTED AT THE BAPTIST MISSION PRESS, AND PUBLISHED BY
THE ASIATIC SOCIETY, 57, PARK STREET.
1907.

Price One Rupee; or One Shilling and Sixpence.

The Coinage of Tibet.

By E. H. C. WALSH.

(Read on 2nd May, 1906.)

The Tibetan system of coinage is very simple, as it consists of a single coin, the *tang-ka* (ཊཾ་ཀ་ and ཊང་ཀ་ *or* ཏང་ཀ་), which is cut up into pieces of different size for its fractional VALUES.

In ancient times, according to the Chinese author Wei Yüan, referred to by Mr. W. W. Rockhill in his "Notes on the Ethnology of Tibet,"[1] the Tibetans used cowrie shells and knife-shaped coins, but since the Sung, Chin and Ming periods (*i.e.*, since the twelfth century) they have used silver, and since the Cheng-tung period of the Ming (A.D. 1436) Wei Yüan states that they have paid their tribute to China in silver coins.

The oldest coin, however, that I have come across or heard of in Tibet, is one coined in Nepal for currency in Tibet, by the Newar King Jaya Bhupatindra Malla Deva in the year 816 of the Newar Era corresponding to A.D. 1696, though silver coins were minted in Nepal for currency in Tibet from the reign of Mahendra Malla, 1551 A.D.

It is difficult to say what has become of the previous coins of Nepal mintage, but I made very careful enquiries for them when in Tibet, and was unable to hear of any. I had, however, heard from Tibetans of the coin I have mentioned above, which is known as *ang-tuk* (ཨང་དྲུག) or "number six" from the last figure of its date, two years before I actually obtained one in Tibet. The previous coins of Nepal mintage would seem to have disappeared. I have, however, obtained, in Nepal, coins, which, for the reasons I give below, I have no doubt were of these previous Tibetan currencies.

Possibly the still earlier silver coins referred to by the Chinese author were merely struck for the purpose of paying the Tribute, and were not in general circulation, and silver coins did not come into general circulation until the coins that were minted for Tibet by the Newar Dynasty of Nepal.

As already noted the coinage of Tibet is very simple, consisting of a single coin, the *tang-ka*, the value of which is nominally six annas, though three of them exchange for an Indian rupee. The weight of the *tang-ka* is supposed to be 15 *karmas* (སྐར་མ or སྐར་བ), the *karma* being one-hundredth of the *srang* (སྲང་) or silver ounce. Its weight, however, varies; as no care is taken in minting to see that it is exact.

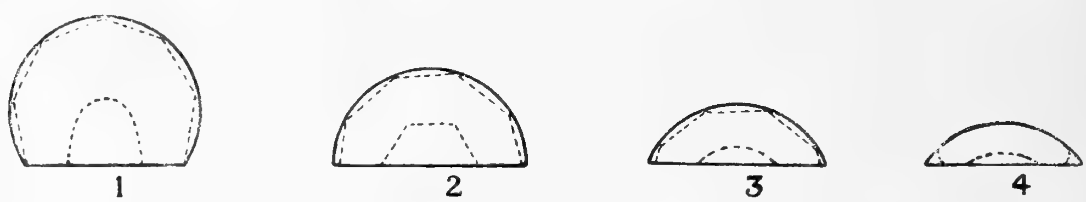
The sub-divisions of the coin, like those of the Old English silver penny, are made by cutting up the coin itself. These sub-divisions are:—

[1] "Notes on the Ethnology of Tibet." Based on the collections in the U.S. National Museum, by W. W. Rockhill, Washington, Government Printing Office, 1895.

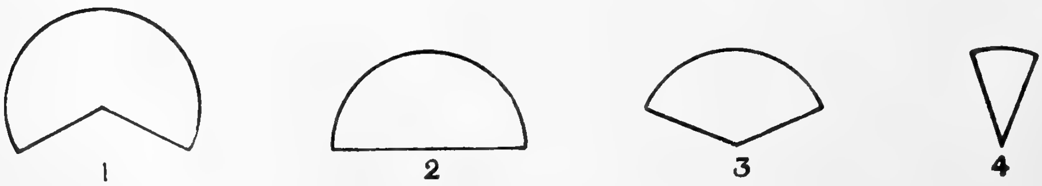
Sho-kang (ཞོ་གང་) $\frac{2}{3}$ of a *tang-ka* = 4 annas (Plate [1] III(A) & III(B), fig. 12).
Chhi-ke (ཕྱེད་གས་) $\frac{1}{2}$,, ,, = 3 annas (Plate III(A) & III(B), fig. 13).
Kar-ma-nga (སྐར་མ་ལྔ་) $\frac{1}{3}$,, ,, = 2 annas (Plate III(A) & III(B), fig. 14).
Kha-kang (ཁ་གང་) $\frac{1}{6}$,, ,, = 1 anna (Plate III(A) & III(B), fig. 15).
Khap-chhe (ཁ་ཕྱེད་) $\frac{1}{12}$,, ,, = $\frac{1}{2}$ anna.

The last sub-division, the "half kha," is one-half of the portion shewn in fig. 15 of Plate III(A) and III(B). It is rarely made and is generally merely a term of calculation.

These sub-divisions, which, if the coins were merely cut up, would be the portion of the coin corresponding to the value they represent, are in reality merely tokens; as the edges are nearly always clipped and the centre is generally cut out, as shewn in the examples given, and the silver so clipped is kept by the smith, who cuts up the coin, as his remuneration, or by the owner, if he cuts his own coin. These sub-divisions, however, always exchange at their nominal value irrespective of their being clipped. The division of the coin in Lhasa and Central Tibet [2] is always made by a straight line cut across it, as shewn in the plate. Mr. Rockhill in his book "The Land of the Lamas," and also in his description of the collections in the United States National Museum, gives an example of a *tang-ka* cut up differently as shewn below. The upper line of figures shews the method of cutting in Lhasa and Centeral Tibet generally, and the lower line the method followed in Eastern Tibet as shewn by Mr. Rockhill



The (*Cho-tang* and *Kong-par*) *Tangka* as subdivided in Lhasa and Central Tibet.
(The dotted lines shew the usual clipping).



The (*Gaden*) *Tangka* subdivided, as shewn by Rockhill.
1. Sho-kang. 2. Chhi-ke. 3. Karma-nya. 4. Kha-kang.

---

1 The obverse of the coins figured is shewn on Plate IIIA. and the reverse is shewn in the corresponding number of Plate IIIB. Similarly Plate IVB gives the reverse of the coins whose obverse is shewn on Plate IVA.

2 "Notes on the Ethnology of Tibet." Based on the collections in the U.S. National Museum, Plate 27, and "The Land of the Lamas." By W. W. Rockhill, p. 207.

This mode of cutting the *tang-ka* must be peculiar to North Eastern and Eastern Tibet. The *tang-ka* so cut up which he gives in the plate referred to, is also a *Ga-den-tang-ka*, the standard *tang-ka*, which coin is never cut up at all in Central Tibet.

Mr. Rockhill also mentions that in Eastern Tibet, about Ta-chien-lu at the time of his visit (in 1888) only Indian Rupees were current, and when a smaller piece of money was needed rupees were chopped in half or quartered

There are six different kinds of *tang-kas* current in Tibet [1] :—

(1) The *Ga-den Pho-dang tang-ka*, so called from its inscription. Minted at Lhasa (Plates III(A) and III(B), figs. 1 and 2).

(2) The *Kong-par tang-ka*, minted at Giamda on the borders of the Province of KONG-BO. (Plates III(A) and III(B), figs. 3, 4, 5 and 6).

(3) The *Pa-nying tang-ka* or "Old Nepalese" Coinage: The currency coined by the Newar kings of Nepal. (Plates III(A) and III(B), fig. 7, and Plates IV(A) and IV(B), figs. 1 to 6).

(4) The *Nag-tang* or "black tanka," a name given to the Nepalese coinage of Ranjit Malla Deva, A.D. 1722. (Plates III(A) and III(B), fig. 8, and Plates IV(A) and IV(B), fig. 7).

(5) Chinese *tankas* minted for currency in Tibet. (Plates III(A) and III(B), figs. 9, 10 and 11).

(6) *Chö-tang* or "cutting tanka."—Nepalese coins since the Gorkha conquest, not struck for currency in Tibet but which are generally current (Plates III(A) and III(B), fig. 13). The name means the *tanka* that is cut up,[2] as this *tanka* chiefly and also the *kong-par tang-ka* are the only ones that are sub-divided.

The *tang-ka* has not a fixed standard either of weight or size, or assay. The following table gives the size and weight of the coins figured on Plates III(A) and III(B):—

Number of coins on plate.	Diameter in inches.	Weight in grains.
1	1·15	80
2	1·11	72
3	1·07	64
4	1·04	76
5	1·05	93
6	1.04	88
7	1·11	104
8	1·10	101·5
9	1·05	78·5
10	1·09	77·5
11	1·06	78

[1] Rockhill, "Land of the Lamas," p. 208.

[2] གཅོད་ཏཾ་ *i. e.* གཅོད་པ་ཏཾ་ཀ།

The *tang-kas* are hand-struck. I obtained a machine-struck *Gaden tang-ka* from Tibet in 1902. The die is similar, but the appearance is different from the hand-struck coins, the compression of the metal being much greater. This coin was said by the person, who brought it for me from Lhasa, to have been struck at the arsenal there by a machine. But the minting by machine cannot have lasted long; as coins were not being so minted when the mission went to Lhasa, and I have not seen any other machine-struck coin than this one.

The *Ga-den Pho-dang tang-ka* (Plates III(A) and III(B), figs. 1 and 2) is so called from the inscription on it. *Ga-den Pho-dang chhog-le nam-gyal,*[1] "The Ga-den Palace victorious on all sides." This coin is minted at Lhasa, and the Ga-den Pho-dang is a name for the Tibetan Government Headquarters there, and means "The Tibetan Government."

On the reverse (Plate III(B), figs. 1 and 2) are the *Ta-shi ta-gye*[2] or the eight lucky signs of the Buddhist religion. The signs are not always given in the same order; the order is, in fact, different in the two coins figured. Taking the order in which they occur in fig. 2, Plate III(B), and commencing with the top one and going round with the clock they are as following:—

(1) The umbrella of sovereignty; (2) The two golden fishes of good luck; (3) The pot of ambrosia; (4) The lotus; (5) The conch shell; (6) The symbol of endless rebirths; (7) The banner of victory; (8) The wheel of empire.

There is a floral design in the centre of the reverse. None of these coins bear any date or any other mark, by which their date can be ascertained. The coin shewn in fig. 1 is an old coin, whereas fig. 2 is a perfectly new coin.

These coins were probably first minted about 1750 A.D., when, owing to the dispute between Prithi Narain, the first Gorkha ruler of Nepal, and the Tibetan Government regarding the exchange value of the previous debased Nepal coinage of the Newar kings then in circulation in Tibet, the Nepal Government stopped the coining of silver for Tibet. But this is merely conjecture; as I was not able to find any Tibetan who could give any information on the point.

This coin has remained unaltered, since it was first introduced, with the exception of such minor variations as have occurred in the making of fresh dies.

The *Ga-den tang-ka* is not subdivided. If it ever is cut it is called *Pongo migpa*[3] or "donkey's hoof." I have never seen one of these coins cut. The "donkey hoof" cutting is, no doubt, the form of cutting figured by Mr. Rockhill of the example in the collection of the United States National Museum and in "The Land of the Lamas" already referred to.

There is no doubt that the design of the *Ga-den tang-ka* was taken from the Newar coinage of the time it was struck, and I give an example of the coin it would

---

1 དགའ་ལྡན་ཕོ་བྲང་ཕྱོགས་ལས་རྣམ་རྒྱལ།

2 བཀྲ་ཤིས་རྟགས་བརྒྱད་ Sanskrit *Ashta Mangala*.

3 བོང་གུ་རྨིག་པ།

seem to have been taken from, on Plates IV(A) and IV(B), fig. 13. This coin is a Newar coin of Jaya Jagajjaya Malla Deva and bears date 852 (Newar Sambat) corresponding to 1732 A.D.

The *Ga-den tang-ka* (Plates IV(A) and IV(B), fig. 14) both on its obverse and reverse is an exact copy of the coin of Jaya Jagajjaya. On the obverse, the form of the eight leaves or petals, which contain the inscription, has been faithfully copied and only the Tibetan inscription substituted, and a wheel substituted for the Newar inscription and symbol of the sword and garland in the centre. On the reverse the eight Buddhist signs (*ashta mangala*) have been retained and the form of the petals containing them exactly copied, and also the three dots between each petal. Only a floral design has been substituted in the central circle for the Newar trident (*trisul*) and inscription. Even in this floral design it is curious to note that the Newar symbols of the sun and moon, to shew descent from the solar and lunar races, have been retained without any significance.

The imitation of this coin of Jaya Jagajja is so complete, and there is no other Newar coin to which there is such complete resemblance, that I have little doubt that the *Ga-den tang-ka* was copied from this particular coin. If this is so, it is interesting; as it fixes the first mintage of the *Ga-den tang-ka* subsequent to 1732 A.D.

The *Kong-par-tang-ka*.—This *tang-ka* bears a date (Plates III(A) and III(B), figs. 3, 4, 5 and 6). The date is given in the Chinese Cycle of sixty years, wh ch was introduced into Tibet in 1026 A.D. The earliest coin of this mintage (figs. 3 and 4) bears the date $\frac{13}{46}$, which means the forty-sixth year of the thirteenth cycle, and therefore corresponds to 1792 A.D. The coins bearing this date are not constant either in die, or in size, and, though they are none of them recent, would appear to have been struck at different times. The design on the coin shewn in fig. 4 differs from that in fig. 3, and though these represent the two types of these coins, there are others which follow one or other of these two types with minor variations due to fresh die. It is, therefore, probable that the coin having been first struck in that year the inscription was preserved without change as in the case of the *Ga-den tang-ka*.

Even educated Tibetans do not, as a rule, know what these figures are, and the uneducated, of course, have no idea. One educated Tibetan, whom I once asked about them, said he believed the top figure represented the age of the Dalai Lama at the time, and the lower figure that of the Regent!

The only other two dates that I have seen on these coins are $\frac{15}{24}$ (fig. 5), namely, the twenty-fourth year of the fifteenth cycle, corresponding to 1890 A.D., and $\frac{15}{25}$ (fig. 6) corresponding to 1891. Some of the latter coins are quite freshly minted, and the die of 1891 has, therefore, remained in use without altering the date, as was doubtless the case with the original die of 1792. This coin is sub-divided (Plates III(A) and III(B), fig. 15).

The *Pa-nying* (བལ་རྙིང་) "Old Nepalese" *tang-ka*, is also known as the *Dung-tang* "spear tangka" or *dung-tse* (དུང་རྩེ་) "spear point" from the trident emblem of the Newar kings, which is minted on the reverse. They were minted to the same standard as the Newar coins current at the time in Nepal, and the Indian name *tang-ka* was probably introduced with these coins, although in Nepal they are called *mohars*.

Although these coins bear on the obverse the inscription of the Newar king who minted them, and on the reverse the Hindu symbols of the trident in the central circle, and also the Newar symbols of the *kharag* and *mala*, the Newar sword and garland, which also appear on the Newar coins, they were specially struck for the Tibetan coinage and bear no resemblance in other respects than the above to the Newar coins current in Nepal at the same time.

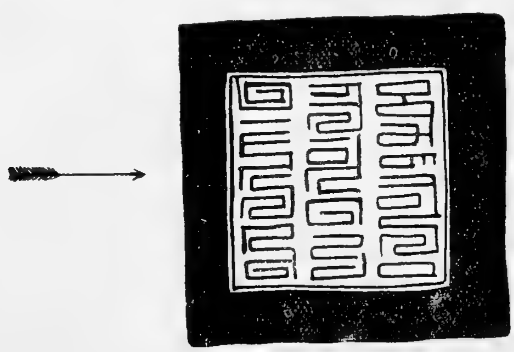
This will be clearly seen by reference to Plates IV(A) and IV(B), in which fig. 8 is a Nepal coin of Sri Nivasa Malla, whose name is also on the *Pa-nying tang-ka*, fig. 2. Similarly fig. 9 is a Nepal coin of Jaya Pratapa Malla who struck the *Pa-nying tang-ka*, fig. 4; fig. 12 is a Nepal coin of Bhupatindra Malla Deva, who struck the *Pa-nying tang-ka* shewn in fig. 6 and bears the same date; and figures 10 and 11 are Nepal coins of Jaya Raṇajita Malla Deva who struck the *Nag-tang tang-ka* (fig. 7) and bear the same date.

Although, therefore, the only Nepal-minted Tibetan coins that I have seen or heard of in Tibet are the *pa-nying tang-ka* of Jaya Bhupatindra, known as the *ang-truk* or "number six" from the last figure of its Newar date, and the *Nag-tang tankas* of Raṇajita Malla Deva, I have no doubt that the other coins of similar design, which I have obtained at different times from Nepal, were of the coinage minted for circulation in Tibet and that coins similar to them were in circulation in Tibet.

The distinctive mark of these coins are the characters which surround the enclosure containing the Newar inscription and the circle containing the *Trisul*. I am not able to decipher these characters nor have I found any Tibetan or Newar who has any idea what they are intended for.

Allowing for differences in fresh dies, they are practically constant, both in their individual form and their relative position on the coin (Plate IV(A) and (B), figs. 1 to 7).

My own opinion is that they are probably an imitation of the characters on the official seal of the Dalai Lama, of which I give a facsimile for comparison.



OFFICIAL SEAL OF THE DALAI LAMA.

(If the Seal is looked at sideways in the direction of the arrow, the resemblance of the characters to those on the coins will be noticed.)

The characters on the seal appear to be in the old Uigur form of Mongolian characters, which are written perpendicularly from above downwards and the lines follow from left to right. These Uigur characters, from which the Mongolian character has been derived, were themselves derived from the Syriac, having been brought to the Uigurs by Nestorian Missionaries; while the arrangement in vertical lines was adopted from the Chinese practice.[1]

The Dalai Lama's seal is the mark of sovereignty in Tibet, and it would be very natural that the Tibetan Government might wish it to be reproduced, or at least indicated, on the coins, which were to be current in Tibet. The characters on the coin are not any of them a correct reproduction of characters on the seal, which might be expected from workmen who did not understand what the characters were intended to represent, and the resemblances suggest that the Newar artificers took the characters as running horizontally and not vertically, which is also natural; as they would assume the lines to be horizontal, as in the Indian and Tibetan languages, with which they were acquainted.

That the Newar coiners were in the habit of imitating characters which they did not understand, and consequently rendering them meaningless, is also shewn by the fact that such meaningless imitations of Persian characters, with the object of imitating the titles of the coins of the Moghul Emperors, are found on other Newar coins. An example of this is found on both the obverse and reverse of the coin of Jaya Pratápa Malla (Plates IV(A) and IV(B), fig. 9) and is of frequent occurrence on Newar coins.

As regards the inscription on the Dalai Lama's seal being in the Uigur character, I would note that Colonel Waddell gives a copy of the seal[2] and describes it as "in square Indian characters."[2] I think there is no doubt that he is wrong in this. He has also printed the seal, in the example he gives of it, with the lines of characters running horizontally and not vertically which they should do, and in which position it is always affixed. If so printed with the lines of characters running horizontally, there are some of the characters which bear a superficial resemblance to certain Indian characters.

As I have already said, the Newar artificers appear to have made a similar mistake, expecting a horizontal script and not a vertical one; and, if the seal be looked at in that direction, as indicated by the arrow, the resemblance of characters on the coins to some of those on the seal will be at once noticed.

This character of the Dalai Lama's seal is called in Tibetan *Shintu-Jod-pa* or "perfectly finished," and resembles the Uigur characters, known in Tibet as *Gyaser Yige*, or "Great golden letters," and is found in almost all old seals of Tibet.[3]

There are also certain distinctive symbols on these coins which do not occur on

---

1 Prof. B. Jülg on "The Mongolian Language," in the Encyclopædia Britt., Vol. XVI, p. 150.

2 Lhasa and its Mysteries." By L. A. Waddell, p. 448.

3 Rai S. C. Das, Bahadur, has given an example of the *Shintu-Jodpa* character, J.A.S.B., Vol. lvii., Part I., 1888., p. 45. He, like myself, was unable to get the symbols of this character named individually, though the purport of the different groups or vertical lines of characters, which he gives as examples, was stated to him.

the ordinary Newar coins. These are the *damaru*, a small double hand-drum, used by Lamas in dances and exorcising, and a loop of the following form . The *damaru* is usually made of the tops of two skulls fastened together. It has a leather thong, with a knob at the end of it, attached to the middle of the drum, and, by turning the drum quickly in the hand, the thong strikes each side of the drum alternately and produces a noise like a rattle. It is peculiar to Tibetan Lamas and would, therefore, not unnaturally suggest itself to Newar artificers as a suitable religious symbol for a Tibetan coin, being distinct from the Newar Buddhist and Hindu symbols which they affixed to their own coinage.

This double drum occurs above the circle on the reverse of coins 3, 4, 5, 6 and 7 with the loop to the left of it. In the other two (figs. 1 and 2) its place is taken by part of the inscription.

The loop also occurs at the top of the obverse of all the coins (figs. 1 to 7).

There are also certain other symbols round the margin of the coins which do not appear on the Dalai Lama's seal. One of these is the three dots within two wavy lines on the left-hand side of the reverse of these coins (Plates IV(A) and IV(B), figs. 1 to 7) and in the symbol immediately below it, namely a dot inside an angle, and in the symbol at the bottom of the coin under the circle. As regards this last I would hazard a suggestion, for the reasons I give below, that it may be a conventional representation of the Potala, the Dalai Lama's Palace, which is the seat of the Tibetan Government.

Kirkpatrick, in the account of his mission to the kingdom of Nepal in 1793, writes: "The silver eight-anna piece, now called Mohr and Adheeda, was formerly denominated Mehnder-Mulie, after the Prince who first struck it, and by treaty established it in the neighbouring kingdom of Tibet; this prince would appear to have been one of the successors of Hur Sing Deo, and of the dynasty of Khatmanda, which city is said to have exclusively enjoyed for some time the privilege of supplying Tibet with coin, a privilege the more singular as it was from this very country that Nepal obtained her silver bullion. The origin of this practice is ordinarily referred to the superstitious reverence in which the valley of Nepal, and, more especially, the north-west parts of it (highly celebrated for their sanctity), has been wont to be held by the spiritual sovereigns of Tibet; but, whatever may have been the cause of it, there is not a doubt that the present Nepal Government made the departure of the Tibetans from ancient usage in this respect, the pretext for the war which it waged about four years ago against the confederated Lamas; as evidently appears from a memorial transmitted to me from Nepal on this subject, an extract of which is given in Appendix No. II."

"The Mehnder-Mulie exhibited anciently a representation of Lehassa on one side, and, on the reverse, the name, titles and emblems of the reigning sovereign of Khatmanda. Since the conquest of Nepal by Purthi Narain, no allusion to Lehassa has been preserved, the Mohr bearing on one side the following inscription: Sri Sri Sri Run Behauder Shah Dewa, and, on the other, Sri Sri Goorknâth Sri Bhowâni, with the year of the Soka and certain emblems allusive to the Hindoo superstition, as the sun, moon, TRISOOL of Mahadeo, etc."[1]

The Mehnder-Mul (Mahendra Malla) referred to as having first coined silver for currency in Tibet reigned in 1566 A.D.

From the above extract it is clear that the distinctive feature of the Newar coinage minted for Tibet was that "it exhibited anciently a representation of Lehassa on the one side, and on the reverse the name, titles and emblems of the reigning sovereign of Khatmanda." The only symbol which can be taken as a representation of Lhasa is that under the circle (Plate IV(A), figs. 1 to 7). In the earlier examples (figs. 1 to 5) the symbol conveys a general impression very like that of the POTALA, the Dalai Lama's place, a long mass of high buildings, towering high above some lower buildings at its foot. This idea is kept up throughout all the earlier examples, but the figure is distorted and loses its meaning in the later coins (figs. 6 and 7).

The originally exclusive privilege of the Raja of Khatmândû to coin for Tibet, mentioned by Kirkpatrick, did not long continue, but was also shared by the other two Newar kingdoms of Bhatgaon and Patan. Of the coins figured on Plates IV(A) and IV(B), figs. 1 and 2 are minted by kings of Patan; figs. 3 and 4 by kings of Khatmândû, and figs. 5, 6 and 7 by kings of Bhatgaon.

The reason for the discontinuance of this coinage was, that it became so debased under the later kings of Bhatgaon, that when the Gorkhas conquered the country they would not continue coining coins for Tibet if they had to exchange at *par* with the debased coins then in circulation, and the dispute over this question was made the pretext of the war between Nepal and Tibet in 1768. Kirkpatrick publishes an "extract from a Memorial of the Court of Khatmândû, relative to the origin of the War with Tibet," which gives a full account of the dispute. I give below the portion which relates to the coinage :—

"In ancient times there subsisted a close union between the Rajahs of Nepaul and Bhoat (*i.e.*, Tibet); when the pure Mehnder-mulli of the coinage of the former country was the current money of the latter. During the respective reigns, however, of Rajah Jy Purkaush Mull, the sovereign of Nepal, and of Rajah Runjeet Mull, the ruler of Bhatgong, the Mehnder-mulli became much debased, the consequence of which was, that at the period Nepal passed into the possession of the Goorkha, Bhoat was full of this base coin. The Maharajah (*i.e.*, Pirthi Nerain) immediately put a stop to this improper practice, sending, at the same time, a friendly deputation to Bhoat, for the purpose of stating the mischievous consequences that would ensue, were it persisted in; and of engaging the Lamas to revert to the ancient usage, by giving circulation only to a pure currency.

"To this representation the rulers of Bhoat replied that the amount of base Mehnder-mulli then in their country was very considerable; that the suppression of it would consequently be attended with great loss to their people; and that, therefore, they could not agree to the introduction of the pure Mehnder-mulli proposed by the

[1] An account of the kingdom of Nepal, being the substance of observations made during a mission to that country in the year 1793, by Col. Fitzpatrick, London, William Miller, 1811, pages 217, 218.

Maharajah, but must desire that the Goorkhas would continue to supply them with the adulterated coin."

"Nine or ten years elapsed in this negociation between the two governments, without their being able to fix on any plan of accommodation. At length the Goorkha envoy proposed that, as they could not stop the circulation of the base coin with which they had been supplied, they should, at least, establish a just rate of exchange between the base and pure coinage, to the end that the merchants of either country might stand in their commercial transactions on the same footing as formerly. The Bhootias, however, would by no means consent to such a regulation; but, on the contrary, absolutely directed that the base and genuine money should be considered, in all negociations of trade, as one and the same; the consequence of which was that for three or four years there was no sort of traffic carried on between the two countries. The circulation of the Nepaulian coin accordingly ceased (*i.e.*, in Tibet). The Goorkha, nevertheless, continuing to retain his friendly disposition towards the Bhootias, endeavoured to prevail on them to depute some respectable person to the common boundary, there to meet and, in concert with deputies from Nepaul, devise some arrangement for the mutual benefit of the two states, as, without a speedy adjustment of the matter, it was evident that the trade of the two countries must be inevitably ruined. The Bhootias, however, were so far from listening to this reasonable proposal, that they, on the contrary, sent word vauntingly to the Goorkha that they had constructed a new road through the plain or valley of Tingri; that they were establishing a post on the common frontier; and that they had assembled an army of 125,000 men and that, if the Goorkha wished for war, he was welcome to advance."[1]

The profits made by the Nepal Government on the silver coinage for Tibet are said by Kirkpatrick to have been a lakh of rupees annually.[2] He adds, "It is to be observed that all silver brought into Nepaul from Tibet, in the way of commerce, must be carried to the mint at Khatmanda, no silver bullion being allowed to pass into Hindostan. In exchange for his bullion the merchant receives Nepaul rupees, the Government deriving a profit of twelve per cent. from the transaction, four per cent. being charged on account of coinage and eight arising from the alloy of the rupee."

"With respect to gold, it has usually been a monopoly in the hands of Government, who obliged the traders from Tibet to sell it at the mint at the rate of eight rupees per tolah, whence the Ticksâli [3] retails it sometimes at the advanced price of fourteen rupees per tolah."[4]

So, altogether, the Newar Government made a large profit out of their monopoly of the coinage for Tibet.

Since the Gorkha conquest, Nepal has not again coined for Tibet, though, since the conclusion of the war, the Nepalese-Gorkha mohars have passed freely current in Tibet along with the Tibetan currency and are called *chō-tang* or "*tang-kas* for cutting" owing to there being the *tang-ka* that is generally sub-divided. The examples on Plates III(A) and III(B), figs. 12, 13 and 14, are all portions of Goorkha *tang-kas*.

---

1 *Op. cit.*, pp. 339-340. 2 *Op. cit.*, p. 211. 3 A Nepalese official. 4 *Op. cit.*, p. 211-212.

The *Nag tang* "Black tang-ka" (Plates III(A) and III(B), fig. 8; Plates IV(A) and IV(B), fig. 7) is the name given to the last of the Pa-nying *tang-kas* coined in 842 (Newar Sambat) corresponding to 1722 A.D., by Raṇjit Malla Deva, the last Newar king of Bhatgaon. There are a large number of these coins still in circulation, and many years of grease have made them black enough to deserve their name. A large number of these coins are also still current in Bhutan.

There only remains to notice the Chinese *tang-kas* minted for currency in Tibet. I have only come across three kinds of these.

The first (Plate III(A) and III(B), fig. 9) bears the inscription in Tibetan གཙང་པའུ་ཆན་ལུང་ "the pure money of Chhan Lung," and round the margin the date in words དྲུག་ཅུ་ཐམ་པ་ "sixty," *i.e.*, the sixtieth year of the then current Chinese cycle; and is equivalent to 1795 A.D. The Chinese inscription on the other side is to the same effect. Mr. Kang-yu-wei informed me that this Chinese emperor's name was Sheng-lung. I have also similar coins of this emperor bearing dates 58 and 59, *i.e.*, 1793 and 1794 A.D. It is given as Keen-lung in Haydn's Dictionary of Dates.

The second (Plates III(A) and III(B), fig. 10) bears the inscription in Tibetan གཙང་པའུ་བཅའ་འཆེན་ "the pure money of Chah Chhen." The date is given in words round the margin ཉི་ཤུ་ཙ་ལྔ་ "twenty-five," and is equivalent to 1820 A.D. I have also a similar coin of this emperor bearing the date 9, *i.e.*, 1804 A.D. The name of this emperor as given me by Mr. Kang-yu-wei was Jau Sengs, great grandfather of the present emperor of China. His name does not appear in the Dictionary of Dates.

The third (Plates III(A) and III(B), fig. 11) bears the inscription in Tibetan གཙང་པའུ་ཏའུ་ཀོང་ "the pure money of Dao Kwong," and in the margin the date in words གསུམ་པ་ "third," *i.e.*, the third year of that cycle, which is equivalent to 1823 A.D. This emperor's name is given in Haydn's Dictionary of Dates as Taou Kwang. In the two latter, as in the first, the Chinese inscription on the other side corresponds to the Tibetan.

There is no copper coinage in Tibet, but Nepalese pice are occasionally met with, and Chinese cash (called *dong-tse* དོང་ཙེ), in Lhasa.

In addition to the coinage, there are certain nominal sums of money which are used in accounts and business transactions. These are :—

Ka-cha = 5 annas.
Sho-nga = 5 *sho-kangs* = 3 *tang-kas* and one *karma-nga* = Rs. 1-4-0.
Srang or *ngu-srang* = 2 *sho-nga* = Rs. 2-8-0.
Do-tse = 50 *srangs* = Rs. 125.

Silver ingots from China are also used as currency. The value of these varies and depends on their weight. The one most in use is called the *Ta-mig-ma* རྟ་རྨིག་མ or "horse-hoof," the value of which varies according to its weight between 60 and 70 rupees. There is also the *Yak-mig-ma* གཡག་རྨིག་མ or "Yak's hoof" worth about 12 to 14 rupees, and the ར་རྨིག་མ or "Goat's hoof," the value of which varies from two to three rupees.

The Indian rupee is also current throughout Tibet and exchanges as equivalent to three *tang-kas*. It is called *Gor-mo* (སྒོར་མོ་) or "The round coin," *Phi-ling* or *Chhi-ling gor-mo* (ཕྱི་སྒྲིང་) "The foreign round coin."

When rupees bearing the King's head were first brought into Tibet with the Tibet mission, the Tibetans were at first not always willing to take them; as they were only accustomed to those bearing the head of Queen Victoria which they knew, and the reverse of which was also different; but the distrust soon passed away and King Edward's rupees were taken as freely as Queen Victoria's.

In parts of the interior of the country, however, money is little used and its place is taken by barter. Chinese brick tea, too, is largely used as medium of exchange. It is made in different qualities which bear a distinctive label and are of a different value.

List of Coins on Plates IV(A) and IV(B).

The obverse is on Plate IV(A) and the reverse on Plate IV(B), with the exception of figs. 12 and 13, the obverse of which is on Plate IV(B) and the reverse on Plate IV(A). The dates are in the Newar Samvat Era.

Figure on the Plate.	Inscription.	Correspon-ding date A.D.	Kingdom by which minted.	Diameter in inches.	Weight in grains.
1	(*Obv.*) Śrī Śrī Sidi. (*Rev.*) Nar "Singha" (*i.e.*, the figure of the lion "Singha" in the centre) 751	1631	Patan	1·10	83
2	(*Obv.*) Śrī Śrī Jaya. (*Rev.*) : (*at top*) Śrī Ni (*in centre*) vása Malla, 781	1661	"	·98	79·5
3	(*Obv.*) Śrī. (*Rev.*) Śrī Lakshmi Nar Siṁ ...	...	Kathmāndū	1·03	68·5
4	(*Obv.*) Śrī (*Rev.*) Śrī Pratápa Malla 761 ...	1641	"	1·05	83·5
5	(*Obv.*)— (*Rev.*) Śrī Śrī Jaya Jitamitra Malla, 783	1763	Bhatgāon	1·10	86·5
6	(*Obv.*)— (*Rev.*) Śrī Śrī Jaya Bhupatīndra Malla Deva, 816	1696	"	1·03	78·5
7	(*Obv.*)— (*Rev.*) Śrī Śrī Jaya Raṇajita Malla Deva, 842	1722	"	1·10	82
8	(*Obv.*): (*in centre*) Śrī Śrī Jaya (*outside*) Śrī Nivāsa malla (*Rev.*) Nepáleswara, 786	1666	Patan	1·0	83
9	(*Obv.*) Śrī Śrī Kavindra Jaya. (*Rev.*) Pratāpā Malla, 779	1659	Kathmāndu	1·0	84
10	(*Obv.*) Śrī Śrī Jaya Raṇa (*Rev.*) Jita Malla Deva, 842	1722	Bhatgāon	1·06	83
11	(*Obv.*) Śrī Śrī Jaya Raṇajita Malla Deva. (*Rev.*) Baisa(kh) Sambat, 842 ...	1722	"	·99	41
12	(*Obv.*) Śrī Śrī Jaya Bhupa (*Rev.*) tíndra Malla Deva, 816	1696	"	·68	20·5
13	(*Obv.*) Śrī Śrī Jaya Jagajjaya. (*Rev. in centre*) Malla Deva, 852. (*Round margin*) Rájendra Nepáleswara	1732	Kathmāndu	1·10	82·5
14	(*Obv.*) (*in Tibetan*) Dgah. ldan. Pho. Brang. Phyogs Las Rnam-rgyal	...	Lhasa	...	...

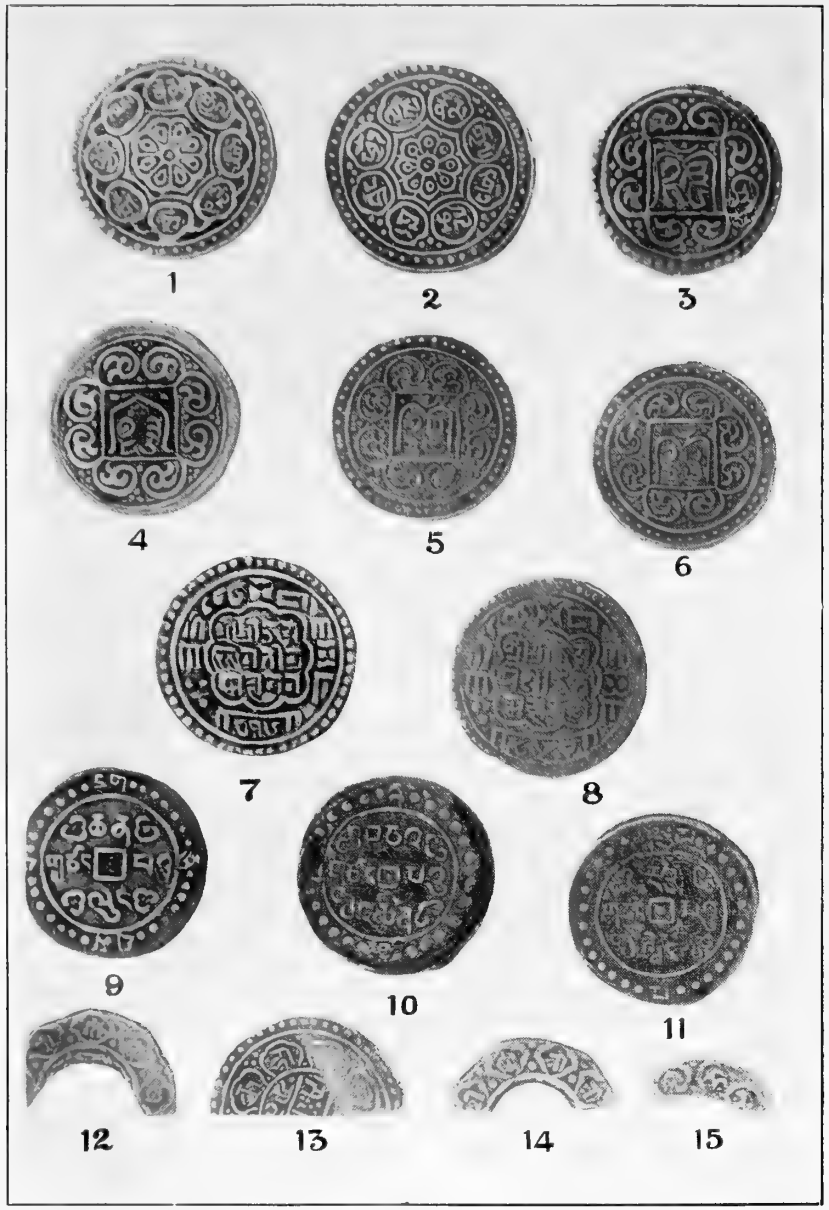


Plate III (A.)
Obverse of Coins, The Reverse of these Coins is shewn in the corresponding No. on Plate III (B.)

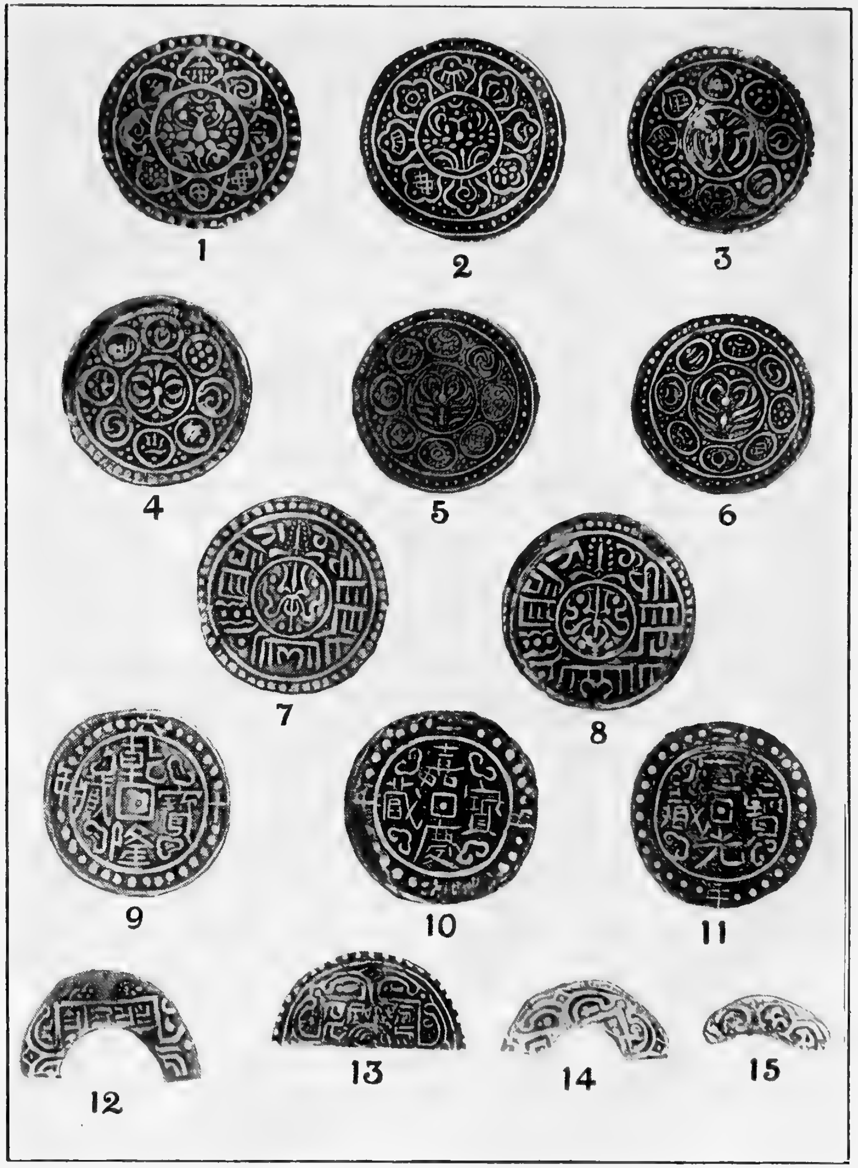


Plate III (B.)
Reverse of the Coins, the obverse of which is shewn on Plate III (A.)

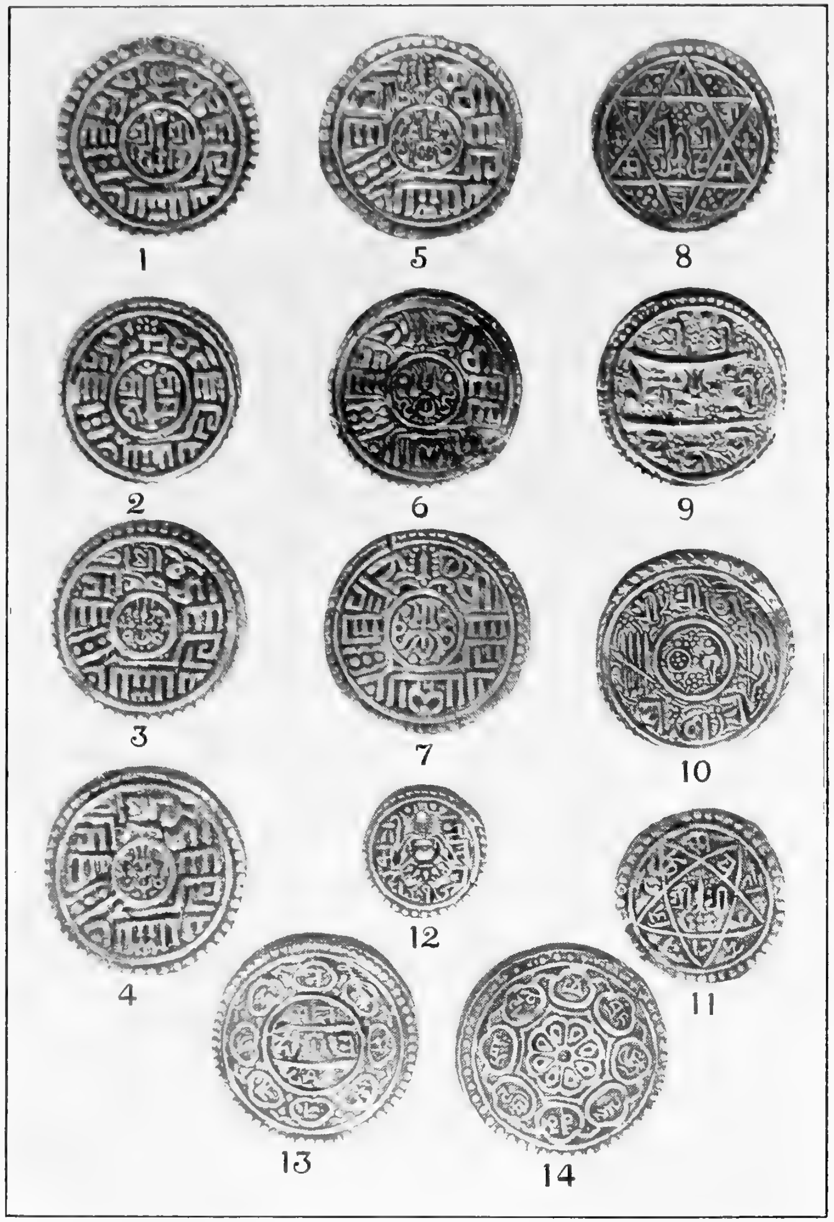


Plate IV (A).
Obverse of Coins. The Reverse of these Coins is given in the corresponding No. on Plate IV (B) (except Nos. 12 and 13), the obverse of which is shewn on Plate IV (B) and the reverse on this Plate.

Plate IV (B).
Reverse of Coins, the obverse of which is shewn on Plate IV (A) (except Nos.12 & 13,) the obverse of which is shewn on this plate and the Reverse on Plate IV (A).

Memoirs of the Asiatic Society of Bengal.

Vol. I.

I. *On certain Tibetan Scrolls and Images lately brought from Gyantse.—By* PROF. SATIS CHANDRA VIDYĀBHŪṢAṆA, M.A., M.R.A.S. (Price Re. 1-8; or 2*s.* 3*d.*)

II. *Sal-Ammoniac: a Study in Primitive Chemistry.—By* H. E. STAPLETON, B.A., B.Sc. (Price Re. 1; or 1*s.* 6*d.*)

III. *The Similarity of the Tibetan to the Kashgar-Brahmi Alphabet.—By* The REV. A. H. FRANCKE. (Price Rs. 2; or 2*s.* 10*d.*)

IV. *Alchemical Equipment in the Eleventh Century, A.D.—By* H. E. STAPLETON and R. F. AZO. (Price Re. 1-8; or 2*s.* 3*d.*)

V. *Malaysian Barnacles in the Indian Museum, with a list of the Indian Pedunculata.—By* N. ANNANDALE, B.A., D.Sc. (Price Re. 1-8; or 2*s.* 3*d.*)

VI. *Ashrafpur Copper-plate Grants of Devakhadga.—By* GANGA MOHAN LASKAR, M.A. (Price Annas 8; or 10*d.*)

VII. *Festivals and Folklore of Gilgit.—By* GHULAM MUHAMMAD. (Price Rs. 2; or 2*s.* 10*d.*)

VIII. *Notes on the Bhotias of Almora and British Garhwal.—By* C. A. SHERRING, M.A., F.R.G.S., I.C.S. (Price Re. 1-5; or 2*s.*)

IX. *Religion and Customs of the Uraons.—By* the late REV. FATHER DEHON, S.J. (Price Rs. 2; or 2*s.* 10*d.*)

X. *Notes on the Fauna of a Desert Tract in Southern India* (Herpetology and Entomology).—*By* N. ANNANDALE, D.Sc., C.M.Z.S., with a list of Mammals by R. C. WROUGHTON, F.E.S. (Price Rs. 2; or 2*s.* 10*d.*)

XI. *Amulets as Agents in the Prevention of Disease in Bengal.*—Compiled in the Office of the Superintendent of Ethnography, Bengal. (Price Annas 12; or 1*s.* 2*d.*)

XII. *Earth-Eating and the Earth-Eating Habit in India.—By* D. HOOPER and H. H. MANN. (Price Re. 1; or 1*s.* 6*d.*)

XIII. *On a Cup-Mark Inscription in the Chumbi Valley.—By* E. H. C. WALSH, I.C.S. (Price Re. 1; or 1*s.* 6*d.*)

XIV. *A Descriptive List of the Sea-Snakes* (Hydrophiidæ) *in the Indian Museum, Calcutta.—By* CAPTAIN F. WALL, I.M.S., C.M.Z.S. (Price Re. 1; or 1*s.* 6*d.*)

XV. *Common Saws and Proverbs collected, chiefly from Dervishes, in Southern Persia.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Re. 1; or 1*s.* 6*d.*)

XVI. *The Common Hydra of Bengal: its Systematic Position and Life History.—By* N. ANNANDALE, B.A., D.Sc., C.M.Z.S. (Price Re. 1; or 1*s.* 6*d.*)

XVII. *Animals in the Inscriptions of Piyadasi.—By* MONMOHAN CHAKRAVARTI, M.A. (Price Annas 12; or 1*s.* 2*d.*)

XVIII. *Some current Persian Tales told by Professional Story-Tellers.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Re. 1; or 1*s.* 6*d.*)

XIX. *The Dards at Khalatse in Western Tibet.—By* REV. A. H. FRANCKE. (Price Re. 1-6; or 2*s.*)

Supplement, Miscellanea Ethnographica. Part I. 1. *The Blow-Gun in Southern India.* 2. *Miscellaneous objects from the Rámanád subdivision of the Madura district.* 3. *Indian Weighing-beams.—By* N. ANNANDALE, D.Sc. (Price Re. 1.)

Supplement, Miscellanea Ethnographica. Part II. 1. *Some Malayan Weapons—By* N. ANNANDALE. 2. *Plan of a Persian Gentleman's House.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Annas 8; or 10*d.*)

Memoirs of the Asiatic Society of Bengal.

Vol. II.

I. *Cirrhipèdes operculés de l'Indian Museum de Calcutta.—Par* M. A. GRUVEL. (Price Rs. 2; or 2*s.* 10*d.*)

II. *The Coinage of Tibet.—By* E. H. C. WALSH. (Price Re. 1; or 1*s.* 6*d.*).

III. *The Exact Determination of the Fastness of the more Common Indigenous Dyes of Bengal, and comparison with typical synthetic Dye-stuffs. Part I. Dyeing on Cotton.—By* E. R. WATSON. (Price Re. 1; or 1*s.* 6*d.*)

IV. *The Saorias of the Rajmahal Hills.—By* R. B. BAINBRIDGE. (Price Rs. 2; or 2*s.* 10*d.*)

Tarīkh-i-Nuṣratjangi.—By HARI NATH DE. (In the press).

MEMOIRS

OF THE

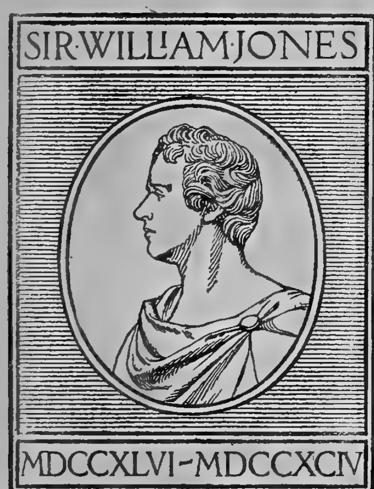
ASIATIC SOCIETY OF BENGAL

VOL. II, No. 3, pp. 25–41.

THE FASTNESS OF THE INDIGENOUS DYES OF BENGAL.

BY

E. R. WATSON, M.A. (*Cantab.*), B.Sc. (*Lond.*)



CALCUTTA:

PRINTED AT THE BAPTIST MISSION PRESS, AND PUBLISHED BY
THE ASIATIC SOCIETY, 57, PARK STREET.

1907.

Price One Rupee; or One Shilling and Sixpence.

The Exact Determination of the Fastness of the more Common Indigenous Dyes of Bengal, and comparison with typical synthetic Dye-stuffs.

Part I.—Dyeing on Cotton.

By E. R. WATSON, M.A. (*Cantab.*), B.Sc. (*Lond.*).

INTRODUCTION.

Probably on no subject is it possible to find greater diversity of opinion than on the subject of the fastness of the natural dyes. A great deal of the confusion, no doubt, arises from the attempt to compare natural dyes as a class with the synthetic dyes as a class, whilst, as a matter of fact, both classes include both fast and fugitive dyes. The popular opinion in India is still perhaps in favour of the natural dye-stuffs. In the course of the last year, the State of Cashmere has imposed an import duty on aniline dyes, with the express purpose of fostering the use of the old natural dyes, in preparing the textiles for which Cashmere is renowned, and of discouraging the use of aniline dyes in this industry, as it was feared that the use of fugitive aniline dyes would lower the esteem in which these textiles are held. The imposition of this duty provided the occasion for expressions of opinion in the daily papers on the relative merits of the indigenous Indian dyes and the so-called 'aniline' dyes, e.g.,—

Statesman, August 1st, 1906 :—" The Kashmir Durbar has taken a step which will, it may be hoped, go a long way to save various beautiful arts, for which the Vale of Kashmir is famous, from deterioration or destruction. The Durbar has decided to charge a heavy (45 per cent.) duty on all aniline dyes at the frontier, and at a certain distance within the frontier to confiscate and at once destroy them."

Statesman, August 9th, 1906 :—" The use of aniline dyes by Indian artisans and handicraftsmen is a danger to which attention has been drawn frequently."

It appears then that the popular opinion in this country is still in favour of the natural dyes, and that the aniline dyes are ousting the natural dyes only on account of their greater cheapness, and of the greater ease with which they can be used. An expression of this opinion may be found in " A Monograph on Dyes and Dyeing in Bengal," by N. N. Banerjee, Asst. Director of Land Records and Agriculture, Bengal, 1896. This author says : " European dyes, which are not as fast as indigenous dyes, appear to commend themselves to the people of this country on account of their cheapness and their brilliancy of colour. The ease with which they can be used makes them also more popular."

For many years a similar opinion has been held in Europe as to the relative merits of artificial dyes and of the natural dyes there available. (It will be seen from the context that all the more valuable Bengal indigenous dye-stuffs have been examined by the chemists and dyers of Europe : the opinion, which is wide-spread in this country, that many of the Indian indigenous dyes are not known in Europe, appears to be without foundation). The following remarks by G. von Georgievics are worthy of note :—" The artificial dye-stuffs first produced were much handsomer and brighter, but not so fast as the majority of the natural dyes, and, by a somewhat hasty generalisation, artificial dyes were at first regarded as handsome but fugitive—a prejudice which, for a long time, acted adversely on the artificial dyes........At the present time we have artificial dyes, some of which are just as fast, and others even more so, than those of natural origin." (Chemistry of Dye-stuffs, 1903).

From these remarks on a general comparison of the natural and artificial dye-stuffs it would probably be concluded that the natural dye-stuffs are, as a whole, fairly fast ; but this conclusion is at variance with the remarks on particular natural dye-stuffs which can be found in various books on dyes and dyeing. I will here quote a few opinions on the more important indigenous dye-stuffs of Bengal.

According to N. N. Banerjee (*loc. cit.*) the more important dye-stuffs of Bengal are :—Indigo (*Indigofera tinctoria*), turmeric (*Curcuma longa*), lac, kusum or safflower (*Carthamus tinctorius*), bakam (*Cæsalpinia sappan*), singhar (*Nyctanthes arbor-tristis*), kamala (*Mallotus philippinensis*), palas (*Butea frondosa*), latkan (*Bixa orellana*) and al (*Morinda tinctoria*). Other dye-stuffs mentioned in this monograph are manjista (*Rubia cordifolia*), mehndi (*Lawsonia alba*), gab (*Diospyros embryopteris*), kanthal or jak (*Artocarpus integrifolia*), and toon (*Cedrela toona*). Catechu or kath (*Acacia catechu*) is mentioned as an auxiliary used in dyeing. This list is in substantial conformity with the list given in " Report on the Dyes and Tans of Bengal, H. W. McCann, 1883."

Banerjee makes the following remarks as to the fastness of these dyes :—

Indigo ..	.. No remark.
Turmeric ..	.. Yields a colour of a fleeting character only.
Lac ..	.. Describes a method to produce a *permanent* red colour (p. 20).
Kusum ..	.. No remark.
Bakam ..	.. Describes a method to produce a *pucka* (fast) red colour (p. 23).
Singhar ..	.. Orange colour, which is very fleeting (p. 18).
Kamala ..	.. No remark.
Palas ..	.. The colour produced is a fugitive yellow inclined to red (p. 24).
Latkan ..	.. Describes a method to produce a fast colour (p. 24).
Al ..	.. Produces a fast red colour.
Manjista ..	.. No remark.
Mehndi ..	.. Ditto.
Gab ..	.. Ditto.
Kanthal ..	.. Ditto.
Toon ..	.. The colour obtained is fugitive.

"A Manual of Dyeing," J. Napier, 1875; "Die Chemie der natürlichen Farbstoffe," H. Rupe, 1900; "Commercial Organic Analysis," A. H. Allen, 1901; and "Chemistry of Dye-stuffs," G. von Georgievics, 1903; may be taken as representing European opinion during the last thirty years.

Indigo.—This dye will not be further considered, as it admittedly stands in the very first rank and has been the subject of numerous investigations.

Safflower.—"The colours obtained by safflower are the prettiest and cleanest that can be had upon cotton, but they are *fugitive*."—Napier.

"The shades obtained by dyeing with safflower are *very fugitive*, discharged completely by quite small quantities of soda, also by chlorine and sulphur dioxide, bleached quickly by light, but not so quickly as the eosin dye-stuffs."—Rupe.

"The dyeings are *very fugitive*."—Georgievics.

Bakam (*Cæsalpinia sappan*).—"All the colours obtained by this wood are *exceedingly fugitive*, losing their brilliancy on a short exposure to air. The sun has a very powerful influence upon colours dyed by this wood. By a short exposure the red colour assumes a blackish tint, passes into a brown and fades away into a light dun colour. Heat is also very destructive to this colour."—Napier.

"The colours obtained are *not fast, either to soap, alkalies or acids.*"—Rupe.

"These dyeings are *not very fast.*"—Georgievics.

Latkan or *annatto* (*Bixa orellana*).—"All the colours dyed by annatto are *exceedingly fugitive*, and although neither acids nor alkalies can completely remove the colours dyed by it, still they constantly change and fade by exposure to air and light. On this account annatto is now very seldom used in cotton dyeing, and when it is used it is only as an auxiliary. It is, however, still used for silks and woollens, as the objections to its use for cotton do not apply so strongly in relation to these substances."—Napier.

"The colours dyed by annatto are fine and bright and resist well acids, soap and chlorine. But they *easily fade in light*."—Rupe.

Al (*Morinda tinctoria*).—"On cloth mordanted for Turkey-red, Anderson obtained a dark, brownish-red colour, devoid of beauty but perfectly fixed, with other mordants not very stable nor very fast to washing......So far as this colouring matter is concerned, there is a field of enquiry yet open to the practical dyer."—Napier.

"Used in a manner similar to Madder in Turkey-red dyeing, one obtains a *fast* red."—Rupe.

Manjista (*Rubia cordifolia*).—"Reds dyed with manjista are *very brilliant but fugitive, being destroyed by a short exposure to light and air*."—Napier.

"Dyes cotton, mordanted with alumina or oil, of an orange-red colour, but the colour is *not fast* to light or soap."—Rupe.

Catechu.—"Is an extremely valuable dye-stuff. It is used only for silk-dyeing, in cotton-dyeing and calico-printing for browns. The colour obtained is red-brown or grey-brown according as chrome or iron mordants are used; neither is handsome or bright, but both are *extremely fast*."—Georgievics.

Such is the evidence at present available as to the fastness of the natural dyes of Bengal. It is, to a great extent, self-contradictory and throughout there is a want of precision indicated by the use of such expressions as "*moderately* fast," "*very* fugitive," &c., &c. I have, therefore, attempted to supplement the available evidence, and, as the result of a series of systematic observations and quantitative determinations, to make precise and numerical statements as to the fastness of the more common of these dyes.

PART I.—DYEING ON COTTON.

List of Natural Dyes examined.[1]

Turmeric (*Curcuma longa*).
Kusum or Safflower (*Carthamus tinctorius*).
Bakam (*Cæsalpinia sappan*).
Palas (*Butea frondosa*).
Latkan (*Bixa orellana*).
Al (*Morinda tinctoria*).
Manjista (*Rubia cordifolia*).
Catechu (*Acacia catechu*).
Red Sandal (*Pterocarpus santalinus*).
Padauk (*Pterocarpus dalbergioides*).

The dye-stuffs lac and kamala, which have been used in the second part of this investigation, *viz.*, on silk-dyeing, are apparently unsuitable and never used for cotton dyeing.

Methods employed for dyeing with these materials.

As will be seen from the following details I have, in all cases, attempted to dye by one or more methods reported to be used by the native dyers.

In some cases I have been unable to produce dyed specimens by following the methods described. This may be due to one of several causes :—

(*a*) The descriptions of the methods are not in all cases detailed, *e.g.*, frequently the quantities of the materials required are not mentioned, and, in the absence of specific directions, I may not have been able to exactly reproduce the methods used by the native dyers.

(*b*) The reports of the methods employed (N. N. Banerjee, *loc. cit.*; H. W. McCann, *loc. cit.*) have generally been supplied by men without any special technical or chemical knowledge (district officers of the Civil Service) and frequently are by no means first-hand reports, and at each reproduction errors have probably crept in.

---

[1] These materials were all obtained in the Calcutta bazaars, with the exception of Al. I must here thank Babu Bipin Behari Das, Research Student, Civil Engineering College, Sibpur, for his assistance in collecting these materials.

(*c*) The methods described in some instances may not have yielded dyed cloth, even in the hands of the native dyers, who may not have discriminated between cloth properly dyed and cloth merely charged with unfixed colouring matter.

When I have been unable to obtain a satisfactory dyed sample by the native methods, I have resorted to methods employed in Europe It is well known that the fastness of a dye depends not only on the nature of the dye-stuff itself, but also to some extent on the nature of the fabric and on the auxiliaries used in dyeing. There is, therefore, always the possibility that these dye-stuffs may, in the hands of the native dyers, yield dyeings of superior fastness to those obtained in Europe from the same materials. An examination of the native methods gives rise, however, to the conviction that this possibility is very remote, and that from any given dye-stuff European dyers will obtain a dyeing as good as, if not superior to, the native production.

A very general defect of Indian methods of dyeing is their inability to give really full shades. As this indicates that there is little affinity under the conditions between the dye-stuff and the fabric, such methods cannot be considered as satisfactory.

Turmeric.—Process described by Banerjee (*loc. cit.*, p. 21, § 82 (*i.*)).

(1) Turmeric decoction prepared by soaking dry root in water, pounding, then adding more water and straining through a cloth. One seer of turmeric gave two seers of decoction. The cloth was soaked for five minutes in this decoction, washed lightly in water and then dipped in water acidulated with juice of the lime. A *full, bright yellow shade* was obtained.

(2) As in process (1), but water acidulated with juice of lime replaced by a ten per cent. alum solution. The colour produced was *slightly duller than* (1).

Kusum.—The method described by Banerjee (*loc cit.*, pp. 16-17, 22) gave quite satisfactory dyeings, both full and lighter shades. One-quarter of a pound of the florets was mixed with two seers of water and worked with the hands for fifteen minutes or so. The water was then decanted off through a coarse cloth strainer. Fresh, cold water was added and this process was repeated until the water strained off was practically colourless. This preliminary washing of the florets was done six times and occupied 36 hours. Then one and a quarter tolas of sajimati and one and a half pounds of cold water were added to the flowers and the mixture well worked with the hands and allowed to stand four hours The liquor was then strained off through the cloth and acidulated with the juice of the lime. Cloth was dyed to a *full red shade* in this liquor at the ordinary temperature in fifteen minutes. A bath giving *lighter shades* was obtained by working the residual florets with a further quantity of water, straining and acidulating with a little lime-juice.

Bakam.—Mention is made both of the wood and the bark for dyeing purposes. Only the wood was available in the bazaars of Calcutta. According to McCann (*loc. cit.*, p. 3) a simple aqueous decoction made by boiling the wood in water may be used for dyeing, but frequently alum is added to the decoction. These methods appear from the descriptions to be applicable for both cotton and silk, but on cotton I was quite unable to obtain satisfactory results by either method.

Banerjee describes the production of a deep, maroon colour by soaking the cloth first in water prepared with myrabolams and green vitriol, and afterwards in bakam-water. Cotton cloth was mordanted by 2 per cent. tannin solution followed by working in a ferrous sulphate solution ($2\frac{1}{2}^{\circ}$ Tw.) for 20 minutes, washed and worked in bakam decoction at the boil for 30 minutes. A *dull, purplish-black shade* (*full*) was obtained.

To obtain a satisfactory red dyeing on cotton a European method was employed. The cloth was mordanted with tannin and red spirits [1] and worked at about 60°C. in an aqueous decoction of the wood for half an hour. Then a little red spirit was added to the bath and the working of the cloth continued for another fifteen minutes. In this way *a very full and bright crimson shade was obtained.*

Palas.—Banerjee (*loc. cit.*, p. 24). "The dyeing with palas is effected simply by steeping in the infusion obtained by boiling the flowers in water. Alum is sometimes added."

(1) Aqueous infusion alone gave a *pale, yellow* colour.

(2) To an aqueous decoction from 25 grs. flowers in 100 cc. water 7 grs. alum were added; a green, slimy precipitate was thrown down. This was strained off and the clear, bright orange liquid used for dyeing. After 30 minutes' immersion cotton cloth was dyed *a medium orange shade.*

Latkan.—Native processes described in considerable detail by Banerjee (*loc. cit.*, p. 24).

"When silk is dyed with latkan the process, as described in the report from Murshidabad, is to mix a *powa* and a half of latkan seeds with 15 seers of water and half a seer of sajimati, and to boil the whole with the silk to be dyed......Cotton may be dyed in the same way. In Nadia the colour is made fast by the following process: 'The bark of the *babul* is pounded and boiled with water in an earthen pot. If cotton cloth is to be dyed, the cloth is steeped in the decoction thus prepared and kept for 24 hours. After drying it in the sun it is steeped and kept for 12 hours in latkan solution obtained by boiling latkan seeds in water. The cloth is again dried in the shade and then steeped for six hours in *babul* water. It is dried again and then washed with pure water.' This gives a fast orange colour."

Cotton cloth was dyed both by the Murshidabad and Nadia processes. In both cases a *full bright orange shade* was obtained.

In following the Murshidabad process, the cloth was boiled in the decoction for o minutes.

---

[1] Cloth mordanted with tannin and red spirits was used for several dyeings. It was prepared always according to the following description:—

Enter the cloth into a boiling 3 per cent. tannin bath and work till the bath has become cold. Wring out and enter into a bath red spirits 1 in 32. Work for one hour and wash well.

To prepare red spirits:—Take 3 parts, by measure, muriatic acid and 1 part nitric acid, with 1 part water. Put the vessel containing the mixture into a cool place and add, in small quantities at a time, feathered tin, in the proportion of 2 ozs. tin for each pound of acid. A few hours after the action has ceased, the spirits are ready for use.

In following the Nadia process, it was found necessary to add sajimati to the water to obtain the latkan solution. A decoction was used similar to that described in the Murshidabad process. Fifty gms. of *babul* bark were used to give 100 cc. of *babul* water.

Al.—There appears to be some confusion in nomenclature with regard to this substance. It seems that both *Morinda tinctoria* and *M. citrifolia* are called *al* or *ach* or *aich* and that both are equally effective for dyeing.

I was unable to obtain this material from the Calcutta bazaars, but was kindly supplied with a sample from the Indian Museum by Mr. Vieux, Assistant Curator, Industrial Section. I have, however, been quite unable to obtain a satisfactory dyeing with this material by any method.

According to McCann (*loc. cit.*, pp. 30—36), the cloth is generally prepared by steeping for three to four days in a mixture of crushed castor-seed and cow-dung. It is then thoroughly rinsed in soft water and may be dyed by simply boiling in water along with the root or the bark of the root. A repetition of this process gave only the faintest colouration to the cloth.

According to Napier (*loc. cit.*) and Rupe (*loc. cit.*) this material gives a full and fast dyeing on cloth mordanted for Turkey-red. A sample of cloth mordanted in this way was scarcely coloured even after boiling for two hours with its own weight of the root or with its own weight of the bark of the root.

Manjista.—According to McCann (*loc. cit.*, p. 48) the decoction obtained by boiling the stems in water may alone be used for dyeing (Darjeeling) or the cloth may be first mordanted by tannin or by steeping successively in alkaline solution and in alum (Midnapur). No discrimination is made as to the material dyed by these different methods.

Samples were prepared by the following processes :—

(1) By working the plain cloth in the aqueous decoction for 30 minutes in the cold only a *very light shade* was obtained ;

(2) by previously mordanting the cloth in a tannin solution (3 per cent.) and afterwards working in manjista decoction as in (1), only a *light pink shade* was obtained ;

(3) by previously mordanting the cloth with aluminium acetate,[1] steeping in cold manjista decoction, gradually raising to the boil and working for 30 minutes, a *fairly full red shade* obtained.

(4) In view of the similarity between alizarine and the colouring-matter of manjista, and in order to obtain strictly comparable samples of Turkey-red and

[1] Pad with aluminium acetate solution sp. g. 1·025 at 90°F till weight of goods tripled. Hang up for 48 hours in a warm moist atmosphere (dry bulb Thermo. 30°C.; wet bulb. 28°C.) Pass through 2 per cent. $(NH_4)_2CO_3$ solution and wash.

To make acetate of alumina :—In one gall. hot water dissolve 2lb. alum; dissolve in a separate vessel 2lb. acetate of lead in one gall. water; in a third vessel dissolve ½lb. crystallised soda; mix all the solutions together and stir well for some time, then allow to stand over night; decant the clear solution which is ready for use.

manjista-dyed cloth, I also dyed cloth mordanted for Turkey-red[1] by boiling for two hours in water along with its own weight of manjista. The cloth was afterwards finished as in Turkey-red dyeing, *viz.*, by steaming and brightening. The shade obtained was *orange-red* only *of medium fullness*, although every effort had been made to obtain a really full shade.

Catechu.—This material is apparently scarcely used by the native dyers.

A European method was employed for dyeing. Catechu was dissolved in dilute acetic acid (10 per cent.) and filtered from insoluble impurities. Cotton cloth was padded with this solution so that 10 per cent. (reckoned on weight of cotton) of catechu was on the cloth and dried. It was then passed through hot potassium dichromate solution (10 per cent. reckoned on weight of cotton) rolled up and left for several hours; afterwards washed and dried. A *light* to *medium brown shade* was obtained by this method and by repeating the whole process once a *full shade* was obtained.

Red Sandal.—This material is apparently not used as a dye in Bengal.

Cotton cloth mordanted with tannin and red spirits was boiled with raspings of the wood suspended in water for 30 minutes. The bath was kept in constant motion. A *medium red shade was obtained.*

Padauk.—This wood is chiefly grown in the Andamans and is not used as a dye-stuff. On account of its similarity to red sandal wood I attempted to dye with it in the manner described for red sandal. On cotton a *medium brownish red shade* was obtained.

Synthetic Dyes used for comparison with the Indigenous Dyes.

The following considerations were kept in mind in deciding which synthetic dyes to use for comparison :—

(1) To use dyes of which the fastness had been already exactly determined and recorded. These could then be conveniently used as *standards.*

(2) To use dyes which would, singly, give tints to match the dyeings with indigenous materials.

(3) To use well-known dyes representative of the more important groups of synthetic dyes.

Those selected were :—

Eosin.
Congo-red.
Primuline developed with β. Naphthol.
,, ,, ,, Resorcin.
,, ,, ,, Phenol.
Magenta.
Safranine.
Alizarine.

[1] Mordanted according to instructions issued by Badische Anilin und Soda Fabrik using Method III(*a*) 1. in pamphlet "Alizarine Colours on Cotton," A. 815.c.

This list includes direct cotton dyes, basic dyes, acid dyes and developed dyes, and the fastness varies from the lowest to the highest grade.

The dyed samples were prepared according to the best European methods as described in modern text-books.

Determination of Fastness of dyed samples.

The dyed samples were examined with regard to the following points :—

(i) Fastness to light.
(ii) ,, to washing with soap.
(iii) ,, to alkali.
(iv) ,, to acid.

(*I.*) *Fastness to Light.*

In order to determine the fastness to light the samples were exposed to the full sunlight from sunrise to sunset for many days. Strips of the samples (10 cm. × 1·5 cm.) were arranged on white writing paper fastened to plates of glass. The glasses were laid on stools on the roof of a building, so that no shadows should fall on them. The strips were so arranged that half of each could be covered by an opaque screen. The screen could be removed to compare the exposed and unexposed portions and replaced exactly in its original position. All the samples were exposed together, both those dyed with indigenous and those with synthetic materials. Since the time required to produce an appreciable fading depends to some extent on the depth or intensity of the dyeing, in many cases dyeings of different depths were made and exposed ; and in all cases a dyeing with an indigenous material was matched by an equally deep dyeing with some standard synthetic dye, which was exposed under the same conditions. The samples were exposed to light at the Civil Engineering College, Sibpur, during the latter half of November 1906, December 1906, and January 1907, *viz.*, on the following days: Nov. 25, 26, 27, 29, 30; Dec. 1, 2, 3, 4, 5, 6, 7, 8, 30, 31; Jan. 1, 2, 3, 4, 5, 6, 7, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21. The samples were examined each day and thus it was determined how many days were required (1) to produce the first sign of fading; (2) to reduce the shade to one-quarter of the original intensity ; (3) to completely bleach the fabric.

Although the majority of the days could be considered as typical, sunshiny, cold weather days, there were a few days on which the sun was for a time obscured by clouds. These days would have less effect than cloudless days, and their relative values were obtained in the following manner : The Sunshine Recorder at the Alipore Meteorological Observatory (which is only about two miles distant from Sibpur) registered the number of hours of sunshine per diem. The maximum number during this period was 8·1 hours and on many days the number registered was a close approximation to this. The day on which 8·1 hours of sunshine were recorded was taken as the *unit "1 day of bright sunshine."* It was assumed that one hour during which the sun was obscured was only equal to half an hour of bright sunshine, and on this assumption the value of each day was determined. These values are given in Table O, overleaf.

Table O.

Date.	Number of hours' sunshine recorded.*	Value of day in arbitrary units.	Date.	Number of hours' sunshine recorded.*	Value of day in arbitrary units.
Nov. 25	8·1	1·00	Jan. 2	8·0	0·99
26	8·1	1·00	3	7·5	0·96
27	8·0	0·99	4	7·8	0·97
29	8·1	1·00	5	7·1	0·94
30	8·0	0·99	6	8·0	0·99
Dec. 1	7·4	0·95	7	7·9	0·99
2	8·0	0·99	11	7·3	0·95
3	7·9	0·99	12	7·9	0·99
4	7·9	0·99	13	5·5	0·84
5	7·6	0·96	14	7·9	0·99
6	3·3	0·70	15	7·9	0·99
7	7·4	0·95	16	8·0	0·99
8	7·6	0·96	17	7·5	0·96
30	2·3	0·64	18	8·0	0·99
31	8·0	0·99	19	8·0	0·99
Jan. 1	8·1	1·00	20	8·0	0·99

* Supplied by courtesy of C. W. Peake, Esq., Meteorological Reporter to Govt. of Bengal.

This table was used to correct the determinations above mentioned, and thus was obtained *the number of days of bright sunshine* required (1) to produce first sign of fading; (2) to reduce the shade to one-quarter of the original intensity; (3) to completely bleach the fabric. These figures are given in Table I, opposite.

The rough estimate of the relative values of the different days was quite sufficient for the purpose, as an error of one day or more is quite possible in estimating both (2) and (3).

The amount to which the shades had faded at any time was determined by examining the strips (part faded, part unfaded) by the aid of a set of standards. These standards were made by dyeing with exactly weighed quantities of pure synthetic dyes (those dyes being chosen which are readily taken up by the fabric): *e.g.*, dyeings were made with Congo-red of 2·0%, 1·0%, 0·5%, 0·25%, 0·12%, 0·06%. The

Table I.—Fastness to Light of Dyeings on Cotton.

DYEING	Fulness of shade.	No. of days' bright sunshine required to produce first sign of fading	No of days' bright sunshine required to reduce shade to one quarter original intensity.	No of days' bright sunshine required to completely bleach.	GROUP.
Turmeric with acid ..	full	1	2	4	I
,, ,, alum ..	full	1	2	4	
Kusum ..	light	1	2	8	I
,, ..	medium	1	2	15	
,, ..	full	1	3	*	
Bakam (Tannin-tin mordant) ..	full	5	15	*	III
,, (Tannin-iron mordant) ..	full	8	*	*	IV
Palas without mordant ..	light	1	2	5	I
,, with alum ..	medium	1	3	10	
Latkan (Murshidabad process) ..	medium	1	2—3	*	I
,, (Nadia process) ..	medium-full	1	2—3	*	
Manjista without mordant ..	light	2	3	7	II—III
,, (alumina mordant) ..	medium-full	2—3	8	*	
,, (Turkey-red mordant) ..	medium	2—3	9	..	
Catechu ..	light	3	9	..	II—III
,, ..	medium	3	12	..	
Red Sandal ..	medium	1—2	12	*	I
Padauk ..	medium	1—2	6	19	I
Eosin (sodium stannate mordant)	light	1	1	1	I
Congo red 0·04% ..	light	1	1	3	I†
,, ,, 0·17% ..	medium	1	1	9	
,, ,, 0·35% ..	medium	1	1	9	
,, ,, 1·75% ..	full	1	2—3	14	
Primuline (5% developed β Napthol) ..	full	1	3	19	I†
Primuline (5% developed Resorcin)	full	1	3	15	I†
Magenta 0·02% ..	light	1	3	5	I†
,, 1·0% ..	full	3	10	*	
Safranine 0·1% ..	light	2	6	..	III†
,, 3·4% ..	full	7	*	*	
Primuline (5% developed Phenol) ..	full	5—6	20	*	III—IV†
Alizarine (alumina mordant) ..	light	12	*	*	IV
,, (Turkey red ,,) ..	light	8	*	*	
,, (,, ,, ,,) ..	full	*	*	*	

* More than 23 days. † Classified by Cassella & Co. (*loc. cit.*).

shades of these dyeings are proportional to the percentage of dye used. It was found on examining the strips along with these standards, that it was fairly easy to say what were the relative intensities of the exposed and unexposed portions of a strip.

In the last column of Table I. *the dye-stuffs are placed in Groups I —IV. according to their fastness to light. In Group I. are placed the most fugitive, in Group IV. the most permanent.*

This system of classification has been applied by Messrs. Cassella & Co., to a large number of synthetic dyes (consult " Cotton Dyeing " published by the firm). The groups to which the synthetic dyes employed belong are thus already known, and by comparison with these we can at once determine into which groups the various indigenous dyes fall.

The following peculiarities observed during the fading may be noted :—

Latkan fades rapidly from orange to light *pink*, and then little further fading occurs. This indicates that there are probably two different dye-stuffs in this material.

Red Sandal and *Padauk* both darken rapidly on first exposure and become colder in tint. Real fading sets in much later.

(*II.*) *Fastness to washing with soap.*

The dyed samples were all treated with warm soap and water under the same conditions. They were all steeped for 15 minutes at 60°C. in an aqueous solution of neutral soap containing 15 grms. per litre. [The soap was tested for neutrality previous to use. It dissolved completely in absolute alcohol, and the alcoholic solution was not alkaline to phenol phthaleïn]. The samples were afterwards washed, dried and compared with the original dyeing. *The dyes have been arranged in this way into four groups, I. being the most affected by washing with soap and water, and IV. the least affected.* These results are given in Table II, opposite.

(*III.*) *Fastness to Alkali.*

The dyed samples were all steeped for ten minutes in a solution of sodium carbonate (10 grms. cryst. carbonate per litre) at 60°C. washed, dried and compared with original. Also the colour of the alkaline bath after the steeping was noted (for 1 grm. of cloth 250 cc. alkaline solution used). Roughly speaking, the faster the dye the less the bath will be coloured. These results are given in Table III., and from them *the dyeings are arranged into four groups, I. being the most affected by the alkaline bath and IV. the least affected.*

Together Tables II. and III. indicate the fastness of the dyeings to washing under ordinary conditions.

(*IV.*) *Fastness to Acid.*

The dyed samples were all steeped for one hour in 10 per cent. acetic acid solution at 40°C. washed, dried and compared with the original. Also the colour of the acid bath after the steeping was noted (for 1 grm. of cloth 250 cc. acid solution used). Roughly speaking, the faster the dye the less the bath will be coloured. These results are given in Table IV., and from them *the dyeings are arranged into four groups, I. being the most affected by the acid and IV. the least affected.*

This treatment with acid measures the fastness of the dyeings to perspiration.

Table II.—Fastness to Soaping of Dyeings on Cotton.

Dyeing.		Fulness of shade.	Appearance after soaping, washing and drying.	Group.
Turmeric with acid	..	full	great change of colour	I
,, with alum	..	full	ditto	
Kusum	..	light		I
,,	..	medium		
,,	..	full	much lighter	
Bakam (Tannin-tin mordant)	..	full	considerably lighter	II
,, (Tannin-iron mordant)	..	full	no change	IV
Palas without mordant	..	light	almost completely washed out	I
,, with alum	..	medium	almost completely washed out	
Latkan (Murshidabad process)	..	medium	slightly lighter	III
,, (Nadia process)	..	medium-full	slightly lighter	
Manjista without mordant	..	light		IV
,, (alumina mordant)	..	medium-full	no change	
,, (Turkey-red mordant)	..	medium	no change	
Catechu	..	light	no change	IV
,,	..	medium	no change	
Red Sandal	..	medium	slightly colder shade	III
Padauk	..	medium	slightly colder shade	III
Eosin (sodium stannate mordant)	..	light	considerably lighter	II
Congo Red, 0·04%	..	light		IV
,, ,, 0·17%	..	medium		
,, ,, 0·35%	..	medium		
,, ,, 1·75%	..	full	no change	
Primuline (5% developed β Naphthol)	..	full	no change	IV*
,, (5% developed Resorcin)	..	full	no change	IV*
Magenta 0·02%	..	light		IV*
,, 1·0%	..	full	no change	
Safranine 0·1%	..	light		IV*
,, 3·4%	..	full	no change	
Primuline (5% developed Phenol)	..	full	no change	IV*
Alizarine (alumina mordant)	..	light	considerably lighter	II
,, (Turkey-red ,,)	..	light	no change	IV
,, (,, ,,)	..	full	no change	

* Results agree with observations of Messrs. Cassella & Co. (*loc. cit.*).

Table III.—Fastness to Alkali of Dyeings on Cotton.

Dyeing.	Fulness of shade.	Appearance after treatment with alkali, washing and drying.	Colour of alkaline bath afterwards.	Group.
Turmeric with acid ..	full	great change of colour	light yellow	I
,, with alum ..	full	great change of colour	light yellow	
Kusum ..	light			I
,, ..	medium			
,, ..	full	much lighter	full orange	
Bakam (Tannin-tin mordant) ..	full	considerably lighter	full red	II
,, (Tannin-iron mordant) ..	full	no change	medium brown-red	III
Palas without mordant ..	light	changed to vy light pink	medium yellow	I
,, with alum ..	medium	changed to vy light pink	full yellow	
Latkan (Murshidabad process) ..	medium	no change	full yellow	III
,, (Nadia process) ..	medium-full	no change		
Manjista without mordant ..	light	no change	very light red	III—IV
,, (alumina mordant) ..	medium-full	no change	light red	
,, (Turkey-red mordant) ..	medium	no change	no colour	
Catechu ..	light	no change	no colour	IV
,, ..	medium	no change		
Red Sandal ..	medium	slightly colder shade	medium brown	III
Padauk ..	medium	slightly colder shade	med. greenish brown	III
Eosin (sodium stannate mordant)	light	considerably lighter	very light pink	II
Congo-red 0·04% ..	light			IV
,, ,, 0·17% ..	medium			
,, ,, 0·35% ..	medium			
,, ,, 1·75% ..	full	no change	no colour	
Primuline (5% developed β Napthol) ..	full	no change	no colour	IV*
Primuline (5% developed Resorcin)	full	no change	no colour	IV*
Magenta 0·02% ..	light			III*
,, 1·0% ..	full	no change	light green	
Safranine 0·1% ..	light			III*
,, 3·4% ..	full	no change	medium red	
Primuline (5% developed Phenol)	full	no change	no colour	IV*
Alizarine (alumina mordant) ..	light			
,, (Turkey-red ,,) ..	light	no change	no colour	IV
,, (,, ,,) ..	full	no change	no colour	

* Results agree with observations of Messrs. Cassella & Co. (*loc. cit.*).

Table IV.—Fastness to Acid of Dyeings on Cotton.

DYEING.	Fulness of shade.	Appearance after treatment with acid, washing and drying.	Colour of acid bath afterwards.	GROUP.
Turmeric with acid ..	full	no change	light yellow	III—IV
,, with alum ..	full	no change	light yellow	
Kusum ..	light			III—IV
,, ..	medium			
,, ..	full	no change	light red	
Bakam (Tannin-tin mordant) ..	full	no change	light yellow	III—IV
,, (Tannin-iron mordant) ..	full	much lighter	light yellow	I
Palas without mordant ..	light	much lighter	no colour	I
,, with alum ..	medium	almost washed out	light yellow	
Latkan (Murshidabad process) ..	medium	no change	very light yellow	III—IV
,, (Nadia process) ..	medium-full	no change		
Manjista without mordant ..	light	considerably lighter	no colour	II
,, (alumina mordant) ..	medium-full	slightly lighter	medium orange	III
,, (Turkey-red mordant) ..	medium	no change	no colour	IV
Catechu ..	light	slightly lighter	no colour	III
,, ..	medium	slightly lighter		
Red Sandal ..	medium	no change	no colour	IV
Padauk ..	medium	no change	no colour	IV
Eosin (sodium stannate mordant) ..	light	no change	no colour	IV
Congo red, 0·04% ..	light			I
,, ,, 0·17% ..	medium			
,, ,, 0·35% ..	medium			
,, ,, 1·75% ..	full	no change*	no colour	
Primuline (5% developed β Napthol)	full	no change	no colour	IV
,, (5% developed Resorcin)	full	no change	no colour	IV
Magenta, 0·02% ..	light			IV
,, 1·0% ..	full	no change	no colour	
Safranine, 0·1% ..	light			III—IV
,, 3·4% ..	full	no change	light red	
Primuline (5% developed Phenol)	full	no change	no colour	IV
Alizarine (alumina mordant) ..	light	considerably lighter	light yellow	II
,, (Turkey-red ,,) ..	light			IV
,, (,, ,,) ..	full	no change	no colour	

* Completely blue whilst in acid bath.

Conclusion.

A summary of the results of the work recorded in this paper is given in Table V.

Table V. Summary—Fastness to various Agencies of Dyeings on Cotton.

Dyeing.	Fastness to light.	Fastness to soaping.	Fastness to alkali.	Fastness to acid.
Turmeric with acid ..	I	I	I	III—IV
,, with alum ..				
Kusum ..	I	I	I	III—IV
Bakam (Tannin-tin mordant) ..	III	II	II	III—IV
,, (Tannin-iron mordant) ..	IV	IV	III	I
Palas without mordant ..	I	I	I	I
,, with alum ..				
Latkan (Murshidabad process) ..	I	III	III	III—IV
,, (Nadia process) ..				
Manjista (alumina mordant)	II—III	IV	III	III
,, (Turkey-red mordant) ..			IV	IV
Catechu ..	II—III	IV	IV	III
Red Sandal ..	I	III	III	IV
Padauk ..	I	III	III	IV
Eosin (sodium stannate mordant) ..	I	II	II	IV
Congo-red	I	IV	IV	I
Primuline (developed β Napthol) ..	I	IV	IV	IV
,, (developed Resorcin) ..	-	IV	IV	IV
Magenta ..	I	IV	III	IV
Safranine ..	III	IV	III	III—IV
Primuline (developed Phenol) ..	III—IV	IV	IV	IV
Alizarine (alumina mordant) ..	IV	II	IV	II
,, (Turkey-red ,,) ..		IV		IV

It is at once seen from this table that the majority of the indigenous dyes, as used, give dyeings which are very fugitive and not worthy of further attention. In the range of the synthetic products it would be difficult to find dyes so easily affected by all agencies as *turmeric*, *kusum* and *palas*. *Latkan*, *red sandal* and *padauk* are scarcely worthy of further consideration, as they so readily fade in light. On the other hand the dye-stuffs *bakam*, *manjista* and *catechu* do not rank in the very highest grade along with, say, turkey-red, but they compare very favourably with the great majority of the synthetic products; and, but for the question of cost, might well hold a prominent place even in the modern scientific dyeing trade.

There is, further, always the possibility that, by some comparatively slight modification of the dyeing process, the fastness of some of the other indigenous dyes might be very considerably improved. When we recollect that, *e.g.*, in the case of Primuline developed with β. Napthol by merely passing the dyed fabric through a weak solution of copper sulphate, we are able to change the fastness to light from I. to III. in our scale (Cotton Dyeing, Messrs. Cassella & Co., p. 93), there seems to remain always at least some ground for hope in this direction.

Memoirs of the Asiatic Society of Bengal.

Vol. I.

I. *On certain Tibetan Scrolls and Images lately brought from Gyantse.—By* PROF. SATIS CHANDRA VIDYĀBHŪṢAṆA, M.A., M.R.A.S. (Price Re. 1-8; or 2*s.* 3*d.*)

II. *Sal-Ammoniac: a Study in Primitive Chemistry.—By* H. E. STAPLETON, B.A., B.Sc. (Price Re. 1; or 1*s.* 6*d.*)

III. *The Similarity of the Tibetan to the Kashgar-Brahmi Alphabet.—By* The REV. A. H. FRANCKE. (Price Rs. 2; or 2*s.* 10*d.*)

IV. *Alchemical Equipment in the Eleventh Century, A.D.—By* H. E. STAPLETON and R. F. AZO. (Price Re. 1-8; or 2*s.* 3*d.*)

V. *Malaysian Barnacles in the Indian Museum, with a list of the Indian Pedunculata.—By* N. ANNANDALE, B.A., D.Sc. (Price Re. 1-8; or 2*s.* 3*d.*)

VI. *Ashrafpur Copper-plate Grants of Devakhadga.—By* GANGA MOHAN LASKAR, M.A. (Price Annas 8; or 10*d.*)

VII. *Festivals and Folklore of Gilgit.—By* GHULAM MUHAMMAD. (Price Rs. 2; or 2*s.* 10*d.*)

VIII. *Notes on the Bhotias of Almora and British Garhwal.—By* C. A. SHERRING, M.A., F.R.G.S., I.C.S. (Price Re. 1-5; or 2*s.*)

IX. *Religion and Customs of the Uraons.—By* the late REV. FATHER DEHON, S.J. (Price Rs. 2; or 2*s.* 10*d.*)

X. *Notes on the Fauna of a Desert Tract in Southern India* (Herpetology and Entomology).—*By* N. ANNANDALE, D.Sc., C.M.Z.S., with a list of Mammals by R. C. WROUGHTON, F.E.S. (Price Rs. 2; or 2*s.* 10*d.*)

XI. *Amulets as Agents in the Prevention of Disease in Bengal.*—Compiled in the Office of the Superintendent of Ethnography, Bengal. (Price Annas 12; or 1*s.* 2*d.*)

XII. *Earth-Eating and the Earth-Eating Habit in India.—By* D. HOOPER and H. H. MANN. (Price Re. 1; or 1*s.* 6*d.*)

XIII. *On a Cup-Mark Inscription in the Chumbi Valley.—By* E. H. C. WALSH, I.C.S. (Price Re. 1; or 1*s.* 6*d.*)

XIV. *A Descriptive List of the Sea-Snakes* (Hydrophiidæ) *in the Indian Museum, Calcutta.—By* CAPTAIN F. WALL, I.M.S., C.M.Z.S. (Price Re. 1; or 1*s.* 6*d.*)

XV. *Common Saws and Proverbs collected, chiefly from Dervishes, in Southern Persia.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Re. 1; or 1*s.* 6*d.*)

XVI. *The Common Hydra of Bengal: its Systematic Position and Life History.—By* N. ANNANDALE, B.A., D.Sc., C.M.Z.S. (Price Re. 1; or 1*s.* 6*d.*)

XVII. *Animals in the Inscriptions of Piyadasi.—By* MONMOHAN CHAKRAVARTI, M.A. (Price Annas 12; or 1*s.* 2*d.*)

XVIII. *Some current Persian Tales told by Professional Story-Tellers.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Re. 1; or 1*s.* 6*d.*)

XIX. *The Dards at Khalatse in Western Tibet.—By* REV. A. H. FRANCKE. (Price Re. 1-6; or 2*s.*)

Supplement, Miscellanea Ethnographica. Part I. 1. *The Blow-Gun in Southern India.* 2. *Miscellaneous objects from the Rámanád subdivision of the Madura district.* 3. *Indian Weighing-beams.—By* N. ANNANDALE, D.Sc. (Price Re. 1.)

Supplement, Miscellanea Ethnographica. Part II. 1. *Some Malayan Weapons—By* N. ANNANDALE. 2. *Plan of a Persian Gentleman's House.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Annas 8; or 10*d.*)

Memoirs of the Asiatic Society of Bengal.

Vol. II.

MEMOIRS

OF THE

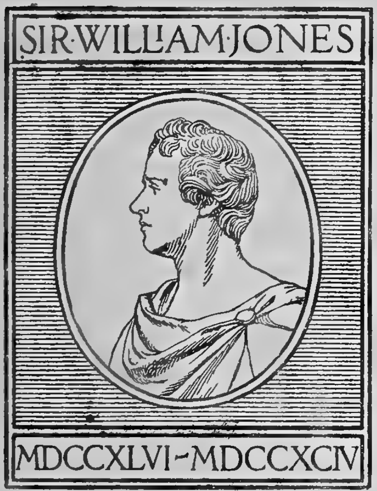
ASIATIC SOCIETY OF BENGAL

VOL. II, No. 4, pp. 43–84.

THE SAORIAS OF THE RAJMAHAL HILLS.

BY

R. B. BAINBRIDGE.



CALCUTTA:

PRINTED AT THE BAPTIST MISSION PRESS, AND PUBLISHED BY

THE ASIATIC SOCIETY, 57, PARK STREET.

1907.

Price Two Rupees; or Two Shillings and Tenpence.

25-5-07.

The Saorias of the Rajmahal Hills.

By R. B. Bainbridge

[Read December 5th, 1906.]

In endeavouring to illustrate the customs and ethnological peculiarities of the Saorias, it is difficult to refrain from dwelling briefly on the climate and nature of their habitat. Glancing at the old maps, the eye is attracted by the wide sweep of the Rajmahal Hills, which rise to an altitude of 2,000 ft. above the level of the sea. South of the Saoria tract runs the Bansloi River, a roaring torrent in the rains, and, in the dry season, a sandy-bed with here and there a glistening pool to mark its course. East and west the hills are met by the zemindari tract and the "Damin-i-Koh," falling away in gentle undulations until they merge themselves into the fat rice lands of Bengal. Northwards the hills stand out boldly, and stem the Ganges, driving its waters with tremendous force against the piers and bastions of the ancient city of Rajmahal.

This remarkable tract has an average rainfall of 50 inches, and a thermometer which frequently reaches 115 degrees (Farht.). In such a climate great muscular development is not to be expected; and the typical Saoria is short of stature, light of build, wiry and capable of undergoing considerable fatigue. Pale complexions are not uncommon; but the characteristic colour is a chocolate brown, sometimes merging into black. The women are well favoured, robust, often elegantly proportioned, and pleasing in feature. They move with that swing of the hips peculiar to those habituated to weighty anklets, and toilsome marches up and down hills: a carriage as far removed from the sweeping grace of the high-caste Hindu woman, as the roll of the lugger is from the glide of the racing yacht.

The measurement of the nasal index gives an average of 94·5. Turning to the Brahman the figures are 70·4. In the Parisian the figures are 69·4. The difference between the Aryan and the typical Dravidian is in marked contrast. In fact, the figures of the Saoria correspond closely to those of the Negro. The head is, however, dolichocephalic, and, in this respect, is similar to that of the Aryan. But the opinion may be hazarded that a set of more extensive measurements would considerably modify the figures 94·5. The Saorias have, in bygone times, intermarried with Aryans, and traces of the facial beauties of that commanding race have not been entirely obliterated. In physique the Sonthal and the Uṛaoṉ are typically Dravidian, whereas, in the Saoria, if the figures 94·5 be accepted as representative, the affinity only exists in the proportions of the nasal index. The present speculation is, no doubt, opposed to that of high authority (see H. H. Risley, *Tribes and Castes of Bengal*); but a prolonged course of observations leads to the conclusion that, the Saoria lacks the characteristic squat and sturdy build of the typical Dravidian. It needs but a casual observer to distinguish the Saoria from the Uṛaoṉ or the Sonthal. They are dissimilar, though the precise line of demarcation may not be easily definable. It would be obviously illogical to attack the theory of a Dravidian origin on the sole ground of dissimilarity of physique. But it is well that facts ascertained should be dispassionately enumerated. Nor is this all, there are other obstacles: The inviolable ramifications of the totemistic system are absent; endogamy and exogamy are not the arbiters of nuptial alliances; marriage is regulated solely by the prohibitions of blood relationship; and the termination of the interdict, and the appearance of the fourth cousin, are simultaneous.

Turning to the moral faculty, it will be observed that some of the differences gradually disappear. The Sonthal and the Saoria are indiscriminate in appetite; articles regarded with loathing by Aryans are to them clean and wholesome. An animal that has died of anthrax or rinderpest is eaten. Sexual license though prohibited in theory is tolerated in practice. Professional prostitution is abhorred, but a religious festival, and a feast end in riotous indulgence. In both peoples there is the same amazing capacity for alcohol, a capacity by no means confined to the men. In the Sonthal there is a trait of treachery. In the Saoria it is lacking. The Sonthal is apt to trade upon his apparent simplicity, and conceals, beneath his stolid exterior, a large measure of low cunning. Less influenced by civilization, and adaptable to circumstances, the craft of the Saoria is superficial. The Sonthal hankers after strange gods and the flesh pots of Egypt. The Saoria prefers starvation on his beloved hills, and renders loyal allegiance to his confused pantheon of godlings and demons. Education and foreign association fail to equip the Saoria with the tortuous windings of the Oriental mind when bent on evil; whereas, in the Sonthal, they enable him to cope not unsuccesfully with the sagacity of the Brahman. Thriftless to a degree the Saoria garners but to squander at a festival, or to become the fortunate possessor of a godling. Superstition, and its handmaid Imagination, mould him at will, and in the grove, or the tree he beholds with terror the "Jampoṛi" (Demno ghost) and invests the inexplicable power of the railway train with a capacity for compassing the direst evil. He ascribes an epidemic of small-pox, or cholera, to the advent of inimical spirits by railway. He exorcises them by constructing a rude model of a train, wheels it through the village, and into the jungle, and desires the invisible passengers to journey onwards. Such is the Saoria of to-day, and such has he been for countless generations.

The exploits of the Saoria, with the bow and spear, form the subject of many a Hindu ballad. The Maharatta horsemen harrowed the rich valley of the Ganges; but his fierce charge was stemmed by the dense jungle and the poisoned arrow of the Hillman. The resolute claims to independence maintained by the ill-equipped Hillman prove that the Mogul too was baffled.

What the sword failed to accomplish the tact and discrimination of Cleveland well nigh achieved. Under his masterly hands was evolved the "Hill assembly," a tribunal composed of chiefs, and vested with authority to try misdemeanants and felons. Under him the Hillman was weaned from lawlessness by the payment of stipends. These arrangements met with the approbation of the illustrious Warren Hastings. The inducements offered were, indeed, calculated to persuade the Saoria to abandon the hills, and settle in that spacious belt of forest, and fertile country below, and ply the arts of peace. But it was not to be,—Cleveland was cut off in the flower of his youth. The incursion of the ubiquitous Sonthal commenced. *Sal* forest (Shorea robusta) and game were things of the past, and the Saoria clung to his heights eking out a precarious livelihood, his constant companions small-pox and starvation. Settlement operations subsequently rendered the position of the Saoria still more uncertain, and accorded to the incursion of the Sonthal the rights appertaining to prescription. The disappearance of the forest on the north of the Saoria Hills and the shrewd counsels of business men created the important industry in *Sabai* grass. To the native banker and middleman it has, in many cases, been profitable beyond the dreams of avarice; to the Saoria it has, in the majority of cases, brought a temporary affluence, which is the portal to wretchedness. Abject poverty is no misnomer among the Saorias of to-day; six annas has to suffice many a family for victuals over eight weary days. Land-settlement, the *Sabai* grass industry and forest conservancy are indeed complex problems. The solution is intimately connected with the prosperity and preservation of a race. To solve them on broad and humane principles, and maintain a link with the past, may well tax the sagacity of a statesman.

I. Divisions.[1]

Male.

Male[2] would mean hillman and is, probably, of Sanscrit origin. "Rama to his brother said as on Malya's cloud-capped ranges, in their hermit guise they strayed" (Ramayan): the word "Mal" suggests hardy in the Sanscrit. Among the Saorias it also conveys the sense of virility and manliness. The word "*male*" may, therefore, be appropriately amplified as a "hardy hillman"; and, indeed, this is actually the meaning which the Soaria intends to convey.

---

1 Spelling of Malto words: The spelling adopted is that which is understood by Saorias who know the Roman alphabet. There are five vowels, long and short, *viz.*, a á, e é, i í, o ó, u ú. These are sounded more or less as they are in Hindustani. Short e and o do not occur in Hindustani and are sounded as in "let" and "lot."

Malto has no diphthongs. In pronouncing foreign words with ai, or au, the Hillman uses the syllables ey and aw, as "Seytaneh" for "Shaitan."

b, ch, d, ḍ, g, g, h, j, k, l, m, n, ṇ, or ñ, p, q, r, ṛ, s, t, ṭ, th, w, y. B vibrates between the English B and v; g and q come deeper and fuller from the throat than in Hindi. th is a sharp English, th sounded lightly with just a suspicion of z. The rest resemble in sound the corresponding characters in Hindi.

In Malto many words are pronounced with a lisp; others come deeply from the throat with a sound of the Northumbrian "*r*." H, as a general rule, is almost silent, except at the end of a word when it is clearly sounded, *e.g.*, in the word *Hindi* the Hillman would sound the *H* very nearly in the same way as the Frenchman in the word *Hibou*. In the word Maleh the *H* would be clearly heard.

2 Male, masculine singular—two syllables as *mal-e*. Maler, mas. plural. Malni, feminine singular. Malnir, feminine plural. There is one declension of Malto nouns by means of case signs, *e.g.* :—

(Mas.)	Nom. Maleh.		Gen. Maleki.		Dat. Malek.	
	Acc. Malen.		Abl. Malente.		Loc. Maleno.	
	Inst. Malet.		Voc. O'Male.			
(Fem.)	Nom. Malinth.		Gen. Malniki.		Dat. Malnik.	
	Acc. Malnin.		Abl. Malninte.		Loc. Malnino.	
	Inst. Malnit.		Voc. O'Malni.			

Saoria.

This term is of doubtful origin, but has probably arisen in the expression "*Savālā Pahāṛ*," the name by which the Rajmahal Hills have been known to the Hindus.

The Sonthals call the Saorias *Munḍa*, and the Hindus call them Paharias. The term "Munḍa" is used by Sonthals who have seen the "Munḍas" of Chota Nagpore. The Saorias, however, protest against the appellation.

The Saorias have five divisions; these are territorial in nature, *viz.*, Parte, Manḍro, Púbbi, Chetteh and Dakṛñi. Parte occupies the centre of the Hill Tract; Manḍro is found on the north; Púbbi on the east; Chetteh is found on the east from Tin-Pahar; Dakṛñi is found on the South and in Pakur Subdivision. The inhabitants of these divisions marry without restriction. Great dissimilarity in language exists; and the Manḍro is frequently unable to comprehend the speech and intonation of the Dakṛñi.

II. Traditions and Legends.

The traditions and legends of the Saorias are meagre, and I am unable to spare time to dwell on their folklore and fairy tales. The following legend is related by aged men after festivals to the youth of both sexes. I have translated the story exactly as related. Questions as to what became of the participants, in the feast, only result in imaginary exaggerations :—

"In the beginning lived Bhim Rajah and Bhim Rani; they had seven sons and seven daughters. The sons were great hunters—they hunted every day. The seven daughters were great cooks, and they used to cook for their brothers. Food was always ready for the hunters in their dwellings; but the cooks were never seen as they used to conceal themselves in the paddy stacks (*dhan* stacks) within the houses. The seven brothers desired to see the cooks, and, accordingly, took counsel together, and left the eldest brother concealed within the house in a straw-heap. His watch was unsuccessful, but the food was placed for him. In this way six brothers hid themselves and failed to discover the cook. The youngest brother then concealed himself in the *ṭaṭṭi* (screen) of his dwelling. It was the custom of the girls to cook in Bhim Rajah's house and then carry the food to the houses of their brothers. He saw the girls husking rice in the same *ukṛhi* all together. They brought food to each house and then returned to Bhim Rajah's house, and, sitting in a line, began to search for lice in each others heads. Then the youngest brother appeared before them and said: 'It is you then who have been giving us food?' They said: 'Yes, why should you tell it everywhere?' He answered: 'I will tell.' Then the youngest brother, touching their persons, said: 'You are my eldest sister-in-law, and so on, until he came to the youngest, when he said: 'You are my wife.' He then took them to the houses of his brothers, and he hid his own wife in a *ḍili* (large basket used for keeping rice). When the other brothers came back they asked him: 'Have you found anyone?' He said: 'Yes, see in your own houses, you have all received but I have got nothing.' The rothers then ate their meal and again questioned the youngest brother. Then he confessed and produced his wife. Being very happy the brothers arranged a great feast and collected goats, fowls, fish, pigs and other things. These were cooked in separate pots. Beef, mutton, fish, fowls, pigs, etc., each had its own pot. The eldest brother said, 'Let each take what best pleases him.' They were sitting in a line with their wives, the youngest brother was given the preference as he had found the wives. He chose beef and *makai* rice, and left, and became a Saoria Paharia taking the cooking-pots with him. The other brothers took what pleased them and also left with their wives, and they formed the other castes. Hence it is that Saorias, when cooking away from their homes, never leave their cooking-pots behind them. They always carry them to their homes."

III. Ethics and Morals.

Dalton, referring to Lieut. Shaw's *Asiatic Researches*, Vol. IV, p. 48, writes as follows: "The Paharias have a firm belief in the transmigration of souls. Their high-toned moral code is, in respect to rewards and punishments, after death, entirely based on that doctrine which, with the code, was, it is said, revealed to their first parents by the Creator. It will be sufficiently understood by a perusal of the following little homily :—

"Whoever obeys God's commandments will behave well in all respects. He will neither injure, abuse, beat, nor kill anyone; nor rob, nor steal, nor waste food or clothes, nor quarrel; but he will praise God morning and evening; and the *women must do this too*. When a good man has lived this life as long as God pleases, God sends for him and says, "You have behaved well and have kept my commandments, and I will exalt you, but for a season you must remain with me."

"The object of the sojourn is not stated, but, when it is completed, the spirit of the good man is remitted to earth to be born again of a woman as a Rajah, or chief, or in some higher position than that he previously held. If he show himself unmindful or ungrateful in his exaltation, his days are cut short, and he is born again as an inferior animal."

"The abuse of riches or other good gifts is often punished in this world. The riches disappear or calamity befalls the offender. Concealment of crime, as murder or adultery, is looked upon as a great aggravation of the offence. It becomes still more heinous if the object of the concealment is to throw blame on another. God sees all that is done, and though mortals may be deceived, and punishment fall on the innocent, the really guilty is sure, in the end, to suffer a greater calamity than he inflicts. Suicide is a crime in God's eyes, and the soul of one who so offends shall not be admitted into heaven, but must hover, eternally, as a ghost between heaven and earth, and a like fate awaits the soul of the murderer."

Dalton (p. 268, *Ethnology of Bengal*) is inclined to doubt the genuineness of this moral code. It is true, however, that the Saorias possess a "Code of Ethics and Morals," although it is not nearly so elaborate as that quoted by Lieut. Shaw. The Saorias do not believe in a life after death—they deny the truth of the doctrine of transmigration of souls. I have described their ceremonies and am only concerned with facts: let others draw the inferences; in a paper of this kind speculation is out of place.

The Saorias say that God, at the Creation, drew up a "Code of Ethics and Morals" for the guidance of all true Saorias. God handed this code to the first Saoria and he handed it to his son, and so on to posterity. According to the Saorias it runs as follows:—

"Good deeds are rewarded by God in this world, and bad deeds are likewise punished in this world. A good man suffers no harm: he has plenty to eat, he has good health, his herds increase and multiply, and, most important of all, the evil spirits possess no power to do him harm. The wicked man never prospers, his cattle die suddenly. The chief of all virtues is Truth. He who tells a lie commits the greatest of all sins. Let no one tell a lie or covet another man's things. Let no one injure another in body or in property. Adultery is wicked: let no one commit adultery."

This code came from *Darmáre* Gosaiṉ and Laihú Gosaiṉ, and it is as old as the hills. During ceremonies and festivals the *Demno* or the *Banḍári* preaches and expounds the "Code of Ethics and Morals" to the young men and maidens. He exhorts them to obey the commandments, to observe Saoria customs and to be good Saorias. The practice of preaching in this strain is said to have existed from time immemorial.

Dalton, in speaking of the Oṛaoṉs (*Ethnology of Bengal*, p. 257), observes: "I have not found amongst the Pagan Oṛaoṉs a trace of the high moral code that their cousins of the Rajmahal Hills are said to have accepted." To theorise in this connection would be ill-advised. Admittedly, there is similarity of language between these two peoples; but similarity of language alone is not a sufficient reason for classing them as "cousins."

IV. Tattooing.

Ethnologically tattooing is of profound interest. But the enquiry was beset with difficulties. The girls were shy and the men suspicious. The question the maidens propounded to themselves appears to have been: "Does the enquiry endanger a custom which heightens our charms?" The problem before the men suggested mysterious designs connected with land settlement and forest conservancy. Question and problem though hazy were yet sufficiently defined to be obstacles. But compliments and presents, I found, had not lost their potency with the gentler sex, even in a matter which, questioned closely as to the reason for a design on a maiden's chin, or a mark on her nose, which appeared to increase the radiance of her black eyes.

Tattooing among the hill-folk cannot be compared with the marvellous designs of Japan; indeed, the style has little of the artistic, and the completed picture is crude and, apparently, meaningless.

Among the recognized masters of this art several colours are used. The Paharias have only one medium, *black*. The instrument is the ordinary needle, or the thorn of the "Kandeh" (Malto), "Merleh" (Sonthali)—(Latin name not available). The colour is made by mixing charcoal with "mahua" juice (*Bassia latifolia*); and the operator is an inexperienced friend. Under these circumstances, it is not surprising that the operation is painful and the design inelegant. The Paharia maiden tattoos.

Tattooing is exclusively her privilege; and the men frankly admit an unbounded admiration for the marks on the faces of their girls.

Tradition has no tales to tell in regard to this interesting custom. Legend weaves no history, either in song or story among the hill-folk. Fashion appears to be the origin of tattooing. In days gone by, it is probable that the custom was not in vogue among the Saorias. Impenetrable jungle clad the fastnesses of the hill-folk, paths there were but few, and danger not unknown,—hence the hill-women did not extend their excursions to the plains, and render themselves liable to be enslaved by a custom, which was, no doubt, common enough in the broad valley of the Ganges.

Among the hill-people tattooing demands no preliminary ceremonies, and no special diet is observed by the subject during the period of operation. The non-Hinduized Paharia does not employ a professional artist. A jungle flower, an arrow, a spear, the stars, are ever at hand to serve as models, and one girl essays her rude powers of imitation on the person of another.

The wife of a hill chief employs no special design to mark her position. All designs are common property and heredity plays no part in their existence. The hill-folk proper tattoo the face as shown by the illustrations annexed.[1] With the Sonthals human-milk is employed for mixing the pigment; with the Paharia the juice of the "mahua" tree is utilized. The difference in the materials used, human-milk and "mahua" juice, indicates that the interpretation, with respect to the Sonthal, is to be found in religious belief and tradition. In fact it is so. Tattooing among the Sonthals is intimately connected with certain immemorial superstitions. The philosophy which regards death as the donor of endless life and beatitude, may vest tattooing with power to propitiate a deity, or comfort a soul on its last journey. To the Saoria, death is the mysterious and the terrible! It may produce a spirit with an infinite capacity for evil, or it may be the portal to annihilation. In such a creed the exquisite sense of comfort possessed by the faithful is lacking. But it is not without its compensations; and the Saoria claims to be of the same caste as the "Sahib"; and in his own simple way glories in propounding opinions that find elaboration among the materialistic philosophers of Europe.

V. Marriage.

I would note that I have given an exact translation of what the Saorias have themselves related to me, in their own language, at various times, regarding their customs and ceremonies. What the narrative probably lacks in style, it gains in accuracy of detail: a desideratum in a work on ethnology.

There is no fixed time for marriages, they may take place all the year round. Oracles are not consulted. The girl should have reached the age of puberty, and the youth should be at least 17 or 18 years old. Marriages do not take place in the month of *Pús*, and during the dark o' the moon. The youth's mother begins the negotiations. Seeing a suitable girl, she betakes herself to the house of the parents. Her first enquiry

---

[1] I am indebted to my wife for the illustrations which indeed give an excellent idea of tattooing among the Saorias.

is as to whether the girl has been bespoken, and as to whether her affections are already engaged. If there be a previous arrangement, the youth's mother seeks in another village for a bride. A girl having been found, her mother and father consult her. When ascertained that her affections are not engaged, the youth's mother says that she will return in the course of three or four days; this is in order to allow the girl's relatives time for consultation. The second visit must not be paid on a Sunday; any other day is auspicious. Sunday is an unlucky day and pujahs are forbidden, also agricultural operations. Visits and marriages may not take place on Sunday, and, neither marriages, nor negotiations, may take place during the dark o' the moon. The moon is required to witness the ceremony. There is also a superstition that marriages may not be fruitful if consummated during the dark o' the moon; and that there may be general bad luck and maladies as well. On the *day fixed* the youth's mother and father do not, as a rule, keep the appointment. A man of good character and intelligence, who is not a relative, is selected for the purpose. He, on his part, chooses two or three companions to witness the discussions. He and his companions are fed and are then sent off with a *malla* (necklace) and a rupee. The necklace is made of glass beads or silver as the case may be. The would-be-groom has to accompany the "go-between" or "marriage-broker." The time for departure is not fixed beforehand, and pujahs and offerings are not made before setting out. On arrival the marriage-broker and his companions are asked to be seated, tobacco and water are offered, and the guests wash their feet and then take their seats. The marriage-broker opens the discussion by saying, "Your daughter has been seen and is desired in marriage. The youth is with me, and, if you are agreeable and pleased with his appearance, further arrangements regarding the ceremony may take place." The girl is then sent for by the parents, and she, and all her relatives, uncles, aunts, and brothers appear. All parties sit in a circle, the "go-between," the groom and his companions being apart. The girl stands up and is told by her father and mother, "See, this youth desires you in marriage, and he has brought a *malla* and a rupee; if you are pleased with him, and wish to accept him as a husband, take the *malla* and the rupee." The young man, at this stage, is standing opposite the girl, outside the circle of her relatives. The girl's consent is indicated when she takes the *malla* and the rupee. In this particular matter the girl is her own mistress. The *malla* and the rupee are handed to the youth by the marriage-broker or *Siṭu* or *Siṭudár*, and the girl, if agreeable, walks up and takes the offerings. If the girl be not agreeable, the *Siṭudar* rises and says to the assembly, "See, there was at first a talk of this marriage, but the girl is not agreeable; this being so, I sprinkle water over her person to show that the arrangements and our claims are washed away: take your daughter, she is doubtless precious, and her marriage will be made with silver and gold (will be sold for gold and silver—Malto)." Uttering this sarcasm the *Siṭu*, the disappointed groom and his companions depart. The water for this ceremony is handed to the *Siṭudar* by the girl's parents. No *mantras* or spells are said before sprinkling the water over the girl's person. If the youth is displeased with the girl, he tells the *Siṭudar* who makes the fact known to the assembly. The girl's parents ask what fault has been found in their daughter. It being shown that the youth is not agreeable, whatever may be the reasons, the parents say, "Very well," and a *loṭa* of water is handed to the *Siṭudar*. This may be brought by anyone. The girl then sits facing the east, the *Siṭudar* places a rupee on her head and pours the water over her ; in this case it is necessary to pour the water, not to sprinkle it. After this the *Siṭudar* says, "See your daughter is free to marry elsewhere," and then they take their departure. The rupee is the property of the girl's parents.

In case the young man and the girl are agreeable, the youth faces the east and the girl stands and faces her swain. The sun is a god, called "Beru Gosaiṉ" ; hence the custom of facing the east. The girl takes the *malla* and the rupee. The *Siṭudar*, the young man and their companions are then fed, and after eating they depart. Before starting the *Siṭudar* is asked to bring information within a few days as to when the youth and his parents wish the actual wedding to take place. The *Siṭudar* carries the request to the boy's parents who say, "Good, go after four days and tell the girl's parents that we fix the 15th day hence for our visit." No *special* day of the week is selected and no oracle is consulted. But a date is fixed for the purpose of enabling the girl's parents to prepare *pochai*. *Pochai* is also made ready at the house of the youth's parents. The parents now visit their relatives—the mother her relatives and the father his relatives—and tell them as regards the marriage about to take place. This is not, however, done by the girl's parents. These relatives present gifts according to immemorial custom, such as, money, *mallas*, arrows, and *ṭangas* (axes), knives, etc. The male relatives give knives, *ṭangas*, arrows and money, and the female relatives *mallas* and money. Bows are not presented. These offerings are all collected in the youth's house. Edibles of all kinds are gathered on both sides according to circumstances. When the day fixed by the youth's parents has arrived, two persons from the girl's parents called *Lapsiṭu* (Feast-broker) come round. They are relatives of the girl's parents, and they come empty-handed. On arrival, they ask the young man's parents as regards the quantity of gifts collected. The answer to this question is not given immediately. They are asked to be seated and water is given by the *Bedsiṭu*, the *Lapsiṭus* wash their feet, and their persons are oiled by the *Bedsiṭu* and they smoke. Food is now offered and then *pochai*. While drinking and making merry the boy's parents produce the gifts collected,—money, arrows, etc.,—and count them out before the *Lapsiṭus*. This is done by the father or the *Bedsiṭu*. But, in the case of money, the whole sum collected is *not* shown ; about half the sum is counted out in a flat basket or brass vessel. If all the money be shown many pseudo relatives collect on the side of the girl, and so about half the sum collected is kept hidden. The *Lapsiṭus* are, however, told that *all* the money collected has been shown and that, being poor folk, the girl is desired in marriage as an honour, it being unfortunate that more money could not be collected, and other words to this effect. These words are said by the *Bedsiṭu*, and the father. Then the *Lapsiṭus* are presented with one rupee each as earnest money, so that they may favour the side of the youth and his parents. One rupee each is the fixed sum, but less is sometimes paid. After this the *Siṭus*, *Bed* and *Lap*, the boy's father and others, go outside and see the bull or ox that is to be sent to the girl's house—buffalos or pigs cannot be sent. The animal should not be lame, blind, or have a broken horn, and it must be young. After looking at the animal they return and the *Lapsiṭus* say, "We have seen all things, money and other gifts, so get ready and come with us." The relatives having assembled in the youth's house food and drink are given to all. Then one of the *Lapsiṭus* and one of the youth's relatives take the bull, or ox, and walk ahead to the girl's house. Allowing them a a sufficient start, the others follow with the youth, the money, the arrows, and other gifts. Palanquin and drums are forbidden by old custom. The young man dresses himself in white or in any other colour except yellow, yellow being the symbol of death. He adorns himself with *mallas* and other ornaments according to means. The bull and his attendants having arrived, the girl's parents are informed, *khatias* (beds) are brought and water is offered. When the marriage party arrives near the village, the *Lapsiṭu*, who has accompanied it, takes all the arrows and *ṭangas*, and stands outside the village on the path, and he counts the party as it passes by into the village. This is done so that the presents and food may be properly apportioned. On arrival, a girl on the bride's side washes the feet of the whole party, and she is given a rupee in the vessel wherein she brought the water. A larger or a smaller sum may be paid. The party sits and tobacco and refreshments are offered and accepted. These attentions are paid by the *Lapsiṭus*. The *Bedsiṭu* is now taken inside the girl's house and he is accompanied by the youth's father, the groom himself, and all his near relatives. The young man is given a seat in the centre of the house, adjoining the central post, which is found in all Paharia houses. The young man faces the east and his relatives also take their seats. *Pochai* is brought and is placed in front of the boy's father. The girl's near relatives also go inside the house. The women (girl's relatives) sit on the western side of the house and all the male relatives on the eastern side. It is essential that the young man should sit and face the east. The *Lapsiṭu* gives *pochai* to the groom's father, to his mother and to all the near relatives of the groom and to the groom himself. The *Bedsiṭu* then takes some *pochai* and pours it on the ground, saying, "O Sun god and truth god, in the name of the youth, and the maid, I pour this offering to you; may they live long and prosper and have many children!" The question of *pon* (bride price) is now discussed and the bride herself is brought in. She may stand or sit and no special seat is placed for her. The *Lapsiṭu* gives a narrative relating to his journey to the groom's house, and the hospitality which he has received. He also gives a list of arrows, and other things, seen by him and brought, including the bull—he adds, "The parents said, we are but beggars and desire the girl to honour our house—let her be given to us accordingly." Then the groom's parents repeat the story about poverty and supplicate for the possession of the girl. The girl's parents accept the situation. Half the money is then produced by the young man's father and presented and accepted. The arrows, axes and knives, are also given. The girl's grandmothers then appear and demand their rights, Re. 1 each. This has naturally to be paid from the hidden store. Then come the girl's elder sister and husband and take Re. 1 each, the maternal aunt also gets a rupee from the hidden store—this is her right. The village headman demands his rupee, *mânḍla táká*; he takes this money in order to catch the girl in case she afterwards runs away from her husband. The village watchman, if any, receives two annas for the same purpose. The bride's sister, or other female relative, then takes a *pailá* of rice (measure) for the groom and bride and four annas. The rice and other victuals brought by the youth's parents, amounting to five or ten seers, are presented to the girl's parents. The girl is brought before the groom and is clad by the young man's married or unmarried sister (not a widow) in her marriage garments (two garments presented by the groom's parents). After this a rupee and a cloth are given to the bride's mother. This is called *kochṛen̰kitteh* and is compensation for the clothes spoiled by the girl during her infancy. The girl's father also gets a *siropah* (turban) and a rupee. All these sums are paid from the hidden store. The groom and bride then sit together, opposite each other, on the ground, in the centre of the hut. The groom faces the west and the bride the east. The *Bedsiṭu* places *sindur* on the little finger of the right hand of the groom, and, taking the groom's hand, he forms a cross between the eyes and nose of the bride, tracing the figure over five times according to custom. Then the bride's brother, or father, or cousin, places one spot of *sindur* on the groom's forehead. After this ceremony the brother, or father, as the case may be, washes the bride's hand, and, placing it in the *Bedsiṭu's* hand, says, "Behold, this girl I give to you being free from disease and blame, and without tarnish; take her and see that she is properly maintained." The *Bedsiṭu* hands the girl, in a similar manner, to the groom's father, and, in his absence, to the groom's brother, or to the groom himself. One rupee is taken by the girl's brother for the *sindur* and one rupee for making over the girl's hand; this money is paid by the groom and is called *ṭeṭṭapeheh sundrá ṭuḍeh pan̰rond ṭaka*. The *Bedsiṭu* says: "Take the girl; if she leaves her husband without cause, he will be entitled to get the expenses of the marriage, and, if he turns the girl out without cause, he will lose his marriage expenses."

After the *sindur* ceremony, the girl's brother and her maternal uncles take two arrows and, going outside, shoot the bull, *máthi bichī*. The first arrow is shot by the girl's brother, and the second by the maternal uncle. The animal is finished off by the bride's paternal uncle with an axe, and the axe becomes his property. The animal is cut up by the girl's brother or uncles, and a piece of the liver is taken into the house and broiled; it is then cut into small pieces, and a piece, with *pochai*, is given to the groom by the *Bedsiṭu*. The *Bedsiṭu* performs a similar office for the bride and all her relatives. The *Lapsiṭu* does the same for the groom's relatives. The *pochai* for the groom is brought from his own house: two *ghaylas* (pots) must be brought, one for the mother and one for the father of the girl, called *banḍi ṭaḍḍi*. Now every one sits down to the feast. The guests have their hands washed by the *Bedsiṭu* and *Lapsiṭus*. The rice brought, as noted above, is cooked, and given in the same dish to the bride and the groom with a little curry. After the feast the bride and bridegroom and the guests all drink, and then the *Bedsiṭu* takes the girl's hand and gives her to the groom, who, taking hold of the little finger of her right hand with his right hand, makes his way oustide the house followed by the guests and relatives. The groom and bride are stopped at the doorway by some one on behalf of the girl's relatives, and are not allowed to go until the groom has cast two annas in pice on the ground. They then proceed to the *Jaṇḍi Gosaiṉ* outside the house and seat themselves beside it. The *Banḍári* who corresponds to the *Gorait* (the individual who gives invitations and performs other offices for the village) comes forward with a fowl on behalf of the girl (not a capon) and a *loṭa* of water (brass vessel) and says, "*O Jaṇḍi Gosaiṉ, O Beru, Bilpu, iṭinte eṛu ḍokánandá narrah coṭe meno mallá,*" which, being interpreted, means, "O Sun God and Moon and *Jaṇḍi Gosaiṉ*, from this day forth may they be happy, may no evil approach them!" The fowl's head is now severed and the blood is sprinkled over the *Jaṇḍi Gosaiṉ*, the bride and the bridegroom. The water is also poured over them. A general shaking of hands takes place and the married pair and party make their way homewards. The marriage and these ceremonies occupy one day. It is usual for the groom and his bride to leave after the marriage, but sometimes the groom and party stay over two or three days. In such a case it is forbidden for the contracting parties to cohabit. The rule is, however, not very strictly observed.

On arrival at the groom's house, the bride and her husband sit beside the *Jaṇḍi Gosaiṉ*. The village *Banḍári* performs the ceremony described above, and the wedded pair are now free to enter the house.

Five days having elapsed a *hanṛiya* (earthen pot) filled with *pochai* and a *khassi* (goat) or pig is killed and taken by the *Bedsiṭu* to the bride's father. The married couple and their companions accompany the *Bedsiṭu*. These things are presented, and, after eating, the party returns the same day with any meat, or *pochai*, which may have been offered in return. These are the proper customs, but expenditure is curtailed according to circumstances. The contracting parties meet before marriage, but they are not supposed to have any sexual intercourse. In case of sexual intercourse, the young man is fined by the village *panchayat* two pigs, one for the girl and the other for her lover (*qeḍpáke*). These pigs are killed and the blood is sprinkled at the door of every house in the girl's village, and the flesh is eaten by the villagers and the *panchayat*. This is done to cleanse the village and prevent the entry of diseases. The marriage then takes place according to the wishes of the parties. In such a case the girl's father claims his *pon* Rs. 20 or so, and the erring pair are considered to be married and proceed to the groom's house. The *Banḍari* then kills the fowl as described above and the groom and his bride enter the house.

Drums are not beaten at marriages, and songs are not sung, nor are there any dances.

VI. Prohibitions.

A girl may not marry her brother, or first cousin; she may, however, marry her fourth cousin removed. The same rules prevail on the side of the mother. A girl cannot marry any near blood relatives. A man may marry an elder sister, and a younger sister, but not a younger sister and *then* an *elder* sister. A man may marry five or six wives, he may marry five or six sisters provided the eldest sister be willing.

There are no tribes or castes among the *Maler*. First and second cousins can only come together of their own free will. The marriage would not be allowed by the parents and by the village *panch*. When a case of this kind is indicated by the girl's pregnancy or otherwise, a *panchayat* is called, and, on satisfactory proof, two pigs are taken from the parties, also two fowls (not capons). They are slaughtered and the blood is sprinkled with water at all the houses in the village by the *Banḍári*. Salt is then brought by the *Banḍári* and mixed with water in a leaf in the presence of the *panchayat*. The *Banḍári* then says, " If you two come together again you will die within five days of the connection. You are henceforth separate. O *Gosaiṉ*, these two are henceforth separate, if they come together again destroy them within five days." The salt is placed in the leaf with the point of a sword, or knife, or with the claw of a tiger or leopard. The offenders are made to drink the mixture by the *Banḍári*. As the delinquents get up to go the *Banḍári* tears in two *sal* leaves, one for each offender, repeating the curse. The delinquents then go different ways. The girl and her parents keep the offspring of such a union, and the child is admitted into caste without any special ceremonies. But until marriage he is not allowed to eat at *pujahs* performed by the village. After marriage he is allowed to do so having feasted the village. In the case of a girl, she takes her place with other women after marriage. In any case women are not allowed to eat offerings made at *pujahs*. The husband of such a girl has, however, to feed the village to wash away the stain as it were.

A man having married the youngest sister in a family cannot marry any elder sister. The prohibitions in this connection are very strictly observed. The elder sister, in such a case, may not sit on or touch the bed or clothes of her younger sister's husband, nor may she smoke his *huka*. There are punishments prescribed for these offences. If a younger sister's husband and an elder sister come together, the man is fined Rs. 20 and is outcasted ; the woman has her head shaved, and painted with saffron, and lime, and she is taken all round the village by the *Banḍári* and made a public spectacle. The offenders are also told, " Go and die in the jungle or anywhere." Such offenders having obtained property and a fresh household godling, are readmitted to caste, after giving a feast to the village. The man's wife does not desert him in such cases. The Rs. 20 wash away the sin so far as she is concerned. This money is spent in a feast, and the liver of a pig is broiled and offered with *paṭki ṭaḍḍi* (*dáru*) to the ancestors of the offenders with these words : " Grant, O ancestors, that this sin be not put to the account of the village, but to the account of the offenders themselves " ! The liver and *dáru* are disposed of by the *panchayat*.

There is nothing to prohibit a Saoria from marrying a woman of another caste. This cannot be done according to custom, but when parties come together, they are admitted to caste by means of the usual feast. When the man and woman die they are not buried in the Paharia cemetery without payment of Re. 1 each to the village headman. This sum is termed *bewah koreh—bewah*, offering at a pujah, and *koreh*, together. The children of such unions are Saorias, and are subject to no fines and ceremonies, and pay nothing to be buried in the village graveyard. In olden days it was customary for Saorias to rush down into the plains and capture wives and cattle. Occasionally there used to be reprisals on the part of the zamindars and their rayats. There are many cases in which the descendants of *Gualins* are still alive. Boys, too, were captured by the Paharias and they became Saorias by intermarriage. Such expeditions were made by armed bands. *Khetaurin* and *Dhanukain* wives were also captured and their descendants are still living. The Hindus have also taken wives from the Saorias.

VII. Adoption.

The custom of adoption is well known. The boy's father is given money according to circumstances, and a bull, or ox, is given to the village for the usual feast, and the selected boy is then handed over. A daughter may also be taken in the same way. In the latter case, however, no money or animal is given, and the girl is only entitled to a half share of the property of her parents by adoption. The balance goes to the other relatives. An adopted son is entitled to the whole of the property. A man may also adopt a brother: in this case he pays nothing, he merely informs the village of his intention. Such a brother is not entitled to any of the ancestral property. The adopted brother may marry the younger sister of his sister-in-law by adoption, but not the elder sister. He may not marry the sister or daughter of his brother by adoption.

The custom of exchanging daughters is prevalent and is a very ancient one. The *Manjhi Bhuiyas* intermarry with Saorias and eat with them. The Saorias do likewise. Such marriages are not brought about by go-betweens according to ancient custom. The Saorias assign no reason for this practice. The Bhuiyas are looked upon as of the same caste, so to speak, but as to whether they broke away, or were outcasted, for some transgression is not known; and there are no traditions or stories on the subject. There are no restrictions in regard to marriage from the point of view of social status. For instance, the daughter of a chief may espouse the son of a rayat and *vice versa*. In the matter of geographical position, there are no restrictions of any moment, and distance is not a bar to the performance of such marriages. There are no differences of belief, or religious practice, and, accordingly, there is no restriction as regards marriage. Differences of occupation offer no bar to marriages.

Infant marriage is not observed. The parties must be of an age to please themselves. In the case of a girl, the fact that she is fit for courtship, is indicated by her wearing a cloth, passing from under her right arm, and tied in a knot on her left shoulder, and falling over her breasts and stomach. It is not essential that the girl should have menstruated. The time for wearing this cloth is fixed by the girl's mother, elder sister or other female relative. There is no special ceremony attached, but the cloth is worn by the girl for the first time on some festival day. Age is no restriction to marriage, and girls are never married to arrows, or trees, nor are they dedicated to temples. The Paharias have no temples. There is no blame or penalty attached to a girl who is not lucky enough to find a husband, nor do her parents and relatives suffer in any way.

Widows are free to re-marry. Such a marriage is called *baṇḍiawoh*. There are no go-betweens in the proper sense of the term for such marriages. *Sindur* is not used, but, in other respects the marriage is the same as the regular ceremony. The expenditure is less, however, that is in all things the expenditure must be one-half of that required for the marriage of a maid.

A menstruating female is subject to several restrictions. She is not allowed to touch any beds but her own. She is not allowed to touch the clothes and other articles of any one in the family. She is not allowed to cook for the family. These restrictions last for four or five days as the case may be. But these restrictions are imposed only when people are looking on as a general rule!

Polyandry is not known. In the case of the death of an elder brother his wife may be kept by a younger minor brother. In this case the girl lives with her husband's parents or relatives; but she is not allowed to co-habit with any one. As soon as the youth is capable, the *Banḍári* kills two fowls at the *Janḍi Gosaiṉ*, and sprinkles the pair with the blood and with a *loṭa* of water. They are then allowed to co-habit. There is no feast. The *Banḍári* invokes the Sun god and asks for a blessing on the pair while sprinkling them with blood. The binding portion of the ceremony is the placing of *sindur* and the eating of the broiled liver. The blood of the fowl consummates the marriage; *vide* marriages of those unable to pay. The slaughter of the fowl and the sprinkling of water are essential. A widower taking a young girl in marriage has to pay twice the usual amount of marriage expenses. The *pon* money and expenses vary according to means, from Rs. 2 to Rs. 100 and more.

A widow cannot, under any circumstances, marry her husband's elder brother. An elder brother's wife might, however, be taken in marriage by a younger brother. She may also marry her fourth cousin removed; it is not compulsory that she should marry in the family; she may marry an outsider.

The first wife is the chief wife and all others are her subordinates. (*Meqṛi Peli*, big wife). All the household property is considered to be under her charge. The servants (if any) are under her orders. She has the privilege of cooking for the family. Her sons succeed to the father's property, that is to a third share. The balance goes to the other wives and their children. In case of illness or absence of the first wife, the second wife occupies her place, and is vested with her privileges.

The wives all live in the same house. There is no custom enjoining the wives to occupy separate houses. The chief wife serves her husband first with food, and she has the privilege of making the beds. She and her co-wives do not eat until the husband has finished. She then serves her co-wives, children and servants, and, finally, she serves herself. At night the husband sleeps in the centre, and the wives occupy their beds on either side. In case of intercourse with a younger wife, without the consent of the elder wife, the husband is liable, on complaint, to a fine according to circumstances. For the first offence a warning is administered. A man may keep as many concubines as he can afford *plus* wives. This can only be done, however, with the consent of the chief wife and the girls themselves. Concubines are taken in order to increase the number of servants; and concubines may be of different castes. A Saoria would not be outcasted for keeping a concubine of another caste. In the case of division of property, the youngest wife's share is divided in two shares, one share goes to the younger wife and her children, and the balance to the concubines and their children.

Professional prostitution is not a Saoria custom. But it is admitted that girls and women do sometimes prostitute themselves by stealth. The offence is said to be of recent origin. They do not, under such circumstances, confine their attentions to the Saorias. A woman caught prostituting herself has to undergo the salt punishment and is cursed. Prostitution has its origin in poverty and in association with the Hindus, due to the larger number of markets and better facilities of communication. In olden days, the Paharias say, the soil was richer and there was a more abundant production; there is a smaller quantity now as the soil is worn out!

The bride gets no part of the *pon* money if any be paid. This belongs to her parents and becomes a portion of the ancestral property, and is inherited according to rules already laid down. The bride's personal share is the rupee and *malla* presented by her husband.

VIII. Physical and other Defects.

Physical defects, on the part of the girl, are not permitted after marriage to annul the contract. Defects such as fractured limbs, idiocy, lunacy, are not considered by the *panchayat* to be good grounds for annulment. Physical defects are compensated by the fact that a man can take another wife. In such cases the wife herself counsels the taking of another wife. An incurable disease, after marriage, is not a sufficient ground for annulment. The *panch* will, however, allow an annulment on payment of Rs. 5, which are placed on the girl's head, water is sprinkled over her person by her husband, and he then breaks a straw in two and the annulment is complete. In such a case he has no claim on the *pon* money paid by him.

If the girl finds defects in her husband, such as mutilation, or impotence, or a filthy and incurable disease, the *panch* annuls the marriage on payment of the *pon* money. No fine has to be paid to the *panchayat*; the *Bedsiṭu* sprinkles the girl's head with water, and he breaks the straw as shown above. The annulment is then complete. As a general rule, there would be no marriage in the case of material defects. Such defects as a broken limb, a blind eye, etc., would be mentioned on either side during the preliminary negotiations; and it has to be borne in mind that parties have ample opportunities of intercourse before marriage.

IX. Divorce.

Divorce is allowed in cases of illicit intercourse on the part of the wife. In such a case the husband is entitled to get compensation from the lover, ranging from Rs. 9 upwards, according to circumstances. The husband breaks the straw and pours water over the wife's head; this ceremony dissolves the marriage. If the wife can show that she was forcibly betrayed, her husband keeps her after taking the fine and obtaining a promise from her as regards another wife. Arrangements for a fresh wife are made by the erring woman among her own relatives. In such cases the first wife loses her privileges as head wife, they pass on to the second wife. A wife may not divorce her husband for adultery.

A divorcée may marry again. Her children by the first marriage remain with the father. The marriage in such cases is similar to the *bandiáwoh* of widows. The children of divorcées and widows share as in the case of younger wives, if there be another wife, if not the widow or divorcée becomes the head wife and enjoys the privileges of that individual.

The children of concubines of another caste are classed as Saorias and not after the mother.

The widow of an elder brother may marry a younger brother. But this is not compulsory. Parties please themselves. The younger brother's wife cannot, under any circumstances, marry an elder brother. A widow's children remain with the first husband's family in case of re-marriage. She, however, has no rights in her first husband's property. In case she marries a younger brother she shares her first husband's property with her children. In the case of the widow being childless by her first husband, the second husband, being a brother of the deceased, succeeds to the property and through him his children inherit. In the case of issue from both brothers the children only inherit the shares of their respective fathers.

X. Shares of Property.

If a man has two sons the property is divided in the proportion of 6 to 4. For instance, if there are 10 heads of cattle, the elder son gets six heads and the younger four heads. Similarly with land and other property. In the case of other brothers they share equally in the second brother's property. Unmarried brothers are, however, entitled to a separate share from the ancestral property termed the marriage portion. If there be no sons the daughters inherit equally, but in this case the *panchayat* is entitled to a buffalo, or a pig, for the usual feast. If there be sons and daughters, the daughters are entitled to one cow and a *thallia* each (brass plate). Grandsons are entitled to an equal half share of the grandfather's property. The balance goes to the uncles on the father's side. On the mother's side the uncles have no rights. The daughters of uncles are not entitled to any share. In all cases of dispute the matter is referred to a *panchayat*. As a matter of fact, property always descends among the Saorias in the male line, except in the absence of male descendants.

A widow with children may not alienate except with the consent of the children. This implies years of discretion on the part of the children. In the case of minors, the husband's male relatives have to give their consent, and the alienation is effected by these relatives. In case the alienation is indispensable, and these refuse their consent, they are required to see to the maintenance of the children till the days of trial are over. A widow is not entitled to alienate property by gifts or otherwise. Being childless she holds the property during her liftime. As soon as she dies, it passes to the male relatives. But in case of re-marriage a widow's rights disappear and she no longer holds the property. Movable and immovable property are divided according to the rules laid down above. There is no distinction. Ancestral property is divided; self-acquired property is *not* divided except by the sons, or other relatives in the direct line: that is, the father's property, or grandfather's property, is divided by sons; but the elder son's property is not subject to division except by his own sons, and, in the absence of sons, by his daughters. If there be no issue of the elder son, his brothers inherit equally, and the *panchayat* is entitled to a cow, or ox, or pig for the usual feast. The issue being daughters and sons, the daughters are maintained by the sons until marriage. The same rules apply in the case of self-acquired property of the daughters, that is, the eldest daughter's self-acquired property passes to her legal descendants, and, in the case of her death unmarried, the sisters share equally. The rights of daughters do not disappear with marriage. Their rights only disappear in the case of death without issue; that is, the daughter's husband does not inherit the property, and, on her death, the property passes to the male relatives of her father. In case one daughter dies, her sisters divide her share, ancestral and acquired. A widow with self-acquired property is entitled to the portion acquired by her when she re-marries. A stepson has no rights in his stepfather's property, either ancestral or acquired; it is, however, customary for stepfathers to maintain their stepsons and to provide expenses for their marriage. After marriage the stepson seeks his own fortune. In the case of a man dying without relatives, in the male or female line, the property, ancestral and self-acquired, goes to the village headman. In such a case the headman gives a feast, expenses being provided from the property in question.

XI. Modes of Addressing one Another.

A wife calls her husband by the name of her son or daughter, *e.g.*, "O father of so and so, come here." If there are no children, she will say, "*Aṛe* come here"—*Aṛe* being equivalent to *ehji* (Hindi). The husband also calls his wife by the name of his children, and, if there be no children, he says, "*Oṛe* come here"—*Oṛe* feminine of *ehji*. A man addresses his brother-in-law and his sister-in-law by his or her name, such as, *Mahesha* or *Maheshi*. Other relatives are called by their names. The eldest brother is not addressed by name by the younger brothers. They call him, "O elder or eldest brother," e.g. *Beḍo baya iṭik barra* (Big brother, come hither).

XII. Birth and Pregnancy.

There are no ceremonies of any kind connected with pregnancy, but women in such a state refrain from drinking *paṭki ṭaḍḍi* (country liquor); this, however, is not enjoined.

During accouchement, a woman is made to sit on a *piṇṛah* (wooden stool); a rope is fastened to the roof of the hut, and the expectant mother grasps the rope, while the *Dai* (midwife) *maqodariyī* (Malto) holds the patient from behind and accelerates and helps delivery by gentle pressure on the stomach downwards. The *maqodariyī* attends to the mother and child for four or five days as the case may be. The fee is four annas and a cloth, but more is sometimes paid. The navel-string is tied and then severed with an arrow head: the *dai* charges one anna for this operation. The arrow must belong to the householder, otherwise the *panchayat* levies a fine in the shape of a fowl. If there is no arrow, the operation is performed with a sharpened bamboo taken from the roof of the hut. Cloth is bound round the mother's hips and stomach very tightly, and, after washing her with warm water, the child and mother are put to bed ; oil is used. The father is not allowed to do any work for five days ; he stays in the house ; he may not do anything besides bring firewood. His daily avocations are done by his neighbours, or relatives, and he is not permitted to walk across his own fields or the fields of any other villager. Should he touch the beds of others, or go to the fields or *jhums* (clearings) of others, a fowl has to be paid and a *pujah* has to be performed. The blood of the fowl has to be sprinkled on the bed or field to wash away the stain. This *pujah* is performed by the owner of the bed or field. The reason is that the man is unclean, and his touch brings sickness to the owner of the bed and destroys the crops in the *jhum* or field.

After five days the navel-string drops off and is taken up by the *dai* (midwife) and is put into a leaf cup with oil ; the ashes from the hearth are taken out and heaped on an earthen plate and the leaf cup and navel-string are placed on the top ; a miniature bow and arrow are stuck into the ashes, and these are covered with a cloth, and taken before dawn and placed under a " Kusum " tree (*Schleichera trijuga*). This is the old custom, but now any tree may be selected. The ceremony is performed by the father who says, while doing so, " I have a son, may he be a great hunter." In the case of a girl the operation is varied by sticking a bamboo spoon for mixing rice, into the ashes, and the father carries it and the navel-string as before, and places them under a tree saying, " May she be a good housewife." Returning home he consults his wife as to the name which should be given to the infant ; the name of a relative is selected. The eldest son takes the name of his paternal grandfather, and the eldest daughter the name of her maternal grandmother. The father and mother then blow into the ears of the child calling it by the name selected. This completes the ceremony. The house is now cleaned and the clothes are washed. For a month, in the case of a boy, the parents visit no one, nor are they permitted to touch the things of other people. The husband is not allowed to shave or cut his hair. In the case of a girl these taboos last for two months. After a month the father brings a *sal* twig, with two leaves on either side, and he fixes it on the path west of the village. Beside the twig he places a handful of rice. On the top of the rice he pours the contents of a fowl's egg, and the shell he fills with water, saying, " May my infant's life be as full and complete." He places this on the top of the rice and returns home. The mother and child are not required to be present at this ceremony. This is the cleansing ceremony and the parents are permitted after it to eat with the villagers; and the father shaves and cuts his hair. In the case of twins the same ceremonies are followed. One egg suffices for the cleansing ceremonies. A well-to-do father makes rice beer and feasts the villagers. Paharia chiefs and village headmen use the same ceremonies.

XIII. Death and Burial.

The dead are buried; the ancient custom is interment. After death the corpse is washed and oiled by the relatives. It is then clothed in its best apparel, *sindur* is placed on the forehead and chest, one line down the nose and one line down the chest. Bows, arrows, all personal property, are brought and placed with the corpse. In the case of a woman, all her jewellery is put with the corpse; only one article belonging to the deceased is retained and produced on days of festival and *pujahs* as a "souvenir." After this the corpse is carried outside the house, and placed with its head towards the west, the feet being towards the east. Before taking the corpse outside, grain is scattered within and without the house, and, as a rule, the path taken by the corpse to the graveyard has grain scattered along its length for some distance. There is general lamentation. The corpse is carried by four individuals, relatives or others. A fowl is killed and is cooked with *makai* (Indian corn) and put in an earthern plate. On the way to the graveyard the *khaṭia* (bed) is placed on the ground and all the relatives have one last look. From this point all the women-folk return. On reaching the graveyard, the grave is dug in depth to the height of an ordinary man, the bottom of the grave is laid out with poles, and leaves, and the corpse is taken off the *khaṭia* and placed at the bottom of the grave on the poles and leaves. Then one of the relatives takes two leaves of the *bhelua* plant (*Semecarpus anacardium*) and places them over the face of the corpse. Poles are then driven in horizontally about half-way up the grave so as to make a platform over the dead body. After this the grave is filled in. The corpse is rifled of its jewellery and brass plates by the bearers. All the clothes of the corpse are torn in pieces and buried with the body. The grave finally has stones put on the top and the cooked *makai* and fowl are placed at the four corners of the grave, saying, "This is for you, O son, or wife; may your ancestors eat this and keep you in safety with them." The party then bathes and returns home.

A corpse is buried on the day of death. Arrows and bows, sticks and bead necklaces are buried: articles of real value are brought away. The grave is dug east and west and the body is placed with its head to the west. No prayers or *mantras* are repeated and the *Demno* is not required to be present. All articles taken away by the bearers are sold and a *khassi* (goat) is bought by them with the proceeds and eaten.

When the bearers return they receive a bull, cow, goat, pig, or fowl, according to circumstances. The animal is killed outside the village, and cooked rice is provided by the relatives of the deceased. The party eats, and, after eating, the leaves used as plates are collected by the *Banḍári*, who places a wattle screen thereon; he then sits on it with two other persons—five persons may sit but not more; everyone is brought forward and asked, "What claims have you against the deceased and what suspicions have you regarding his death?" Claims not put forward at this time receive no recognition afterwards. Suspicion as regards witchcraft, or death by poison, also must be put forward at this time. This being done, the *Banḍári* collects the leaf plates and carries them, with the receptacle in which they are carried, and places them on the spot where the dead body was put down in order to enable the relations to have a last look. There are no ceremonies in respect of purification in the case of death. Death does not render the relatives unclean. During five days the near relatives of the deceased abstain from eating food cooked with oil and turmeric. After five days an animal is killed on behalf of the deceased within the village. The same day the bearers kill the animal purchased by them with the proceeds of property taken from the deceased. This animal is killed, cooked and eaten by them outside the village; the bearers and relatives and all the villagers, women and children, sit outside their houses and *makai* rice and meat are given in *bhelua* leaves to everybody. *Pochai* is also given. Before feasting, some broiled liver, *pochai* and *makai* rice are placed by all the guests at the spot where the body was first laid down. These things are placed in *bhelua* leaves and the relatives take precedence in making the offering. The deceased is called upon by name to accept the offerings made, and he is told of all that has been done for him; then everyone begins the feast. After this the elders sit and repeat a homily to the relatives, which may be translated as folows: " Be not sorrowful, his days are ended and he has now been taken by the *Láihu Gosaiṉ* (Maker)." After the lapse of a year invitations to another feast are sent to all relatives, and these relatives bring offerings of rice and *pochai*.

The *Charri Beddu* ties a stone to a string, or balances a bow, and sits facing the east, holding the string and the stone suspended. He says, " O *Ber Gosaiṉ*, in whose name shall the drums be beaten to please the deceased?" Names are repeated until the pendulum or bow oscillates. The drums are beaten according to the measure for this ceremony by the individual thus selected. The *Charri Beddu* then asks, " Who shall kill the goat to please thee O deceased Rama ? " (white goat). The name being ascertained, the *Demno*, who is present, is given some *pochai* inside the house, and he comes outside and everyone follows him. Straw is placed for him and he sits thereon. He takes a quantity in his hands. He washes his feet and hands and then sits and calls to the deceased waving the straw in his hands, " Oh come, these things are for thee; come, oh come! By the godlings and demons, by the rocks and the jungles, by all the powers of darkness and light, come, O Rama, come to the feast provided for thee, etc." This incantation has to be seen; it is indescribable. The *Demno* becomes more and more excited, his limbs tremble and his voice comes from him in gasps and yells until, on a sudden, he says, " I am here! I am Rama!!" Then his relatives fall on him, and, weeping and laughing, dress him in saffron-stained garments. The *Demno* asks for things required by him, brass plates, and money too, if he has taken the trouble beforehand to find out where it is hidden. He says, " O mother, where is my *thallia*, or money: bring it mother. I and my ancestors are very poor and I wish to take it with me; bring me so and so, father or aunt or sister!" Everything desired is given without suspicion. He also asks for food and a quantity of each of the different kinds of food provided is heaped on a plate, and placed in the *Demno's* hands; being Rama he eats and drinks and throws pieces of food over his shoulders to his deceased relatives calling them by name! While he is eating, the goat is killed and some of the blood is sprinkled over the food; while the blood is being sprinkled, the *Demno* seizes the goat, and, placing his mouth to the severed neck, drinks the blood. He also eats the mixture in his plate. The deceased's relatives have all placed something in the plate according to request, or, according to their own wishes. The *Demno's* mouth and face are smeared with blood. He yells and groans: he is truly an appalling spectacle! The opportunity is taken by the deceased's relatives to ask questions as to why he left them, etc., etc., and these are answered according to the ingenuity of the *Demno*, or they are met by requests for articles! Menstruating females are not permitted to feed the *Demno*. Having satiated himself with blood, the *Demno* says, "I am now going back, I have eaten and drunken and I am going back to *Ber Gosain̰* or *Laihu Gosain̰*; saying this, he falls down in a fit, rigid, and, to all intents and purposes, dead! Water is then poured over him and uncooked rice is thrown on him. This brings him back to consciousness. He then takes water, and, after striking the near relatives with his matted locks, he sprinkles the water on the assembled crowd, saying, "All sins are washed away." He now throws away the straw. The articles collected by him, while personating the deceased, become his own property. Having been given to the deceased, at his own request, no one dares to touch them except the *Demno* and his personal companions; gifts called *bákára* (Malto). All parties then adjourn to the feast which lasts all night to the beating of drums. Dances are given by the girls and men and the feast lasts as long as the *pochai* and food hold out. Before the guests leave, the nearest male relatives of the deceased on the father's and mother's side offer a piece of broiled liver and *pochai* and rice to *Ber Gosain̰*, saying, "Let not such a feast be given again in his house, let such feasts be given again only on occasions of rejoicing and festival!" This ceremony is callen *amte* (Malto), *bhauj* and farewell (Hindi). Then the relatives and guests give money or other gifts to their hosts; and the hosts present two pigs or more to their guests. These are shot with arrows, and, after being cut up, the guests divide the meat, leaving one share to the hosts, and then take their departure after a general shaking of hands in the English fashion: the shaking of the right hand is a very old custom amongst men and women.

These ceremonies apply to men, females and boys, but not to infants unable to speak. Such infants are buried outside the regular graveyard, and the bearers, before re-entering the village, are sprinkled with water by the *Bandári*. He also breaks an egg by casting it into the jungle, saying, "May the disease which killed the child not attack the villagers."

A man or woman dying of small-pox is not buried. The body is covered with thorns, or wood, and left in the jungle in a hole! The five days' ceremony does not take place. When the village is free from disease the feast and rejoicings described above take place. In such cases only clothes go with the corpse; and on the *amte* day the bearers get an extra share of the feast. In cholera the same customs are followed and the village is under *taboo*. In neither case is the corpse placed on the ground for a last view on its way to the jungle.

In case of death by accident, or snake-bite, the usual ceremony is observed. In case of death by tigers, or other wild animals, the same customs are followed if the body is found, if not the usual feast takes place after the lapse of a year.

The Paharias do not employ Brahmans or Hindus as priests. In the case of a Paharia suffering capital punishment, or dying in a far country, the *bhauj* always takes place.

The Simlong (Pakur), and Chandna (Godda) Paharias burn their dead sometimes, but this is comparatively a new custom.

It is inaccurate to say that the *Demno* is not buried. He *is* buried except when he dies without relatives; but anyone dying without relatives is left in the jungle.

In the case of a chief a house is built over the grave, but this house is not repaired and gradually disappears.

On the horizontal stakes at the bottom of the grave *bhelua*, or *sal* leaves, are laid, and the corpse is placed thereon. In some cases the whole corpse is covered with leaves.

Demnos after death become, as a rule, *Jamporis*. This is a devil that seeks especially for pregnant women and kills them. The *Jampori* is very black, with long hair and enormous and terrible eyes. He kills women with a staff. He lives in *palas* trees (*Butea frondosa*), *simal* trees (*Bombax malabaricum*), and banyan trees (*Ficus bengalensis*). He appears at midday and midnight and sits watching from the foot of his tree.

XIV. Religion.

The *Maler* have no temples. The following deities are worshipped: *Ber* or *Beru Gosain*, *Bilp Gosain*, *Láihu Gosain*, *Darmáre Gosain*, *Jármátre Gosain*. These gods are not represented by idols, and no special form of worship is fixed for them, nor is there any special day fixed for their worship. These gods have no priests, and sacrifices are not offered to them except when the godlings of the Saoria pantheon are worshipped. It may be noted that *Darmáre Gosain* has never been represented by any symbol; the Maler deny that they have ever fashioned a block of wood to represent this deity.

Janai or *Janda Gosain* is quite distinct from *Darmáre Gosain*, and *Darmáre Gosain* and *Ber Gosain* are separate deities. *Ber Gosain*, *Bilp Gosain* and *Láihu Gosain* are also separate deities. It is asserted that *Láihu Gosain* is the most powerful of all the gods.

It would be contrary to custom, and belief, to represent any one of these gods by idols: some Saoria authorities contend that a man doing so would be outcasted.

Láihu, *Darmáre* and *Jarmátre Gosains*[1] are invisible: the representations of *Ber Gosain* and *Bilp Gosain* are seen in the heavens, as the sun and the moon. These gods are invoked at all ceremonies. They have power to benefit cultivation and also the public health. They possess much greater power than the godlings. *Jármatre* and *Darmáre Gosains*, although separate deities, are regarded as attributes of *Láihu Gosain*.

---

[1] *Láihu Gosain* = the Creator. *Darmáre Gosain* = Divinity of truth, &c. *Jarmátre Gosain* = Divinity of Birth.

Terminology.

Godlings = *Gosain̮*, *Eṛwe*, *Náddu*[1] ; *Eṛwe* = Pujah or Propitiation.

(1) Chal Náddu = Jáhirthán Pujah (Sacred grove) ; (2) Chamḍa Gosain̮ or Chamḍ Eṛwe ; (3) Gúm Eṛwe or Gúmo Gosain̮ ; (4) Móri Eṛwe (Peafowl) ; (5) Barya Chúki or Kon̮ṛa Gosain̮ ; (6) Paú Dúri Gosain̮ or Paú Eṛwe ; (7) Ḍál Eṛwe ; (8) Kuṭṭi Eṛwe or Ṭanḍ Kuṭṭi Náddu ; (9) Cháng Eṛwe ; (10) Sarkari Palki Gosain̮ ; (11) Janḍi Gosain̮ or Janḍa Gosain̮ ; (12) Bajotro Gosain̮ ; (13) Ṭanḍe Eṛwe ; (14) Guṛya Gosain̮ or Guṛka Gosain̮ ; (15) Aḍwa Eṛwe (Gosain̮ of Harvests) ; (16) Chark or Áṭ Machli Gosain̮ ; (17) Bodri Gosain̮ ; (18) Raksi Gosain̮ ; (19) Kanḍo Gosain̮ or Makáro Gosain̮ ; (20) Ḷanj Eṛwe (seats for the godlings) ; (21) Dúára Gosain̮ or Bárá Dúári Gosain̮ (slightly different from Chark Gosain̮) ; (22) Mangṛe Eṛwe ; and (23) Gosain̮ Ṭaḍḍi.

Paú Dúri Gosain̮.

Godling of Highways and Journeys.—The legend is that a Saoria, in ancient times, went a journey to a far and strange country. He returned afflicted with a peculiar skin disease. The oracle of the swinging stone was consulted, and he was told to sacrifice to *Paú Dúri Gosain̮*. He did so and became well ; hence the origin of this deity or godling. The *pujah* for this godling takes place at the end of the cold season. There is no fixed day and the actual date depends on the quantity of things collected by the villagers, or householder, who is going to do honour to the godling. The *Charri Beddu* fixes the auspicious day for brewing the *pochai*. A little oil and cooked rice are taken by the *Charri Beddu* for his pains. The only essential is that the *pujah* is forbidden during the dark o' the moon. A great deal of *pochai* is not made, but every householder in the village brews a little. Invitations to relatives are carried by the village *Banḍári*. The *Charri Beddu* is brought to the village and is asked to fix the day for the brewing of *pochai*. A *loṭa* of water is handed to him, and, after washing his hands and feet, he sits facing the east with the swinging stone suspendod. He says, "*O Ber Gosain̮*, the *Paú Gosain̮* is to be worshipped ; tell us who is to brew the first pot of *pochai* so that it may be pleasing to *Paú Gosain̮* ?" Names of women are repeated, and, when the stone swings in answer, the girl or woman has been selected. She must be a relative of someone in the village, or the wife or sister, or niece, of the householder who has arranged the sacrifice. The girl is called and is made to sit near the *Charri Beddu*. She is oiled by one of the women ; she has *sindur* placed on her forehead, one line down the forehead, and one line over each eyebrow, which runs down her cheeks and meets under her chin. Water in an earthern-pot is brought and a little rice ; the earthen-pot is placed on the fire and the girl selected takes the rice in her right hand and says, "O *Ber Gosain̮*, in my father's house, or brother's house, *Paú Gosain̮ pujah* is going to take place, and I have been chosen by the *Charri Beddu* to brew the first pot of *pochai*, let the *pochai* be good and let there be peace and joy in his house. Lo ! I scatter the rice." She then casts the rice which need not fall into the pot. After this the serious business of brewing *pochai* begins. The *Charri*

[1] *Náddu* = godling-*gosain̮*.

Beddu is given oil and food, and one spot of *sindur* is placed on his forehead (anyone may affix the vermilion). Then the *Charri Beddu* takes his leave.

When all things are ready (*pochai* takes from five to seven days), the *Bandári* and another individual go to the *Demno*, taking with them some rice, *sindur* and a fowl's egg. They tell the *Demno* that *Páu Dùri* is to be worshipped, and ask him to fix the date, and select the man who is to perform the *pujah*, in order to please the godling. The offerings brought are presented, but no answer is given immediately, and the visitors stay the night. At dawn the *Demno* rises, and, after washing his hands and feet, takes his seat facing the east, with a *sal* leaf in his hands. Oil is put on the *sal* leaf and the *Demno* still holding it, says, " O *Ber Gosain*, so and so has the feast and *pujah* ready for *Paú Gosain*, tell us who should begin the *pujah* in order to please the *Paù Gosain*." He takes some of the rice brought and throws it at the oiled leaf, repeating names as he does so, and, as soon as one grain sticks in answer to a name, the man is found. The auspicious day is fixed by the same means.

The *Demno* has a godling made of mud in his house, and, before consulting the oracle of the leaf, he offers this godling some rice, and paints it with *sindur*, and he prays for help to ascertain the auspicious day and the proper man. A *Demno* will not disclose the name of this godling, but it is probably called *Guṛya Gosain*; this is the godling of fits and hypnotism. After giving the *Demno* an invitation the visitors return, and arrangements for food and leaf plates are made. One day before the *pujah* the guests and the *Demno* arrive at midday. Drums are brought and beaten and the *Demno* is given rice and *pochai*; he then says, "*Banṛoh Manjhi* (or any other name) has invited me to this *Paù Gosain pujah*, and has prepared all things, and has given me this food and this *pochai*, may his *pujah* be acceptable and his days many ! " He then places some rice on the ground and pours a quantity of *pochai* on the earth. After this he eats and drinks and everyone follows suit. Then the men and women dance and sing all night. In the morning the householder, who is offering the *pujah*, starts out with the *Demno* and the drummers, who dance and beat their drums. The *Demno* leads the way. Everything prepared for the feast, a little of each is taken in a *sùp* (flat basket) with oil and *sindur* and some uncooked rice (*ahora chawal*), and a bottle of *paṭki ṭaḍḍi* (*dáru*)—*this is essential.* The *pochai* taken is for drinking purposes ; it is not intended for the *pujah.* A white he-goat is led by the householder's brother, or cousin, who carries an axe or sword, also a *sal* twig, with two leaves on either side and a miniature bow and arrow. The *Demno* marches in front of the procession carrying his bamboo staff. Outside the village, on the western path, he selects a spot, and, clearing it with the help of others, he plasters a small part of it with water and then fixes the *sal* twig and arrow thereon in line. The *Demno* now repeats spells and *mantras* and generally excites himself. The bow is laid down in front and the offerings are also laid beside it. The oil and *sindur* are mixed together and the two brothers paint the ground, the twig and the arrow, and invoke *Ber Gosain*, making mention of the offerings such as the goat and the *dáru*, and desire the deity to render the *pujah* efficacious on behalf of *Paú Gosain*, asking, at the same time, that health and prosperity may follow. The head of the goat is marked with *sindur*, the first finger of the right hand being used for the purpose. The householder and his brother then take a little *dáru* in leaf cups, and, calling on *Ber Gosaiṉ*, repeat the above prayer and pour the *dáru* over the plastered earth and over the other offerings. In the meantime the drummers dance and sing. The *Demno* does not permit much waste of *dáru ;* he seizes the leaf cups and drinks the greater part, being by this time beside himself with frenzied incantations. The goat is now brought before the *sal* twig and its head is taken off with one blow: if done with one blow, it is a good omen and the sacrifice is accepted, if not, twice as much expenditure has to be incurred for the next *pujah.* As soon as the blood is sprinkled on the sacrifice, the *Demno* seizes the goat, and, placing his mouth to the severed neck, drinks the blood as it gushes forth ! The remainder of the *dáru* is drunk by the *Demno*, the householder and his brother. As soon as the goat's head falls, a *loṭa* of water is poured thereon. The *pochai* is then divided and more singing and dancing take place. The head of the goat is cooked and eaten on the spot by the party. While the *pujah* is going on, the drummers dance and sing all round the spot. Two of the men are dressed as women with short skirts and are adorned with bells, bracelets, etc. The song is as follows,—in the name of the householder offering the *pujah :—*

"Oṛe Banroh majie Pawe eṛwene,
Ariojario—qegṛojah ;
Eṛwathraweh kilesoh,
Eṛwathrani kileso ! "
(*Malto*).

The song is full of indecent suggestions with respect to the householder and his wife, and I refrain, therefore, from giving a translation.

The party now returns beating drums and singing the song given above, and then enters the dwelling of the householder. They dance at least five times round the house, to a slower measure, *still* rendering the *same* song. The drums are then given back to the householder who offers more *pochai.* After this there is a general feast ending in a dance with the girls: this is a different dance with a different measure. The dance finishes in an orgie, and the young men and maidens usually give free vent to their amorous desires by disappearing into the jungle ! This describes the great festival in honour of the godling. But in the case of journeys, etc., these elaborate ceremonies are not observed, the *Charri Beddu* and *Demno* are not consulted, *pochai* and other articles are not required. On the day of departure, in the morning, the traveller proceeds with the *sal* twig, a fowl, a little oil, some rice, and a miniature bow and arrow, and he performs the *pujah* on the western path, while he sits and faces the east. He repeats a prayer asking for a prosperous journey and a safe return. The fowl is killed and the blood is sprinkled on the sacrifice, but the fowl and the severed head are taken home.

This godling has no idol or image, the two leaves on the *sal* twig represent the male and female on the same branch so to speak. (*Maq̣ kóró* (Malto) equals *sal*-twig, the godling itself).

A bachelor or a widower can offer no *pujah*. On the fifth day after a man's death, all the godlings acquired by him, and to whom *pujah* has been offered, are carried out by the *Banḍári* and male relatives, along the same path over which the corpse was taken, and are, finally, formed into a heap and abandoned. The formula on abandoning these godlings is as follows: "He who used to obey you, and make offerings to you, has gone, and there is now no one to look after you; go, therefore, with him and return no more to the house." A man marrying again gradually acquires godlings according to circumstances; he cannot immediately acquire *all* his godlings or guardian spirits. Bachelors can perform no *pujahs* with the exception of the *bhauj pujah* to the deceased.

Offerings made at *pujahs* are never taken by anyone: they are always left at the place where they have been offered, with the exception of certain things as already described.

Guṛya Gosaiṉ or Guṛka Gosaiṉ.

Guṛya means without teachers or self taught, but a *Guṛya Demno* will affirm that he gets his knowledge from a snake, on whose back he sits at night, eating mud and weeds found in stagnant water. This snake lives in the jungle in a bath of mud and slush. *Guṛya pujah* takes place in *Phalgun* or *Magh*. The origin of this *pujah* is somewhat curious. In *Magh* or *Phalgun* a girl or woman in the village suddenly becomes possessed; this is signified by tremblings and screams and extreme agitation. She is questioned and answers that *Guṛya* or *Guṛka Gosaiṉ* has come into the village. The villagers then take some uncooked rice and some water and proceed to the girl's house, and throw the rice at her and sprinkle the water over her person and say, "Dance outside, we will obey you as the chosen one and do his *pujah*." She then comes outside and dances; and this is the signal to the other girls, who also gradually become possessed and join the dance. This goes on for a month or more. During this time the "chosen woman" or girl, while under *Guṛya's* influence, makes known the various intrigues in the village! She accuses men and women by name! "You did this, you did so and so, bring fowls." In such a case there is never a denial. The offenders bring a fowl each. If there be *any* hesitation, the *Guṛya Gosaiṉ* possessing the girl threatens to get on the top of the offender's house or *inside*! The terror this threat inspires always produces compliance. The fowls are killed by the *Banḍári* and the houses of the delinquents are sprinkled with the blood and with water. The chosen girl then, or a few days later (the dancing going on every night) selects a boy or young man as the *Guṛya Lállú Sardáre*. The person selected takes a cane stick and, putting *sindur* thereon, says that he has been selected and that he should dance and do well. He also becomes possessed and dances with the woman holding his cane. The *Lallú Sardáre* is under a vow of chastity for the time being. Drums are beaten while this dance goes on. After a month or so, the "chosen woman" while possessed, gives out the day when *Guṛya* is to leave the village. Arrangements [1] are

[1] Elaborate arrangements are not made.

now made for *pochai*, and money is collected for the purpose of buying a he-goat (white) and such things as *pan*, *súpári* (betel leaf and areca nut), *ganja* and a *pankha* (fan) are essential, also an earthern pot with a cover. Another dance takes place in the village, and those who become possessed, dance in the centre of the village. The girl who was first possessed dances with the fan in her hand. The *Lállú Sardáre* (dancing master) then kills a fowl at the *Qep Jhanḍa* (*sal* post in the centre of the village), now called *Sarkári Jhanḍa*, and he sprinkles it with the blood and with water. The " chosen girl " with her fan then marches out of the village followed by the *Lállú Sardáre*, and the girls, all dancing and shouting, " Dance dance, come, come, children, girls, dance dance " and so on. The *Lállú Sardáre* carries the offerings in a *súp* (flat basket) and the earthen pot contains the *ganja*, *súpári* and sweets. Some *pochai* also is taken. The " chosen girl " halts when the spirit suggests that she has arrived at a suitable place. The men here make a miniature house of bamboos and grass, while the party keeps on dancing round and round. A bamboo of full length is planted in front of the house, also a *sal* post two or three feet in height and 12 inches in girth. The *sal* post has roughly fashioned teeth cut on the top. A small mound of earth is made below. All these things are touched with *sindur* and the offerings brought are placed here, and then the goat is killed by the *Lállú Sardáre*. The " chosen woman " sits and drinks the blood from the neck of the goat as in the case of the *Demno*. The *Lállú Sardáre* then takes an egg and some water, and, sprinkling the crowd, casts the egg away, saying, " Now all things are finished, and *Guṛya* has come outside, may there be peace and good health and prosperity." Everyone now returns to the village. When the house and post become dilapidated, a similar procession and dance take place and the godling is housed once again. This godling is the guardian of the village and is supposed to remain outside and thereby prevent other evil influences from entering the village.

Chamḍa Gosaiṉ.

Chamḍa Gosaiṉ lives in the house and he is represented by three bamboos, each five cubits in length. These are one for the husband, one for the wife, and one for the old woman, such as grandmother. The bamboos are oiled and dried by a fire and are then wrapped in *páṭh údáli* (indigenous fibre) until they become a maund or more in weight. They are then painted with black and red bands. A big plume of peacock feathers is fastened to the top of a piece of rounded wood, which, in turn, is fixed to the top of the bamboo ; each bamboo is similarly dealt with. The *páṭh* falls three feet or so below the bamboos, and, in fact, forms a thick veil all round it. *Chamḍa pujah* takes place in April as a rule. The arrangements are made after all harvests have been garnered. *Chamḍa* worship has its origin in sickness. In such cases the *Charri Beddu* and *Demno* are consulted, who, in turn, consult the oracle and order a *pujah* to be offered to *Chamḍa Gosaiṉ*. Only the well-to-do can afford to perform this *pujah* and the *Charri Beddu* and *Demno* do not, therefore, select poor people for the purpose. (It will be observed, from what appears later, that the chief godlings can only be worshipped and acquired in regular order, and *Chamḍa* cannot, therefore, be worshipped by a man who has not already acquired the godlings below *Chamḍa Gosain̰*). After consulting the *Demno* and *Charri Beddu*, the householder returns and takes some uncooked *alwa* rice and water, and scatters them all over his house and walls and on the patient saying, "O *Ber Gosain̰* and *Darmáre Gosain̰*, the *Demno* and *Charri Beddu* say that *Chamḍa* has afflicted this unfortunate one, let him become well and, at the end of a season, I will perform a *pujah* to *Chamḍa*." Should the case recover the promise is kept, not otherwise! After the year has gone by, the *Demno* is consulted as regards the date. A fowl's egg, some *sindur* and rice are taken to him and the *Demno* fixes a day by casting rice at the oiled leaf. First he ascertains the name of the woman who is to brew the preliminary pot of *pochai*, then the name of the man who is to do the *pujah*, also the name of the individual who is to start the music.

The man selected to perform the *pujah* is a brother, or nephew, or uncle of the householder. The woman chosen [1] puts on clean clothes and applies *sindur* to her forehead and nose, two lines passing round her eyes and meeting on each side of her nostrils. She places the earthern pot on the fire and fills it with water. She then throws rice into the pot saying, "May the *pochai* and *pujah* be good." The male relatives do the same. After this the real business of brewing *pochai* begins. *Tassar* is gathered and all kinds of eatables, also a white he-goat and two pigs are obtained for the actual *pujah*. When everything is ready (this takes eight days or more), the householder fixes a date and sends a knotted string to his relatives with six or seven knots as the case may be.

It takes a whole day to get the three bamboos ready. These are prepared outside the village. As soon as the bamboos are ready (at this *pujah* all the neighbouring villagers gather) the *Tállu*, that is the man who is to perform the *pujah*, kills a fowl and sprinkles the three bamboos with blood and some *pochai*. When the fibre is put on, a pig is killed by the *Tállu Beddu*, and the *Chamḍas* are sprinkled with the blood. The musician selected gives the signal for general *tom-toming* and he circles round the three bamboos followed by the drummers. The fibre-clad bamboos are now raised by three men of sufficient strength, and held erect by bands strapped to their stomachs and a dance is performed. These three men are completely veiled by the fibre fringe, and it requires a man of singular strength to lift the *Chamḍa* and dance with it, as, frequently the weight is two maunds and more! *Pochai* is drunk here and food is eaten. It may be noted that the householder's bamboo must be towards the east, his wife's in the centre, and the old woman's towards the west.[2] The three dancers dance in line and the drummers dance all round them, and, finally towards morning, the party returns to the village carrying with them the *Chamḍa Gosain̰s*. Then the dance goes on in front of the householder's dwelling. After everyone has danced his fill, the *Chamḍas* are placed standing against a *ṭhek* (store-house or *gollah*) for *makai* outside the house. The *Demno* now appears on the scene, and sits down facing the east, inspiring himself as usual; in the centre sits the *Tállu*, and, on the

[1] *Piṭṭa Beddu* (Malto).

[2] The women do not attend at this place.

west, the householder himself. A place is plastered with water in front of the *thek* and the three *Chamdas*, saying, "O *Ber Gosain*, *Darmáre Gosain Chamda* having brought us wealth and prosperity we now offer in return the *pujah* promised"; then the ground, the three *Chamdas*, the *thek*, the he-goat's forehead and the *Demno's* forehead are marked in the order named with *sindur*, also the *Pitta Beddu's* forehead. The relatives and their wives, the *Demno* and others have thick *tassar* bands fastened round their necks: this is essential; the offerings of rice and *pochai* are then placed before the *Chamdas*.

As soon as the *Chamdas* are raised, the man holding up the householder's *Chamda* shouts a set of very indecent questions.[1] He in turn is questioned and answered by his "confrère" holding up the second *Chamda*. In the meantime the old woman's *Chamda* performs on its own account. There is no attempt to suggest: a spade is a spade indeed! The villagers join and repeat things, the most gross and improper, although the women-folk are within hearing distance! Finally, there is general license until the *Chamdas* are hung up inside the house.

The *Demno*, having by this time become sufficiently self-hypnotised, springs on the top of the *thek*, the he-goat's head is taken off by the *Tállu's* brothers; the omen is good if it falls clear at one blow, if not, the indication is that the *pujah* has not been accepted, and that it has to be done again when circumstances permit. As soon as the head falls, the *Demno* seizes the trunk and, placing his mouth to the severed neck, drinks the blood! He then says, "The godling, *Sàhári Náddú*, who gives you all good things has arrived." He now commences searching in the *makai*, saying, "Here it is—no, it has fled"! until he finally seizes and produces it and gives it to the *Tállu*. This *Sáhári Náddú* is always kept for *pujahs* and devotional purposes, and is a piece of quartzite, or other oval-shaped stone, found in streams. During this performance the *Demno* displays considerable sleight of hand. *Sindur* is applied to the *Sáhári Náddú* and it is then put into an earthern vessel, covered over and hung up in the house. After this the *Chamdas* are taken into the house and hung up north and south. Then the feasting begins. The relatives on the wife's side get a big hog[2] and a special offering of *pochai*. These things are divided and then the wife's relatives present money and the husband's relatives also present money. All this time the dancing has been going on; and the women join the dances as soon as the *Chamdas* are hung up. These carousals continue for two or three nights, as the case may be, and general license prevails among the young men and maidens. People come from great distances for this *Chamda pujah*, bringing with them their own food, and take part in the dancing and in the general license.

Five days having elapsed the *Chamdas* are again brought outside the house; they are washed with water, and offerings of *sindur*, and *makai-rice*, and *pochai* are made to them. A fowl is killed and the *Chamdas* are sprinkled with blood. This is followed by a dance,—of the men only,—lasting for an hour or so, the indecently gross

---

1 It is impossible to translate these questions and answers: they are too grossly indecent!

2 *Chaur Mókú* pig or hog in this particular connection. One to the husband's relatives = *Kind Mókú*.

questions being repeated. After this the *Chamḍas* are hung up once more and the *pujah* is at an end.

The Sáhári Náddú henceforth accompanies the householder to all *pujahs*, and it is oiled and marked with *sindur*. The *Demno's* perquisites are the breast and loins of the he-goat—*Tokereh* (Malto)—rice and oil, and etc., *pochai*.

GÚMÓ GOSAIṈ OR NÁDDÚ.

In the case of illness, should the *Demno* or *Charri Beddu* advise a *pujah* to *Gúmó Náddú*, the householder takes rice and water and sprinkles them on the patient and in his house, saying, "If recovery takes place, I will sacrifice to thee, O *Gúmó Gosaiṉ*." The year having gone by, the date and name of the *Tállu Beddu* are ascertained and *pochai* is made ready. Two *sal* trees[1] are selected and the *Tállu* kills a fowl and sprinkles them with the blood. He then paints them with *sindur* and offers rice, *pochai* and *paṭki ṭaḍḍi* (*daru*). After this the trees are felled and the bark is taken off. They are then carried and placed in front of the householder's dwelling in line on the ground. The height of the house is measured while the *Demno* starts his incantations. When the poles are ready, the *Demno* gets astride of them and he is carried round the house five times. Before taking him round, however, his body is covered with the red ants found on mango trees, in order to ascertain whether the spirit has really entered, or, whether the *Demno* is shamming! The bite of this large red ant is excruciating! The poles are then taken inside the dwelling, and fixed to, and lashed side by side with the central post of the house on the south.[2] A mud alṭar is erected and *sindur* is applied thereon. Offerings of rice and *makai* are scattered and *daru* is sprinkled. The *Demno* does not allow the liquor to be wasted, he also eats the offerings in his excitement, saying, "The god comes from this path," and other matters. Then the goat is brought and its head is taken off, the *Demno* drinking the blood as usual from the severed neck. This finishes the *pujah* and the feasting and carousals begin. Men and women dance together and the festival ends in a licentious orgie!

ḌAL ẸRWẸ.

Ḍal Ẹrwe takes place in *Mágh*, *Jeyṭh* and *Akhár*. Disease or trouble is the origin of this worship. The *Demno* is consulted and he finds out from the oracle that *Ḍálá Gosaiṉ* has to be propitiated. On his return from the *Demno*, the householder scatters rice and water over the sick person and in the house, saying, "If the sickness disappear, I will sacrifice to thee, O *Ḍálá Gosaiṉ*." The patient having recovered, the householder collects materials for the *pujah*, which takes place about a year after the consultation with the *Demno*. The *Charri Beddu* or *Demno* are again approached, and the woman who is to brew the first pot of *pochai*, is selected, also the man who is to perform the *pujah*, *Tállu Beddú*. The procedure already described is followed. A white *she-goat* is

---

[1] One tree for the wife and the other tree for the husband.

[2] *Gúmo Gosaiṉ pujah* takes place in February and March.

obtained and the date is fixed, while the *Bandári* gives the invitations. One day before the *pujah* a clump of bamboos[1] is chosen and *pochai*, rice, *sindur* and a fowl are taken to it. The *sindur* is applied to the bamboos and the offerings are placed beneath. The fowl is killed and the blood is sprinkled over the bamboos saying, "O *Ber Gosain*, *Darmáre Gosain*, may the *Dálá Gosain* be pleased to accept these things and give us prosperity." Two bamboos are cut down, and carried into the village, and placed in front of the householder's doorway. Two plantain trees are then cut down with a sword or axe, the bark is split into small pieces and the singers sit thereon. The bamboos are now split into thin strips and these strips are woven to form an oblong-shaped shallow basket. After this a pot of *pochai* is given to the weavers, who sprinkle a little on the basket, saying, "Mayst thou be pleased with our labours." The *Tállú* then takes the *Dálá* inside the house and places it beside the *Gúmó Gosain*. The *Demno* sits here and begins his incantations, while the *Tállú Beddu* puts *makai*, *pochai* and oil into the *Dálá*. He also kills a fowl and sprinkles the blood over the *Dálá* and the *Gúmó Gosain*. It may be borne in mind that a man cannot sacrifice to *Dálá Gosain*, without having sacrificed to *Gúmó Gosain* in the first instance. On this occasion *Gúmó Gosain* receives a he-goat. After this the *Dálá Gosain* is given to the *Demno*, who, placing it on his head, goes round the *Gúmó Gosain* five times with four men holding the four corners of the *Dálá Gosain*. This is in reality a dance and the *makai* is scattered all over the house inside, while drums are beaten outside The *Demno* and others sing :—

"Sári Bayí bareni qárion kú,
Cudeh Baiyí bareni qárion kú."—(*Malto*).

Translation :

The younger sister comes, abuse her not,
The younger sister comes, reject her not.

After this the party goes outside, with the *Dálá Gosain* and joins the drummers. Every one then carries the *Dálá Gosain* five times round the house singing :—

"Majúreri, pakireri, jolnihi, dignihi kel kelatri.
Itháhi mãrá menja, *Dálá* Gosainyi."[2]—(*Malto*).

Translation :

"With drums and peacock plumes we play and dance,
And dreaded *Dálá* greatly pleased perchance!"

The greater part of this scene cannot be described without shocking the proprieties. A grotesquely indecent dance is performed by the *Demno* and others who are mad with drink as a rule. The *Demno* fans himself during this amazing performance.

---

1 Planted bamboos, not jungle bamboos.

2 Correct way of spelling Gosain in Malto. I have, however, adopted the usual method throughout. The rest of this song is too grossly indecent for translation and I have therefore expunged the balance.

Drums, cymbals and conch shells are used while the dancers slap their buttocks and thighs shouting :—

" Nin óhó lállá enóhó lálen
Lekureh ! laleh chámen páṛá."—(*Malto.*)

Translation :

" Lo I dance, then dance thou well,
While shout and song united swell !"

The women-folk look on and some even join the dancers. *Makai* is scattered all round the house during these rites. The dance goes on the whole night and the *Ḍálá Gosain̰* is placed on the *makai ṭhek* outside the house. *Pochai* is given to everyone, and in the morning offerings are made; and then, on a sudden, the *Demno* springs on the top of the *makai ṭhek.* The she-goat is killed and he drinks the blood and produces a stone *Gosain̰* from the *ṭhek*, which the *Tállú* takes. This stone is placed inside the house. The *Ḍálá Gosain̰* is now brought within and is placed beside the *Gúmo Gosain̰ ;* the *Demno* takes his seat beside it. Offerings, as usual, are made and the white he-goat is killed. The *Demno*, who has been calling on the *Gúmó Gosain̰* and the *Ḍálá Gosain̰* to come and be pleased, drinks the blood as usual. The *Ḍálá Gosain̰* is then hung on the two *Gúmó Gosain̰* poles, and the *Demno* has water sprinkled over him to bring him back to consciousness. The *Ḍálá Gosain̰* becomes the receptacle for all the stone godlings produced by the *Demno.* The *Demno* gets the breast of the goat and the *Tállú Beddu* the forequarter. The *pujah* is concluded by the *Tállú Beddu* who has to eat, at least a part, of the testicles of the he-goat broiled ! After this the feast and the dance take place, and presents are given and received as already described. These carousals also end in an orgie and in licentious indulgence among the young men and maidens.

Order of Worship—

(1) Paú Dúri Gosain̰—Eṛwe or Náddú.
(2) Kon̰ṛa Gosain̰ or Baryá Chúki.
(3) Ṭand Kuṭṭi Náddú or Eṛwe.
(4) Gúmó Gosain̰—Eṛwe or Náddú.
(5) Chamḍa Gosain̰ or Chamḍ Eṛwe.
(6) Ḍálá Gosain̰ or Ḍál Eṛwe.
(7) Kanḍo Gosain̰ or Náddú.

These are the chief godlings and *Chamḍa* holds the highest rank. Others outside this list are godlings and demons. The chief godlings require a great deal of expenditure. The other godlings and demons may be sacrificed to, by poor people, and they are not worshipped in any regular order.

Chal Náddú-Jahirthan Godling (Village grove).

The villagers gather at the *Jahirthan* and, as a rule, the *Demno* performs the *pujah.* Fowls, pigs, *pochai, dáru,* new grain of all kinds or fruit are offered.

Women may not participate in this *pujah*. Drums are beaten during the dances and the *pujah* takes place after the principal crops are harvested, that is in *Bhaddra* and in *Pus* (Bengalee). The *Demno* selects a stone at the *Jahirthan*, and this represents the godling for the time being.

Móri Eṛwe—Peafowl.

This *pujah* is celebrated by the head of the household. Pigs are sacrificed before the feathers of a peacock tied together, and these feathers are waved over the sick person to drive away the malady.

Cháng Eṛwe.

This godling is sacrificed to after the grain has been harvested and stored. A pig is offered in order that the grain collected may remain in safety. The meat of the slaughtered animal can only be eaten by the males of the householder's family. The *Demno*, as usual, has to drink the pig's blood.

Sarkári Pálki Gosaiṉ.

This *pujah* is performed in the middle of the village. A post is set up about two cubits in height and four notches are cut at the top, and new Indian corn cobs are tied thereto. Occasionally, pigs are sacrificed to this godling. This *pujah* is performed prior to enjoying the new Indian corn.

Bajotro Gosaiṉ.

This godling is propitiated so that epidemics may be driven away. The *pujah* is performed at a selected place outside the village and each householder contributes something to the cost. A branch of the native ebony tree is used during the ceremony and pieces of this branch, when the *pujah* is finished, are stuck in the roof of every house in the village. This is supposed to preserve the villagers from epidemics.

Ṭande Eṛwe.

This godling is worshipped, during the months of *Bhaddra* and *Pus*, inside the cow-shed, where a *sal* post about three feet in height is erected. Three, four or five notches are cut in the post. *Sabai*-grass is placed beside it and *sindur* is applied to the post and the *sabai*-grass. The presence of the cattle is necessary and the *pujah* is chiefly intended to keep them in safety. The offerings are rice, milk, pigs, spirits, fowls and pigeons, but the presence of the *Demno* is not essential. Dances are enjoined, but the women-folk are prohibited from participating. They cannot take part in the *pujah* and are only permitted to look on from a distance. After the ceremonies feats of arms and strength are displayed.

DÚARÁ GOSAIṈ OR BÁRÁ DÚARI GOSAIṈ.

This godling is somewhat similar to *Chark Gosaiṉ*. The *pujah* is, however, performed at the door or entrance of a house. The offering is a goat. No swing is required for this *pujah.*

The Saorias deny that there is any godling named *Kúl Gosaiṉ*. They say that if anyone has written about *Kúl Gosaiṉ*, it was under a misapprehension. *Kúl Gosaiṉ* would mean "all the godlings," and the misapprehension has arisen in this meaning, or in the *Kul* of the Sonthal meaning, "tiger." Similarly the Saorias do not recongnize *Auṭga Gosaiṉ* (*see* Dalton). They assert that someone has confused *Auṭga* with *Ondga Bonga* of the Sonthals. I would here note that Saorias agree with me in thinking that *Bedo* by itself is not one of the terms applied to God. Beḍo means, *large, great, chief, big ;* it might be used with *Gosaiṉ* as, for instance, *Beḍo Gosaiṉ* (*see* Dalton), but not by itself.

CHARK GOSAIṈ ÁṬ MACHLI GOSAIṈ.

This godling is sacrificied to in the case of small-pox, cholera and other epidemics. A swing is made and fixed outside the village, and those possessed ride thereon. The place is selected by the *Demno* or other individual possessed. It is essential in this case or the *Demno* and the *Guṛya* priestess to ride on the swing. After doing so, the *Demno* says, "The sickness now wishes to leave the village, kill the goat"(a white he-goat is required); the goat being killed, the *Demno* sprinkles water all round ; the swing is left standing and the people go home.

BODRI GOSAIṈ, CHICKEN-POX AND COUGHS.

In this case no model is made. If the whole village joins the ceremony, a black he-goat is essential and every householder offers something. These offerings are carried to the spot indicated by the *Demno*, or other person possessed, and the devil is here asked to leave the village. The person possessed drinks the blood of the he-goat, or black fowl, in the case of the *pujah* being performed by a single householder.

MANGṚE ERWE.

This *pujah* takes place on the Rajmahal side of the Hills and is done by subscription. It has its origin in maladies and epidemics. The ceremony takes place within the village. This *pujah* has a dance and song.

SONG (Malto.)

Sáki bállo keyeni dirá manágṛú
Ḍanḍá ṭaká ongirá dira manágṛú

Tállú baya mangṛú páne mókene
Tallu baya ḍáni mangṛú pane mókeni
Qesa, qesi meneni dirá manágṛú
Ithahi mãṛá menjá dirá manágṛú
Ithahi mãṛá menjá Surjá darmáre.

Translation :

Thou diest unfriended and alone,
    O Buffalo of the plains;
The gold that bought thee shall condone.
    O Buffalo of the plains.
The *Tállú*[1] eats thy parts unclean,
    O Buffalo of the plains;
His bride too joins the feast I ween,
    O Buffalo of the plains.
Bespattered shalt thou be with gore,
    O Buffalo of the plains;
Yea, thou art glad and *Surja*[2] more,
    O Buffalo of the plains!

Jandi or Janda Gosain.

This *Gosain* is put up after the harvests—*makai* or other crops. It also originated in illness. The *Demno* or the *Charri Beddu* says that *Jandi* or *Janda* has to be propitiated. The patient having become well, the householder vows to perform the ceremonies after the harvest. The day having arrived, a bamboo is cut down and brought (full length) and a small *sal* post; the post is cut all round and rough teeth are fashioned on the top similar to those of *Gurya Gosain*. Should the *Charri Beddu* give directions, a small piece of *salu* or other cloth is tied to the top of the bamboo. The bamboo and post are planted together in front of the house, a little to the east of the doorway. The earth is plastered, offerings are made and *sindur* is applied; a fowl is then killed and the blood is sprinkled (cock as a rule); finally water is poured on the offerings. This closes the *pujah*. There are no dances and songs. This *Gosain* is regarded as *Kali* of the Hindus by some Paharia authorities.

Gosain Taddi.

This is the great Paharia festival. It is not confined to any particular village and is generally observed after the harvests are garnered, that is in January and February. The *Demno* and *Charri Beddu* are not required to fix an auspicious day for the preparation of *pochai*, etc. Before the dancing and carousal the *Bandári*

[1] *Tállú*, person selected to perform the *pujah*.
[2] *Surja*, householder giving the *pujah*.

makes a collection of offerings from each house. He puts these in a basket and carries them outside the village, and leaves them to all devils, demons and maladies. He then waves an egg round his head calling upon all devils and diseases not to enter the village and throws it into the jungle. Then the feast begins, and, after the feast, the dance. The girls crown themselves with flowers and dance with the men. Drinking, feasting and general licentiousness prevail for three or four days. This is the season for new songs, and girls and young men give full play to their poetical powers.

Song (Malto)

Ṭúnḍi kiáre pachiá táke
Ṭúnḍi kiáre púrabe táke
Qeḍe bari tariki neken eta Chándi.

Translation :

The western wind has come and gone,
The eastern wind has come and gone,
Who cares for weary feet and woe
Tell, O Chándi, tell !

Again—

Ejúgen ayáth áṛe anḍilá
Nájúgen abáth áṛe anḍiláh
Ikó chúdi Máhuráni allengeno
Aṭunḍiyá Chándi ?

Translation :

Our mothers saw not such a sight,
Our fathers saw not such a light,
Whence doth the white queen view
The radiance of the beacons bright
Tell, O Chandi, tell !

N.B.—This song was composed to commemorate the coronation bonfires of His Majesty the King-Emperor !—R. B.

Kóñṛá Gosaiṉ.

In this case the *pujah* has its origin in illness, and the ceremony takes place a year after the convalescence of the patient. The *Tállú Beddu* and *Piṭṭa Beddu* are selected. A sow, *paṭki ṭaḍḍi*, three small earthern pots, and peacock feathers are essential. The *pujah* takes place at the household hearth, the *Demno* being present. The offerings are placed before the hearth with rice, *sindur* and oil. The *dáru* is sprinkled and the *Tállú Beddu* then *cuts* the sow's throat, and the animal's blood is also sprinkled over the hearth and the offerings. The *Demno* quaffs the blood from the severed neck; the peacock feathers and the earthern pots are kept with the household gods. This *pujah* only takes place when all materials have been collected, and the ceremony ends with a great dance and general licentious indulgence.

Ṭáṇḍ Kuṭṭi Náḍdú.

This also originates in illness and in the convalescence of the patient. The *Tállú Beddu*, the *Piṭṭa Beddu*, *paṭki ṭaḍḍi*, a sow, and two pigeons are essential. A *sal* tree is selected by the *Demno* and is felled by the *Tállú* after it has been painted with *sindur* and sprinkled with the blood of a fowl. Out of the tree a post three or four feet in height is made, the top is rounded off and bands are cut along the length of the post; these bands are painted with *sindur* and drums are beaten all round the cowshed. On the day fixed for the *pujah*, all the cattle are shut up in the *guhal* (cowshed). The *Demno* selects a spot and the post is planted beside the cowshed. The offerings are now made and the *Demno* selects a cow and paints its forehead with *sindur*. The *Tállú* cuts the throats of the pigeons and the blood is sprinkled over the sacrifice and the post; the pig is then brought and its throat is cut, and the *Demno* drinks the blood. Water is now sprinkled over the *Demno* and he recovers. Then everyone adjourns to the feast; and drinking and general licentiousness take place.

Raksi Gosain̰.

The *pujah* to this godling is performed towards the Rajmahal side of the hills. A stone[1] is selected outside the village, and it is garlanded with flowers; and the trees and branches round about are also garlanded. *Sindur* is applied to the godling. The essentials are a he-goat and *paṭki ṭaḍḍi*. Sweets are hung with the flowers, and a miniature umbrella is suspended in front of the *Gosain̰*. The *Demno* is required to be present. After the *pujah* dances take place as well as general licentiousness. This *Gosain̰* has a fowl and other edibles offered to it by the *Banḍári* on days of festival. The *Manḍro* and *Chetteh* Saorias worship this *Gosain̰*.

Kanḍo Gosain̰.

This also originates in sickness, and the *Tállú Beddu* and *Piṭṭá Beddu* are selected. Everything being ready a *sal* tree is chosen by the *Demno*, and a fowl having been sacrificed the tree is felled. From it a post three or four feet in length is taken and this is fashioned into five rough stools or *pin̰rahs*. These are carried inside the house and placed in front of the *Gúmó Gosain̰*, *sindur* is applied and the usual offerings are made with *pochai*. Then the he-goat is brought, its head is cut off and the *Demno* drinks the blood. These stools are afterwards placed on the *Ḍálá Gosain̰* which has already been hung up. The stools are covered with a white cloth and are offered to the godlings as seats. The usual dances, songs and licentiousness take place.

---

1 The stone is circular and about 3 feet in height; it is usually fashioned. Smaller stones are placed all round it: clearly a lingam.

Ner Lalleh.

The Ner Lalleh or snake dance may be seen during the *Durga-pujah.* This great Hindu festival takes place, as a rule, in the month of October. The rains no longer whip the roads into yellow foam and sweep down the hill sides in roaring rivulets. The crops are ripening and the heart of the rayat is glad. He pauses in his toil and anticipates plenty, and a warm fireside in the winter. This is the season of reunion, of good cheer and fellowship—the Eastern Christmas! The courts are closed, the overworked official seeks relaxation in the hills or at Calcutta, and the Hindu is likewise on pleasure bent. The Saoria also descends from his fastnesses, carrying long, tasselled bamboo staves ringed with gleaming brass; his head-dress is adorned with plumes and peacock feathers. His ankles and knees are encircled with tinkling bells; and he makes merry to the sound of ringing drums. But a *Cobra-di-Capello* is essential. Prior to leaving home, a *pujah* is performed on the village dancing ring; a fowl or pigeon is sacrificed, and *Ber Gosaiṉ* and *Darmáre Gosaiṉ* are implored to protect the snake-master from harm. The *Guru* and his companions catch a snake—considerable dexterity is displayed—and place the reptile in a basket. The dancers and the *Gúru* then visit the neighbouring villages and even extend their excursions to the hamlets in the plains. The snake is placed in the centre and the dancers circle in ever-changing step, while the *cobra* uprears its hood before the *Gúru.* The measure is very intricate and is accompanied by a weird and deep chant in unison. Forty or fifty men dressed in red, blue, or crimson, dance in circle, and, finally the dancers imitate, with marvellous precision, dancing all the while, the winding movement of a snake in motion! The excitement and picturesqueness of this amazing spectacle are better imagined than described.

The following is the song.

Malto :—

Utari bandlá, Púrabi bandlá
Bandlá púrab sánjre sámdre
Gúrúdar gúrúkiáre, sanpre
Bandáre Utari bandlá
Púrabi bandlá bandlá púrab
Sánjre sámdre ámer bimer
Goler káṭi eto darm karore
Sánp, sánp tori ailo, chutaki keláwóh.

Translation :

A spell from East and North I wis,
A spell from the Ocean's boom;
The master binds the dreaded hiss,
Nor fears he the bite that's doom.
A spell from East and North I ween
And the Death all helpless lies;

Nor ire nor sting, ah me! the scene
While our song doth swelling rise.
Oh, bring ye gifts and service true,
Lo, the master plays the snake
With snapping finger; bring his due
And offerings freely make.

The festival continues for a month and more. The snake is then taken to the middle of a running stream and liberated. The disciples who offer pigeons, etc., are here taught snake lore and incantations; and the necessary drugs are given to them by the *Gúru.* A goat and two pigeons are sacrificed on the bank and the party betakes itself homewards. The *Gúru,* it may be observed, is often given money by his disciples.

Devils and Evil Spirits.

Mără Kambe is a devil who lives in trees; he is seen swinging on creepers by the privileged at midday or midnight. He is a male devil, absolutely black, with white eyes and very long matted hair, and feet and hands turned backwards. This devil is the ghost of an old man who has died unmarried. He cannot bear to see pregnant women. Should they approach his abode, he beats them and kills the unborn child, causing an immediate miscarriage; also, frequently, he causes the death of the mother. He pays very little attention to sacrifices and *pujahs.* Goats, fowls, eggs and other things are offered to him. This devil has much power for harm and only attacks pregnant women.

Dinḍeh, a female devil. She also lives in trees. She is black with yellow eyes; she pays some attention to sacrifices. She attacks both men and women. This is the ghost of an old unmarried woman, who wrestles with men and beats women and causes maladies. In such cases the *Demno* and others sacrifice eggs, a black fowl and a small black cloth rubbed with soot. These are offered in a small basket at the place fixed upon by the *Demno.*

Póṛi.—Male or female devil. This is the ghost of either a man, woman or child. This spirit lives in graveyards but wanders about. This is a black spirit with white eyes, who wears a dirty cloth round its loins and wrestles with people, causing diarrhoea, vomiting, etc. To this ghost a fowl's egg, burnt *makai* and burnt rice, tobacco mixed with lime are offered in a mud plate at the place selected by the *Charri Beddu* or *Demno.*

Nárráh.—Sex unknown. This devil lives in dirty and stagnant pieces of water and slush. It assumes all forms such as, pigs, tigers, rats, etc. This ghost causes sickness and death at night by licking the bodies of human beings. I tbrings dropsy and other awful diseases. The *Demno* and *Charri Beddu* administer jungle medicines.

A *Demno* is said to have poisoned one of these devils with pig's blood mixed with poison. The ghost died as a musk-rat. Sacrifices are not offered to this devil.

Jámpóṛi.—Demnos, after death, as a rule become *Jámpóṛis.* This devil seeks especially for pregnant women and kills them. The *Jámpóṛi* is very black, with long hair and terrible and enormous eyes. He appears at midday and midnight and lives in Banyan and other trees. He watches from the foot of the tree. (See also Burial).

Ám Nárráh.—This is similar to *Nárráh* but is smaller. This devil lives in a clear spring of water. It receives offerings [1] of pigs, the *sattu* of Indian corn, the *tulsi* tree, *sindur* and incense.

Úmet Nárráh.—This devil lives under big rocks and in the hollows of rocks near springs. His victims suffer from *mirgi* (epilepsy).

MAHESH NÁDDÚ.

A boy named *Mahesha,* if ill, should make a sacrifice to *Mahesh Náddú ;* this is decided by the *Demno* or *Charri Beddu* and the ceremony takes place when the child becomes well. The day before the *pujah,* the family and guests sleep in the jungle over night ; the site is selected by the *Demno,* rice, oil, *sindur* and a white he-goat are offered at the spot indicated, and afterwards the boy's hair is cut. The *Demno* does not remain present and the boy's father has to perform the ceremony. This is done only in the case of a boy named *Mahesha.*

XV. NEW PUJAHS.

Pujahs are offered on the village path to models of trains, umbrellas, elephants with three constables and two *mahauts* armed with swords and guns, also to leopards and tigers. When a *pujah* is necessary, models of these are made and the ceremony takes place on the pathway leading to the village. In case of illness sometimes the *Demno* fixes upon a train after consulting the oracles. He says, " Many devils have come into the village by train, make offerings and cast them out." In the case of the elephant, constables and *mahauts,* the same thing is done. Leopards and tigers are propitiated, and *pujahs* are offered to prevent them from entering the village. *Pujah* to the umbrella is also offered in the case of sickness. These ceremonies may take place during the course of an illness, and they are performed immediately, except in the case of the umbrella, as more elaborate arrangements are required, and the ceremony ends with a dance.

Small-pox and cholera epidemics are often ascribed to the advent of many devils by train. The elephant is also able to bring a number of devils, and it is said to be wise to sacrifice to them. These devils are not described and the models of the train and elephant are thrown in the place indicated by the *Demno,* or by one of the village women who is in the habit of being possessed by *Guṛyá Gosaiṉ.*

---

[1] The *Demno* should be present at all *pujahs* offered to these evil spirits.

XVI. Panchayat.

Composed as follows :—

Old Custom—

1.	Siṉyaṛe	=	Village headman.
2.	Bânḍári	=	Gorait messenger, etc.
3.	Koṭwáre	=	In charge of *panch* arrangements.
4.	Giri	=	Most influential rayat.

The dormitory system prevails among the Saorias. The marriageable girls have a house to themselves and the youths have another to themselves called *Koḍbahá aḍá ; murs maq̣ koḍbahá*, Bachelors, dwelling house ; *Pel maq̣ koḍbahá*, Maidens' dwelling house.

XVII. Houses.

Saoria houses are always erected north and south, and bamboos and grass are used in the construction. The walls are made of wattles, etc.; earth is sometimes used, but old custom does not sanction this innovation. The floor of the house is depressed, that is, it is lower than the level of the village site. *Pujahs* are not offered before building a new Saoria dwelling.

XVIII. Prohibitions Regarding Food.

Saorias no not eat cats, ponies, vultures, kites, crows, adjutants, dogs, jackals, wolves and hyenas. The flesh of leopards and tigers is used medicinally. Bears are eaten. It is forbidden to kill dogs and cats, and *pujahs* have to be performed in case a tiger or leopard is killed. The individual who kills a dog or a cat has to offer rice, *pochai* and a fowl's egg on the western path of the village. He says, "O *Ber Gosaiṉ*, do not allow *Singni Bauri* to come into the village." This is the ghost of dogs, cats, leopards and tigers, etc. *Singni Bauri* causes sickness.

Among the territorial divisions differences in these connections are found, but these differences relate to details and not to essentials.

I am indebted to Dúleh Sardáre (Chief), Surja Sardáre (Chief), Samson Surja Siṉyáre (Headman), Banroh Siṉyáre, Dohrah Siṉyáre, Kallia Munsi, Rupah Sardáre (Rajmahal), Keso Sardáre (Rajmahal), and a host of others who have, at various times, supplied me with valuable information regarding the customs and ceremonies of their own people the *Maler*.

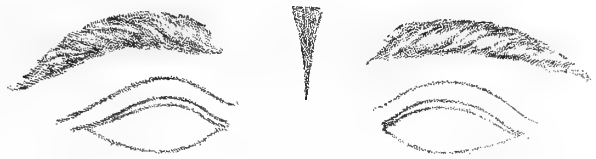


FIG. 1.

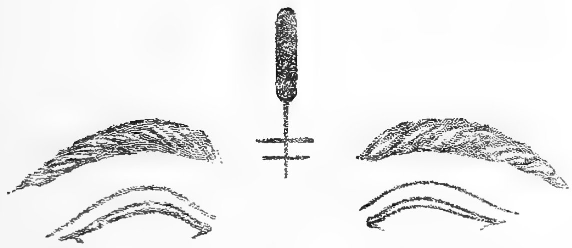


FIG. 2.

FIG. 3.

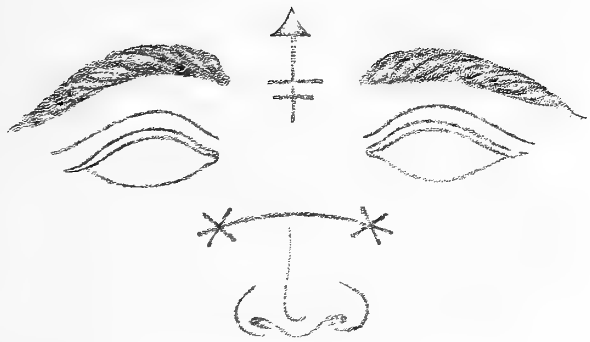


FIG. 4.

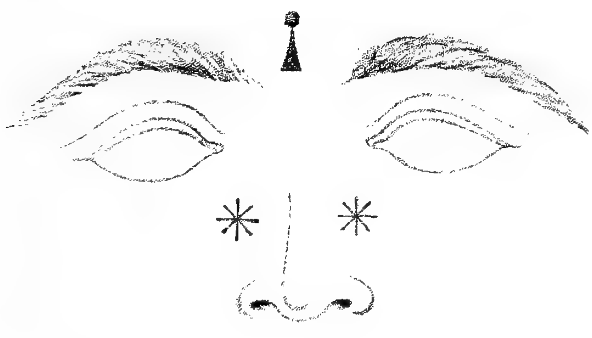


FIG. 5.

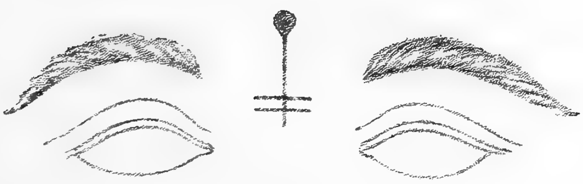


FIG. 6.

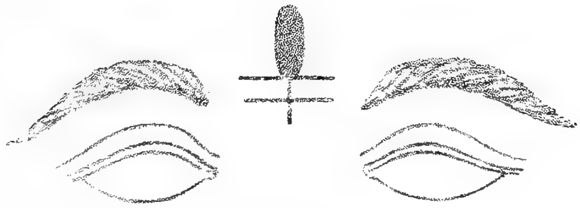


FIG. 7.

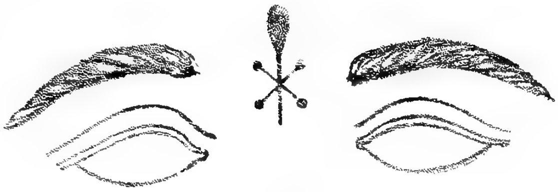


FIG. 8.

FIG. 9.

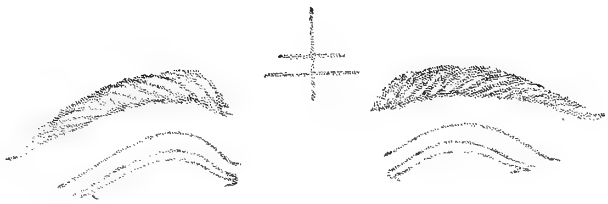


FIG. 10.

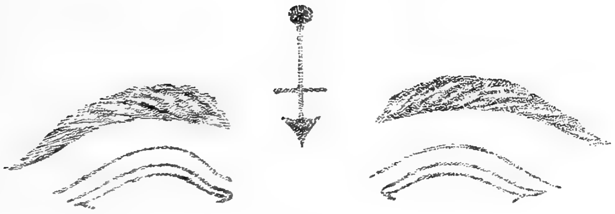


FIG. 11.

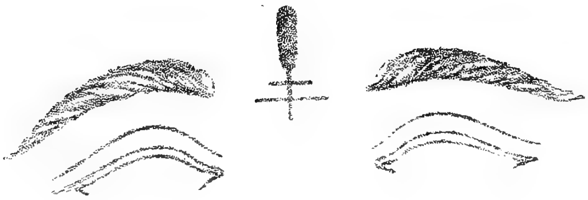


FIG. 12.

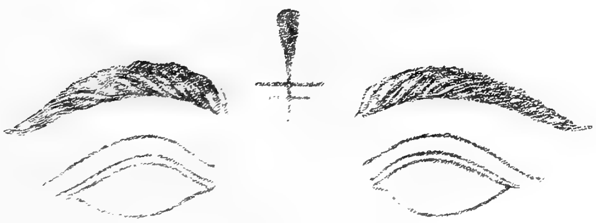


FIG. 13.

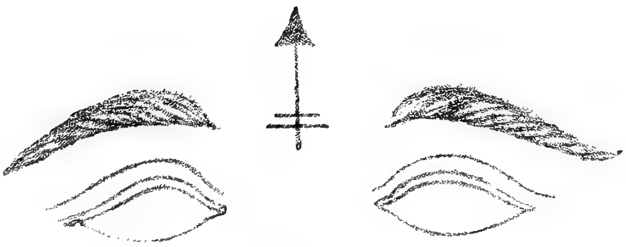


FIG. 14.

Memoirs of the Asiatic Society of Bengal.

Vol. I.

I. *On certain Tibetan Scrolls and Images lately brought from Gyantse.—By* PROF. SATIS CHANDRA VIDYĀBHŪṢAṆA, M.A., M.R.A.S. (Price Re. 1-8; or 2*s.* 3*d.*)

II. *Sal-Ammoniac: a Study in Primitive Chemistry.—By* H. E. STAPLETON, B.A., B.Sc. (Price Re. 1; or 1*s.* 6*d.*)

III. *The Similarity of the Tibetan to the Kashgar-Brahmi Alphabet.—By* The REV. A. H. FRANCKE. (Price Rs. 2; or 2*s.* 10*d.*)

IV. *Alchemical Equipment in the Eleventh Century, A.D.—By* H. E. STAPLETON and R. F. AZO. (Price Re. 1-8; or 2*s.* 3*d.*)

V. *Malaysian Barnacles in the Indian Museum, with a list of the Indian Pedunculata.—By* N. ANNANDALE, B.A., D.Sc. (Price Re. 1-8; or 2*s.* 3*d.*)

VI. *Ashrafpur Copper-plate Grants of Devakhadga.—By* GANGA MOHAN LASKAR, M.A. (Price Annas 8; or 10*d.*)

VII. *Festivals and Folklore of Gilgit.—By* GHULAM MUHAMMAD. (Price Rs. 2; or 2*s.* 10*d.*)

VIII. *Notes on the Bhotias of Almora and British Garhwal.—By* C. A. SHERRING, M.A., F.R.G.S., I.C.S. (Price Re. 1-5; or 2*s.*)

IX. *Religion and Customs of the Uraons.—By* the late REV. FATHER DEHON, S.J. (Price Rs. 2; or 2*s.* 10*d.*)

X. *Notes on the Fauna of a Desert Tract in Southern India* (Herpetology and Entomology).*—By* N. ANNANDALE, D.Sc., C.M.Z.S., with a list of Mammals by R. C. WROUGHTON, F.E.S. (Price Rs. 2; or 2*s.* 10*d.*)

XI. *Amulets as Agents in the Prevention of Disease in Bengal.*—Compiled in the Office of the Superintendent of Ethnography, Bengal. (Price Annas 12; or 1*s.* 2*d.*)

XII. *Earth-Eating and the Earth-Eating Habit in India.—By* D. HOOPER and H. H. MANN. (Price Re. 1; or 1*s.* 6*d.*)

XIII. *On a Cup-Mark Inscription in the Chumbi Valley.—By* E. H. C. WALSH, I.C.S. (Price Re. 1; or 1*s.* 6*d.*)

XIV. *A Descriptive List of the Sea-Snakes* (Hydrophiidæ) *in the Indian Museum, Calcutta.—By* CAPTAIN F. WALL, I.M.S., C.M.Z.S. (Price Re. 1; or 1*s.* 6*d.*)

XV. *Common Saws and Proverbs collected, chiefly from Dervishes, in Southern Persia.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Re. 1; or 1*s.* 6*d.*)

XVI. *The Common Hydra of Bengal: its Systematic Position and Life History.—By* N. ANNANDALE, B.A., D.Sc., C.M.Z.S. (Price Re. 1; or 1*s.* 6*d.*)

XVII. *Animals in the Inscriptions of Piyadasi.—By* MONMOHAN CHAKRAVARTI, M.A. (Price Annas 12; or 1*s.* 2*d.*)

XVIII. *Some current Persian Tales told by Professional Story-Tellers.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Re. 1; or 1*s.* 6*d.*)

XIX. *The Dards at Khalatse in Western Tibet.—By* REV. A. H. FRANCKE. (Price Re. 1-6; or 2*s.*)

Supplement, Miscellanea Ethnographica. Part I. 1. *The Blow-Gun in Southern India.* 2. *Miscellaneous objects from the Rámanád subdivision of the Madura district.* 3. *Indian Weighing-beams.—By* N. ANNANDALE, D.Sc. (Price Re. 1.)

Supplement, Miscellanea Ethnographica. Part II. 1. *Some Malayan Weapons—By* N. ANNANDALE. 2. *Plan of a Persian Gentleman's House.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Annas 8; or 10*d.*)

Memoirs of the Asiatic Society of Bengal.

Vol. II.

I. *Cirrhipèdes operculés de l'Indian Museum de Calcutta.—Par* M. A. GRUVEL. (Price Rs. 2; or 2*s.* 10*d.*)

II. *The Coinage of Tibet.—By* E. H. C. WALSH. (In the press).

III. *The Exact Determination of the Fastness of the more Common Indigenous Dyes of Bengal, and comparison with typical synthetic Dye-stuffs. Part I. Dyeing on Cotton.—By* E. R. WATSON. (Price Re. 1; or 1*s.* 6*d.*)

IV. *The Saorias of the Rajmahal Hills.—By* R. B. BAINBRIDGE. (Price Rs. 2; or 2*s.* 10*d.*)

Tarīkh-i-Nuṣratjangi.—By HARI NATH DE. (In the press).

MEMOIRS

OF THE

ASIATIC SOCIETY OF BENGAL

VOL. II, No. 5, pp. 85-120.

MUNDARI POETRY, MUSIC AND DANCES.

BY

REV. FR. J. HOFFMANN, S.J.

CALCUTTA:

Printed at the Baptist Mission Press, and published by

The Asiatic Society, 57, Park Street.

1907.

Price One Rupee; or One Shilling and Sixpence.

21-12-07.

Mundari Poetry, Music and Dances.

PART I.

By REV. FR. J. HOFFMANN, S.J. *Communicated by* MR. E. A. GAIT.

A study of the features of Mundari poetry presupposes two considerations of a general character, *viz.*, the comparatively low stage of culture in which the Mundas still are, and the character of their language.

The Mundas never either invented an alphabet of their own nor have they adopted any from aliens. They are, as a race, up to the present, entirely illiterate. Hence their mythology and ritual formularies as well as their folk-lore and poetry remain exclusively treasured up in the popular memory, and through it alone are they handed down from generation to generation. It is, therefore, not surprising that their poetry, like their whole civilization, should be very primitive and simple and remain even nowadays in the melic stage. It is made to be sung, and the few simple melodies to which it has to adapt itself are all meant to regulate or to follow their dances. It is never recited or declaimed. We need not, therefore, look for those developments which recitative poetry has gradually evolved, such as the ballad, the idyl, the ode, the elegy. It consists of a great number of short pieces, lyric in character, all of which are nothing more or less than songs. Any other name for this or that particular piece would hardly be justified.

The Mundari language consists mainly of monosyllabic and dissyllabic original words. These are combined into living speech by means of affixes, most of which are suffixes and infixes. In this way compound words of five, six or even seven syllables are frequently obtained. Regarding the structure of the line and the stanza it is difficult to give a satisfactory account. There is first the question of the rhythm in the line which embraces the accentuation of words, the length or brevity of syllables and the number of syllables in the line; secondly the form of the stanza as such.

The accent is not nearly as marked as it is in the Teutonic languages; in originally dissyllabic words it falls, with rare exceptions, on the first syllable. Grammatical formations do not change the accent of the original word; hence reduplicated monosyllables keep the accent on the last syllable, v.g., *nel*, to see; *nenẽl*, to see repeatedly, to look after. The same rule holds good in those cases where an inserted functional consonant turns a monosyllable into a dissyllabic word, v.g., *nel*, to see; *nepẽl*, to see each other. Whenever affixes of one or several syllables are added for functional purposes to mono- or polysyllabic words, the resulting compound has more than one accent; for the original word, as well as the affix, keep their respective accents, v.g., *háturẽnko*.

Regarding the length or brevity of syllables, there is a certain distinction between long and short syllables, but it is not easy to ascertain the exact rules, because the distinction is not sufficiently marked to be readily perceived throughout. Even the most educated among the Mundas can give no satisfactory account of it. Distinctly long syllables are met with only in the comparatively few cases where two vowels are contracted into one; this happens mainly in a small number of contracted frequentatives, and in the indeterminate tense, *i.e.*, that form which is used to make general statements. Besides this, in vivid descriptions the Mundas lengthen out the tense affixes as well as the vowels of other words into distinctly long syllables in an arbitrary manner. This is done in conversational language for the sake of emphasis. Vowels thus lengthened become prominently accentuated, v.g., *horāre,* instead of *hóraré;* *nirjānae*, instead of *nírjánae.* There exists also quite a number of very short neutral vowels which seem mainly intended to form a sort of easy transition between two consonants; these vowels are so short as to be often hardly perceived by a foreigner. These, as well as the arbitrarily lengthened syllables mentioned above, do not enter as rhythmic factors into the line.

When actually singing, the Mundas lengthen any vowel, even the short neutrals just mentioned, in an apparently arbitrary manner just to suit the melody. It is, therefore, difficult to decide whether there be or not a really sustained verbal rhythm in the lines, and to point out in what it consists. Some pieces seem to have it distinctly, whereas in others hardly a trace of it can be seen. Similarly, for the sake of the melody, the following euphonic, or rather melic, additions are made to words :—

(*a*) Words beginning with a vowel, especially when they stand first in a line, often take an initial *n* by way of an easy start for the first note, v.g. *nokorega* for *okorega*, *napu* for *apu*. In the case of words beginning with an *h*, the aspirate is thrown out by this initial *n*, v.g. *nora* for *hora*.

(*b*) Vowels are either infixed or suffixed to words. These inserted vowels have the full value of the ordinary Mundari vowels; they must, therefore, not be confounded with the short or neutral vowels mentioned above, v.g. *Sel-e-kuti* for *Selkuti*, *miru-o* for *miru*.

(*c*) Vowels, instead of being merely lengthened, are sometimes changed into diphthongs: *osair* for *osar*.

All these changes make it sometimes difficult for a foreigner to recognize words in a song; he will not, for instance, at once recognize the word *osar* in *nosair*, or *hojortan* in *nojoretan*.

We do not, therefore, in the lines of Mundari poetry, find that pronounced rhythm, arising out of the original word-form, which is such an essential feature of our own poetry. On the contrary the words have to submit to certain changes in order to accommodate themselves to that kind of rhythm which is inherent in the melody. Nor is there anywhere any attempt at rhyming. Since the pieces are not intended for recitation, the need for rhyme has probably never been felt by the Mundas.

There is a distinct attempt to have a fixed number of syllables in the lines of the same piece. However that attempt is hardly ever entirely successful. The number of syllables varies considerably in different songs.

Whether such lines may or may not be called verses is a mere question of terminology.

So much for what, from our point of view, may be called the negative side of Mundari poetry.

In describing its positive side, its national characteristics, we might conveniently distinguish between its soul, or the ideals which it pursues, and its body, or the outward form in which the poets or bards clothe those ideals.

As to the first, we could hardly expect to meet with either the heights of the Aryan epos and drama, or with the variegated charms of the lighter kinds of Aryan poetry. For these suppose a degree of intellectual culture which the Mundas were partly too indolent and partly too unfavourably circumstanced to work out for themselves. Ever since the great Munda or Kherwarian race was broken up, and its unabsorbed remnant driven in small fragments into the various mountain fastnesses of Central India by the northern invaders, the mental horizon of the fraction who are now called Mundaris or Mundas has been limited to the joys and sorrows of a very simple life. Their world is a narrow circle of villages hidden away in forest-clad mountains, where the appearance of an alien has, till recently, been quite an extraordinary sight. And they are quite content to leave the wide world and its wonders to such races as may care for them. Their only desire regarding that world has been, and still is, to be left alone by it.

Hence, of the shock of nations and of races impinging on each other, of the unbounded longings of soaring minds after a nobler life and a higher world, of the mystic, the melancholic, or the fairy dreams of the romantic school, which form the subject-matter of so much of our poetry, little or no traces are to be found in theirs.

And yet it would be wronging them to suppose that they are devoid of poetic instinct. It is not as mere animals, or as incipient men, that they move through their simple life. They see it, they look at it in an intensely human way. It cannot be said that they allow themselves to be smothered by the hard struggle for existence. They see the joys and sorrows of life ; they perceive them as such, and, culling them as it were, they clothe them in a profusion of songs which seem almost inexhaustible.

Besides the old and ever new theme of poesy, the fairy dreamland of first love, with its counterpart, the poignant grief of the disappointed lover, the following are the ordinary subjects of their songs :—the golden worth of friendship, the fitness or becoming nature of the good old customs, the pleasures of the chase, the terrors of the tiger-infested forests, the horrors of war the pangs of poverty, the complaint of the servant, the foolishness of forming unsuitable attachments, the reprehensible ways of the giddy-headed village *belle* who seeks to attract attention in a manner which stands condemned by the social customs, the more pardonable little vanities of youth, the chaff and banter between youths and maidens, the chiding between husband and wife, the remembrance of some stirring event, such as a battle, a great panchayat, etc., the surprise and delight caused by the occasional sight of a so-called Rajah's gaudy suite, and even the amusement caused by the somewhat comical appearance of the itinerant Hindu merchant as he jogs along astride the bulging pack-saddle of his wretched little country " tattoo " (pony).

They are keenly alive to the beauties of scenery as well as to the charm of flowers, of colours and of the play of light ; and they show their appreciation of all these charms in striking word-pictures, sometimes of great and deeply poetic beauty, which they use as terms of comparison, as symbols or as frames to the subjects treated of. Simple, limited and hard, as their life may seem to us, and to a great extent is in reality, it still offers to them a source from which they draw in abundance the honey of poetry, one of the greatest and truest blessings, ever ready for the lowest as well as the highest of men.

This original poetry will of course be worthless to the scoffer ; and to narrow minds, unable to appreciate aught that lies beyond their own little circle, refined or otherwise, it must appear crude. But though it lays no claim to artistic perfection, it brightens the Mundas' lives ; and it certainly is not without its own intrinsic merits. Not the least among these merits is the fact, that of the hundreds of songs, which after the day's work resound over the whole country evening after evening, not one is defiled by a lewd expression nor even by an indecent allusion.

Horace enunciated but the verdict of common sense when, comparing poetry to honey, he said that even as honey that was not entirely sweet had better not be served up, so verses that were not very good had better not be made at all. Do these aboriginal forest-dwellers instinctively feel that what the Roman poet exacted for the outward form applies with even greater force to the inward soul, or essence of all human ideals, amongst which poesy occupies a foremost place, *viz.*, that a single vice destroys them as such ? A lesson from an unexpected quarter indeed to a certain school who, under the specious pretence of art being its own end, produce would-be ideals, poetry and other so-called works of art, which contribute more to the degradation of art and of life itself than can easily be expressed.

In considering the outward form we first meet with a very characteristic feature which is in a way akin to the Hebrew psalms, but has no distinct counterpart in Aryan poetry. In most of the songs, two lines are devoted to the expression of one and the same idea. This is done in various ways :—

(1) If the idea is adequately expressed in the first line, then the second line merely repeats the same idea. But this repetition must be made, not in the same but in synonymous terms. The perfection aimed at is the substitution of a synonym for each term of the first line. This is frequently not attained, but the leading words of the second line are generally synonymous with the leading words of the first line.

By way of illustration, take the first stanza of a song which inculcates, on the members of a family, the necessity of submitting to any inconvenience rather than break any of those sacred rules which have done so much for the maintenance of mutual respect and a really wonderful morality among all the members of the often very large families huddled together, so to say, in comparatively small huts. One of these rules forbids the wife of a junior brother to stand or sit on the same mat with either the senior brothers or sisters of her husband ; for to these she owes respect, and in return the seniors in question owe her the consideration due to a junior brother's wife. On her mat she is queen. Nobody may so much as step on it except her husband, her parents and those junior members of the family who must look up to her as to their own mother.

In this first stanza temptation sings to her, addressing her by one of those terms of endearment that are so freely used in their songs, *uru*. The corresponding synonyms are recognizable by the words italicised.

> *Bolome* nuru *bolome! rabanga* nuru *rabanga*.
> *Sorome* nuru *sorome! reara* nuru *reara* nairi!
> *Enter*, my chafer, enter! *'tis cold*, chafer, 'tis cold.
> *Dart in*, my chafer, dart in! *'tis chilly*, chafer, so chilly!

In the next stanza she exclaims with indignation, "How could I enter, how dart in, since in one part of the hut my senior brothers-in-law are seated, and in the other my senior sisters-in-law?" In other words: "What is the inconvenience of cold and chill to that of breaking the sacred rule handed down by our ancestors?"

Here the question naturally arises: Have they then such an abundance of words that they can render any and every idea in two sets of synonymous terms? Has it not been said that their language is poor rather than rich in words? Their language is indeed rather poor in words, and yet they find a way out of that difficulty.

To understand the solution of this apparent paradox, we must here revert to a short consideration of the most fundamental characteristic of their language. In the so-called organic languages words are no longer bare roots; they are parts of speech, *i.e.*, ready-made, spoken, or written signs which not only *denote* objects and actions in a very precise manner, but also clearly *connote* the various ways in which the mind conceives those objects and actions. They are directly denotative of objects and actions, and equally directly connotative of almost every form of abstraction the mind is capable of. In Mundari, on the contrary, we meet mostly with bare roots, not only entirely devoid of the abovementioned connotative power, but also, to a great extent, of any very precise denotation, with words of a very vague signifying power and therefore of great functional elasticity. Whereas they denote objects and actions merely in their widest or vaguest sense, they hardly ever connote, by themselves alone, the precise manner in which the mind may conceive objects and forms of activity. That connotation is left almost entirely to the context of a given sentence and to the circumstances under which it is uttered. The same root or word-form may be used as a concrete or an abstract noun, as an adjective or a verb. Even pronouns, conjunctions and interjections may perform the function of a verb; and *vice versa*, every one of their twenty-one tense-forms in any of the four voices may resume the function of a noun, an adjective or an adverb.

It is to this vagueness of signifying power, to this functional elasticity of his words, that the Munda has recourse to produce the number of synonyms he requires for his songs. He even pushes it to extremes which to us may appear sometimes ridiculous and sometimes almost shocking. Provided a word have even but one feature, one element in common with another, he will unhesitatingly use it in a song as a synonym, although the main denotation of the second word differ so entirely from that of the first that in ordinary conversation it may never be used as synonymous with it.

The following examples may serve as illustrations :—

Sen, used as a verb, means *to walk, to go, to go away*, and denotes the ordinary measured step.

Hojor denotes a faster step ; the kind of trot so common among Indian carriers.

Here, therefore, are two words which denote two different degrees of intensity of generically the same action. Now, if the word *sen* occurs in one line of a song, the word *hojor* or its poetic form *nojor* occurs frequently as its variant in the next line. The poet does not intend it to denote a faster step than that signified by the word *sen*. Singers and listeners accept it as a perfect synonym to *sen*. The fact or circumstance that it appears as variant to *sen* in a song determines its *de facto* meaning in the line of a stanza.

Birid means to stand up, to get up. Mundas carry on all their conversation in a sitting posture. When anyone wants to talk to another, whether on business or for a simple chat, he will not begin talking before both he and his interlocutor have comfortably squatted down. When the talk is over he will get up. That is the sign that he has nothing more to say and is now going his way. In such circumstances, therefore, *birid* denotes indirectly the beginning of the act of *going away*. This very slight common element in the denotation of the two words is sufficient to allow, in poetry, the use of *birid* as a perfect synonym of *sen*. Hence when *birid* occurs as variant to *sen*, it no longer means *to stand up, to get up*, but, like *sen*, it means *to go, to go away, to get on, to walk*.

Soan denotes any odour whether agreeable or otherwise, and if used as a verb it is equivalent to the English *to smell*. *Sinrin* in ordinary conversation always denotes a disagreeable odour of stale or decaying food in general and of fish in particular. The unwary foreigner, sufficiently acquainted with Mundari just to translate a song literally, might naturally feel shocked at finding this predicate connected with the names of some of the sweetest scented flowers that are met with in Chota Nagpur. However, if a preceding line speaks of a sweet-smelling flower, then the fact that in a subsequent line *sinrin* occurs as variant to *soan*, suffices for the Munda to call up the mental picture of the sensation caused by a sweetly scented flower : he unhesitatingly accepts *sinrin* as under the circumstances meaning *fragrant*.

The following may suffice as an illustration of this. Munda maidens are exceedingly fond of ornamenting their hair with flowers. These are generally arranged in a row, like a crest over the heavy knots into which the hair is gathered near the left ear. Youths are equally fond of flower ornaments, but they stick either single flowers or tiny bouquets over one and sometimes over both ears. This act of sticking anything over the ear is called *dandid'*. Hence this word is, in songs, very often used as denoting a flower or a small bouquet, just as the English *buttonhole* is used to denote the flower or flowers fastened to a button hole. Such a bouquet might, therefore, be translated by the word *earstick*, though this may sound even more injurious to the pretty flowers than the English buttonhole. *Dali* or *daili* is nowadays used only in songs and denotes, primarily, a *bunch* or bouquet of flowers. Hence again it is also used as synonymous with the generic term : *ba*, flower or flowers.

In this song a youth sings to his sweetheart :—

I. Chikan *baha*[1] *bahalenam*[2] main ?
Baha[3] *baha soanam*[4] *!*
Chikan dandid[1] dandidleuam[2] main ?
Daili[3] *daili sirinjam*[4] *!*

II. *Bahate*[1] chi *umentanam*[2] ?
Baha[3] *baha soanam*[4] *!*
Dandid'te[1] chi *rearantanam*[2]
Daili[3] *daili sinrinjam*[4] *!*

Corresponding variants are marked with the same number.

The song may be closely translated as follows :—

I. Into what flower hast thou blossomed, maiden ?
Thou art fragrant like the flowers.
Into what bunch of flowers hast thou grown, maiden ?
Thou art full of perfume like a bouquet.

II. (Or) dost thou wash thyself in flowers, maiden ?
(That) thou art fragrant like the flowers.
(Or) dost thou bathe in blossoms, maiden ?
(That) thou art full of perfume like a bouquet.

This very peculiar use of words cannot be sufficiently insisted on, if we want to do justice to their little songs and realize, to some extent, what those songs are to them.

In addition to this almost inexhaustible stock of synonyms the Mundas have two other means at their disposal : first, they have retained, for their songs, a certain number of words which are now quite obsolete so far as conversational language is concerned ; secondly, they readily use in songs such Hindi or Sadāni words as they have picked up, as synonyms to their own ; thus *rai*, mustard-plant, occurs as variant to the Mundari *mani ; dhar*, path or road, as variant to *hora*, etc.

(2) If the idea is only adumbrated in the first line so as to require either a simple expansion or absolute generalization, then the second line repeats it in such a manner as to obtain the desired effect. This is done in two ways, either (*a*) by using in the second line a word denoting an object of the same kind or genus but of a different class or species from that denoted by the corresponding term of the first line, or (*b*) by using a contrasting term.

If the poet desire to call up a mental image of the pleasure caused in general by the sight of bright flowers, he will mention in the first line a tree or shrub with a gaudy flower, and, as a corresponding variant, he will, in the next line, give the name of another tree or shrub with an equally pleasing flower, though the second flower differ ever so much in shape and colour from the first.

Similarly, to evoke the mental image of the pleasure caused by sweet scents he will, in the first line, name some scented flower, and, in the next line, name another flower having an agreeable though specifically distinct smell. He thereby intimates that he really makes abstraction of the particular objects he names and uses them only as steps to reach a broader and higher view or level.

This is carried to great lengths, especially in the extensive use of similes and allegories, which a language of this type must have recourse to in the treatment of wholly abstract subjects, such as mental states and affections, lying so much beyond the reach of their simple concrete verbal means. The following song in two stanzas may serve as an illustration of this.

A maiden, after having hesitated for a time, intimates her resolution to marry her admirer because she is satisfied that his love is true. She represents herself as a tree and then pictures her admirer's love allegorically by two characteristic creepers which entwine many a tree from stem to crown in the Chota Nagpur forests. The *kunduru* is a hardwooded creeper starting without support under a tree at some distance from the trunk until it reaches the first branches, when it rapidly spreads through the crown. As its trunk and branches are studded with sharp little thorns, it forms a certain protection to the tree, whilst its abundant tiny little leaves add grace to the foliage.

The *palandu* is a softer creeper which grows in spirals around the trunk of a tree and beautifies its crown with its large dark-green leaves. The spirals around the trunk and the larger branches gradually increase in diameter until they attain a strength sufficient to uphold the tree even when its roots are destroyed or the lower end of the trunk is too decayed to allow of the tree standing by itself alone.

The winding winding *kunduru* is holding me enclosed with his windings, the winding *kunduru* is holding me enclosed.
The creeping creeping *palandu* is holding me enclosed with his spirals, the creeping *palandu* is holding me enclosed.
Since then the mind is at ease come along, *kunduru* ; thou and I will go together (through life), thou and I will go together, *kunduru*.
Since then the heart finds its rest come along, *palandu* ; thou and I will walk together, thou and I will walk together, *palandu*.

The creeper is not inappropriately chosen as a symbol of the chief, *i.e.*, the unifying tendency, of true love. But the use of two different kinds of creepers is intended to develop and complete its description. The first line exhibits in the thorns of the *kunduru* that element of jealousy, which is inseparable from love among the so-called semi-savages, as well as among the most refined of men. The second line portrays in the powerful rings of the *palandu* that element of faithfulness or strength which is proof against trials and lasts even unto death.

The following song may serve as another striking instance of this method of generalizing, and thus idealizing :—

I. Who, brother, made the *golden* battle-axe ?
Who, brother, made the *silvery* arrow-heads and shafts ?

II. The blacksmith, brother, made the *golden* battle-axe.
The silversmith made the *silvery* arrow-heads and shafts.

III. Don't, please brother, bring out the *golden* battle-axe.
Don't, please brother, parade the *silvery* arrow-heads and shafts.

IV. 'Tis dripping with blood, the *golden* battle-axe.
They are wet with gore, the *silvery* arrow-heads and shafts.

Now there is not a trace of gold on the Munda's battle-axe nor a thread of silver adorning his arrows. But gold and silver being the brightest among metals and of different hues, are here used to call up a vivid picture of the flash and glitter which the brandishing of polished arms produces in the bright sunlight. The poet simply intends to place the fighting youth and their armour in the most favourable light, in order to put all this sheen and glamour over against its real end, and thus condemn it by presenting, in the last stanza, the once dazzling arms as covered and darkened with the blood of fellow-men, as instruments and signs of the agonies of the slain and the wounded. It is the Munda's way of saying in a poetic manner, that all the fascinating sheen and glamour of a nation's youth in arms can never be either a justification or a compensation for the horrors of war.

Two examples may suffice to illustrate the use of contrasting terms in two subsequent lines for the purpose of widening or generalizing.

A young man invites his comrade to come with him to the forest and dig out the fresh bamboo shoots, which are considered a great delicacy. His friend dissuades him from the dangerous errand, and winds up by these four lines :—

Kalanga *gatingre*[1] ! *Kulajana*[2] do !

Kalanga *sangaing*[1] re ! *taruljana*[2] do !

Dasi[3] *Korage huakiado*[4] !

Kamirin[3] *Kurige sodar*[4] *kiado* !

Let us not go, my friend ! it is full of tigers you know !
Let us not go, my chum ! it is full of wild beasts you know !
These mauled the man-servant you know !
These mangled the maid-servant you know !

The contrasting terms *man-servant* and *maid-servant* are not here intended to designate any particular servants at all. They are used to convey the idea of *dependants*, and even of others whom need or duty obliges to enter the forest, even like man-servants who must procure from it the necessary building and fire-wood, or like the maid-servant who has to bring in the leaves required daily for drinking cups and rice and stew-dishes, as well as the leaves of the stunted palm for plaiting the indispensable mat. Hence the lesson of the song is: Don't, for a mere delicacy, enter the dread forests that swarm with wild and ferocious beasts, since so many whom need or duty calls thither fall victims to them.

A young man has been commissioned to guard a mustard-field against pilferers. Two girls walk up to him and ask permission to pluck some of the coveted leaves, but he remains true to his trust and refuses the permission, although they offer him their trinkets. The song is meant to inculcate honesty, and does so in a truly poetic way by pointing to a youth who for honesty's sake resists not only the coaxing, but even the proffered trinkets, of the two charming temptresses, who after all ask but little and offer more than the few mustard leaves are worth. A strong temptation indeed! It begins with an address by one of the girls drawing her companion's attention to the beautiful picture which the light-green, gold-crested mustard fields present at a particular season of the year.

Buru[1] burure *manido*[2].
Bera[1] berare *rai*[2].
Limang-lomonga[3] *manido*[2].
Kidar-kodora[3] *rai*[2].

Buru means "mountain," *bera* means "valley"; *mani* is the Mundari, *rai* the Hindi word for "mustard"; *re* is "in," and *do* here means "behold!"

Limang-lomong means "fresh and tender," *kidar-kodor* means "light and wavy."

The repetitions *buru buru* and *bera bera* mean, even in prose, "every mountain, every valley." Hence the song may closely be rendered thus:—

Behold on every mountain mustard fields!
Behold in every valley mustard fields!
Behold the mustard fields so fresh and tender!
Behold the mustard fields so light and wavy!

Here the contrasts "mountain and valley" are equivalent to such phrases as "the whole country," "all around," "everywhere."

It may be remarked here *en passant* that a close translation of Mundari songs is often very difficult, and sometimes impossible, partly for the want of a sufficient number of English synonyms, and partly for other inherent reasons. It can hardly ever be more than a very poor rendering. Amongst other defects it robs them of that peculiar charm which these synonymous repetitions have for the Mundas, and consequently it can never be for our minds what the original is for theirs. That charm is considerably heightened by the alternating manner in which the repetitions are sung by the boys and girls at their dances. When the boys have sung two lines, the girls take up the second line and sing only that, so that the synonymous repetition sounds like an echo of the idea expressed.

Boys	Buru burure manido !	Limang lomonga manido !
	Bera berare rai !	Kidar kodora rai !
Girls—	Bera berare rai !	Kidar kodora rai !

These echo-like repetitions are certainly well calculated to deepen the impression intended in certain graver songs, as well as to heighten the point in such as are meant as friendly banter.

Thus the last stanza of the song about the horrors of war, given above, cannot but become more impressive by the echo :—

Boys	Maiomtana dada samrom kapiho !	'Tis dripping with blood, brother, the golden battle-axe.
	Kirumotana dada rupa mailsar !	They are wet with gore, brother, the silvery arrow-heads and shafts.
Girls—	Kirumotana dada rupa mailsar !	They are wet with gore, brother, the silvery arrow-heads and shafts.

The following is a piece of banter against the very natural anxiety of maidens to hide their ordinary shortcomings when their intended pays a visit to the family. A few words of explanation are required to understand it fully. The ordinary fare of the Munda is rice, with generally some stewed edible herbs or leaves. On special occasions a stew or curry of pulse (*ramra*, i.e., the Hindi *urid* or *dal*) is served up with the rice. Ordinarily they are not over particular about the rice being perfectly washed before it goes into the cooking-pot, or about removing inferior and foreign grains or even small pebbles from the pulse previous to roasting or stewing. Some are more careless than others, and it is against these that the song is directed. *Salha* or *sala* means " to select." In connexion with pulse it means to remove every impurity carefully so as to leave only the best grains. *Gugura* and *dambar kom* denote tiny little round bells. Of these there are two kinds. The very smallest are attached to the neck of hunting hawks, whereas a slightly larger kind are attached to leathern ankle rings, as well as to belts, which young men tie above the ankle and round the waist in the war dances called *paiki*. The sound of both kinds is weak enough, especially that of the hawk-bell, which is intended to give only a clue to the hunter as he follows his bird into some thicket or bush. These little bells are introduced on purpose to hint in a bantering way at the quick sympathy with which lovers seem endowed with regard to all that concerns them mutually.

Since the piece is throughout a good illustration of the feature under consideration, it may be given here in full :—

I.	Boys	*Okoe*[1] *hijutan*[2] ? *chaulim*[3] *chapitan*[4] !	Who is coming (that) thou art busy washing the rice ?
		Chimae[1] *setertan*[2], *ramram*[3] *salatan*[4] !	Which one is nearing ? thou art selecting grains !
	Girls—	*Chimae setertan ? ramram salatan !*	
II.	Boys	*Gatim hijutan*[1][2] ? *chaulim chapitan !*	Is thy friend coming ? thou art washing the rice !
		Sangam setertan[1][2] ? *ramram salatan !*	Is thy lover coming ? thou art selecting the *urid* grains !
	Girls—	*Sangam hijutan ? ramram salatan !*	
III.	Boys	*Chitem*[1] *aiumli*[2] ? *chaulim*[3] *chapitan*[4] !	By what did'st thou hear him (approach) thou art, etc.
		Meretem[1] *atenli*[2] ? *ramram*[3] *salatan*[4] !	By what did'st thou make out (his approach) ? thou art, etc.
	Girls—	*Meretem atenli ? ramram salatan !*	
IV.	Boys	*Kata*[1] *peredo richi-gugura*[2].	His feet forsooth are full of hawk-signals.
		Maeang[1] *peredo besra-dambarkom*[2].	His waist forsooth is full of falcon-bells.
	Girls—	*Maeang peredo besra-dambarkom.*	
V.	Boys	*Richi-gugura*[1] *viringkenado*[2],	The hawk signals (sounded) *riring.*
		Besra-dambarkom[1] *varangkenado*[2].	The falcon-bells (sounded) *rarang.*
	Girls—	*Besra dambarkom varangkenado.*	The falcon-bells (sounded) *rarang.*
VI.	Boys	*Enategeho ! chaulim chapitan !*	Aha ! that's why thou art washing the rice.
		Enategeho ! ramram salatan !	Aha ! that's why thou art selecting the *urid* grains.
	Girls—	*Enategeho ! ramram salatan !*	

The following considerations may perhaps be suggested as a possible explanation of this very peculiar feature.

The alternating choral arrangement just shown demands of course a repetition. But it does not exact the substitution of synonymous terms Similarly whenever expansion or generalization is required by means of a contrasting or a specifically differing term, repetition of the rest of the line is a necessity. But here again the expansion or generalization would be attained equally well by the mere repetition of the identical remaining terms of the line. The substitution of synonyms has nothing to do with the expansion or generalization.

Would it be a satisfactory explanation to ascribe this substitution to a mere dread of monotony, to the mere desire of changing just for the sake of changing? But such a desire would seem to point to a refinement which we hardly expect from an entirely illiterate aboriginal race. It is an exigency of style as style, and therefore seems to presuppose a literature.

On the other hand, poetic instinct may very well be conceived as exacting such an expedient in languages of a certain type, whereas languages developed along other and higher lines would naturally reject it as monotonous and tedious, because they have other and better means at their disposal to obtain the same or similar effects.

Mundari is far from being a very apt instrument for the expression of abstract thought, whether of the ratiocinative or of the emotional character. It is too much tied down to a rather close, not to say slavish, imitation of concrete realities, and it can hardly rise beyond the lower forms of abstraction. But poetry is essentially an abstraction of a very high order. It cares little or nothing for the concrete realities it touches on, but out of these it draws only those elements which cause in men the great emotions and passions of love and hate, of pleasure, joy and delight, of grief or anguish, of hope or dread, of terror or despair. It must therefore present concrete things precisely under those aspects under which they are most likely to give rise to these emotions and leave their other attributes in the background. It is said that poetry is essentially concrete. In a sense it certainly is, inasmuch as it hardly ever reasons, but depicts concrete realities, and does so in the most vivid manner. The concrete realities it uses must, by poetry, be transformed as it were into very words, and into precisely such words as will most intelligibly and most irresistibly speak to the emotional nature in man. And in this sense it is a very high abstraction indeed.

Like the power or faculty of speech, which, out of a few material sounds, creates an instrument attuned to the almost infinite variety of mental activity, this power of using concrete realities for the purpose of addressing and deeply stirring the equally noble emotional part of the human spirit is, in its essentials, not a reward of effort and study, nor the result of high culture, but a free gift to man in all ages and all climes. It is a gift enabling the simplest, as well as the most intellectual, to absorb, to force into his own soul, the whole of nature, nay at times the whole of the universe, and there attune it to the spirit's own present disposition, impregnating it with all its own joys and sorrows, so as to transform that objectively cold and unchangeable, unfeeling universe into very words, which sing, or sigh, or laugh, or cry, or glow with brightest hope, or darken with despair. In this sense poetry certainly is an abstraction of the very highest order, not an abstraction wrought by the intellectual, but by the emotional, nature of the spirit that lives in man. But the outward means used for its expression must naturally differ from race to race, from nation to nation, according to their different tempers and degrees of culture, which manifest themselves so strikingly in the structural character as well as in the single words of their languages.

Now we have quite a number of ready-made words which present objects to the mind precisely in that light in which true poesy must present them. To give but one example: the word *horse* simply calls up the picture of a domesticated quadruped which is one of the most useful among man's animal helpmates. The word *steed* calls up the picture of the same animal, but this picture brings out prominently those very qualities which we admire with *fond pleasure* in the horse: his noble bearing, his graceful swiftness and his fiery courage even to death on the battle-field.

In addition to poetic words the Aryan poet has, at his disposal, the greater elasticity of his sentences and the generally more ample and abstract character of his whole language. These advantages, coupled with rhyme and rhythm, powerfully assist and stimulate the mind to conceive objects easily as causes of the emotions and passions which form the very inner essence of poesy.

The Munda must, with his simpler means, try to obtain the same effect. Possibly the synonymous repetitions under consideration are precisely intended as one of these means.

By expressing his idea once in the concrete terms at his disposal, he calls up in the first line the image he intends using or idealizing for his poetic purpose. By repeating it in the subsequent line in synonymous terms, he helps and urges the mind to look for special features, *i.e.*, to bring into prominence those very features which are calculated to cause the emotions he wants to stir up. Habit lends a charm to these repetitions and thus assists this primitive means to do for the Munda what our richer and subtler means do for us.

The Mundas have a large number of qualitative words which belong to the class of jingles, because they are formed, either by the repetition of the same word, v.g., *chom-chom*, *pir-pir*, *jilib-jilib*, or by the juxtaposition of two similarly sounding words. In this class of words the second word presents either one or two vowel changes, e.g., *kandang-kundung*, *bangad-bungud*, or one or two consonant changes, e.g. *keleng-beleng* *rarae-barae*, or both consonant and vowel changes, e.g., *nambar-dumbar*, *kere-bore*.

With regard to their meaning these jingles may be divided into two classes:

(1) Those which are clearly intended to imitate some sounds, v.g., *siraen-soroen*, whizzing; *chere-bere*, used of the twittering of many birds; *rarae-barae*, used of the confused noise caused by a multitude of people all talking at the same time.

(2) Such as would appear to be imitative in a wider sense, *i.e.*, not of sounds only, but of impressions produced through the senses of sight and touch, smell and taste. Thus *jilib-jilib* is descriptive of the flashes caused (*e.g.*) by the movements of polished arms of men marching: *bijir-balang* differs from *jilib-jilib* inasmuch as it is descriptive of the shimmering effects of bright light reflected from shining or brilliant objects in rapid motion, such as the twirling of a sword, the play of small silvery fish in clear water: *biana-bocona* is descriptive of graceful wavy movements, such as the flight of certain birds, the swaying of tall trees with rather flexible branches: *kere-bore* is descriptive of the smoothness and tenderness of fresh young plants and animals: *lomang-lomong* is descriptive of the impression of softness and richness produced on the eye by young plants: *rese-pese* is used of the pleasing effect produced by a regularly arranged or co-ordinated number of small bright objects, such as a fine set of small

pearly teeth, the beads of a necklace, tiny flowers growing in bunches : *mondol-mondol* used of a rich, sweet scent : *binga-banga* of objects striped in a regular manner.

There is hardly any natural phenomenon producing distinctly pleasing or charming, delightful or disagreeable, painful or distressing, impressions which has not its own corresponding jingle. Whereas *binga-banga* is used of objects which are pleasing on account of their being striped regularly in variegated colour, *bangad-bungud* is reserved for the description of the striped tiger. It seems to convey something of the terror that beast inspires : *ari-ari* describes that feeling of despondency or despair which arises either from repeated failure or in the presence of insurmountable difficulties in the struggle for life.

Regarding the function and position in the sentence of these jingles, the following may be taken as general rules :

(1st.) They are nearly always used predicatively, *i.e.*, as Intransitive predicates, very seldom as qualifying appositions to a noun.

(2nd.) When used as appositions qualifying a noun, they stand after the noun. This is a remarkable deviation from the otherwise invariable law, according to which every Mundari adjective must precede the noun it qualifies. *Marang ora'* : a large house ; *chom chom horo :* a taciturn individual. The inversion is allowed only in poetry. Jingles thus following a noun are in reality equivalent to a qualifying relative clause, or to an adjectival phrase introduced by *so*.

Dandom ora' *chome chome*, dandom ora' lingitana.

The umbrella house, *which is so snug and cosy*, or, the umbrella house, *so snug and cosy*, the umbrella house is leaking.

(3rd.) As predicates they generally take as affix the linkword *a*, which is the verbalizing factor for any Mundari word.

Ale disumdona bhuina Bindi kapi *jilib-jilib-a*.

In our country, my darling daughter Bindi, the battle-axe *is flashing*, i.e., war is raging.

(4th.) However, in poetry mere juxtaposition of subject and predicate is often met with, *e.g.*

Chirpingkodoko bijir-balang.
Aeraingkodako bian-boeon

My (*darling*) *chirpis* (a tiny silvery fish) (are) *shimmering* (because of their rapid movements).

My (*darling*) *aeras* (a small shining fish) (are) *moving in graceful curves.*

The Mundas are quick in perceiving natural defects as well as acquired shortcomings. They have thus coined quite a number of derisive jingles. These are often repeated twice :

Kandang-kundung or *kandang-kundang-kandang-kundung* is used to describe the walk of a lanky, weak-kneed, long-legged individual, who threatens to fall to pieces at every step he takes: *tapa-tupu* or *tapa-tupu-tapa-tupu* describes the waddling kind of walk of stout but stunted individuals: *sil-sil* is used of an unkempt, disorderly head of hair.

Jingles, like other words, may be used metaphorically, *i.e.*, transferred to mental or moral dispositions. Thus *chom-chom* is applied to any roof or covering that spreads regularly downward from a single point, and, therefore, presents the shape of a dome, a pyramid, an umbrella. Hence it denotes the pleasant impression made by the regularity of shape, as well as by that of a safe and snug dwelling or covering. It corresponds therefore to the English *cosy* or *snug*. This idea of covering or enclosing a material space is transferred to the moral sphere by being applied to the character or disposition of persons; thus *chom-chom* is used of a reticent character, or a forbidding behaviour, as opposed to a frank and cordial manner.

Often they take the present tense affix *tan*, *plus* the linkword *a*. In the subsequent line the *a* is then generally left out.

Bururе mandukam hale ribi-ribitana ho
Berare saraјom hale gasa-gasatan.

On the mountain the mhowa-fruit lies thick and dense like the big black ants when they move in a body,
In the valley the sal-tree fruit lies closely packed like the small red ants when they crawl over each other,

i.e., just now, or at this season, edible fruit is plentiful everywhere on hills and in valleys.

These jingles are used also in vivid descriptions or in excited moods in the ordinary conversational language, but not nearly so frequently as in the songs. In these they occur with such a profusion that they must be considered as a distinct factor in the outward form of Mundari poetry.

They are, in their own way, very apt means towards the main end of poetry as the following considerations will show:—

They directly describe not so much the objects, as the pleasant or painful impressions and feelings caused by them, *cf.* the meanings given above on pp. 98 and 99.

It may, perhaps, be said that they seem to point to a widened sense of imitative harmony or that faculty of imitating, by so-called words, certain impressions made on us. Whereas with us such words are now mainly restricted to sensations of sounds, these aborigines would seem to have preserved and developed that faculty so as to extend it to all the other sensations and even to purely mental (non-sensational) impressions: cf. *doed'-doed'* descriptive of the feeling of weariness and annoyance at the dreary monotony of a long road or an apparently endless plain one is traversing; and *ari-ari* descriptive of the utter dejection and despair caused by repeated failure.

This seems to derive some confirmation from the two following facts:—

(*a*) If these jingles be broken up and either the first or the second part be taken by itself alone, it has no longer any meaning for the Mundas themselves. Everyone knows what is meant by *biana-boeona*, *kere-bore*, *limang-lomong*, *mondol-mondol*, etc., etc. But if you ask them what is the meaning of *biana* or of *bore* or of *lomong* or of *mondol*, etc., etc., they will answer that they do not know; some will even say that they never heard that word. As soon, however, as you reconstitute the jingle and say: *biana-boeona*, *kere-bore*, *limang-lomong*, *mondol-mondol*, etc., they at once recognize it as a familiar sound or word.

(*b*) Even in their full form they cannot, like all other Mundari words, be used as independent predicates in ordinary conversational language. They must be completed *i.e.*, specified by some other appropriate predicate.

He! means, yes! Used as intransitive predicate it means *to agree*. Hence *he-eae*, he will agree; *hetanae*, he does agree; *hekedae*, he agreed; *heakadae*, he has agreed.

But you cannot say *mondol-mondol ea*, it will smell sweetly; *mondol-mondol-tana*, it does smell sweetly; *mondol-mondol-keda*, it did smell sweetly. The specifying predicate *soan*, to smell, must be added to the jingle: *mondol-mondolge soana*, it will smell sweetly; *mondol-mondolge soankena*, it did smell sweetly, etc.

It is noteworthy, however, that an independent predicate can be formed with the present tense affix *tan* and with that only: *mondol-modol'tana*, it does smell sweetly.

It would be interesting to find out from a comparison with cognate languages whether the component parts of these jingles had or still have, in some of them, a distinct meaning of their own which enabled them to stand as independent predicates in ordinary conversation, or whether they were orginally intended to simply imitate certain impressions.

In poetry they enjoy a greater liberty; they can stand as independent or complete predicates without being specified by any other words. As such they may take the categorical affix *a*, or the present tense affix *tan* with or without the affix *a*. These affixes, however, seem to be used rather to complete the line; the tendency is to merely juxtapose them with their subjects, leaving to the mind the task of referring them to their subject. It cannot be denied that this mode of forming sentences is very effective in the presentation of word-pictures since these gain in proportion to their very simplicity of structure: here everything that could possibly distract the imagination is purposely left aside, and only that feature or attribute which the poet intends presenting is placed over against the subject.

It may be remarked here that this mode of forming sentences is not limited to the case where jingles stand as predicates, but it is extensively used in most of their word-pictures. There are whole stanzas, sometimes entire songs in which no link-word appears. As an instance take the following :—

Pokri-pindire keora bado
Ba mondol-mondol keosr bado
Raja bandare barangubado
Ba nurae-barae.

On the tank-bank the keora flower,
The flower sweetly, sweetly smelling, the keora flower,

Near the raja's dam the barangu flower,
The flower fresh and fragrant, the barangu flower.

Though the jingles be by their very nature intransitive predicates, they may be used transitively with a peculiar effect. When so used they can generally be rendered into a foreign language only by circumlocutory explanations. By way of example take the first two stanzas of a song warning young people against falling in love with persons whom social exigencies prevent them from marrying : —

Chetan tolarea' kota baam leon-leonaea
Kota bam leon leon
Latar tolarea' nambar baam numbar-dumbaraea
Oke nagengea kota-baam leon-leonaea
Kota baam leon-leon
Chimae nagengea nambar-baam nambar-dumbaraea
Nambar-baam nambar-dumbar ?
Nambar baam nambar-dumbar.

Leon-leon describes the gentle, graceful waving in the breeze of some very elastic tree tops. *Nambar-dumbar* describes an aimless and constant going about hither and thither of people who shun steady work, as though it appeared that showing themselves everywhere was the chief pleasure and business of their lives. Here both jingles are used transitively. The stanzas may be literally rendered as follows :—

Thou art gracefully waving the Kota flower of (*i.e.*, plucked in) the upper hamlet,
The Kota flower waving gracefully like a tree top in the breeze.
Thou art aimlessly and incessantly hithering and thithering, *i.e.*, taking or parading hither and thither the Nambar flower of (*i.e.*, plucked in) the lower hamlet,
The Nambar flower aimlessly and incessantly hither and thither.
For whose sake art thou gracefully waving the Kota flower of the upper hamlet,
The Kota flower waving gracefully like a tree top in the breeze.
For which one art thou aimlessly and incessantly parading hither and thither the Nambar flower of the lower hamlet,
The Nambar-flower aimlessly and incessantly hither and thither !

But this does not do full justice to the force of the transitive predicates. They contain a distinct allusion to the predilection of young people for adorning their hair with single flowers or with flowering twigs. When walking, these flowers move with their heads, and it is this movement of the flowers which is here compared with the gentle swaying of flexible tree-tops in the breeze. Hence the real meaning may freely be rendered in some such way as the following :—

Thou art walking about with a kota-flower of the upper hamlet waving on thy head like a tree-top swaying in the breeze,
Thou art incessantly moving about exhibiting in thy hair the nambar flower of the lower hamlet.

If now we remember that the variants *kota-flower* and *nambar-flower*, *upper hamlet* and *lower hamlet* are intended to expand and generalize, and if we consider this in connexion with the peculiar meaning of *nambar-dumbar*, we shall easily see that the following is the pith of the two stanzas :—

Now-a-days thou art thinking of nothing else but exhibiting thyself everywhere decked out with any flowers thou mayest chance to find in the whole village :

All this surely is not aimless. For whose sake then art thou thus bent on ostentatious show ?

But what a variety of shades these transitive jingles introduce into the expression of that thought.

The difficulty of a close, single-worded rendering is, however, not confined to the transitive use of jingles, but it is rather general. For very frequently jingles by their very nature imply comparisons which are in no way implied by English terms more or less corresponding to them. Cf. *leon-leon* in the stanzas given above and *ribi-ribitan* and *gasa-gasatan*, p. 100. Sometimes the difficulty arises from the fact that the jingle attributes directly to its subject some striking attribute not inherent in the subject itself, but in something closely connected with the subject. This may be illustrated by a stanza from a song embodying a complaint against the rough ways of boys and youths. Some girls go to gather flowers for their hair from some trees close by the village. They find the trees bare of every flower. They ask who may have done this and then answer that it must have been the huntsmen who have passed. In the hunting season bands of fifties and sometimes of one or several hundreds pass and repass in all directions. A tree is soon bare of its last flower if the boys and youths of these bands take it into their heads, as they generally will, to stick a bunch of flowers over their ears on their way to and from the chase. Here the girls complain that they not only took all the flowers but also tore them off in such a ruthless manner as to disfigure the very appearance of the trees. However, to show that their hearts are divided between the flowers and the rough-handed hunstmen, they throw into their taunt a flattering jingle for the latter :—

Sendrako jilibe jilib, sendarako petĕkeda,
Karengako jolobe-jolob, Karengako changarked.

The huntsmen, the glittering ones, the huntsmen have plucked them,
The sportsmen, the flashing ones, the sportsmen have torn them off.

Jilib'-jilib' means " glittering," but is rather applied to small objects, though it may be applied to larger ones too. Hence here it refers to the arrow-heads carried to the chase.

Jolob'-jolob' is synonymous with jilib'-jilib', but applies to larger objects giving greater flashes when in motion. Here it applies to the *kapies*, battle axes.

Hence the lines taken separately really mean :

The huntsmen *with their glittering arrows*, etc.
The sportsmen *with their flashing axes*, etc.

But, as explained above, they belong to each other as two factors or means for the expression of a single idea, and if so taken together they mean :

The huntsmen *bright with armour*.

This example may serve at the same time to illustrate another very striking feature of a certain number of jingles :

To denote *nuances* or varying degrees in the appearance of phenomena described by jingles, the vowels are changed, as is done in *jilib'-jilib' jolob'-jolob'*. Fallen leaves are driven about quickly by a strong wind, but slowly by a slighter breeze. Hence the variation in the following song which inculcates the national custom : " no marriage price paid, no wife to be had." Marriageable girls are symbolized by fallen tamarind and mangoe-leaves, *i.e.*, they are no longer held fast by the needs and affections of young children, and they are as plentiful as the fallen leaves at a certain season ; they move about everywhere even as those leaves are wafted about by the winds. The song says : "If thou payest the customary marriage price thou canst stop a leaf, if not the leaf continues travelling with the wind." But it says so in a graphic way :—

Jojo-sakam uli-sakam pire-piretan otangtanaga
Pire-piretan otangtan.
Jojo-sakam ulisakam pare-paretan dopalitanaga
Pare-paretan dopalitan.

The tamarind leaf, the mangoe leaf is fluttering fast in the wind, my dear,
Fluttering, twirling fast with the wind.
The tamarind leaf, the mangoe leaf is wafted down from the tree by the breeze, my dear,
Wafted down from the tree by the breeze.

There exists another set of words of sufficiently frequent occurrence in the songs to claim consideration as a distinct verbal factor in Mundari poetry. These are the terms of endearment.

The frequency of these terms arises from three causes, two of which are common to human nature, *viz.*, the tendency of parents to apply such terms to their children, and of lovers to apply them to each other Among the Mundas this tendency is very strong. The third cause is connected with the racial conception of friendship between individuals of the same sex. These friendships are considered very sacred and as binding throughout life. Though their marriage rites distinctly state that the marriage tie is not a thing of a few days, but for the whole of life, they say : " Marriage may break, but friendship never." When a boy or a young man wants to enter into friendship with another, he informs his parents of the fact, and the tie is then consecrated as it were by certain formalities and to a certain extent shared in by the families of the two boys or young men. One of the formalities consists in the adoption of a new name for each other. This is always the name of some bright or some fragrant flower. Thenceforward they address each other and speak of each other only by and under that name.

The same holds good for girls. These friendships may be thus formed also among two grown-up married men or two grown-up married women.

Parents as well as senior brothers and sisters adopt, as terms of endearment for their children or juniors, chiefly the names of bright coloured birds or insects, more rarely of flowers. This practice extends to close relatives such as cousins to even the third or fourth degree.

Lovers never ostentatiously use either names of flowers or of birds. They simply add the general *affectionate* affix *ga*, or the more tender *na*, to pronominal addresses: *Amga!* thou dear, or *am na!* thou darling, or *ama*. These affixes are added also to proper nouns, predicates and to affirmative or negative particles *he-ga he-na, hea!*

All three are ordinary terms of either affection or familiarity used currently by parents to children, by relatives to each other, by friends and close acquaintances. But unmarried youths and grown-up unmarried girls will never use them unless they have declared their love for each other.

Ga and *a* may be addressed to both boys and girls, *na* to girls only.

Sometimes the occurrence of a term of endearment is the only clue to tell us who the speaker or questioner is in a given song.

From what has been said so far we may conclude that terms of endearment, jingles and synonymous variants as such, constitute the sum total of poetic words in Mundari.

There now remains to be considered another factor of the outward form of their poetry which is distinct both from words as such and from their arrangement with regard to each other, *viz.*, the use of metaphors and chiefly of similes sustained throughout the whole of quite a number of songs.

The Mundas exhibit a marked predilection for clothing their ideas so completely in similes and symbols always taken from nature as it surrounds them, that an alien might understand every word of a song without as much as guessing what idea the song is meant to convey. Songs of this kind they call *banita kaji* "fictions" or *jonoka kaji* "word measures," *i.e.*, a piece where the ostensible words are used as a measure or counterpart of something not expressly stated. They will symbolize an idea by translating it into a different order of nature, sometimes in its more striking outlines, sometimes into its details (*vide* p. 94) and leave to the listener the task of applying the simile, and of feeling and dreaming himself into the emotion the poet intends to stir up by the picture he presents. Many of these similes are chosen with a genuine poetic instinct and with a correctness which reveals depth of feeling as well as a close and appreciative observation of nature. The pictures themselves are generally drawn in sharp, correct outlines, unencumbered by any superfluous detail. We may at times think that their simplicity savours of poverty rather than of artistic purpose. However, in judging them we must remember that these aborigines, living in closer contact with nature than we do, have in many respects a keener eye for its details. Simply raise before their mental eye, *e.g.*, the vision of a particular tree, and they will, in their imagination, directly see that tree's characteristic structure together with the shape, colour and peculiar fragrance of its blossoms and its fruit. Can there be anything more simple than the lines already quoted :—

> *Buru-burure manido* ! Behold on every mountain mustard fields !
> *Bera-berare rai* ! In every valley mustard fields !

I have purposely criticised the extreme simplicity of these and similar lines. To the question : "Why does the song say nothing about the fine, light green colour of the stalks and the bright golden colour of the flowers ?" the answer was given : "Because everybody sees that." On asking : "But do you and other Mundas then really like and enjoy the nice mixture of colours of a flowering mustard field ?" an intelligent young man replied : "Who would not like it ! it is beautiful !"

This must be borne in mind if we want to appreciate correctly the word pictures used for their similes and metaphors, and it is obvious, moreover, that to realize their beauty presupposes a close acquaintance with the flora and the fauna of their country. If we would or could see and appreciate them as they do, we should easily realize that these pieces of nature culled here and there, these landscapes so often appropriately vivified by the introduction of birds, fishes and other animals into the picture, are sometimes admirably calculated to raise the mind into the very mood or *Stimmung* which best suits the emotion the picture is meant to stir up.

These emotions again, though the common property of mankind, are often intimately connected with peculiar racial customs. Hence a knowledge of these is indispensable for a thorough understanding of their poetry.

The feature here under consideration may have been guessed already by the reader from some of the examples adduced in the preceding pages to illustrate other features. A complete explanation of a few more pieces will help to illustrate it and bring it out more prominently.

In the following piece, the poet singles out two trees which strike the eye even amid the rich and pleasing hues of a Chota Nagpur forest, *viz.*, the gigantic cotton tree, *edel*, and the wild plantain tree, *kadal*.

Straight as a candle, the cotton tree always throws out branches, generally three or five in number, around the same point or section of the trunk. When full grown its lowest branches are always at a good height above the ground, sometimes as much as thirty feet and more. The branches like the trunk are, as a rule, perfectly straight and slant up slightly from the trunk. Above the first set of branches it throws out other sets similarly disposed, but of gradually decreasing lengths so as frequently to produce a cone-shaped crown. The twigs starting from the branches support each at its end a trio of large, well-shaped leaves of a light green colour. The foliage is not thick, and, as the different sets of branches are at a distance from each other, the gracefully tapering trunk is shown to advantage along its whole length. When in full vigour, this giant forms a pleasing contrast to the more leafy but less graceful trees and shrubs of the forests and is found here and there on the cultivated hillsides and highlands. When blossoming it is covered with a profusion of large chalice-like flowers of a bright red hue and thus offers a sight which cannot but strongly attract the attention of these children of nature who delight so much in bright colours. Now the poet does not waste words on the description of the tree. The purpose for which he uses the picture supposes that it is at its best, and every Munda knows what that means. Nor does he take the trouble to clothe his idea in the conventional form of a grammatical sentence. With more effect he simply juxtaposes with the name of the tree the jingle *jenged' jenged'* which is used of bright red flowers, *Edel jenged'-jenged'*, and this to the Munda means : the majestic cotton tree is bright with red flowers.

The wild plantain tree is larger than its cultivated namesake. It grows chiefly in valleys or dells close by mountain streams and near the clear ponds so frequently excavated by the streams, when, in the rainy season, they rush as wild torrents down the mountain side over the steep rocks. Before the leaves are torn by storm or age, these trees with their smooth, straight stems, and their crown of erect, gigantic leaves, offer a pleasing picture of rich and graceful proportions standing out prominently among the high grasses and shrubs generally covering the sides of streams. Here again the poet draws his picture by simply putting over against the name of the tree a jingle applied chiefly to men and women of perfect proportions and somewhat above the ordinary height.

Kadal kore-bore : The (shining) plantain tree, strong and gracefully tall.

To introduce the much appreciated contrast into his picture he places the cotton tree on the top of the hill or on the hill side, by means of the locative case of *buru*, hill or mountain, *burura'* ; since this may mean *on the top of the hill or on the side or slope of the hill*, the hearer is at liberty to see the tree in either of the two positions that suits him best. So far then we have the lines :

Burura' edel jenged'-jenged'
Berara' kadal kere-bore.

This may be a very good word-picture with a charming contrast included, but it would hardly be correct Mundari poetry. The lines so far contain no real synonyms, and one at least of these is necessary. Since the song is a dialogue, the poet brings in the person addressed by the speaker, and this offers a chance for the required synonym. Parrots, on account of their bright plumage, furnish terms of endearment used by parents for their children as well as by relatives for any members of the family younger than themselves. *Miru* and *Kare* both denote a parrot more variegated in colour than the common green parrot, *kead'*. These two are introduced as variants :

Burura' edel miru ! jenged'-jenged'
Berara' kadal kare ! kere-bore.

Adaptation to a given melody by means of a fixed number of syllables is now all that remains to be done for the first stanza. This is effected by adding a euphonic or rather melic *o* to *edel* and *Kadal* and *jenged'* and by repeating the terms of endearment *miru* and *kare* at the end of the lines :

Burura edelo, miru' jenged'-jengedo' miru.
Bera'ra' kadalo, kare ! kere-bore kare.

The terms *miru* and *kare* imply that the person addressed by the speaker is a relation of his and somewhat younger than himself ; at the same time they show that he speaks to him with a confiding tenderness, for these terms of endearment are not currently used by mere relatives, but only in confidential and affectionate conversation. Since in the typical Mundari village all the male members of the community are descendants of the same ancestors, they are all more or less closely related. Hence we may conclude that the speaker addresses one of his cousins of his own village who chances to be just a trifle younger than himself and whom, consequently, he may call *miru* or *kare*.

Having completed his picture the poet now proceeds to use it for the purpose he has in view.

Composed on the same principles as the first, his second stanza is intended to form a shocking contrast with the first : the pleasing picture must be utterly destroyed, and this is done by simply substituting for the jingles *jenged'-jenged'* and *kere-bore*, two synonymous predicates denoting the felling and the downfall of trees : *gur* to fell and *rauruo'* to fall down. In the first of these a melic *e* is inserted before the passive affix *jan* and an *o* added at the end. In the second line the predicate *rauruo'* changes the *u* into *e* and throws off the categorical *a* at the end.

Burura' edelo, miru ! gurejanao miru !
Berara' kadalo, kare ! raurejan !

The (majestic) cotton tree of the mountain side is felled !
The (shining) plantain in the valley fallen.

I may here remark that the linkword or, as it is called by some, the categorical *a* is very frequently and evidently purposely left out at the end of second lines. This intensifies the impression produced. In prose this can never be done with transitive or intransitive predicates ; for this *a* is the verbalizing factor, *i.e.*, precisely that which transforms words into verbs, *i.e.*, transitive or intransitive predicates. This omission in poetry is a remarkable grammatical violence done to such predicates. Is it perhaps the result of a greater elasticity of the mind as it rises to poetic descriptions, an attempt at breaking through the rigorous and rather narrow frame-work of the Mundari proposition or sentence ?

The third stanza begins to reveal the purpose for which the strongly contrasting pictures have been used.

The disappointed youth asks his confidant by whose words this sad change may have been brought about, and thereby indicates that he did not mean to speak of the felling of real trees, that these were but used as terms of comparison with another beauty which had captivated his heart even as the sight of the two trees in question might well captivate an appreciative eye. The greater part of the second stanza remains intact.

To the words : *burura' edelo* and *berara' kadalo* two very idiomatic Mundari questions are substituted, *Okoe kajite :* literally, by whom being speaking, *i.e.*, by whose words, and *chimae bakanrate,* by which one being talking, *i.e.*, by whose talk.

Okoe kajite miru! gurejanae miru?
Chimae bakanrate kare! raurejan?

By whose words, my dear! has it been felled, my dear?
By whose talk, my dear! is it down, my dear?

In the fourth stanza his plaint grows pathetic as may be judged from the answer he gives to his own question.

He complains that it is one of his listener's own friends who, by his words, has wrought all this desolation. To the interrogatives *Okoe* and *Chimae*, two synonyms for *friend* are substituted with the possessive affix *m* thy:

Gatim kajite miru! gurejanaea miru!
Sangam bakanrate kare! raurejan!

By the words of thine own friend, my dear, it (the cotton tree) is felled!
By the talk of thine own companion, it (the plantain tree) is down.

In the fifth and last stanza he solaces himself with the only consolation which real love can find at all in such a case, by saying that the maiden whose loss he bewails has found a husband who is rich and kind enough to make her happy. But he says so in the terms of the simile adopted in the beginning:

Toaleka otereo miru! gurejanaea miru;
Daileka madire kare! raurejan.

It (the cotton tree) was felled unto a ground (as sweet) as milk,
It (the plantain tree) fell unto a manured field as rich as curds.

Synonyms go on increasing in number from stanza to stanza, until in the last stanza every word of the second line is a synonymous variant to a corresponding word in the first.

The whole song is the plaint of a young Munda over the marriage with another man of the maiden he had set his heart on. The following is a real if poorly rendered English equivalent:—

The maiden I loved was fair and bright like the majestic cotton tree in bloom on the mountain side, and graceful as the plantain tree in the valley. Her loss robs my life of its joy even as the felling of the cotton tree robs the hill side of its brightest ornament, even as the fall of the plantain tree robs the valley of its greatest charm. And it is a friend of mine and cousin (and hence a good companion of my own) who by marrying her has brought this desolation on me. However, as I loved her truly, I may at least comfort myself with the thought that she has found a husband who can offer her a comfortable home.[1]

---

[1] There is a variant to this song which in two additional stanzas describes the life of the two trees and enters into the details of their flowering. In the first stanza the word *jengedi jenged* is replaced by a jingle descriptive of the trunk of the cotton tree, *viz.*, *lengen-leng*, *i.e.*, tall and straight.

Burura' edelo miru lengen-lengea miru
Berara' kadalo kare kere bore kare.

The grief so poetically depicted in this song is one that falls to the lot of many young people owing to the social system and especially to the marriage customs.

On the one hand their system, so far as the treatment of women is concerned, differs radically from that of the Hindus. There is nowhere a trace of seclusion; even the simplest form of it, *viz.*, the veil, is entirely unknown. Nothing in fact but a flower or a load is ever seen on the head of Mundari women. In return for the large share of in and outdoor work which falls to their lot they enjoy the greatest liberty. They do nearly all the marketing, they freely pay visits to relatives in different villages, they frequent fairs; nothing in fact hampers their movements except a set of traditional rules framed as safeguards of general morality. Hence young people see enough of each other to allow of attachments based on real or fancied love.

On the other hand stands a set of rigid racial marriage customs which but too often oblige young people to sacrifice their feelings on the altar of tribal traditions and superstitions. It is true that parents will never definitely arrange a marriage without asking both the young people concerned whether they agree to the union. Young men and, for the matter of that, even girls may reveal their predilections to their parents and ask them to try a settlement in conformity with their inclinations. But two factors are always ready to destroy even the fondest hopes. Since the wife must be paid for the parents make a claim to be consulted in the matter, and many a young heart is at least temporarily broken over a difference in the number of cattle or the size and quality of rice fields or over some social or superstitious stain attaching to either his or the young woman's family. Supposing, however, all these difficulties to be either

---

The second stanza in this variant shows the trees as budding:

Burura' edelo miru temporjanaea miru
Berara' kadalo kare kandiakana kare

The cotton tree on the hill, my dear, is budding my dear:
The plantain tree in the valley is throwing out its bunch.

Kandi is used of the peculiar formation of both the bud and flower as well as of the bunch of fruit of the plantain tree. Hence the term recurs in the 3rd stanza:

Burura' edelo miru bajanado jenged jengeda miru
Berara' kadalo kare kandijana leon-leona kare.

The cotton tree on the hill is flowering bright red, my friend
The plantain tree in the valley, my friend, bears its bunch of flowers gracefully waving, my friend.

The rest of the song is the same as given above. These two additional stanzas are evidently meant to depict the grace of mature youth more in detail.

I have been told by one man that the two trees denote both the young man who is represented by the cotton tree' and the maiden whose loss is bewailed, she being represented by the plantain tree. Such an explanation is, however, at variance with the song itself and with the whole character of their poetry and may, therefore, be dismissed as wrong.

I myself suggested the following explanation of the original song:

'You Mundas like the forest and fine trees, because they are beautiful. Still you go and cut them down to gain ground for cultivation and then you burn them in order to manure the new ground. So the song complains that the beautiful trees are so ruthlessly cut down. But at the end it says: Well, after all it is all right, because by their ashes the trees give us rich fields.

Only one elderly man accepted my explanation saying: Sir, your interpretation is also good, it is very good! in fact it is better than ours. You have found that out by reflexion: *uru'tem namakada!*

Needless to say that I did not feel flattered by his compliment the more so as he himself, being asked about the meaning of the song, had begun by giving me the same interpretation as that given in the text above.

non-existing or safely got over, there remain the inexorable omens to be taken into account. If they be unfavourable, the marriage cannot take place, however suitable and desirable it may appear to all the parties concerned.

It happens occasionally that two young people disregard the consent of their parents and live together awaiting a subsequent settlement by both families of social and financial points, and generally that settlement is eventually arrived at. However, such a proceeding is not considered good form. Most young people will submit to their parents' will and to the decision of the omens as to a sad but irresistible fate.

The small bright king-fisher, *gara-kikir*, makes its nest either in holes on steep river banks or in newly thrown up white-ant hills. There is a grey and brown dove called *gara putam*, because it prefers the proximity of rivulets and streams to forests or the wide fields. Its cooing is louder than that of other doves. It nests chiefly in the densely leafed branches of the young sal-tree. These two furnish the terms of comparison for the sorrow of a widow over the premature death of her husband. Even as these two birds whistle and coo with happiness as they fly incessantly from spot to spot around their nesting place, so the wife and mother moves in the enjoyment of domestic happiness about the house and fields which rest on her husband's strength and wisdom. A sudden storm sometimes transforms the white-ant hill into a wet grave for the young king-fishers and throws down the sal-tree with the turtle-doves' nest. So sickness and death sometimes rob the wife and children of their only support and joy.

The two first stanzas graphically depict the birds as they fly rapidly from place to place, whistling and cooing for joy.

Gara kikir gole gole ho ! naija putam reara ruiur
Garaтia chidobariho ! nairia chi tikurare ?
Gole-goleteng aiumli'a ho ! riurtegeng atenli'a ;
Bale'bunum chetanria ho ! lindung sarjom latarri ?

Hark ! the king-fisher whistles and whistles, the river dove is cooing,
Is he on the river, is he on some pool ? is it (the dove) near the stream or is it on the height ?
Hark ! I heard his whistle, I caught its cooing,
Hark ! he is on the fresh ant-hill ! it is under the young sal-tree.

The third stanza describes in the simplest words one of those cyclonic storms which, in the rainy season, sometimes cause much damage to crops, trees and huts even in Chota Nagpur. The earth is so saturated with the continuous rain that water oozes out and wells up in many places and the sky is roaring with the storm-wind which seems to blow from every quarter.

Chetanate hoeoleda ho ! latarate rampiled
Bale' bunum raurejana ho ! lindung sarjom latumjan.

Hark ! from above it blew ! from below (the waters) oozed through.
The soft ant-hill collapsed ! the tender sal-tree (is) broken in two.

The last stanza states the grief of the birds, alluding to the customary wailing of Mundari women which enumerates the good qualities of the deceased and different kinds of miseries brought on the survivor by his loss.

Gara-kikir ragetana ho! naiputam niamtan!
Jati jati ragetana ho! kilinalang niamtan!

Hark! The king-fisher is weeping! the river-dove is wailing!
He is weeping all kinds of grief! it is wailing every kind of sorrow!

The following is a counterpart to the above piece: Parents bewail the lot of a daughter who following her own inclination and disregarding all the laws of caste and clan (*kili*) marries a young man of either the blacksmith or the weaver caste. The Mundas tolerate these castes in their villages and respect them as useful and necessary inferiors, but they will neither eat nor intermarry with them.

There are at least three kinds of silk worms cultivated in the country. *Lumam* is the generic term for all of them. *Barwaluman* is the largest and attaches its cocoon by one tie only. *Laria* is a slightly smaller kind attaching its cocoon by two, sometimes three and even four ties. These two are much brighter than the so-called *kandeor-lumam* the smallest of all, and are therefore often used as terms of endearment. *Lumam* and *laria* occur here as variants. It is on this use that the whole simile is based. *Lumam-ing* means: "my silk-worm," *laria-ing*, "my small silk-worm." The affectionate affix *go* is added in this piece so that the whole compound *lumaming go* and *lariating go* mean "my darling silkworm," *i.e.*, my darling child.

Silk worms feed on the tenderest leaves of young sal trees and two or three other kinds of Chota Nagpur forest trees. The showy but hard and stringy palm-leaf can afford no nourishment to them: a silkworm attached to a palm-leaf must needs perish miserably.

Hence the parents complain that their daughter, deceived by mere outward appearances, has contracted a union which must eventually prove as disastrous to her as the palm-leaf to the silkworm. For, on account of that union, she becomes an outcast forfeiting all the benefits which traditional membership confers on all the individuals of the Munda race in general and of a given *kili* or clan in particular. Furthermore blacksmiths and weavers, besides being socially inferior to the Mundas, are generally landless and therefore poor. Finally they themselves will not extend to the intruded Munda girl the same care and affection which they owe to a daughter-in-law of their own caste. The first stanza is a simple cry of horror.

Lumaming go lumaming go! kita suba lumaming go!
Lariaing go lariaing go! tali suba lariaing go!

My sweet silkworm, my sweet silkworm! under a palm-tree (is) my sweet silkworm!
My darling *laria*, my darling *laria*! under a palmyra (is) my darling *laria!*

Kita is the generic term for palms; *tali* is the Mundarized Sadani or Hindi word for the palmyra or toddy palm.

The second stanza states the fact of the *mesalliance* :

Kita suba lumaming go ! kitarege tolenjana !
Tali suba lariaing go ! talirege neonranjan !

My sweet silkworm under a palm tree ! to the palm tree it has attached itself !
My darling *laria* under a palmyra ! to the palmyra is wound fast !

The third stanza complains of the senselessness of that *mesalliance* : Were there not plenty of suitable young Mundas to choose a husband from ?

Bale opad'bano'leka kitarege tolenjana !
Lindung sarjom bano'leka talirege neonranjan !

As though there were no young saplings, it attached itself to a palm-tree !
As though there were no tender young sal trees, to a palmyra it is wound fast.

The last stanza foreshadows the dreary future of the wayward girl and reproaches her for her ingratitude in having thus left her own :

Kitage chiaputia, kitarege tolenjana ?
Talige chi engatia, talirege neonranjan ?

Will or can the palm tree ever be a father to it, that it attached itself to a palm tree ?
Can the palmyra ever be a mother to it, that to the palmyra it wound itself fast ?

Mundas are exceedingly fond of their children, in fact unreasonably so. They will hardly ever inflict corporal punishment and even with a sharp reprimand they are far too sparing "lest the little one cry." The children know that where asking and coaxing fails, a few tears are pretty sure to procure whatever there is to be had. True, that is always little enough. Very often they have to cry not for the gratification of a mere whim but for very pain and not rarely from hunger. Malaria fever carries off numbers of babies, and the survivors are all subject to more or less regular attacks of that dread infliction up to the age of about fifteen, when they appear to be pretty well immunized for a long period.

For an ordinary attack of malaria nobody would think of offering a sacrifice, no more than for curing a sprain or a broken limb. This shows that they consider malaria as a very natural thing, a necessary evil which is quite different from other diseases caused always by evil spirits or by witchcraft, according to them. Through these fits of icy cold and burning fever the children must pull as best they can. Not that the parents abandon them, but they have neither the means nor the knowledge to offer such relief as might be given.

Besides this universal infliction there is for a great many the actual want of sufficient food for a part of the year. The people who have grain enough to serve up even a single full meal of rice every day of the year are comparatively few. From May to October many a child cries in vain for a meal of plain rice, but the parents have nothing to offer but an unsavoury and weak food of a little coarse pulse and herbs which few other men would care to touch. It would be a great mistake to fancy that the parents, especially the mothers, do not suffer keenly from their own helplessness in presence of so much suffering of their children. However, the children have inherited the light-heartedness and, unfortunately too, the light-headedness of the race. They quickly forget a past pain and never seem to think of the new one ahead.

This characteristic and the parents' intense participation in their children's alternations of pain and pleasure form the subject of the following song.

Among the several kinds of small fish, which during the rains leave tanks and streams to roam about in the flooded rice fields, there are two, conspicuous for their silvery scales, the *chirpis*, a tiny little thing, and the *aera*, slightly bigger. Evidently many a young Munda has watched with pleasure the bright and varying metallic shimmer of the *chirpis* as they rush and tumble about in the clear, shallow, sunlit waters as well as the graceful undulating movements of the *aeras*. The song shows sufficiently that the lookers-on have made the following reflexions: These little things seem to have nothing to do but to amuse themselves and play about the livelong day. And yet by leaving the stream the majority of them are doomed to a speedy and painful death. For the rice-field ridges will soon be closed to keep the water standing in them and thus a return to the stream is cut off. As the fields are gradually drying up, *chirpis* and *aeras* may be seen struggling in agony: their playground is turning into a graveyard. Sometimes an occasional shower partly refills the fields with water, and then the survivors who were but now on the point of breathing their last, suddenly play about again as though there had been no trouble at all and as though certain destruction did not await them with the final and complete drying up of the fields.

The first stanza depicts the happy play of the fishes in the flooded fields. The second stanza shows the contrast: the fields drying up and the fishes gasping in pain. The third shows a passing shower of rain with the accompanying welling up of water from the field springs and the renewed play of the light-hearted *aeras* and *chirpis*. And here it stops. It does not intend to leave on the mind the sad emotion produced by the scene of the second stanza; by thus ending with the picture of regained happiness it does, at the same time, inculcate the lesson that it is, in the long run, a wiser philosophy to dwell on the bright rather than on the dark side of life. A poetic rendering of the saying: " After rain comes sunshine." Or as the Mundas put it: " We can eat and drink and enjoy ourselves like kings when we have it, and when we haven't, then we can fast too in a royal manner," *i.e.*, we don't allow ourselves to be downcast by misery, we never say die.

The piece is a good example, too, of the accuracy and the detailed thoroughness with which they choose their similes. The flooded rice fields are the happy play ground of the bright little fishes, the dry fields are their doom So too for the people; when the rice fields have abundance of water there will be a rich harvest and the children's natural playfulness will not be marred by hunger and concomitant sickness. But when the fields remain dry the children are suffering even as the gasping *chirpis* and *æras*.

The fields are very appropriately called *toa-leka*. *Toa* means not only milk, but also *breast*. Hence here *toa-leka* means *breast-like* or *breasts*.

They are here exhibited as the breasts of mother earth from which men, earth's children, draw their sustenance. The word *dai*, curds, being used as a variant to *toa*, assumes the same meaning.

I.

Toa-leka otere chirpingkodo.
Dahi-leka badire aeraingkodo.
Chirpingkodo bijir-balang,
Aeraingkodo bian boeon.

In the breast-like rice fields (are) my *chirpis.*
In the breast-like terraced uplands (are) my *aeras.*
My *chirpis* shimmering and glittering (in rapid play)
My *aeras* gracefully moving about

II.

Toaleka otedo anjed'jana !
Dahileka badido dundajan !
Chirpingkodoko ragetana !
Aeraingkodoko saiad'tan !

The breast-like rice fields are drying up !
The breast-like terraced uplands drying !
My *chirpis* are crying !
My *aeras* gasping !

III.

Pisir-pisirdoe gamaleda !
Jaram-jaramdoe rampiled ;
Toa-leka otedo pere'jana
Dahileka badido charangjan
Chirpingkodoko rasikatana
Aeraingkodoko landatan

Gently, gently it rained,
Bubbling-bubbling it welled up,
The breast-like rice fields are filled up,
The breast-like terraced uplands flooded :
My *chirpis* are rejoicing
My *aeras* laughing.

In the three preceding pieces we meet with two terms of comparison. Thus in the song, p. 108, the cotton-tree and the plantain tree. In that on p. 111 the king-fisher and the river dove, and, in the last, the *chirpi* and the *aera.* The same remark applies to all their similes. These duplicate terms of comparison are demanded by the law of synonymous variants. As stated, p. 95, these variants themselves seem to be ultimately based on the alternating choral system of singing at the dances.

So that the form of the stanza as such rests on and is conditioned by the manner in which it is sung.

What is deserving of notice is the adroit way in which they make use of this peculiar structure of their stanza for purely poetic purposes, quite independent of both song and dance. The chief of these are: the presentation of vivid contrasts, the widening and generalization of ideas in a concrete, picturesque manner and the development of their similes into details, both poetic and exhaustive without being overloaded.

It may, I think, be claimed for these songs that they frequently depict graphically, that their conception is sometimes really highly poetical.

On the other hand, however, they are devoid of one feature which is essential to that kind of poetry which we consider as the highest. They only sing of feelings and emotions that are shared in and experienced by every normally constituted human individual in certain circumstances. We find in them nowhere a personality above the average, nowhere a character of overwhelming power for either good or evil or of extraordinary moral beauty. Nowhere do they reveal to us the emotions and struggles of those masterminds and superior natures who live as it were in a world of their own creation. Heroes, such as Homer, Sophocles or Shakespeare depict, are absolute strangers to the world of which these songs are echoes. Nor has that world any room for such characters. Even the figure of the typical king is wanting in it. If here and there the *rajah* is mentioned, he comes in more as a mere occasional object of curiosity than as a human factor who influenced that world in any way. Nor do we find an allusion, much less an exposition, of any definite religious system. The Karam songs, it is true, here and there attempt the inculcation of a certain philosophy. But then these are evidently alien and they are so uncongenial to the Munda taste that they are called *hambal durangko*, difficult or heavy songs.

Of the genuine Mundari songs it may be said therefore that they do, in their own way, reveal to us a stage of civilization in which the individual disappears in the community; a stage of culture which is entirely identified with the communal system in its original form. This system rests entirely on a mixture of general ethical principles and characteristically racial customs and traditions. These are the unwritten laws framed to be the safeguards of that system. As such they are considered so sacred and all-important that the individual may never step beyond them without being held guilty of endangering the community itself.

So much appears evident from even a cursory perusal of the songs. A more attentive consideration or study would seem to justify the conclusion that they are directly intended for the purpose of inculcating in the simplest, and perhaps the best and only way at the disposal of such a civilization, the social and moral customs of the community and the race. They do no doubt bear abundant traces of being spontaneous effusions of a poetic conception of life. But it is natural that among the many songs which welled up spontaneously, the vast majority should depict life as it stands in the frame of the peculiar racial customs and as moulded by the communal system;

and it is quite conceivable that among them those which seemed best suited to inculcate the moral and social precepts, grown on and out of that system, should have been preferred and have received the public sanction of being allowed as standard poetry on the dancing ground.

It is a striking feature of the whole social and religious life of the Mundas that they have no *ex officio* teachers of either secular or religious knowledge and no schools of any description. What there is of teaching is done by the family in the most primitive way. Besides, children and young people are constantly in requisition for grazing cattle and for other domestic and field work. Hence the only time that they could all gather and would do so willingly is after the day's work for dance and song. The idea of using these gatherings for the purpose of impressing on the minds of the young nearly all they had to teach them socially and morally may, therefore, have quite naturally suggested itself to the community.

These dances are no longer what they used to be but a couple of decades ago, and still are here and there in a few isolated villages hardly touched by alien influences. They have lost so much in good form and decency that the older folk are complaining of what they call the wild and unseemly character of both the dance and the reckless, rowdy drum accompaniment. Even if with regard to this complaint we make an allowance for that propensity of old age which gained for it the somewhat sarcastic title of *laudator temporis acti*, it is certain that it contains more regrettable truth than exaggeration.

In " the good old times " of which the elders speak, the dancing ground was always in the village itself and was never the exclusive domain of the young people, whereas now-a-days they but too often gather for a dance outside the village. The whole community would be there. Parents and grand-parents would sit around listening to the songs and the drums and sharing in the joy of the young people, and the children would be there, learning on the dancing ground itself the songs and the melodies and the steps of the various dances. It need hardly be said that all this constituted by itself alone a great safeguard of decency and morality.

If such a school be very primitive, it cannot be denied that it is an attractive one and in its way effective in bringing home the social and moral wisdom of the race to a light-hearted and not a very highly gifted youth. In its way it may be an ornament for the civilization which developed it, inasmuch as " Omne tulit punctum qui miscuit utile dulci."

The following may perhaps be adduced in support of the view advanced above :—

(1) The songs as well as the dances are classified according to different periods, beginning with the year's chief festivals, and this classification is strictly adhered to so that songs and dances belonging to one period are never sung during another.

(2) *The Karam-feast* of Hindu origin is even now-a-days not universally accepted by the Mundas. The *Karam-songs* are, however, pretty generally known.

Many of these songs contain distinctly philosophic teachings, which, as already stated, seem but little palatable to the Mundas. It would appear as though the new alien teachers, despairing of the success of their methods of oral teachings, conformed to the national taste and clothed their ideas in the form of popular songs as the only chance of getting a hearing at all.

(3) In certain songs it is pretty evident that it is not so much the individual nature which reveals its own personal emotions, but rather the philosophy or wisdom of the race which shows how the individual of the community should feel under certain circumstances. There are plainly didactic features traceable among the really poetic features of the songs. To quote but one example : In the last stanza of the song given above, pp. 108 and 109, the consolation which the young man suggests to himself over the loss of his sweetheart may be very disinterested and highminded, it may even be the only real consolation available in such a case. But it certainly is not the common feeling of the disappointed lover. Here it is the communal system with its racial marriage laws which tells the young man that that is the way he has to feel if he wants to be wise at all.

(4) There exist some songs which are rigorously excluded from the dancing ground because they are not decent enough, because they contain either a lewd expression or an unbecoming allusion.

I have never myself heard any of these songs and could so far not even obtain a sample of them. I am credibly informed that there are very few of the kind and that only here and there some young men will venture to sing them when out alone about the fields, but never in company.

If that be so, it is a proof that the community as such exercises a rigorous control over the songs. It would hardly do this if it did not consider them as valuable means of inculcating the racial wisdom and maintaining it on a high moral level.

It is easy to see how such a control discourages and practically reduces to a minimum indecent and inferior productions.

Now-a-days a great many *Sadani* songs are in vogue (chiefly *Karam-songs*), especially in those parts where Mundas live side by side with Hindus or Hinduized aborigines and Uraons.

But with them the present paper has no concern. Song-making, as already remarked, is in recent times at a very low ebb. The race is going through a crisis which it has but scanty chances of surviving. Its very ancient and primitive civilization contains no safeguards against great and sudden changes, such as the British occupation has brought on it by its judicial and executive system and by allowing and favouring an unlimited influx of Hindus and Mahomedans. The unequal struggle with the latter for the ancestral rights in their village lands, and that by means of legal technicalities about which they understand nothing, the unhealthy and often frightfully demoralizing influences of labour recruiting agencies, keep them in constant alarm and apprehension of losing what they naturally cherish most : their lands, their children and even their wives or husbands.

Add to this the efforts of missionaries trying to substitute different and antagonistic forms of Christianity in place of their old beliefs and practices. It is easy to see how entirely all these influences, however different and opposed to each other, must dislocate the whole mental and moral balance. And such a state of things is anything but favourable to poetry. True they continue to sing and to dance, but as already stated, in a less decent and a less intelligent way, and many young people no longer understand all the songs handed down by the preceding generations.

To us their jingling adjectives and predicates may seem childish, their repetitions tedious and as means of generalizing or idealizing they may appear rather absolutely embryonic or abnormally clumsy ; the method by which the synonyms are got is so absolutely alien and uncongenial that we can hardly accept them as genuine synonyms, so that they may make on us a more unfavourable impression than the efforts of a rhymster, who, for the sake of his rhymes, drags all kinds of words together into some sort of rhythm with an utter disregard of ideas or æsthetic fitness.

But it is not by our standards that we must judge these songs, if we want to estimate their character with objective correctness. Looked at and judged by our standard they must, of course, stand condemned as rude attempts, as products of a lower mental culture, even as their material culture can stand no comparison with that of the West. Compared with European agricultural machinery, the Mundas' implements are children's toys, the product of childrens' wits and hands. Before an English residence or an ordinary hotel the Munda's house is abject poverty, and his village is a hygienic horror if compared with the sanitary and other arrangements of any decent Municipality. But to the Munda his implements, his hut and his village appear in a very different light ; he cannot make the comparison which depreciates these things in our eyes, because the European term of comparison does not exist for him. To him, his primitive implements and fields mean security against want and famine, his hut means comfort and a cosy shelter against cold and rain, and his village stands for all the amenities and safeguards afforded by a regulated communal life. If we consider these things in themselves, we too shall realize that the field, the hut, and the village embody the thought and the experience of generations, and they will appear to us an immense advance on the state of those who lived by the chase and had to face their prey with crude stone weapons ; we shall see in them elevating factors that made the lives of generations better and happier, we shall in a word appreciate them as living evidences of that spirit and reason in man which ever urges onwards and upwards in all directions without rest and without discouragement even in the face of the greatest obstacles.

Similarly we must consider the poetry embodied in these songs in itself and not as compared with that of more advanced and more highly gifted races, if we wish to realize what it is to the Mundas and what it is in itself.

There is first the mere fact of its existence at all, which is full of meaning. If bare language, as has been so well said, constitutes an impassable barrier between man and beast, then poetry must be admitted to do so in a much higher degree. For it takes a view of life which we cannot by any stretch of imagination or any effort of thought attribute to the dumb animal. The beast may be, and indeed is, in its way very business-like, but it is never a poet.

Secondly there is the fact of its abundance among the Mundas. These songs are endless and spring up on all sides.

Schiller said :—

> Wo man singt, da lass dich fröhlich nieder ;
> Böse Menschen haben keine Lieder.

If he was right, then this abundance of songs points to a fundamentally good trait in the natural character of the Mundas, a trait which still wins a good side from life, however hard that life may be in its struggle with nature and with other races pressing on it from all sides.

Finally, if we consider it in itself as presented to us, we find in its very mechanism, *i.e.*, in the means it uses, a striking evidence of that wonderful instinctive and innate versatility and resourcefulness of the human mind which knows how to attain the highest ends with the simplest means. Here is a race which, partly owing to adverse circumstances and more probably through its own mental indolence, has so far neglected to evolve its own language into a fit and pliable instrument for the expression of highly abstract thought. Its words are vague and comparatively few, its sentences rigid, often obscure and dependent on trivial circumstances for perfect intelligibility ; yet, when the racial mind feels impelled to manifest and express itself in that high class of abstraction which poetry implies, it is not at a loss to do so with the scanty material at its disposal. The vagueness of its words seems poverty to us. The racial mind turns that very feature to account for its purpose ; out of that very poverty it draws the material form of its poetry, that innate treasure of the soul which does more to really enrich and ennoble life than any amount of ringing coin could ever do What else indeed is the creation of the numerous synonyms out of the very indefiniteness and vagueness of their words, but a *tour de force*, if I may say so, of that mind which refuses to be checkmated by material difficulties when it is really bent on accomplishing the outward expression of one of its strongest and highest impulses or instincts ? What else but this again is the expression of complex and highly abstract ideas by means of a mere collocation in two lines of contrary or generically the same but specifically differing terms, which considered in themselves are both incapable of expressing such ideas ?

(*To be continued.*)

Memoirs of the Asiatic Society of Bengal.

Vol. I.

Memoirs of the Asiatic Society of Bengal.

Vol. II.

MEMOIRS

OF THE

ASIATIC SOCIETY OF BENGAL

VOL. II, No. 6, pp. 121-153.

TARĪKH-I-NUṢRATJANGI.

BY

HARINATH DE.

CALCUTTA:
PRINTED AT THE BAPTIST MISSION PRESS, AND PUBLISHED BY
THE ASIATIC SOCIETY, 57, PARK STREET.
1908.

Price One Rupee; or One Shilling and Sixpence.

25-4-08.

PREFACE.

The *Tārikh-i-Nuṣratjangi* was written by Nawab Nuṣrat Jang of Dacca, who died in 1822. It is difficult to ascertain the exact year in which the book was composed, but it is certain that the work was finished before 1817, for the MS. of it, which was presented to the library of the Asiatic Society, Bengal, by Mr. Swinton in 1820, bears on its last page the following words:—

"Account of Dacca by the Nawab Nuṣrat Jung, the present Nawab of that city, 1817."

The book was undertaken, as the author states in his preface, at the request of some of his English friends. After Nawab Nuṣrat Jang's death, it was continued by his *arzbegi's* son Sayyid 'Abdul Ghanī *alias* Hamid Mir, who brought it down to the year 1843 when the line of Jasārat Khān became extinct with the death of Ghāziuddin Muḥammad.

In editing the *Tārikh-i-Nuṣratjangi* I have made use of the following MSS.:—

(1) A very good MS. in *nastāliq* in the possession of Maulavi Abu Musa Ahmad-ul-Haq, Assistant-master, Collegiate School, Dacca. This MS. was copied from an original, now lost, and is the only MS. which gives the continuation of Nawab Nuṣrat Jang's work by Sayyid 'Abdul Ghanī.

(2) A manuscript in *shikastā*, belonging to my pupil Maulavi 'Abdul Mu'id Khan of Noākhāli. It does not contain the portion written by Sayyid 'Abdul Ghanī.

(3) The MS. (Persian Catalogue D 170) in the possession of the Asiatic Society of Bengal. It is written in *shikastā* and comes down as far as Nuṣrat Jang's own time. It bears the well-known autograph note of the late H. Blochmann, the correctness of which is more than doubtful:—

"This book is good-for-nothing. The history of Dacca is written in the last two leaves. The other leaves contain the history of Bengal, but most facts are wrong and nothing is new."

I have not noted the *varietates lectionis* as the subject-matter of the work is much more important than its artificial Hindustani–Persian diction.

I avail myself of this opportunity to express my gratitude to Mr. J. T. Rankin, I.C.S., Secretary to the Board of Revenue, Eastern Bengal and Assam, without whose generous encouragement I should never have found myself in a position to edit this booklet. Had it been customary for the editor of a Memoir submitted to the Asiatic Society of Bengal, to prefix a formal dedication to his work, these pages would have most certainly been dedicated to Mr. Rankin, whose knowledge of the history of Dacca is, if not unrivalled, at least unsurpassed.

A translation of this book, with historical notes, will follow in due course.

HARINATH DE.

IMPERIAL LIBRARY,
CALCUTTA:
18-3-1907.

دیباجه از مهتمم

بسم الله الرحمن الرحیم

سپاس و حمد و ثنا بالعشي و الاشراق * نثار بارگه منعم علی الاطلاق

سپس ازان بر ضمائر ارباب بصائر پیدا و هویدا باد - که تاریخ جهانگیرنگر ڈهاکه موسوم به تاریخ نصرت جنگي چکیدهٔ خامهٔ انتظام الدوله نصیر الملک نواب سیدعلي‌خان بهادر نصرت‌جنگ صوبه‌دار ڈهاکه است که در سنه ۱۸۲۲ میلادی رخت هستي ازین جهان بر بسته - اکتشاف سال قطعي تالیفش رهین کمال اشکال ست اما همین قدر به تخمین و قیاس میتوان گفت که پیش از سنه ۱۸۱۷ حلیهٔ اختتام در بر کشیده باشد * چرا که بر پشت نسخهٔ قلمي که در کتاب خانهٔ ایشیاٹیک سوسائیٹي بنگاله موجود ست در انگریزي زبان این کلمات مرقوم ست - واقعات ڈهاکه از نواب نصرت‌جنگ نواب حالي آن بلده سنه ۱۸۱۷ - و در فارسي زبان این عبارت منقوش ست - این رساله مشتمل بر احوال جهانگیرنگر ڈهاکه که جناب سوینٹین صاحب در کتب خانه هدیه دادند واقعه بتاریخ یازدهم اکتوبر سنه ۱۸۲۰ مسیحیه *

از دیباچهٔ کتاب بوضوح مي پیوندد که نصرت‌جنگ این تاریخ را به اشارهٔ برخی از گروه و الا شکوه انگلیشیه ترتیب داده و تا زمان مسند نشینیش که سنه ۱۷۸۰ باشد تراوش پذیر قلمش گشته - پس از رحلتش پسر عوض بیگی وے مسمی سید عبدالغني عرف حمید میر آن را به تکمیل رسانیده و تا سنه ۱۸۴۳ که از وفات نجم‌الدوله قمر الملک نواب سید غازي الدین محمد خان بهادر فیروز جنگ نسل و تبار نواب جسارت خان منقطع و نابود گشته در حیز تحریر در آورده و واقعات بسیار بران افزوده *

هنگام طبع این کتاب نسخ مفصلهٔ ذیل تاریخ نصرت جنگي پیش نظرم بوده :—

یکی نسخهٔ قلمي بخط نستعلیق از مملوکات جناب مولوی ابو موسی احمد الحق صاحب رئیس جهانگیرنگر ڈهاکه و معاون ڈهاکه کالیجیٹ اسکول که منقول از اصل نسخهٔ سید عبدالغني ست - و همین نسخهٔ ست که تکملهٔ سید عبدالغني در آخرش ملحق ست *

دوم نسخهٔ قلمي بخط شکسته که تلمیذم مولوي عبدالمعید خان آنرا از ضلع نواکهالي بهم‌رسانیده و از نظرم گذرانیده - لیکن از جزء الحاقي سید عبدالغني عاري ست *

سوم همان نسخهٔ قلمي کتاب خانهٔ ایشیاٹیک سوسائیٹي بنگاله و این نیز بخط شکسته است و تا عهد نصرت جنگ دران مسطور ست - در باب تنقیدش این چند الفاظ در انگریزي زبان که صحتش بیش از مشکوک

بودنش نباشد از خط خاص ايچ بلخمن صاحب رقم يافته - اين كتابيست بے سود - تاريخ ڈهاكه دردو ورق پسينش نگاشته شده است - اوراق ديگر مشتمل بر تاريخ بنگاله است اما بيشتر مضامينش مخدوش و هيچكى بديع و نادر ندارد *

در باب اختلاف نسخ چيزے رقمزدۂ كلك راقم سطور نگرديده - زيرا كه شايستگي موضوع كتاب از انواع اصطناع فارسي هندي نژادش بيش ست *

درين مقام اظهار تشكر والا جناب ابهت انتساب جے. ٹي. رينكين صاحب سكريٹري بورڈ آف ريوينو شرقي بنگاله و آسام مغتنم مي انگارم كه بے ترغيب و تشويق كوبماندهاش اين تاريخ عكس انداز آئينۂ اشاعت نه گشتے و اگر معمول بودے كه چون رسالۂ به ايشيائيك سوسائيٹي بنگاله پيش كرده آيد - آنرا مصدر به تقديمي رسمي بايد كرد - پس لامحاله اين اوراق پيشكش جناب رينكين صاحب موصوف الصدر (كه ذخيرۂ معلوماتش در باب تاريخ جهانگيرنگر ڈهاكه اگر چه عديم المثيل نيست مگر كم از درجۂ اسبقيت نباشد) كرده شدے *

اگر خواست ايزدي ست ترجمه و حواشي كتاب بمقتضاے وقت مطرز بطراز اشاعت خواهد شد *

امپيريئل لائبريري كلكته
مورخه هيجدهم مارچ
سنه ۱۹۰۷ ميلادي

هوري نات دے

فهرست مضامين تاريخ جهانگير نگر ڈهاكه موسوم بتاريخ نصرت جنگي

مضامين — صفحات

مضامين	صفحات
	۳۶

Tarīkh-i-Nuṣratjangi.

By Harinath De.

بســـم الله الرحمن الرحيم

زيب ديباچهٔ سخن حمد كبريائيست جلّ شانهُ كه به نيروي قدرت كامله اش نفوس كائنات را تنومندي حيات ارزاني و آئينهٔ نُطق را بصيقل ثنايش صفائي رو نمودن شاهدان معاني و زبان سخنور را بتائيد ذكرش درخلوت سراى كام كاميابي شيرين بياني و انديشهٔ رسا و فكر شگرف در جست وجوى كُنه ذات والا صفات او پيوسته طپانچه خور حيراني و عنقاى بلندپرواز دانش بخيال بال كشائي در هواى فضاى ملك لاهوتش مبتلاى صد گونه پريشاني و تحفهٔ درود نا معدود بر روان قافله سالارى است كه جانبازان و وادي معرفت و كمال را پروانه‌آسا محو و مبتلاى شمع جمال جهان آراى خويش ساخته و بطلوع طليعهٔ خورشيد وجود مسعود خود ناهجان مشاعر صورت را از ظلمت ضلالت و تيرگي غوايت پرداخته و هزاران تصليه و ثنا نثار وجوه عقبات طيّبات او كه از لمعات سيماى ماه مثال شان قلوب ارباب ايقان و اصحاب عرفان روشن و سطح گيتي بظهور بهار فر طلعت شان از ازل تا ابد گلشن است - من بعد اين مختصريست مشتمل بر بيان برخي از احوال فرمان روايان ملك بنگاله سيماً نوئينانيكه بدار السرور شهر جهانگير نگر صانها الله تعالى عن الفتن و الخطر قدم بر چار بالش رياست گذاشته بانتظام امر خطير ايالت اينجا همت گماشته اند و نيز انموذجي از حقيقت ابنيه و عمارات رفيعهٔ اينجا كه هنوز از نقش و نگار در و ديوار شكستهٔ آن نام و آثار آن صناديد عظام بر صفحهٔ روزگار باقي ست - ازانجا كه برخي از گروه والا شكوه انگلشيه كه همت عالي نهمت شان مصروف ادراك حقايق عالم مي باشد مشوّق شده اشارت خلت بشارت بتاليف آن باين اضعف عباد الله و اقل خلق الله سيد علي الحسيني القزويني كه از پيشگاه فضل و عاطفت خسرواني المخاطب بانتظام الدوله نصير الملك سيد علي خان بهادر نصرت جنگ ست فرمودند لهذا بجمع آن كمر همت بسته باندك وقتى بغايت اجمال بلا فصل والافصال بكلپتره نگاريها ترتيب داده بنظر اخلاق منظر شان جلوه گر ساخت مخفي نماند كه از روى تاريخ جهانگيري موسوم به اقبال نامه و عالمگير نامه چنان معلوم و مستنبط شده كه صوبهٔ بنگاله از عهد سلطنت جلال الدين محمد اكبر بادشاه داخل قلمرو شاهي گشته است - و قبل آن فرقهٔ افاغنه بران تسلط داشتند و جنود شاهي را مكرر با عثمان خان سردار ايشان حروب و پيكار رو داده خصوص هرگاه راجه مان سنگه راتّهور كه از ابطال رجال و عمده اراكين سلطنت بوده بصاحب صوبگي اين ملك مامور شد رسيده هرچند بجنگ‌هاى نمايان استخلاص اين ملك از چنگ ايشان كرد - هرگز باتمام ميسرش نگرديد و تا زمان اورنگ آرائي آن بادشاه بانام و جاه هم چنان در ايادى اختيار آن فرقه مانده بعد ازان چون در سنه هفت جلوس نور الدين محمد جهانگير بادشاه مطابق سنه يك هزار و بيست و يك هجري اسلام خان از حضور سلطاني بصوبه داري بنگاله سرفراز شد - او فوجى جري و كار گذار بسر كردگي شجاعت خان تعين نمود آخر بعد از تقارب فريقين مكرر از طرفين حربهاى مردانه درميان آمده نسيم ظفر و فيروزي بر پرچم لواى شجاعت خان وزيد و عثمان خان در عين دار و گير زخمى جان گزا برداشته ازين عالم در گذشت و پسر و برادرش ولي خان و عمر خان با جمعى از رفقاى او به اسلام خان در پيوستند و ملك بنگاله بر اولياى بادشاهي قرار گرفت و در عهد رياست اسلام خان ڈهاكه صدر و ناظم نشين و ملقب بجهانگير نگر و چاٹگام موسوم باسلام آباد

گرديد و او بابادي و انتظام جهانگير نگر همت خود را باقصى الغايت مقصور ساخته شهري در كمال وسعت و فسحت و صفا و زينت ترتيب داده و هم در عهدش ملک آشام مفتوح و ضميمهٔ ممالک و قلمرو بادشاهي شده بود - من بعد اسلام خان از صوبه داري بنگاله معاف و مرفوع شده و بحضور شاهي آمده و از پايهٔ رفيع وزارت كلاه گوشهٔ عزت بعيوق كيوان سود *

ذكر صوبه داري قطب الدين خان وغيره و ناظمان ديگر كه در زمان سلطنت جهانگير بادشاه بامر ايالت جهانگير نگر مامور شدند

يكي قطب الدين خان كوكلتاش و دومي مهابت خان كابلي ست - و بعده در اوائل عهد شاهجهان بادشاه شهاب الدين محمد مهين پور جهانگير كرت ثاني راجه مان سنگه و در آخر عهدش ابراهيم خان بآن سركار سرفرازي يافت و او پيوسته در جهانگير نگر اقامت مي داشت - و شورش رحيم خان افغان و بغي و عناد او با منتسبان سركار بادشاهي در وقتش ظهور يافته مجملي از مفصلش اينكه رحيم خان خود را ملقب به رحيم شاه ساخته با سوبها سنگه زميندار چتوه و ديگر بعضي جاها متفق گشته بردوان و جسر و امره وغيره را متصرف شده در قلعهٔ هوگلي تاخته نور الله خان فوجدار آنجا تاب جنگ با سوبها سنگه نياورده گريخت و ليكن جمعي از فرقه هولنديز سواره بر دو منزل جهاز از راه دريا ملحق بقلعهٔ هوگلي شده بتوپ اندازيها چندان داد مردانگي دادند كه سوبها سنگهه تاب اقامت نياورده بطرف سونار گام گريخت و باز ازانجا مراجعت بسمت بردوان كرده مع رحيم خان بجانب مرشدآباد لشكركشيد و هم در آنجا رحل اقامت انداخت و دختر رام كشن زميندار مقتول بردوان را كه بغارت آورده بود بسبب وفور حسن و جمالش عشقي ازو در خاطر خود جا داده خواست كه بجبر او را بتصرف در آورد - ليكن هربار كه سوبها سنگه قصد بجانب او كرد او خود را بلطائف الحيل ازو نگاه ميداشت ناگاه شبي بغليان شهوت خواست كه شيشهٔ ناموس او را بسنگ حرام كاري بشكند - دختر مذكور كه خنجر تيزي از براى چنين روز پنهان با خود مي داشت - در هجوم نشهٔ شهوتش بزير ناف او چنان زد كه واصل بجهنم شد * * لمؤلفه *

سر انجـــام بدكار بد ميـــرسد * مدان از صنم كز صمد ميرسد

بعد از فوت سوبها سنگه برادرش همت سنگه قائم مقام او شده باستظهار رحيم خان دم استقلال زده در مرشدآباد كه در آن زمان مخصوص آباد نام داشت - كوس انا ولا غيري مينواخت و ببادهٔ نخوت و غرور سرخوش گشته وجود و عدم كار كنان سركار بادشاهي را يكسان مي انگاشت و رحيم خان نعمت خان نوكر بادشاهي را با برادر زاده اش بسبب آنكه سر باطاعت و فرمان برداري او در نمي آورد به تيغ بيدريغ كشت چون اين خبر متوحش بجهانگير نگر به ابراهيم خان ناظم بنگاله رسيد تدارک اين معني را از حيطهٔ امكان خود بيرون ديده عرضداشت كيفيت حال بحضور معلى ارسال داشت و از واقعه نگار وسوانح نگار نيز نويسانيد بر طبق آن فرمان قضا جريان بنام زبردست خان خلف ابراهيم خان كه مبارزي بس شجاع و دلير بود و بعد ازان پس از پدر خود در زمان سلطنت اورنگ زيب عالمگير بادشاه بامر رياست اينجا سرفراز شده براى دفع شورش اين گروه فتنه پژوه صادر شد

و نیز بنام ناظمان و فوجداران صوبه اودهه و الهآباد یرلیغ معلی دریبباب بتهدید تمام ورود یافت بنابران لشکریان و دیگر عظما از رفاقت رحیم شاه پهلو تهي کردند چنانچه او با شر ذمهٔ قلیلی در ماند وهم اشاره فیض بشاره به شاهزاده عظیم الشان پسر بهادر شاه نبیرهٔ اورنگ زیب بادشاه بصوبه داري بنگاله و بهار نفاذ یافت *

ذکر روانه شدن شاهزاده عظیم الشان از حکم پدر بطرف بنگاله بر سر رحیم خان

آن نتیجهٔ سلطنت با سلطان کریم الدین و سلطان فرخ سیر پسران خود و جمعی از بندهای بادشاهي و دوازده هزار سوار عزم بنگاله فرموده اما تا وصول شاهزاده زبردست خان پسر ابراهیم خان بانوارهٔ جنگي و احشام توپخانه بادشاهي از جهانگیرنگر با تیاري تمام بسرعت سریعه از دریا گذشته با رحیم خان که بر کنارهٔ گنگ خیمه زده بود بحرب درپیوست و توپ اندازیهای شایسته کرده بر افواج افاغنه غالب آمد روز اول تا سه پاس روز دوم آن نیز تا دو پاس از هر دو طرف کشش و کوشش و حربهای مردانه آشکارا شد آخر رحیم‌شاه هزیمت یافته عزیمت بسمت مرشدآباد نمود و در آنجا رسیده در فراهم آوردن افواج مصروف شد - و زبردست خان باصغای این خبر پروانجات بنام زمینداران و تهانه‌داران بجهت مسدود ساختن راههای عبور و مرور رحیم شاه و اسیر نمودنش نوشت و اموال مغروته را بفوج خود قسمت نموده دلهای سران شکر را از خود راضي ساخته بدست خود آورد - مجروحان را روانه جهانگیرنگر نمود و سه روز رفع ماندگي کرده با یلغار تمام بجانب مرشدآباد نهضت آرا گشت و در اثنای طی مراحل و منازل زمینداران و تهانه‌داران بنگاله با افواج زبردست خان ملحق مي شدند - و تا داخل شدن مرشد آباد در زیر لوای ظفر پیمای او افزوني فوج چندان گردید که رحیم شاه از هیبت آن بسمت بردوان فرار نمود اما شاهزاده عظیم‌الشان بخیال انکه خبر چیره دستیهای زبردست خان بر رحیم خان اگر بحضور معلی خواهد رسید معلوم نیست که در بارهٔ سرفرازي او چه حکم نفاذ خواهد یافت عجالةً خود را تا اکبرآباد رسانید و هم در آنجا عرضداشت زبردست خان مشعر بر خبر گریختن رحیم شاه و ظهور فتح و نصرت نمایان بحضور او رسید و لیکن چون از شاهزاده بجلدوي این خدمات شایسته که از زبردست خان بعمل آمده نوازشات مبذول نگشت بل بی التفاتي کمال بظهور پیوست لهذا بیدل شده و پاس ادب شاهزادگي نه نموده نقاره زنان از مقابل دائرهٔ دولت شاهزاده گذشته روانهٔ شاه‌جهان آباد گردید - رحیم شاه رفتن زبردست خان را غنیمت و خبر آمدن شاهزاده افسانه پنداشته دست تطاول بر مال اصاغر و اکابر بردوان و هوگلي و حوالي آن دراز ساخته بویراني آن ملک دقیقهٔ فرو نگذاشت - چون دائرهٔ دولت شاهزاده بمرشدآباد نزول فرمود زمینداران و تهانه‌داران و فوج داران با نذر و پیش کش حاضر و رجوع گشته فراخور حال خود سرمایهٔ سرفرازي دریافتند و شاهزاده بادراک خبر ظلم و بدعت رحیم شاه عنان توجه بجانب بردوان منعطف ساخته خواست که رحیم شاه را بلطایف الحیل حلقهٔ اطاعت بگوشش اندازد و لیکن او بدغابازي پوشیدن جامهٔ اطاعت را بظاهر قبول کرده مترصد قابوی وقت مي بود تا وقتیکه میسرش شد دفعةً بمحاربه پیش آمد و اسپ خود را جولان داده بافیل سواري شاهزاده چسپانید و عرصه را برو تنگ ساخت حمید خان قرشي که

یکی از شجاعان نامی و رفیق شاهزاده بود بمعاینهٔ این حال بانگ برو زد که ای نمک حرام شاهزاده منم با من مقابل شو و بسرعت تیری جگر دوز در زه کمان نهاده بر پهلوی رحیم شاه چنان زد که ترازو شد آن مجروح به تدارک آن تیر نپرداخته بود که فوراً تیری دیگر برسرش زد بمجرد رسیدن دو زخم کاري طاقتی درو نمانده از اسپ در گردید و بر زمین افتاد خان تهور نشان بچستي رسیده سرش برید و بر نیزه کرد و ایما بنواختن نقارهٔ فتح نمود شاهزاده بعد فراغت از کار رحیم شاه داخل قلعه بردوان گشته زلال رحمت بر حال زمینداران آنجا ریخته هر یکی را به نعمت استمالت بنواخت و ویرانهارا آبادان ساخت و جگت رام پسر رام کشن زمیندار مقتول آنجا را خلعت داده باز بر زمینداریش قائم فرمود و حمید خان را در ازای آن چنان جانفشاني باضافهٔ منصب و خطاب شمشیر خاني و بهادري و خدمت فوجداري تهانهٔ سلهت وغیره سرفراز ساخت و قلعهٔ بردوان را که مسکن حاکمان پیشین بود بعمارت جدید آراسته نشیمن خود مقرر فرمود و نیز جهت اداي نماز جمعه مسجد جامع در آنجا بنا کرد و هم در بندر هوگلي گنجي جدید آباد کرده موسوم به شاه گنج عرف عظیم گنج ساخت و بعد فارغ شدن از آبادی آن دیار در جهانگیرنگر آمده سکونت فرمود چون دران روزها خبر بعضی حرکات شاهزاده مثل هولي بازي و پوشیدن لباس رنگ زعفراني که از منهیات شرع است بوساطت وقایع و سوانح نگار بذروهٔ عرض بار یافتگان اشرف و اعلی رسیده بود لهذا فرمان تهدید آمود بخط خاص بنام شاهزاده صادر گشته در عتاب حضور افتاد و مرزا محمد هادی مردی سپاهي پیشه که در ایام محاربهٔ دکهن در حضور بادشاه ترددات شایسته بظهور رسانیده بود وهم بقصاص مظلومي باسترضای خالق جان آفرین بحکم شریعت پسر خود را کشته و منظور نظر سلطاني گشته بخدمت دیواني صوبه اڑیسه سرفراز شده بود از حضور معلی بخطاب کار طلبخان و بدیواني بنگاله مامور گشته وارد جهانگیرنگر گردید و باسعاف و انجاح امورات بادشاهي چنان بامانت و دیانت مصروف شد که دست تصرف شاهزاده از بنگاله و حاصلات آن کوتاه گردید اوقات شاهزاده بکدورت و ملال انجامید و لیکن مرزای مزبور بپاس حرمت شاهزادگي بمجرا و سلام همیشه حاضر مي بود و در اطاعت و انقیاد ظاهر از خود تفاوت نمي نمود و ملک بنگاله را بکار دانیهای خود تشخیص جمعبندي کرده و نسخهٔ یک کرور روپیه تیار ساخته بحضور معلی فرستاد و بیشتر از پیشتر مورد تحسین و آفرین گشت - شاهزاده بملاحظهٔ تدابیر صائبه و افزوني رشد و اعتبار او پیوسته بر عناد و کین مي افزود و درپی آن میبود که او را منعدم فرماید چون تدابیر حصول این مدعا ضرور افتاد لهذا شاهزاده سایر نوکران قدیم نقدیرا که از شجاعت و پر دلي نصیبي وافي داشتند و موافقت با بادشاهزاده حاصل بود بترغیب انعامات و اضافهٔ مشاهره در اخفا با خود متفق ساخته ایما کرد که در وقت فرصت براه گذری کارخان مشارالیه را تمام سازند آن فرقه حسب الحکم شاهزاده منتظر وقت مي بودند چون دستور خان مزبور بود که بوقت سواري بی تعبیهٔ اسلحه بر خود سوار نمي شد و رفقایش نیز بهمان آلات همراه او مي‌شدند - بنابران قابو نمي‌یافتند تا او روزی از روزهای دیوان علی الصباح بر وضع خود با تنی چند از رفقا بحضور شاهزاده میرفت که آن فرقه او را غافل پنداشته ببهانهٔ زر تنخواه بر او شورش کردند او رقم این معني را از ناصیهٔ حال آنها خوانده و این فتنه را از اشارهٔ شاهزاده تصور کرده بچالاکي مع رفقا از هجوم آنها بر آمده و روبروی شاهزاده رسیده بی ادبانه زانو بزانو نشست و دست بجمدهر کرده گفت که این هجوم و فتنه باشارهٔ شماست شاهزاده چون قافیهٔ وقت بر خود تنگ دید با خان

مشار اليه بسماجت و مدارا پيش آمده خود را ازو رهانيد خان مرقوم فوراً بديوان عام آمده عرضداشتي مشعر بر بي اعتدالي نقديان باشارهٔ شاهزاده بحضور معلى ارسال نمود - چون از سلوک شاهزاده او را دلجمعي و اطمينان حاصل نبود لهذا سائر زمينداران و قانون گويان را طلب داشته اشاره در باب تجويز و تعين جاى مناسب كه ازانجا خبر نيک و بد هر سه صوبه توان دريافت جهت سكونت اختيار نمود آخر بعد كنكاش بسيار سر زمين مخصوص آباد متعلقهٔ پرگنه چونه كهالي به پسند در آمده و مع ارباب دفاتر ديواني و قانون گويان و زميندارا‌ن بى اجازت شاهزاده در آنجا آمده طرح اقامت انداخت و در گلهڌيه كه آبادي نداشت محل سرا و ديوان خانه و كچهري بادشاهي جهت تحصيل مال واجب تعمير نموده و فارغ البال درآنجا سكونت ورزيده بخوبي بكار سركار بادشاهي مي پرداخت - اما عرضداشت مرسلهٔ او در بلاد دكهن بملاحظهٔ بادشاه در آمده فرمان عتاب آمود براى وا گذاشت صوبهٔ بنگاله و اقامت بصوبهٔ بهار بنام شاهزاده عظيم الشان صادر شد بادراک اين معني شاهزاده سر بلند خان را در جهانگيرنگر باسلطان فرخ سير نائب گذاشته مع سلطان كريم‌الدين بصوبهٔ بهار در قلعهٔ مونگير كه ساختهٔ شاه شجاع بود رسيده ملاحظه فرمود كه عمارتش بشكست و ريخت در آمده است و بمرمّت و آراست آن اخراجات سنگين متصور لهذا در آنجا فرود نيامده بلب گنگ جاى پسند ساخته شهر عظيم آباد را بنام خود آباد ساخت - و قلعه و شهر پناه محكم احداث فرموده سكونت گزيد و چون در مخصوص آباد كار طلب خان بسال تمامي مجمل كرده براى دستخط كاغذات تشخيص و تحصيل بدرپ نرائن قانون گوى صدر بر حسب دستور آنوقت كه بدون دستخط قانون گوى كاغذات مالي و ملكي وغيره منظور ديوان كل خالصه بادشاهي نمي شد تكليف كرد او در خواست سه لک روپيه در وجه رسوم خود نموده بعد ازان دستخط نكرد ناچار مشاراليه از جي نرائن قانون گوى ديگر كه شريک درپ نرائن بود بر كاغذات دستخط كنانيده و پرواى مخالفت شاهزاده و درپ نراين نكرده بحضور معلى رفته هندويهائى زر كثير و تحائف و پيش كش بى شمار از بنگاله بحضور معلى و وزير گذرانيد و كاغذات صوبه به مستوفى و ديوان كل سپرده از حضور بخلعت و خطاب مرشد قليخان سرفراز و باضافهٔ منصب و صوبه داري بنگاله و بهار و اڑيسه و انتظام امورات ديواني آن ممتاز گشته معاودت نمود *

ذكر صوبه داري مرشد قلي خان

او بعد رسيدن بمرشدآباد خدمت ديواني بنگاله به سيد اكرم خان و نيابت اڑيسه به شجاع الدين محمد خان داماد خود مقرر نمود و دران زمان بعد از زبردست خان اعتصام خان از حضور والا بصوبه داري جهانگيرنگر مع اسلام آباد و روشن آباد و سلهت مقرر بود بالجمله مرشد قلي خان در آبادي و معموري شهر مخصوص آباد باقصي الغايت كوشيده موسوم بمرشد آباد ساخت و چكلهٔ ميدني پور را بر طبق مصلحت وقت از صوبهٔ اڑيسه خارج نموده مضافات صوبهٔ بنگاله گردانيد و سائر زميندارانِ معمولات خود را بحضور طلب داشته در قيد نگاه داشت و جهت وظيفه و معاش آنان كارها مقرر ساخته بجز رسي از رعايا مال واجب سركار مي گرفت مگر زميندار بيربهوم و بشن پور بحمايت انبوه جنگل و كوه نزد مرشد قلي خان رجوع نياورده

معرفت وکلای خود وجه پیشکش مقرري و فرمایشات و نذورات را میرسا نیدند و مرشد قلي خان بعد سال تمامي مجمل نموده یک کرور و سه لک روپیه علاوه محاصلات جاگیر باتحائف این ملک و ولایت انگلند ارسال حضور معلی نموده در جلدوی حسن ترددات خود بکفایت سرکار بادشاهي از پیشگاه والای شاهي بخطاب علاءالدوله موتمن الملک جعفرخان نصیري نصرت جنگ و باضافهٔ منصب و عطیه علیهٔ ماهي مراتب سرفواز شده باستقلال تمام مدت دوازده سال وچند ماه بصوبه داري این ملک پرداخت وقوم الیمان که در بنگاله کوٹهي نداشت و کاروبار تجارت معرفت فرانسیس مي نمود باتفاق فرانسیس نذرانه بحضور او گذرانیده سند حاصل ساخته مکان کوٹهي در بانکي‌ابازار گرفته اول خانهای کاهي بر پا نموده طرح اقامت انداخت و بعد ازان عمارات و بروج و خندق عمیق و پهناور که آب دریا اندرو جاري و راه آمد و رفت سُلُپ از هر چهار طرف باشد به اخراجات کلي تیار نموده - و بمرتبهٔ کار او بلندي پذیرفت که بر کلاه پوشان دیگر تفوق مي جست بمشاهدهٔ این حال دیگر بعض گروه خرد پژوه انگلشیه و قوم هولندیز بفکر برداشتن کوٹهي او متفق گردیده با احسن الله خان فوجدار بندر هوگلي شکایت فتنه پردازي و خون ریزي و احداث کوٹهي باین متانت نمودند خان مشارالیه کیفیت حال را بجعفرخان عرضداشت و بر طبق آن از حضور جعفرخان پروانهٔ محتوي بر ممانعت بنای کوٹهي بنام احسن الله خان صادر شد و لیکن الیمان تحقیر این حکم نموده بمجادله پیش آمد و فرانسیس نیز مخفي کمک الیمان مي نمود - آخر در جنگ و جدل تاب مقاومت نیاورده در پردهٔ شب باعیال و اطفال از کوٹهي بر آمده راه ولایت پیش گرفت بالجمله چون درین مقام در ضمن شرح احوال بنگاله تحریر برخي از کیفیت احوال آشامیان و مآل حال شاه شجاع ضرور شد - لهذا بر دیباچهٔ اعلان مي نگارد ٭

برخي از ذکر شاه شجاع برادر عالم گیر بادشاه

هرگاه در عهد دولت محمد اورنگ زیب عالم‌گیر بادشاه شاه شجاع برادرش طریق بغي ورزیده بطرف این هر سه صوبه بعزم تسخیر لشکر کشیده و اورا با عساکر گردون ماثر شاهي در مقام کچهوه اتفاق مجادله افتاده ظفر بجانب او و هزیمت بلشکر بادشاهي رو داده اما امرای بادشاهي بتدبیر صائب خویش اله وردي خان میر بخشي شاه شجاع را با خود موافق ساختند و او از راه غدر شاه شجاع را ببهانهٔ خوف تیر و تفنگ از بالای فیل بر اسپ سوار گردانیده آوازه انداخت که شاه شجاع کشته شد چون لشکریان او را بر فیل ندیدند آن دروغ بی فروغ را راست انگاشته رو بگریز نهادند و شاه شجاع باشر ذمهٔ قلیلی فرار نموده خود را در بنگاله رسانید و سدالباب به تلیاگدّهي و سکرّی کرده اکبرنگر عرف راج محل قرار گرفت چون همدران ایام آشامیان نیز سر از ربقهٔ اطاعت بر آورده راه مخالفت مي پیمودند بنابران محمد اورنگ زیب عالم گیر بادشاه برای تمشیت و کفایت این هر دو مهم عمدهٔ امرای عظام عمدة الملک خان خانان معظم خان را که از جمله امرای کبار و سپه‌سالار و مردی بس جري و از سادات صحیح النسب ولایت ایران بود بصوبه‌داري بنگاله نام زد ساخته کسیل فرمود ٭

ذکر صوبه داري معظم خان

چون خان خانان بدرۂ سکري و تلپاکري رسیده راه را مسدود یافت ناچار براه جهاز کهند با محی شاقه مع دوازده هزار سوار در ملک بنگاله رسیده اول در تدبیر کار شاه شجاع افتاد شاه شجاع ازین معني سراسیمه شده بر نوارهای بادشاهي که از جهانگیرنگر طلب داشته بود سوار شده به تري راه جهانگیرنگر پیمود و خان خانان از راه خشکي تعاقب او نموده بجهانگیرنگر در آمد - شاه شجاع درینجا نیز امکان اقامت در خود نیافته با معدودے از رفقا بجانب آشام گریخت و راجۂ آشام از بیم و سطوت خان خانان پیغام صلح و معذرت نامه بذریعۂ وکیل نزد خان خانان فرستاد چون دران نامه اظهار عدم قصور خود و سرکشي و دست درازیهای پیم نرائن زمیندار کوچ بهار بولایت بادشاهي نموده بود لهذا خان خانان نظر بر مصلحت وقت عذر او پذیرفته وکیل او را مخلّع رخصت فرموده و رشید خان را با دیگر چندی از سرداران تعین نموده که حسب قرار داد آشامیان هر قدر از ولایت بادشاهي در حیطۂ تصرف آشامیان آمده است آنرا ازیشان استرداد و دخل نماید و وکیل پیم نرائن زمیندار کوچ بهار را پیش خود راه نداده مقید ساخت و رشید خان بسمت مقصود رفته پرگنه گدهي باري و چند پرگنۂ دیگر را تاکنارۂ آب بیاس که از معمولات بادشاهي بود گرفت و چون سابقاً سبحان سنگه بوندیله به تنبیه پیم نرائن زمیندار کوچ بهار تعین شده بود و از و تمشیت آن امر نشده و درین اثنا باز آشامیان سر از متابعت گردانیده شورش و فساد تازه شروع کرده بودند - لهذا خان خانان تادیب هردو را نصب‌العین همت ساخته عرضداشت کیفیت حال را بحضور معلی ارسال داشت و بر طبق آن حکم ناطق در تسخیر آن هر دو ملک صادر شده - او در سنه ۱۰۷۲ یک‌هزار هفتاد و دو هجري احتشام خان یکی از امرای بادشاهي را بصوبه داري جهانگیرنگر مقرر نموده و سید افتخار خان را در کمک احتشام خان مقرر نموده و انتظام مهمات خالصۂ شریفه را به بهگونت سنگه بدستور بحال داشته و اهتمام نوارہ به محمد مقیم سپرده بکوچ بهار رفت و با زمینداران آنجا جنگ نموده به تردد تمام تا رنگ پور وغیره بتصرف در آورد - و بشن نراین نسر پیم نراین زمیندار برضا و رغبت خود حلیۂ اسلام پوشیده با خانخانان پیوست و پیم نرائن دربهوتّنت رفته بدامن کوه نشسته در ویراني رعایا میکوشید و بهوتّنت به پانزده کروه بسمت شمال کوچ بهار مابین مغرب و شمال بنگاله مائل به شمال واقع و طولش پنجاه و پنج کروه است و خانخانان بعد از فتح کوچ بهار اسفندیار بیگ را مع چند منصب دار و چهار صد سوار بکار فوجداري آن جا گذاشته و آنجا را به عالمگیر نگر موسوم ساخت و خود متوجه به تسخیر آشام گردید و نوارۂ بادشاهي را از جهانگیرنگر طلب داشته و به تري و خشکي جنگ در انداخته کدگاؤن و سلپاتي و اکثری از بلاد آشام را بقبض و تصرف در آورده و مذهب مبین اسلام را درآنجا جاري ساخت - و راجۂ آشام بطرف کامروپ گریخت - و فوج آن شقي در کوه و جنگلستان بکمین نشسته همیشه شورش و فساد تازه بر افواج بادشاهي بر پا مي ساخت و خان خانان و میر مرتضی و راجه امر سنگه وغیره را بمحافظت کدگاؤن وغیره والات و ادوات راجۂ آشام که بدست آمده بود مقرر نموده خود در موضع متهرا پور بقصد گذرانیدن ایام برشکال آمده خیمه ساخت و جادو و سحر آشامیان که مشهور ست به خان‌خانان کارگر شده بدرد جگر مبتلا گردید چون آن درد یوماً فیوماً در اشتداد بود بقلعۂ حاجي‌گنج که از شهر جهانگیر نگر

بفاصلۀ چار و نیم کروه واقع ست و برای سکونت خود ساخته بود رسیده جان بحق تسلیم نمود و معتمدین مصاحبینش بر حسب وصیتش نعش او را چند صباح در آستانۀ قدم شریف که به معادي گنج مذکور است برسم اسلام امامیه امانةً بخاک سپرده در موسم جهاز روانۀ نجف اشرف که از توابع بلاد عربستان و مزار فایزالانوار جناب علي بن ابوطالب دران سر زمین بهشت آئین ست فرستادند و مدفون گردانیدند - و قلعۀ و خانه‌اش الحال خراب و ویران ست مگر بعض از فصیل های شکسته وغیره باقي ست اما تتمۀ احوال صوبۀ بنگاله اینکه : —

ذکر مجملاً صوبه داري اولاد جعفر خان نصیري وغیره

بعد انتقال جعفر خان نصیري صوبه‌داري هر سه صوبه بدستور به شجاع الدوله شجاع‌الدین محمد خان خویش دوم جعفرخان نصیري که در حین حیاتش نائب صوبۀ اڑیسه بود از حضور محمد شاه بادشاه مقرر شده و او مدت دوازده سال بآن امر بخوبي قیام نموده و بعد رحلتش پسرش علاءالدوله سرفراز خان بدستور پدر خود بآن امر سر بلندي یافته مرزا غالب علیخان داماد خود را که از سلسلۀ علیۀ صفویه بود بایالت جهانگیرنگر مقرر ساخت اما یک سال و دو ماه و چند روز از تمکن او بر وسادۀ ایالت این هر سه صوبه گذشته بود - که بجنگ محمد علی وردیخان بهادر مهابت جنگ کشته شد *

ذکر ابتدای ریاست محمد علي وردیخان بهادر مهابت جنگ

تبئیین این مقال آنکه چون محمد علی وردیخان بهادر مهابت جنگ که از قبل پدر سرفراز خان به نیابت صوبه عظیم آباد مامور بود - بسبب بعضی امر که باعث بر حسد بود خاطر خود را از طرف سرفراز خان راست نداشت و پیوسته در فکر آن مي بود که اگر دست یابد سرفراز خان را از میان بردارد لهذا با موتمن الدوله محمد اسحاق خان بهادر که بحضور سلطاني تقرب کمال بهم رسانیده محسود وزیر و سایر امرای حضور گردیده بود بقبول یک کرور روپیه پیشکش و رسانیدن اموال ضبطي خانۀ سرفرازخان توسل جسته مخفي استدعای خدمت صوبجات ثلاثه نموده فرمان شاهي مشتملبر جنگیدن با سرفراز خان و انتزاع صوبجات مذکور ازو حاصل ساخته زین‌الدین احمد خان داماد کهتر خود را از جانب خود در عظیم آباد نائب گذاشته باشتهار تنبیه زمیداران بهوجپور با فوجی مردانه که از قبل آراسته بود بطرف مرشدآباد حرکت نمود چون بحسن تدبیر خود از درۀ شاه آباد گذشته قریب راج محل رسیده عرضي بحضور سرفراز خان باین مضمون ارسال داشت که چون مذلت و خفت برادرم حاجي احمد بحضور سامي بحد افراط رسیده و کار به بی ناموسي کشیده لهذا فدوي بپاس ناموس لا علاج شده تا اینجا رسیده است و لیکن غیر از فرمان برداری و اطاعت مقصودی ندارد امید که حاجي را مع تبعه و لحقه اش نزد بنده رخصت فرمایند سرفراز خان بادراک این خبر معه فوج خود از شهر مرشد آباد نقل بطرف مهابت جنگ نمودن مناسب دانسته با رفقای قدیم پدر خود مثل محمد غوث افغان که مبارزی بی بدل بود

و مردان عليخان و مير مرتضى و حاجي لطف علي خان كه هر يكى از ابطال رجال بودند بر آمده بر موضع كريك برلب آب درياى بهاگرتي منزل ساخت و ازان طرف مهابت جنگ نيز قريب تر رسيده بجنگ در پيوست باوجود آنكه فوج سرفراز خان سامان درست نداشت كارزار شايسته - ودستبردهاى مردانه نمودند تا آنكه گلولۀ تفنگ بر سر سرفراز خان رسيده كارش را تمام ساخت مع هذا محمد غوث خان فوج طرف مقابل خود را هزيمت داده ونند لال سردار آنجانب را كشته بقلب فوج مهابت جنگ در افتاد و بسياري مردان كارى را بكشت و خود هم با رفقا كشته شد - هم چنين چند سردارى ديگر كه نام شان بالا مرقوم گشته بدلاوري جانهاى خود را در پى آقاى خود در باختند بعد دو روز اين واقعۀ عظيمه مهابت جنگ در اواسط شهر صفر سنه ۱۱۵۳ يك هزار و يكصد و پنجاه و سه هجري داخل شهر مرشد آباد شده و بر مسند امارت مستقر گرديده پيشكش موعود را بحضور معلى ارسال داشته بحصول سند صوبه داري هر سه صوبه و خطاب حسام الدوله شجاع الملك محمد علي وردي خان بهادر مهابت جنگ و منصب هفت هزاري و مراتب ماهي مفتخر و مباهي گرديد - و زين الدين احمد خان داماد كهتر خود را بخطاب احترام الدوله بهادر هيبت جنگ و منصب هفت هزاري و ماهي مراتب و پالكي جهالردار و نوبت و علم از حضور سلطاني معزز گردانيده صوبه‌داري عظيم آباد را اصالةً باو داد و هم چنين نوازش محمد خان را به نيابت چكلۀ جهانگير نگر و سلهت و اسلام آباد عرف چاتگام مقرر نمود و ليكن بعد چندي نوازش محمد خان را از جهانگيرنگر طلبداشته بخدمت ديواني هر سه صوبه و منصب هفت هزاري و مراتب مذكوره و خطاب احتشام الدوله بهادر شهامت جنگ سرفراز گردانيده و حسين قلي خان را بجايش به جهانگير نگر گماشت و چون شهامت جنگ مرد مشقت كش و چندان بتمشيت امور فائق نبود لهذا حسين قلي خان را كه بارزانت راى و اصابت شعور بود باز از جهانگيرنگر طلبيده به نيابت شهامت جنگ مقرر نمود و حسين الدين خان برادرزادۀ حسين قلي خان را كه جوانى قابل و بحليۀ كياست محلى بود بر منصبش بجهانگيرنگر گسيل ساخت و برادر زادۀ سوم اوسط خود سعيد احمد خان را كه از عهد شجاع الدوله و سرفراز خان بفوجداري رنگپور مامور بود بمناصب و مراتب مذكوره مع خطاب مهتم الدوله بهادر صولت جنگ از حضور معلى معزز گردانيده بنويد كار صوبۀ اڑيسه بعد انتزاعش از مرشد قلي خان داماد شجاع الدوله خورسند ساخت هم چنين هريكى از ذوالقربى و رفقاى قديم خود را بخدمات لائقه و منصب و مراتب شايسته بنواخت •

ذكر رفتن مهابت جنگ بجنگ مرشد قلي خان و گريختن مرشد قليخان وغيره

بعد تمكن بر مسند ايالت و انفراغ از رتق و فتق مهمات صوبۀ بنگاله افواج قاهره آراسته عزم بجانب مرشد قلي خان نمود - اگر چه مرشد قلي خان در ابتدا طالب صلح گشت و ليكن باز باغواى بعضے از رفقاى خود با مهابت جنگ جنگيده و هزيمت يافته بطرف مچهلي بندر بدر رفت و آخر الامر با اهل و عيال و مال و منال خود كه بحمايت راجه رتي پور مالك معبد جگرناتهه از دست مهابت جنگ مصون مانده

بود به بعضے از حدود ممالک دکهن که قلمرو آصف جاه بود رفته رحل اقامت نهاد و مهابت جنگ داخل شهر کٹک شده و بندوبست آن صوبه را درست نموده بر حسب وعده سعید احمد خان بهادر صولت جنگ را به نیابت آن صوبه منصوب ساخت و خود بمرشد آباد رسیده بخاطر جمعي بمهمات مالي و ملکي پرداختن شروع نمود و چون در اندک زمانی صولت جنگ را بسبب بعضی جهات با عماید و رؤسای آن ملک موافقت نشد لهذا باغوای و مددگاري آنها محمد باقر خان داماد مرشد قلي خان از طرف دکهن آمده تمامي آن صوبه را گرفت و صولت جنگ را مقید ساخته مهابت جنگ با صغای این خبر بار دیگر در آنجا رفته او را بجنگ شدید خلاص ساخت و نیابت آنجا رابه شیخ معصوم نامي عطا نمود بعد از شیخ معصوم عبدالنبي خان عموی مصطفی خان بهادر ببر جنگ که سپه سالار مهابت جنگ بود قرار گرفت و هرچند بعد ازوی چندی پسرش و نیز راجه دولبهه رام که متعاقب بپایهٔ دیواني خالصه شریفهٔ صوبه‌جات بنگاله وغیره سر بلندي یافته مخاطب به مهاراجه مهندر بهادر و مفتخر بمنصب پنجهزاري و نوبت شده بود بامر نیابت انجا پرداختند لیکن بالآخر آن صوبه در چوّت مرهتّه مقرر شده از جانب مهابت جنگ وهم از جانب مرهتّه به میر حبیب تسلیم یافت *

ذکر مهابت جنگ و مرهتّه رگهوجي بهوسله راجهٔ ناگپور و بهاسکر پندت

چنانچه مجملے از مفصلش این ست که چون در آن روزها در قوایم قصر سلطنت ضعفے تمام راه یافته بود بنابران صولت و سطوت امرای شاهي از خاطرهای کلان تران ملک محو شده هرکسی را از هر سمتی داعیهٔ کشور ستاني در دل جاگرفته بود چنانچه رگهو جي بهوسله راجهٔ ناگپور بقصد تسخیر ملک بنگاله بهاسکر پندت را مع چهل هزار سوار جرار بایین صوب فرستاد و از درهٔ پچیت در آمده به بردوان سر بر آورده در غارت و ویراني آن ملک دقیقهٔ فرو نگذاشتند - مهابت جنگ باستماع این خبر فوجی آراسته بر سر او رفت و جنگید - بهاسکر تاب جنگ مهابت جنگ نیاورده بطرف بیر بهوم رفت و ازانجا عزم بالجزم بطرف ملک خود داشت که باز باغوای میر حبیب که یکی از اهالي ایران و متوسل و نائب مرشد قلی خان بود و بعد زوال دولتش رفاقت رگهوجي بهوسله اختیار نموده بود پای استقلال فشرده و بار ثاني بمرشد آباد آمده در حرب و قتل و غارت دقیقهٔ فرو گذاشت ننمود - و تا مدتی بزور و شور تمام کٹوه را دائرهٔ لشکر خود ساخته ملک بردوان وغیره را در حیطهٔ تصرف داشت آخر بحسن تدبیر مهابت جنگ و مردانگي و کار گذاریهای مصطفی خان افغان که از سرغنه امرای مهابت جنگ و دلاوری بی نظیر بود و سردار خان روهیله از متابعان مصطفی خان و دیگرسرداران علاقه او بهاسکر مع فوج گریخته از بنگاله بدر رفت چنانچه بعد این معرکه تا دیري رگهوجي راهواي تسخیر ملک بنگاله و طلب چوّت یعني ربع حصه از زر تحصیل قلمرو بادشاهي که قبل آن گاهی در ملک بنگاله رواج نداشت در خاطر نبود و لیکن باز بهاسکر را باتفاق علی قراول یکی از عظمای ملک دکهن

و میر حبیب به بنگاله فرستاد آنها چون آفت ناگهاني بمرشدآباد برسر مهابت جنگ ریخته حوالي آن را غارت کردند چون این بار لشکریان مهابت جنگ را بسبب مشقتهای حروب سابقه کسالت برابدان راه یافته بود لهذا رای مهابت جنگ بران قرار گرفت که این بار اینها را بحیله دفع سازد چنانچه این امر را مصطفی خان که مردے عیار و زبان‌آور و بکار بغایت هوشیار بود کفیل گشته و با سرداران مرهته در ساخته سخنان سلوک و مصالحه در انداخته قرار داد بران نهاد که سرداران مرهته جریده نزد مهابت جنگ آمده ملاقات نمایند و بهتصفیه و معاملهٔ چوت پردازند و بنای این ملاقات درخیمه شده بود چنانچه رسیدن سرداران مرهته قریب خیمه تنها همان و کشته شدن بدست سرداران معتمد مهابت جنگ که اخفا در کمین بودند همان چون این خبر در لشکرگاه مرهته فاش گشت میر حبیب که بدام تزویر مهابت جنگ نیامده بود مع افواج گریخته بطرف ملک ناگپور رفت و مهابت جنگ بانیل مقصود در مرشدآباد رسیده بکام دل بادوستان بعیش و کامراني نشست - و چون درین معامله با مصطفی خان وعده نموده بود که بعد فراغت از کار مرهته صوبهٔ عظیم‌آباد را باو عطا نماید لیکن بملاحظهٔ احترام الدوله زین الدین احمد خان بهادر هیبت جنگ که برادر زاده و داماد کهترش بود و آن صوبه باو تعلق داشت مصطفی خان را بلطائف الحیل و وعده وعید میگذرانید و لیکن آخر کار بسبب عهد شکني ناچاقي و رنجش درمیان آمده ساغر اتفاق بباده نفاق مملوشد - و مصطفی خان طوعاً و کرهاً از نوکري استعفا نموده ببهانهٔ وطن خود با تیاري تمام و استعداد مالا کلام بطرف عظیم‌آباد شتافت - چون نزدیک رسید - هیبت جنگ خبر وصول مصطفی خان دریافته با فوجی که از قبل آراسته و مهیا داشته بود مستعد کارزار گشت هر چند در دو سه حربی که شد بمقابله مصطفی خان فوجش کشته و زبون گردید و لیکن چون خواستهٔ تقدیر بانعدام مصطفی خان بود در جنگ سیومي گلولهٔ تفنگ ناگهاني بر سینه‌اش رسیده کار او تمام گردید و مرتضی خان پسر و رفقایش مغلوب گشته پناه به مرهته و میر حبیب بردند و ملازم سرکار رگهوجي شدند-قضارا بعد چندے از معاملهٔ مصطفی خان با شمشیرخان و دیگر بعضی برادران افغان نیز که بعد از مصطفی‌خان درعرصهٔ نام و نشان و اعتماد در آمده بودند ناچاقي درمیان آمده صحبت بوهم خورد سببش اینکه در جنگ مرهته که از آنها گونهٔ مسامحت بعمل آمده بود مهابت جنگ کینهٔ آن در دل فرا گرفته و عمل بر سازش آنها با مرهته نموده مع رفقایش از نوکري جواب داد شمشیرخان وغیره سندی باقي خود را که قریب ده لک روپیه بود از مهابت جنگ گرفته بقصبهٔ دربهنگه که وطن مالوف شان بود رفتند و بیکار در خانه نشستند ازانجا که دران روزها هیبت جنگ را با وجود فرط شعور و رای دور اندیش بخیال همسري مهابت جنگ داعیهٔ آن که در دل شده بود که سرداران لشکر خوب و مستعد نگاهداشته رساله هاي افواج خود را برابر مهابت جنگ گرداند لهذا بنفایس تقریر از مهابت جنگ اذن گرفته شمشیر خان و سردار خان را با برادران شان که جمع کثیر بودند طلبداشته ملازم سرکار خود گردانید ازانجا که شیوهٔ بی وفائي در طینت آن قوم مخمر ست و به سفک دماء و بیرحمي از سائر اقوام ملک هندوستان موصوف شمشیرخان خیال تسخیر عظیم آباد در خاطر جا داده و مشورهٔ قتل هیبت جنگ در همدیگر درست نموده روز دیگر ملازمت که با رفقا برای گذرانیدن نذر بر طبق دستور ملک هند حاضر شد و هیبت جنگ را که دران وقت جز معدودی از رفقای بی سلاح و برخی از ارباب اهتمام مثل یساولان و قولاران و نسقچیان پیش او نبودند

در عین گذرانیدن نذر بدشنهٔ ستم کشته و خانه اش را تاراج و با مرهته و میر حبیب اتفاق نموده با فوجی عظیم مستعد کار زار مهابت جنگ نشست چون مهابت جنگ ازین واقعهٔ هائله آگاه شد فوراً با فوجی جرار بتاخت و بجنگ در ساخت و سرداران لشکر مهابت جنگ کثرت اعدا را که مع لشکر مرهتّه هفتاد هزار کس بودند در خاطر نیاورده صف لشکر را دریدند و شمشیر خان را کشتند و قوم مرهتّه و میر حبیب بمعاینهٔ این دلاوریها از لشکر مهابت جنگ یکبار رو بفرار نهادند و تا سرحد ملک خود هیچ جا نیارامیدند این از اواخر جنگ‌های نامي بود که مرهتّه را با مهابت جنگ رو داد و بعد ازان باز دو سه بار که در ضلع میدني‌پور با لشکر مهابت جنگ محاربات خفیفه کردند از جمله حرکات مذبوحي بود آنرا حسابی نتوان کرد الحاصل مهابت جنگ بعد از قتل شمشیرخان از سر نو بندوبست صوبه عظیم‌آباد نموده هم عنان ظفر و اقبال بدار الامارة مرشدآباد نهضت آرا گشت و در آنجا رسیده تا آخر عمر بفرحت و تنعم بکام خود و دوستان بنشست چون غیر از فساد مرهتّه خللی دیگر در قلمرو او نبود و اگرچه تا مدت ده سال با آنقوم جنگها کرده و هر بار بیاوري اقبال قرین ظفر و فیروزي گشته و لیکن نزد رای رزین خود معاملهٔ مرهته را سهل و سرسري و حیات باقي ماندهٔ خود را قبل از پایان پذیرفتن آن بطرز مجادله و مخاصمه کافي نا نگاشته بصلح و صفا رضا داد و بعد از خود سراج الدوله را نیز مقاوم آنها نه پنداشته بر حسب درخواست رگهوجي و میر حبیب صوبهٔ کتک را در چوت وا گذاشته و از حاصلات بنگاله نیز دوازده لک روپیه، بران مضاف ساخت و مقرر چنان نمود که میر حبیب معتمد سرکار رگهوجي ست بصورت نوکري مهابت جنگ نائب آن صوبه بوده زر را تحصیل نموده بسرکار رگهوجي رسانیده و مصالح الدین محمد خان از طرف مهابت جنگ در آنجا نزد میر حبیب مشارک امور بوده پیوسته در تنظیم این کار مي پراخته باشد - چنانچه مصالح الدین محمد خان را مع سند و خلعت برای میر حبیب رخصت فرمود و آن قضیه را بدین تدبیر صائب منفصل نموده خورد و بزرگ ملک بنگاله را از اذیت و اضرار مرهتّه رهایند اکنون برخی از مآل حال سراج الدوله و خاتمت کار حسین قلي خان نایب شهامت جنگ و حسین الدین خان صوبه دار جهانگیرنگر را در سلک تحریر در مي آرد تا این مختصر نمونه از خرواري باشد *

ذکر سراج الدوله و حسین قلی خان و حسین الدین خان وغیره امیران جهانگیر نگر

مخفي نماند که چون مهابت جنگ سراج الدوله را دوست تر میداشت و غایت مرتبهٔ الفتش او را بران قاصر گردانید که با وجود لا اُبالي محض بودن او من بعد او ولي‌عهدش باشد لهذا سراج الدوله را داعیهٔ آن شد که حین حیات مهابت جنگ خارها یعني چندی از عظمای دولت مهابت جنگ را گمان عداوت و کینه از آنها در دل داشت از راه مقصود خود پاک سازد خصوصاً حسین قلي خان و حسین الدین خان را بفهم ناقص خود از عمده معاندان مي دانست حالانکه این هر دو مظلوم خالي ازان بودند و کسیکه عمده مخالف جان او بود او را بسبب کوري چشم عقل خود نمي دید بل دوستش مي انگاشت آخر آن وقت آگاه شد

که کارش از دست و دستش از کار رفت القصه بلطائف الحیل اذن آن هر دو مظلوم بیچاره از مهابت جنگ و شهامت جنگ گرفت و بنای کار برین تدبیر گذاشت که اول از کار حسین الدین خان که در جهانگیر نگر باستقلال تمام ست فراغت نماید و بعد ازان بعمویش پردازد از اتفاقات وقت در آن روزهای مرزا محمد باقر و پسرش محمد صادق زمیندار بعضی از پرگنات بهائی وارد مرشدآباد شده بود سراج الدوله با آنها در ساخته آنها را خفیه برین کار گماشت و محمد صادق را بانعامات لائقه امید وار و بخطاب صداقت محمد خان سرفراز ساخت و او بجهانگیر نگر رسیده و با کوتوال قلعه در ساخته بهنگام شب با جمعیت چهار صد پنجصد مردم در قلعه خزیده حسین الدین خان را کشت شنیده شد که دران روزها حسین الدین خان بمرض مالیخولیا که قسمی از جنون ست مبتلا شده بود و روزیکه مقتول شد لباس سرخ پوشیده هر دم از نشیمن خود برآمده بطرف آسمان می نگریست و می گفت بیا بیا توقف چرا هرگاه محمد صادق بر سر او رسید و بقتلش جسارت نمود رفیقی چند بی اسلحه و بی خبر از کار قضا در خدمتش حاضر بودند - مقابلت با محمد صادق نمودن نتوانسته فراري شدند صبح آن بعض از اراکین شهر جهانگیرنگر مثل مرزا علي نقي شهر امین که قرابت قریبه بآن مرحوم مظلوم داشت و میر ابو طالب نائبش و چندی دیگر پیش محمد صادق حاضر شدند و بتواضع و نرمي ازو پرسیدند که از بهر تصدي صوبه داري اینجا چه سند بشما حاصل ست او شمشیر خود را از نیام بر کشید و نمود آنجمع نظر بر مصلحت وقت نموده آداب بجا آوردند و في الفور از قلعه برآمدند و فوجی لائق ترتیب داده اول پدرش محمد باقر را که بعذر پیري موافقت با پسر نه کرده بود کشتند و بعد ازان بر محمد صادق یورش نمودند چون او از ته کار آگاه شد از بیم فتنه در قلعه مسدود ساخته بود لهذا دیوار جانب شرقي را از صدمات افیال شکسته مع فوج داخل شدند و لیکن محمد صادق بدست نیامد و براهی چنان گریخت که آثارش پیدا نشد و آخر الامر در عهد صوبه داري میر محمد جعفر خان پسرش میر محمد صادق خان صداقت محمد خان را بسبب جرمی ادنی بر سر توپ پرانید و حق تعالی بانتقام حسین الدین خان او را بایین نهج خَسر الدنیا و الاخره گردانید و چون بعد از کشته شدن آن مظلوم کمال نا انتظامي به مهمات مالي و ملکي اینجا راه یافته بود لهذا جهت بندوبست آن راجه راج بلهبه دیوان شهامت جنگ از حضور مهابت جنگ تعین شد و او دراینجا رسیده قریب دو ماه در نظم و نسق مهمات جهانگیرنگر و ضبطي اموال خانه و زمینداري محمد باقر و محمد صادق و اتباع شان پرداخته بمرشدآباد معاودت کرد و مدت صوبه داري حسین الدین‌خان مقتول دوازده سال بود اما سراج‌الدوله بعد فراغت از کار حسین‌الدین در پی فنای حسین قلي خان افتاد و مهابت جنگ بر ارادهٔ او آگاه شده از برای رفع بدنامي خود را به بهانهٔ شکار بطرف راج محل کشیده و شهامت جنگ نیز در خانهٔ خود دم بخود ماند - سراج الدوله با جمعی از سپاه بر در دولت سرای او آمده او را گرفتار کرده قتل نمود و برادرش حیدر علي خان را نیز که از نور بصارت عاري بود بقتل در آورده و از روایت ثقات بدریافت آمده که هرگاه نوازش محمد خان شهامت جنگ این هردو مقتول را از هندوستان با خود آورده بود با ایشان عهد کرده بود که در هنگام آفات و عاهات حمایت ایشان بواجبي نماید و دقیقهٔ از دقائق حفظ شان نامرعي نگذارد و عجب ازین بزرگ یعني مهابت جنگ باوجود دانش و رای وفور چنان

مسحور الفت سراج‌الدوله بود که رضا باین کار نابکار داد لیکن حرکات قبیحه حق تعالی را خوش نیامده سراج‌الدوله را بپاداش این عمل زشت گرفتار ساخت و این ممالک با وسعت و فسحت را از قبضهٔ اختیا اولاد مهابت جنگ بر آورده بدست چنان حکام عادل سپرده که در معرض عدالت و انصاف رعایت نفس خویش هم منظور ندارند - القصه چون مهابت جنگ در سنه یک هزار و یکصد و نه هجري بعارضهٔ استسقا بعمر هشتاد سالگي ازین دار فنا در گذشت *

ذکر مسند نشیني نواب سراج الدوله در بنگاله و ناظمان ڈهاکه جهانگیرنگر

سراج‌الدوله بجایش متمکن گشته صلای ظلم و ستم در داد اول ظلمیکه کرد بر حال گهسیتي بیگم خالهٔ خود یعني زوجهٔ شهامت جنگ بود که اموالش بجبر و غصب داخل خزانهٔ عامرهٔ خود نمود و بعد ازان سرداران لشکر و اراکین دولت مهابت جنگ را از دست و زبان خود چنان بیازارید که همه از برای زوال دولتش دست بدعا بدرگاه خالق کبریا بودند تا آنکه بعد یکسال و دو ماه از صوبه‌داري او بحمایت سرداران با نام و نشان انگلشیه که بسبب غارت نمودن کوٹهي کلکته ازو پر دل بودند برو دست تسلط یافتند و میر محمد جعفر خان بر مسند صوبه داري هر سه صوبه متمکن گشت و بر خلاف مرضي سرداران انگلشیه که گاهی مجوز چنین امور نیستند میر محمد صادق خان بقتلش رسانید و دولت و ریاست از خاندان مهابت جنگ انتقال کرد - روایت کنند که بعد کشتن نعش او را بر فیلی انداخته تشهیر مي نمودند که فیل متصل تربوالیهٔ چوک مرشدآباد رسیده در جائیکه نعش حسین قلي خان مع فیل قرار گرفته بود و خون از سرش چکیده ساعتی ایستاده و قطرات خون از سر سراج‌الدوله نیز همدران جا چکید فاعتبروا یا اولی الابصار اما میر محمد جعفر خان بار اول یکسال بر چار بالش امارت متمکن مانده بسبب ناانتظامي رای که خلق خدا ازان خصوص از دست جفای میرن یعني میر محمد صادق خان پسرش در مصائب گوناگون مبتلا بودند و بعد سوخته شدن خرمن حیات میرن ببرق آسماني معزول شد - در سنه یکهزار و یکصد و هفتاد و چهار هجري بیاوري بخت میر محمد قاسم خان بر مسند صوبه داري بجای میر محمد جعفر خان نشست و بدستور مهابت جنگ و سراج‌الدوله جد مرحوم مبرور را بصوبه داري جهانگیر نگر بر قرار گذاشت و نفاق و منازعات با صاحبان عالیشان انگلشیه او را رو داد آخر تاب مقاومت نیاورده بجانب هندوستان فرار نمود ثانیاً میر محمد جعفر خان بر وسادهٔ ایالت مربع نشین شد *

ذکر نواب جسارت خان صوبه دار جهانگیرنگر

چون بعد کشته شدن نواب حسین‌الدین خان راجه راج بلهب پس از انتظام مهمات جهانگیرنگر بمرشدآباد معاودت نمود از پیش مهابت جنگ در سنه یک هزار و یکصد و شصت و هشت هجري نظم و نسق مهمات

جهانگیر نگر بعد مولف نواب جسارت خان تعلق گرفت و بعد فرار فمودن میر محمد قاسم خان و تقرر دومین میر محمد جعفر خان صاحبان والا شان انگلشیه سایهٔ مکرمت و احسان بر جد مبرور مبسوط داشته از همراهي میر محمد قاسم خان که بناچاري حسب الطلب و خواهش او اتفاق افتاده بود از شهر عظیم آباد بر گردانید و بجهانگیرنگر آورده بقبض تفویض امر ریاست اینجا فرمودند و جد مرحوم مبرور که اوقات حیات مستعار خود را قسمی که بدولت خواهي و خیر اندیشي و رضا جوئی سرکار دولت مدار کمپني عالیشان صرف فرمودند اظهر من الشمس ست و نیز بصاحبان والا شان بهتر معلوم بنابران دربن جزو مختصر بشرح آن حاجت نه نمود اما جد مبرور مدت بست و هفت سال بران امر قیام فرموده قریب انتقال خود ازین سرای فاني بدار السرور جاوداني از برای مقرر شدن این امر بنام سید محمد خان بهادر حشمت جنگ برادر بزرگ مولف پیش نواب گورنر جنرل آن زمان که عماد الدوله مستر وارن هیستیفکس بهادر جلالت جنگ که بحلیهٔ کیاست و فراست و حق شناسي بکمال مرتبه آراسته و پیراسته بود به صاحبان کونسل مستر ریچارد بارول وغیره نگاشتند چنانچه گورنر جنرل بهادر و صاحبان والا شان کونسل نظر بر قدامت حقوق و دولت خواهي جد مبرور و استدعاے ایشان بطیب خاطر منظور فرمودند و در حیات مستعار ایشان برادر مشار الیه را بر مسند ایالت اینجا بدستور آن مرحوم متمکن و مستقر ساختند *

ذکر صوبه داري نواب سید محمد خان بهادر حشمت جنگ

جناب برادر نیز مدت هفت سال بصوبه داري ابن جا پرداخته ازین دار فنا بعالم بقا رحلت فرمودند *

ذکر مسند نشیني نواب نصرت جنگ بهادر

من بعد ان صاحبان عالیشان بدستور نظر بر سوابق خیر اندیشي‌های این خاندان به نسبت سرکار دولت مدار کمپني عالیشان عاصي را در سنه یکهزار و دو صد هجري بمسند صوبه داری اینجا نشانیدند چنانچه این اضعف عباداللّه بافضال الهي و ابذال نوازشات سرکار ممدوح بر ان استقامت و بوظائف دولت خواهي بر قرار معهود استدامت دارد مخفي نماند نواب نصرت جنگ جنت مکان مؤلف رساله هذا تا عهد ریاست خود بقید قلم در آورده ذکر متفرقات چون امکنهٔ قدیم و پل و مساجد وغیره نموده بودند بنابر جلد هذا نا تمام مانده بود بنده فقیر حقیر سید عبدالغني عرف حمید میر ولد سید محمد حسین خان الحسیني که بعهدهٔ عرض بیگی نواب ممدوح بوده انتقال نموده اند برخی از احوال نواب نصرت جنگ مغفور ذکر ساخته تا فوت نواب غازي الدین محمد مرحوم که خاتم مسند ریاست جهانگیر نگر شدند تحریر نمود تذکرهٔ متفرقات فرمودهٔ نواب غفران مآب را در اواخر رساله مندرج ساخت *

برخی از تذکرۂ نواب نصرت جنگ بهادر

اظهر من الشمس ست که نواب نصرت جنگ جنت مکان در عهد ریاست خود بسکه نیکنام و صاحب اقبال شدند که سبقت بر پیشینان بردند فخر خاندان نواب جسارت خان مغفور و شمع بی دود دودمان سید مرتضی مرحوم گردید چنانچه کدخدائی برادر کوچک خود نواب شمس الدوله بهادر با بدرالنسا بیگم صبیۂ نواب مبارک الدوله ناظم مرشد آباد کنانیده باز گشتند و نوبت شاهي که تا آن زمان بر سر چوک نواخته مي شد بدر دولت خود آورده و نواب در پالکي که سواري بادشاهي ست جلوس نموده زیب و زینت بخشید و مردمان وضیع و شریف و امیر زادگان شکسته حال در سایه هما پایۂ آن یگانۂ دوران خود ها را رسانیده بمقاصد دلي و سعادت کامیاب گردیدند و مشهور و معروف است که دربار آن خجسته اطوار نمونۂ بارگاه شاهان و رشک افزای محفل سلاطین نامدار بود چون عمر شریفش بشصت و سه رسید بتاریخ غرۂ شهر ذي قعده سنه ۱۲۳۷ع یک هزار و دو صد وسي و هفت هجري نبوي مطابق سنه ۱۲۲۹ بنگله موافق سنه ۱۸۲۲ع یک هزار و هشت صد و بست و دو عیسوی بروز یکشنبه بعارضه پیچش بر آمدن پنج گهڑی روز ازین سرای فاني بعالم جاوداني انتقال فرمودند و داغ مفارقت خود بر دل متعلقین و متوسلین گذاشتند شش گهڑي روز باقي بود که بحسینیي دالان متصل زینه چون گنج شایگان مدفون گردیدند انا لله و انا الیه راجعون روز وفات آن والا صفات عجب شور وغلغله در شهر بود گویا قیامت قائم گردید و از هنود و مسلمانان تا صاحبان عالیشان انگلشیه بجز چشم گریان و دل بریان بنظر نمي آمد و صدای شیون از هرخانه و فریاد و فغان از هر کاشانه چنان بلند بود که گوش فلک ناهنجار را کر مي‌ساخت مادۂ تاریخش غلام علي خلف میرولي مرحوم چنین گفته * تاریخ

بسر مزار نصیر ملک نوشت کاتب کن فکان * که حساب سال رحیل اوست هذا هو قصر الجنان

و نیز شخصی دیگر گفته مصرع قال طبتم فنعم عقبی الدار بعد از فوت آنصاحب اقبال اکثر از عمائد شهر و روٴسا و سکنای این دیار بعرصۂ قلیل روانۂ عالم بقا گردیدند - بقول شاعری مصرع آن قدح بشکست آن ساقي نماند *

ذکر ریاست نواب شمس الدوله بهادر

بعد فوت برادر - شمس الدوله بهادر بصوابدید بعضی از حواشیان خود چون مرزا محمد علی وغیره خطوط متواتر در استدعای مسند نشیني خود بجای برادر بحضور نواب گورنر جنرل بهادر و اهالي کونسل آنزمان ارقام فرمودند چونکه نواب صاحب ممدوح از سابق در مقدمهٔ گرفتاري خط نواب وزیر علي خان بهادر صوبۂ اوده و دیگر راجه های اطراف و طلبیدن فرانسیس در عهد ریاست نواب پیر جنگ خلف مبارک الدوله مغفور که اختیار کل آن سرکار تعلق بایشان داشت بد نام شده بودند و بسبب آن تا مدت هفت سال در کلکته نظر بند بودند و صاحبان عالیشان انگلستان از نواب صاحب موصوف صاف دل نبوده همیشه در تجسس حالات و تفتیش کارخانجات مي بودند بنابر درخواست شان بدرجه پذیرائي مقرون نکرده از راه دور اندیشي یک پلٹن تلنگه و دو توپ جنگي در ڈهاکه متعین نمودند و از مشاهرۂ نواب نصرت جنگ مغفور یک هزار و پان صد

روپیه سکه خرچ ذات نواب مرحوم قرار داده با نظامت و جاگیر خالصه بازیافت فرمودند نواب صاحب موصوف ازین حال بسکه غمگین و خسته خاطر گردیده گوشه نشینی اختیار نمودند عوام میگویند که نواب شمس‌الدوله بهادر اگر برای نواب قمرالدوله پسر خود که داماد نصرت جنگ مرحوم ست می نوشتند یقین که ریاست قائم و مسند بر قرار مي ماند لیکن گفتهٔ عوام چه اعتماد دارد که گفته اند مصرع هر کسی مصلحت خویش نکو مي داند * الغرض نواب موصوف خلعت ماتم پرسي مرسلهٔ نواب گورنر جنرل بهادر را که في الحقیقت خود خلعت ماتم بود پوشیده دربار عام روز یکشنبه که از قدیم الایام جاري بود موقوف ساختند و با مردمان کم ملاقات مي نمودند و مبلغ معینه یعنی مشاهره خود را بسبب عالي دماغي بنظر نیاورده جمیع نظم و نسق سرکار خود را یک قلم به مرزا محمد علی عرف میان نذکو که از سابق داروغهٔ سرکار شان بود سپرد بلکه مالک سیاه و سپید گردانید مرزا محمد علي چونکه مرد عاقل و جزرس بود باوجودیکه مشاهره و خاص شدن نظامت وغیره هم کارخانجات نظام سابق و متعلقان و منتسبان قدیم و جدید نواب نصرت جنگ مرحوم و نواب شمس‌الدوله بهادر را بحال و بر قرار داشته تقسیم مشاهره ماه بماه مي نمود اگرچه تاهم خود غرضان مشهور کرده بودند که مرزا مذکور نواب صاحب ممدوح را از داد و دهش وارد و صادر باز مي دارد لیکن آن بیچاره این بدنامیها را بر خود پسندیده آنچه لوازمهٔ دولت خواهي و حلال نمکي بود بجای آورد و نواب شمس الدوله نیز بر جانفشاني و حسن تدبیرات او نظر فرموده نیک و خیر خواهیش بحضور گورنر صاحب و صاحبان کونسل نوشته عزت افزائیش خواستند بایمای نواب صاحب عالیشان از سرکار فیض آثار کمپني بهادر بخلعت و خطاب خان بهادر سرفراز شد چنانچه نواب صاحب ممدوح بدربار عام خلعت مرسله را باضافهٔ دیگر از طرف خود سرفراز و ممتاز فرمودند خان مومي الیه بکر و فر تمام از دولت خانه بسواري فیل که هودج نقره داشت سوار شده مراجعت نمود - و تاریخ خلعت پوشي او شاعری چنین نظم کرده * * نظم *

مخلـع مخاطـب چو شد میرزایم * نمـودند شادي همـه خاص و عام
خرد گفـت تاریخ با عیـش ماند * محمـد علیخـان بهـادر مـدام

و این جشن اخیر نواب شمس الدوله بهادر بود بعد ازین هرگاه بعمر شصت و یکسال رسیدند بعارضهٔ چند در چند گرفتار شده آخر الامر بمرض اسهال بتاریخ شهر ذي‌الحجه سنه ۱۲۴۶ هجري یک هزار و دو صد و چهل و شش هجري بروز یکشنبه در وقت یک و نیم پاس شب گذشته مرغ روحش از قفس تن پرواز نمود و بروز دوشنبه سه پاس روز گذشته بود که در دالان مقدس حسیني متصل زینه به پهلوی برادر خود بموجب وصیت خویش مدفون شدند خدایش بیامرزد که عجب عالي دماغ و مرد صاحب حوصله بود و استقلال طبیعت بآن مثابه داشت که در عوارض جسماني تا زمان مرض الموت سه سال مبتلا ماند لیکن کسی درین مدت شکایت مرض یا لفظ آه که مریضان مي‌کنند و اضطراب مي نمایند نشنید ایام ریاست یازده سال بود - خطاب نواب امیر الملک شمس الدوله سید احمد علي خان بهادر ذوالفقار جنگ *

ذکر ریاست نواب قمر الدوله بهادر

بعد انتقال نواب شمس الدوله بهادر - نواب قمر الدوله بجای پدر بر مسند ریاست متمکن گردیده به میر جیون که تا آن زمان داروغهٔ اصطبل بود و دخترش در عقد نواب صاحب بدین طریق آمده که مادر میر مذکور مسماة بیگمه مغلانی نواب بیگم صاحبه بود بنابر دخترش مسماة حسینی بیگم همراه جدهٔ خود دران محل سرای آمد و شد میداشت اتفاقاً نظر خواهش نواب قمرالدوله بهادر براو افتاد چنانچه پدرش را طلبداشته خواستگاری نمودند او این امر را تائید آسمانی تصور نموده و فخر خود شمرده معاً قبول نمود و وقت شب بخانه اش رفته در عقد نکاح خود در آوردند صبح این خبر طشت از بام گردید نواب شمس‌الدوله بهادر باستماع این معنی بسکه غمگین و شکسته خاطر گردیده هر چند تلافی و تدارک فرمودند فائده نه بخشید و سودمند نیفتاد که تیر از کمان گذشته بود آخر درین رنج و الم فوت نمودند الحال که مطلق العنان شدند امورات نظم و نسق سرکار خود را باو سپردند میر مذکور چونکه کاهل الوجود و خالی از ذهن بود بنابر انجام امورات و ضبط کارخانجات سرکار مطابق دستور سابق نتوانسته پریشان و مضطر گردیده نواب ممدوح را قرضدار مهاجنان گردانید و اکثر فتورات در بندوبست مقررهٔ راه یافت نواب موصوف بمعاینهٔ این حال سراسیمه شده بعض از خیر خواهان قدیم چون شیخ محمد ضمیر و مرزا جعفر وغیره را طلب نموده ارشاد فرمودند که خود کرده را چه علاج باید کرد اکنون شما ممد و معاون میر مذکور باشید تا همگی امورات سرکار بخوبی تمام انجام یابد اینها قبول نموده سرگرم مشورت بوده آهسته آهسته دخیل و قابض گشته عرض نمودند که مرزا محمد علی خان بهادر فوت نموده است الحال بنام حور النسا خانم زوجه اش برای محاسبه نالش فرمایند و از اسباب و نقد و جنس سرکار که بخانهٔ اوست همه را باز آرند ازین صورت مبلغ کثیر دستیاب خواهد گردید اجناس فراوان که مرزا مذکور برده حاکم همه را خواهد دهانید نواب صاحب ممدوح ازین سخن روی درهم کشیدند و موافق رای بلندش نیامد لیکن آنها مکرر التماس نموده آخر الامر برین آوردند که نواب صاحب بنام خانم مذکوره بعدالت دیوانی مستغیث شدند و این ابتدای مقدمه سرکار نواب صاحب ست و الا از عهد نواب جسارت خان مرحوم تا این زمان نام کدامی نواب صاحبان در سررشتهٔ عدالت و یا فوجداری ثبت نشده بود چنانچه نقل ست که روزی منشی محمد شفیع یکی از وکلای عدالت نام نواب شمس‌الدوله بهادر را بر سبیل مثل بدین نهج برده بود که نواب صاحب ڈهاکه نیز ازین معامله که در پیش ست واقف اند مستر متفورڈ صاحب بهادر که بتجویز مقدمهٔ مرجوعه مصروف بودند بمجرد شنیدن این کلام حکم دادند که وکیل مذکور را نسبت بی ادبی که بشان نواب صاحب کرده یعنی گواه قرار داده از وکالت معزول نمودم باید که دیگر در کچهری نیاید الغرض نواب صاحب موصوف بعد داخل شدن عرضی استغاثه بنام خانم مذکوره از کردهٔ خود نادم و پشیمان شده مرزا محمد جعفر را که بانی این امور بود نظر انداز فرمودند میر جیون که جویای چنین وقت بود قابو یافته بعرض رسانیده که مشاهرهٔ نواب شمس‌الدوله بهادر که از سرکار ناظم مرشدآباد بسبب دامادی مقرر بود از وقت انتقال نواب مغفرت مآب مسدود ست مصلحت چنان می نماید که یکی از معتمدان و خیر اندیشان این خاندان را

با عرضي جاري شدن مشاهرهٔ مقرره بحضور همايون جاه كه بالفعل مسند نشين مرشدآباد اند فرستاده شود بقين ست كه بملاحظهٔ عرضي حكم بحالي مشاهرهٔ مسدوده اصدار يابد نواب صاحب ممدوح استفسار فرمودند كه لائق اينكار كرا مي بيني مير مذكور عرض نمود كه بهتر از شيخ صاحب كسى بنظر فدوي نمي آيد، نواب صاحب ممدوح اين راى او را پسند نموده شيخ صاحب مذكور را با عرضي خود روانه مرشدآباد فرمودند مير مذكور فرصت وقت يافته براى بهبودي خود نواب صاحب معزى اليه را بانواع و اقسام مسكرات چون شراب و بهنگ و برش وغيره چنان مخمور ساخت كه خبر آشنا و بيگانه نمانده باكه از خود بيخبر گرديدند چونكه انتهاى چنين كارها بدست آخر نواب صاحب را اول عارضهٔ دماغي چون صداع و اختلاف حواس خمسه وغيره لاحق شده بصرعه انجاميد *

بعد از اشتداد مرض بتاريخ هشتم شهر ربيع الثاني سنه ۱۲۵۰ هجري نبوي مطابق سي و يكم ماه ساون سنه ۱۲۴۱ بنگله روز پنجشنبه بوقت برآمدن يک و نيم پاس روز جان شيرين خود را بجان آفرين تسليم نمودند و دو ساعت از شب گذشته بود كه مطابق ضابطهٔ خاندان خود در پائين مزار نصرت جنگ جنت مكان اندرون كوشک مدفون گرديدند تاريخ وفات آن مرحوم شاعرى گفته * * شعر *

دست چون برداشت قمرالدوله از دنياى دون * گشت مائل در ره حق كرد دل را استوار
داد هاتف اين ندا قرب جوار پنجتــــن * يافت در فــردوس مسكـــن بارگاه گلعذار

نواب قدسيه بيگم دختر نواب نصرت جنگ مغفور كه زوجهٔ نواب قمرالدوله مرحوم بودند قبل از فوت شوهر خود بتاريخ يازدهم شهر ربيع الاول سنه ۱۲۵۰ هجري مطابق هفتم ماه ساون سنه ۱۲۴۱ بنگله روز يكشنبه ازين دار فاني به عالم جاوداني رخت هستي بر بستند * * تاريخ وفات آن مرحومه *

چو رحلت قدسيه بيگم نمودند * ز دنيا باغم و اندوه و تكليف
خرد سال وفاتش گفت افسوس * كشيده رنجها بردند تشريف

بپائين خسر خود نواب شمس الدوله بهادر مدفون گرديدند - عمر نواب قمرالدوله بهادر پنجاه و دو سال و هنگام رياست سه سال و شش ماه - خطاب قمرالدوله شمس الملک سيد جلال الدين محمدخان بهادر منصور جنگ *

ذكر مسند نشيني نواب سيد غازي الدين محمد

بعد تجهيز و تكفين نواب قمرالدوله پدر خود نواب غازي الدين محمد بر مسند زينت متمكن گرديده بموجب راى مير جيون مذكور چندى عمل مي نمودند اما بعد خانه نشين شدن او مستر كلي كرافت بهادر كه سشن جج اين ديار بودند و با نواب شمس الدوله بهادر ارتباط تمام و محبت كمال ميداشتند ممد و معاون نواب صاحب گرديدند بسبب اينكه هرگاه نواب قمرالدوله بهادر فوت مي كنند بعض از بزرگان عاقبت انديشان اين خاندان چون آقا عبدالعلي استاد نواب صاحب ممدوح وغيره فهمانيدند عين مناسب است كه حالا حضور پيش

صاحب موصوف حاکم این بلده که دوست نواب شمس‌الدوله بهادر اند تشریف برده بصد عجز و نیاز بفرمایند که صاحب را جد بزرگوارم کمال دوست میداشتند و یکی از مخلصان دلي مي شمردند پس نظر بر اتحاد و یک رنگي آن مغفور فرموده دست شفقت از سر این بی پدر بر ندارند - و برای بهبودي من یتیم هر قدر که ممکن باشد بروح جدم مرحوم بحضور صاحبان عالیشان کونسل و نواب گورنر بهادر ارقام فرمایند نواب غازي‌الدین محمد بهادر هماندم آقا عبدالعلي را همراه خود گرفته نزد صاحب رفته آنچه مصلحت قرار یافته بود فرمودند بلکه از سراسیمگي بیتاب شده بصاحب موصوف چسپیده گریستند صاحب ممدوح هم نواب صاحب را بسینهٔ خود چسپانیدند - نواب شمس‌الدوله را بخاطر آورده آب دیده شده گفت اگر موافق گفتهٔ ما عمل نمائي انشاءالله تعالی شما ثاني نواب شمس‌الدوله بهادر خواهید شد در بهتري شما حتی المقدور کوتاهي نخواهم کرد هرگاه نواب صاحب یعنی نواب قمرالدوله بهادر فوت نمودند نواب صاحب ممدوح صغیر سن بودند از میر غلام علي استاد خود بسکه مي ترسیدند و چون طفلان از نوشت و خواند مي گریختند بنابر میر جیون برای فائدهٔ خود مطابقت رای صاحبزاده نموده عرض کرد الحال حضور را اختیار ست اگر خواهند درس گیرند و گر نخواهند نگیرند کسی را زهرهٔ آن نیست که بر حضور جبر نماید یا ناکید کند صاحبزاده موصوف از سخنش دلیر شده دست از نوشت و خواند بر داشتند بلکه بایمای میر مذکور استاد خود میر غلام علي را امتناع فرمودند که بدولت خانه نیاید و برهنموني بعضی از اوباشان حاضر الخدمت بمی خواري و زنکه بازي مصروف شدند - میر مذکور بدستور سابق صاحبزاده را در ینکو چه راهنما شده دخیل و قابض بود روزی مستر کلي کرافت بهادر و میلتن صاحب کمشنر برای ملاقات صاحبزاده آمد در مبارک برج که مکان نشستگاه نواب صاحبان بود نشستند - صاحبزاده باستماع خبر آمدن آنها میر مذکور را طلب فرموده خود بصاحبان موصوفین مشغول ذکر و حکایت شدند - درین اثنا میر مذکور هم در رسید - صاحب زاده بملاحظهٔ او حکم دادند که بزودي برای نشستن میر صاحب کرسي بیارید چونکه از سابق صاحبان قصهٔ دخترش و آزردگي نواب شمس‌الدوله بهادر و قدسیه بیگم مرحومه مطلع بودند خصوص مستر کلي کرافت بهادر بسبب دوستي نواب شمس‌الدوله مرحوم نواب قمرالدوله را هرچند فهمانیدند که برای شما خوب نیست بهترست که دختر میر جیون را طلاق دهید - نواب قمرالدوله مرحوم سخن او را گوش نه نموده بنابر صاحب موصوف از نواب قمرالدوله بهادر تا دم زیست دیگر ملاقات نکرد و دشمن جاني میر مذکور بود - چون چشم آنها بر میر مذکور افتاد و لفظ نشستن از صاحب زاده شنیدند یکبارگي برخاستند و گفتند بس بس مایان خود مي رویم آمدن او ضرورتے ندارد این بگفتند و بگاړي خود سوار شده رفتند - صاحبزاده و دیگر متعلقان باهم یکدل شده رای زدند که چه باید کرد آخر سخن برین قرار گرفت که آزردگي ایشان بالفعل در حق خداوند سم‌ست - تا حال خط بحالي مشاهره و ریاست از صدر نیامده مناسب است که میر صاحب را برای چند روز خانه نشین گردانند و دیگر کسی را بعهدهٔ میر سامانے مقرر فرمایند چنانچه آقاعبدالعلي را نامزد نموده کلید کارخانجات که از میر مذکور تعلق داشت گرفته همانندم آقای موصوف را پیش صاحب ممدوح فرستادند آقا صاحب موصوف آنچه مناسب بود تقریرهای شایسته نموده صاحب موصوف را راضي و خوشدل گردانیده آمدند - چنانچه همدرانوقت صاحبان مذکورین متفق شده برای بحالي مشاهرهٔ نواب صاحب و دیگر مراتبات

بحضور گورنر بهادر رپورت فرمودند تا بعرصهٔ یک ماه حکم بحالي ریاست و اجرای مشاهرهٔ نواب صاحب بدستور قدیم سوای مبلغ پانصد روپیه سکه بابت انگو نفاذ یافت - بعد صدور حکم هر دو صاحبان نامبردگان خود بدولت خانه نواب صاحب آمده تخلیه نموده آنچه لوازم پند و نصیحت بود گذارش نمودند نواب صاحب حسب ظاهر قبول نموده آقا عبدالعلی را برای انجام و اهتمام امورات سرکار مقرر فرمودند و میر محمد علي را ممد و معاون شان نمودند و خود سر گرم صحبت اوباشان و کمینه‌ها بوده بانواع و اقسام عیش و عشرت چون رقص زنان و بهکتیه و گهانڈو و اسپ دوانیدن و مرغ جنگانیدن و مي نوشي و زنکه بازی و اختلاط فحش وغیره مصروف و مشغول گردیدند علاوه ازان داد دهش بیجا و انعامات زیاده از حوصله اختیار کردند - اگر کسے از متقدمین متعلقین خاندان بطریق پند و نصائح حرفی مي گفت چین بابرو شده غیظ و طیش مي فرمودند و آن بیچاره را بر طرف مي ساختند - بنابر از کهه تا مه مهر خاموشي بر لب نهاده سکوت و رزیدند بلکه اکثر نجبا و شرفا خانه نشین گردیدند آقا عبدالعلي و میر محمد علي عهده برائي این اخراجات در آمدني سرکار نه دیده دست بردار از عهدهٔ معینه شدند نواب صاحب هم خانه نشیني ایشان غنیمت شمرده عهده میر ساماني را به حسین بخش پسر سائیسی که دران هنگام انیس و جلیس بود تفویض فرمودند مثل مشهورست مصرع فکر هر کس بقدر همت اوست - آن نابکار بعرصهٔ قلیل اکثر از جواهرات بیش قیمتي و ملبوس خاص نواب صاحبان چون دوشاله و خلعتهای زرین و زردوزی و قباهای کمخواب وغیره را خود هم گرفت و بیاران خود چون جعفرخان قوال و محمد حسین و مرزا نوروز علي وغیره هم دهانید و بسبب فضول خرچي عهده بر آنشده در دو سه ماه یکماه مشاهرهٔ ملازمان تقسیم میکرد درین ایام زنی از قسم طائفه دار باشندهٔ رنگپور ظهورن نام وارد گردید حسین بخش برای رسوخیت بحضور اطلاع نمود بر طبق آن حکم حاضر نمودن او برای رقص نفاذ یافت چون آن خراب کن این خاندان بموجب حکم حاضر آورد نظر خواهش حضور بر او افتاده چنان واله و فریفتهٔ او شدند که آن زن بازاري را داخل محل سرای خاص نموده بخطاب نواب بیگم سرفراز کردند و حسین بخش و یاران اورا بیشتر از پیشتر سرفراز و ممتاز فرمودند - صاحبان عالیشان خصوصاً مستر کلي کرافت بهادر باستماع این حالت دست تحیر بدندان تفکر گزیدن گرفت و از کرده و نوشتهٔ خود نادم و پشیمان گردید - متعلقان و منتسبان قدیم بمعاینهٔ این حال عریضهٔ متواتر بحضور نواب بدر النسا بیگم صاحبه جدهٔ نواب صاحب که دختر نواب مبارک الدوله مغفور بودند فرستاده امیدوار این امر شدند که اگر جناب عالیه از مرشدآباد تشریف ارزاني فرمایند یقین ست که مفسدان خراب کن این دودمان مفقود و مقهور گردند - و نواب صاحب هم متنبه شده صلاح پذیر شوند بموجب درخواست آنها خود بیگم صاحبه موصوفه نیز نظر بر خداوندي و قدما پروري فرموده تشریف آوردند و هرچند فدر و تدبیر نمودند سودمند نیفتاد بقول سعدي علیه الرحمة * بیت *

خــوی بــد در طبیعتي که نشست * نــرود جز بــوقت مرگ از دست

چنانچه جناب عالیه از آمدن خود متخجّل و منفعل گردیده عازم مرشدآباد شدند درین اثنا بعین روانگي بیگم صاحبه معظمه ظهورن مذکوره از نواب صاحب ناراض شده نزد مادر خود که بمکان دیگر میبود رفته نشست هر چند حضور بطلب او کسان فرستادند نیامد عند الاستفسار معلوم شد که او شکایت از حسین بخش دارد تاکه او درین سرکارست نخواهد آمد نواب صاحب همانکم حسین بخش را مع هوا خواهانش بیرون کرده

ممانعت دخول فرمودند یعني درون ڈیوڑهي دولت خانه اگر پا نهد بشکنند - عبدالعلیم داروغهٔ سرکار جناب بیگم صاحبه معظمه بسکه چالاک و پرتدبیر بود فرصت وقت یافته با مسماة مذکوره پیوست و بصحابت آن بحضور نواب صاحب رسائي نموده بسخنان ملائم دلجوئي‌های نواب صاحب کرده بخدمت جناب عالیه بیگم صاحبه برده بقدم انداخته عفو تقصیرات کنانید جناب بیگم صاحبه این معاملات را از اقبال خود تصور فرموده شکر خدا بجا آورده و بعرصهٔ هفت و هشت روز عبدالعلیم را پیش نواب صاحب گذاشته خود روانهٔ مرشدآباد گردیدند *

ذکر داروغگي مولوي عبدالعلیم

بعد حسین بخش عبدالعلیم بعهدهٔ داروغگي سرکار سرفراز شده ضبط و نسق جمیع امورات برای خود نموده شهرت داد که آنچه میکنم بحکم شور صاحب کمشنر میکنم و گاه گاهی برای تیقن مردمان پیش صاحب کمشنر مذکور هم مي رفت و مسمی خیراتي که سابق در زمرهٔ خواصان بود بجمعداري خواصان سرفراز کنانیده بحضور متعین نموده تاکید تمام کرد که شب و روز از پیش نواب صاحب جدا نشود و از دلجوئي و خاطر داری بیگم صاحبه یعني ظهورن موصوفه غافل نباشد و بجز آدمان خاطر جمعي خود بکسی راه ندهد و خود بچالاکي قطعهٔ خط از طرف حضور بدین مضمون نویسانیده که مسمی حسین بخش وغیره چهارده کسان از نقد و جنس این سرکار تغلب و تصرف نموده اند خانه تلاشي اینها نموده سزای قرار واقعي دهند و پیش صاحب مجسٹریت فرستاد صاحب موصوف مطابق خط بحکم خانه تلاشي نامبردگان بنام ناظر فوجداري قطعهٔ پروانه جاري نمودند که اسامیان را گرفتار کرده بحضور حاضر آرد آن مفسدان باستماع این خبر آوارهٔ شهر و دیار گردیدند بعد این تدبیر داروغه مذکور باطمینان خاطر در بندوبست مصروف شده اول مشاهرهٔ نجبا و شرفا متعلقان قدیم را تخفیف نمود بعد ازان دست در باورچي خانه وغیره کارخانجات انداخته اکثر معمولات را موقوف ساخت و جمعدار مذکور بحضور نواب صاحب بوده ظهورن موصوفه را چنان از خود موافق کرد - که او را پدر و زنش مسماة هرنّیه را مادر میخواند و بسبب این وسیله از انعامات فراوان بهره‌مند گردید عبدالعلیم داروغه چونکه جمعدار مذکور را از گرفتن همچون انعامات لانهایات مانع مي شد بنابرین جمعدار داروغه را سنگ راه خود تصور کرده در پی او شد و نواب صاحب را بوسیلهٔ بیگم موصوفه برین آورد که او را از کار معینه معزول سازند چنانچه نواب صاحب بحال او بی التفاتي نموده اکثر بد مزاجي و چشم نمائي مي فرمودند داروغه ازین واقعه خسته خاطر گردیده التجا بمنشي میر علي اشرف که سررشته دار کمشنر بود آورد و بوساطت و تائید او کشمنر را بپلهٔ خود آورده و خطوط درمادهٔ ابتري خانه و کار خانهٔ نواب صاحب بذریعه صاحب کمشنر رقم کنانیده بصدر عالیه فرستاد اما از حضور نواب گورنر جنرل بهادر حکم اصدار یافت که نواب صاحب مالک و مختار خانهٔ خود اند - هرچه خواهند کنند بورود این چٹهي نواب صاحب عبدالعلیم را معزول ساخته جمیع ضبط و نسق سرکار را بجمعدار مذکور سپردند *

ذکر خیراتي جمعدار

چون انجام امورات سرکار تعلق از خیراتي جمعدار گرفت او از برای رفع بدنامي خود حیله کرده اطلاع نمود مناسب ست حضور آقا عبدالعلیم را که قدیم خیر خواه سرکار و استاد خداوند اند خود تشریف بخانه شان برده همراه خود بیارند و عهدۀ میر سامانی را بدستور سابق باوشان تفویض فرمایند تا بخوبي کار انجام یابد نواب صاحب هم مطابق ایمای او عمل نمودند این بار دوم ست که آقا صاحب بعهدۀ موصوف نامزد گردیدند چونکه هیچ کار سرکار از آقا صاحب تعلق نداشت هر روز بدولت خانه آمده بصورت انگشت زاید بیکار و معطل مي نشستند و جمعدار مذکور خود دخیل و قابض بوده هرچه مي خواست میکرد ایشان محض برای نام بودند آخر بعرصۀ قلیل از مشاهدۀ اینگونه حالات خود خانه نشین گردیدند و جمعدار مذکور بصلاح مدن فوطه دار که خزانچي سرکار بود و بهگن جمعدار وغیره بیگم موصوفه را در قبضۀ خود داشته از هر قسم جواهرات و طلا و نقره و ملبوسات وغیره جنسهای گران‌بها که بسالهای سال و زمانهای دراز نواب صاحبان سلف فراهم آورده بودند بتحت تصرف خود آورده و نواب صاحب را بجز نام اختیاری نبود و احدی را نمي گذاشت بجز خویش و اقربای خود حتی که خواصان و فراشان نیز اقربای او بودند - بحضور باریاب شود و علاوه ازان خود را پیش نواب صاحب دعوتی قرار داده و اکثر شعبده‌های علوي و سفلي را نموده مطیع و منقاد خود گردانید چنانچه حضور شاگردش شده نقش هوا وغیره پر مي ساختند و طبله نواختن که کار سپرده هاي زنان است و او دران مهارت تمام داشت بنواب صاحب تعلیم میداد و سخنان پوچ پا در هوا مثل اینکه بر هر کسیکه خواهم جنات و شیاطین سوار کنم و هر کرا بخواهم بطرفة العین بکشم غرض نواب صاحب را از خود ترسانیده میداشت آخر چون اوجش بانتها رسید و طالع بلند او رو به پستي نهاد که گفته اند هر کمالی را زوالی - روزی زن بازیگری در اثنای راه بازي میکرد اتفاقاً گذر حضور هم بهمان راه افتاد بترک سواران همراهي خود حکم فرمودند که این را بیارید چون بدولت خانه مراجعت فرمودند او حاضر نبود - عند الاستفسار معلوم شد که آمده بود مگر کسی خبرش بحضور نرسانید، نواب صاحب را این سخن بخاطر ماند - روزي بحضوری خانسامان میز خانه که بوقت حاضري حاضر بود ارشاد فرمودند که زن بازیگر را طلبیده بودم چرا خبر بمن نیاوردند او که از جمعدار مذکور آزرده خاطر بود فرصت وقت مي جست قابو یافته بعرض رسانید که کرا یارا که بیحکم جمعدار اطلاع چنین امورات بحضور نماید - نواب صاحب را سخنش ناگوار تر آمد چین ابرو شده خاموش ماندند روز دیگر منشي عنایت علي را فرمودند که من از دست جمعدار مذکور تنگ آمده‌ام حیرانم چه کنم مي ترسم که سحری کند یا بسبب ازار خود مرا بکشد منشي مذکور بعرض رسانید که او را چه یارا و چه طاقت او که آسیبی بحضور رساند - حضور را هر حال اختیارست درین اثنا این عاصي هم در رسید و بمنشای حضور از زبانم بر آمد که جمعدار مذکور را بمقدمۀ فوجداري در محکمۀ مجستري طلب ست از باعث حضور تا حال مانده کفایت میکند که خطی بنام صاحب مجستریت ابلاغ یابد چنانچه بموجب آن به منشي صاحب موصوف حکم نفاذ یافت بآناً فاناً چتهي حضور رفت و صاحب موصوف ناظر فوجداري الطاف علي را مع پیادگان برای

گرفتاریش فرستادند جمعدار مذکور پی بمطلب برده بسرعت تمام از طرف پشت دولت خانه بگریخت و مریدانش چون نرسنگه خواص و امیر فراش وغیره که محیط بودند کافور شدند چنانکه شاعری گفته - فرد

فلک این لعبت چین و چگل را * چه لعبت گر زمانی چید بر چید

ذکر داروغگي میر علي نقي و گلزار بیگم و محبوب و میر محمد اسمعیل و سلطانه

بعد مفقود شدن خیراتي جمعدار حضور متوجه خورد محل که جای سکونت حیات‌النسا بیگم صاحبه که والدهٔ نواب صاحب بودند رونق افزا گردیدند جناب بیگم صاحبه از آمدن غیر وقت متعجب شده استفسار فرمودند حضور تمام حالات را من و عن بیان نمودند بیگم صاحبه بدریافت حال مرزا هینگن داروغه سرکار خود را بسبب بدنامي بعض دفعات مصلحتاً نظر انداز فرموده بودند گفته فرستادند که بچالاکي آن زن بازیگر را بدست بیاري تا بمدعای خویش فائز شوي مرزا مذکور بصد امید زن مطلوبه را باختیار در آورده بحضور پیش کش نمود و حضور هم بطریق انعامات از سر جرائمش در گذشته بعهدهٔ مقررهٔ او سرفراز فرمودند بعد حصول مطلب طرفین از راه خداوندي نواب صاحب عهدهٔ میر ساماني باین عاصي تفویض مي فرمودند چنانچه هفت روز جمیع امورات سرکار معطل ماند - اما این عاصي که بی عقل محض ست کارخانهٔ عالي را قابل انجام خود ندیده کفاره نمود و امیدوار معاف گردید اما نام بزرگان و خیر خواهان قدیم سرکار را شمرد که بایشان سپرد شود تا بخوبي انجام یابد نواب صاحب از آنها میر علي نقي خلف نواب شیر جنگ مرحوم را پسندیده حکم احضار شان نفاذ یافت بعد حاضري شان بعهدهٔ مذکورهٔ سرکار سرفراز گردیدند چون میر علي نقي بسرکار فیض آثار اختیار یافت بسبب کم حیثیتی بصلاح محرران کار میکرد مرزا هینگن مذکور هم در آن روزها شریک بود و حضور صبیهٔ بازیگر را یافته کم التفاتي بحال ظهورن بیگم مي فرمودند و او هم بر خاسته دل مي بود و مرزا هینگن باطلاع حضور بیگم صاحبه مزبوره را برای رفع وحشت شان در خورد محل بخدمت جناب والده بیگم صاحبه فرستاد تا والدهٔ نواب صاحب دل جوئیش نمایند و گاه گاه حضور هم پیش نام برده میرفتند درین ایام شخصی شهباز خان که ملازم حال بود روزی تعریف حسن گلزار بیگم دختر شریف درمیان آورد چنانچه حضور مشتاقش گردیدند خان مذکور بازار حسن او گرم نموده خود بخانه نشست عند الطلب جواب فرستاد که آن معشوقهٔ یکتا و جمیلهٔ بی همتا که چشم آفتاب از تاب عذارش در پیچ و تاب ست بلا عقد نکاح و کابین خاطر خواه بدست نخواهد آمد نواب صاحب از زن بازیگر سیر شده بصد شوق مشتاق جمال جهان آرایش شدند میرعلی نقی و مرزا هینگن دور اندیشي نموده از مردمان معتمد گلزار بیگم ربط بهم رسانیده بعرصهٔ یک هفته بوقت شب برای ملاقات نواب صاحب آوردند مگر خان مذکور هم همراه آمد چونکه بیگم مسطوره بسکه چالاک و گرم و سرد زمانه چشیده و کار آزموده بود سوای ازین ره نمایش خان مومي الیه هم حاضر بود بنابر بجز ملاقات یارانه هیچ سروکاری بهم نپذیرفت و بمکان خود بر گشت بروز دیگر نواب صاحب مرزا هینگن و میر علي نقي را فرمودند بهر طریقیکه باشد زن شبینه را حاضر آرید بمجرد حکم اینها قافیهٔ وقت خودها تنگ دیده بصد جد و کد میر برهان علی برادر خویش میرعلي نقي را درمیان کرده مسماة مذکور را بعقد نواب صاحب باخفای خان مسطور در آوردند ظهورن بیگم باستماع این خبر

دیوانه وار خواست که خود را بکشد - نواب صاحب سراسیمه شده اورا نیز از خرد محل آورده بدیوانخانه پیش خانه
داشته و آن زن بازیگر را بدر فرمودند چونکه مرزا هینگن و میرعلي نقي بسبب عقد گلزار بیگم از ظهورن بیگم
محجوب بودند و بیگم از او شان کشان بود بنابر حضور مضطرب شده این عاصي را بر انجام امورات ضروریه داروغهٔ
سرکار ظهورن بیگم فرمودند - چنانچه تا پنج ماه نامزد بوده خانه نشین شد نواب صاحب بعد عقد گلزار بیگم
شنیدند که این سه طفل دارد و بعض گفتند که حالا هم از جگن بنیه کوتهي وال حامله ست ازین سخنان متنفر
شده بروز نوردهم عقد بیرونش کردند بعد رفتن او خواستند که بدستور سابق از ظهورن بیگم که موانست او وحشت
میفزود برای دلجوئي و خاطر داریش آورده هم عقد نمودند بلکه در کابین او چند قطعهٔ اراضي و گنجیات مندرج
ساختند چون ظهورن بیگم مجلس از اغیار خالي و بخت خود را بر سر اوج یافت اول به بیخ کنئ مرزا هینگن
مصروف شد - مرزای مذکور از مشاهدهٔ این حال خود ترک حاضر باشي حضور نموده بدر دولت خورد محل
که مقرر بود مسرور و محظوظ نشست اما میرعلي نقي بخوشامد و بر آمد مسماة مسطوره را از خود راضي و موافق
ساخت لیکن فضول خرچي حضور را ضبط نتوانست کرد - شمهٔ آن این ست که مشاهرهٔ ظهورن بیگم هزار روپیه
و در ماه حسیني بیگم مادر علاتي نواب صاحب صد روپیه و حیات‌النسا بیگم مادر حقیقي سه صد روپیه بدین رو
مضاعف در مضاعف فرمودند علاوه ازین جنس یک روپیه را بده روپیه مي خریدند بلکه اگر صد هم مي شد
مضایقه نمیکردند چونکه گنجایش آمدني سرکار اینقدر نداشت بنابر در تقسیم مشاهرهٔ کل فتور واقع مي گشت
و در سه ماه چهار ماه یکماه بر آمد میگردید - و آنهم هر که بوقت تقسیم حاضر آمد یافت و کسیکه در رسیدن
تاخیر و توقف ورزید محروم و مایوس ماند لهذا اکثر متعلقان که دعوی پرورش ازین سرکار مي داشتند و خود
را ذوو الحقوق و منتسبان نواب صاحبان سلف مي فرمودند باستمزاج مستر لوس صاحب کمشنرآن عصر قطعه
درخواست باستدعای یافتن مشاهره خودها از مشاهرهٔ نواب صاحب خارج کرده بصحابت صاحب کمشنر
موصوف بحضور نواب گورنر جنرل بهادر گذرانیدند عندالاستفسار نواب صاحب جواب شافي ارقام فرمودند -
یعنی مرزا محمد جعفر و میر محمد علي و میر غلام علي و مرزا جلال‌الدین و مرزا ولایت علي وغیره چهارده
کسان از متعلقین سرکار که مستغیث شده اند و في الواقع قدیم و استحقاق پرورش میدارند اما وجه معینهٔ اینها
در لنگر بود هرگاه از سرکار کمپني بهادر خود موقوف شدند - قصور اینجانب چیست چنانچه این جواب بحق
آن بیچارگان ازین سو رانده و ازان سو مانده شد بعد چند روز یک‌یک کرده روی نیاز و عذر خواهي بهمین در دولت
آوردند و حضور نیز نظر بر خدمتگذاري ایشان و بزرگان ایشان فرموده از سر قصور در گذشتند در همین روزها روزی
چنني لال طائفه دار برای رقص حاضر شده بود محبوب نام صبیهٔ متبناتش که نوجوان و نورس بود بمد نظر در آمد،
و چند روز او را در مبارک برج داشته بعیش و کامراني مشغول گردیدند چونکه میرعلي نقي با ظهورن بیگم
موافق بودند بنابر حضور در امورات محبوب مذکوره ازو احتراز نموده اکثر گفتگوی صلاح و مشورت و بازي و اختلاط
با میر محمد اسماعیل که داروغهٔ عمارت خانه و نوبت خانه و مشعل خانه و فیل خانه بودند و میر صاحب
مذکور بسکه عاقل و زیرک و فهم درست داشتند و حضور را در هر حال از خود راضي و شاکر مي داشتند بنابرین
روز بروز عزیز و محترم شده مدار المهام سرکار گردیدند - میر علي نقي چار ناچار چون انگشت زاید باتفاق میرصاحب
مي پرداخت و شب و روز برای سلامتي عهدهٔ خویش بدلجوئي و خاطر داري نواب صاحب و بیگم صاحبه مي بود

لیکن میر اسمعیل چون دیگران بد نفسي را کار نفرموده در پی ایذا و آزارش نگردید اگرچه بعرصهٔ قلیل محبوب مذکوره بجای خود رفت اما ظهورن بیگم بگمان آنکه محبوب مذکوره آوردهٔ میر صاحب موصوف بود لهذا در پی انداختن از جاه و مراتب شان میکوشید وحضور را چنین شبه در دل افتاده بود که میر علي نقي به ظهورن بیگم گفته است که میر اسمعیل حافظ و حامي محبوب بود بنابران تنزل میر علي نقي و ترقي میر صاحب موصوف صورت بست روزی بخشو نام خواصی بر گازي همراه حضور بود در اثنای راه زنی سبزه رنگ بصد جلوه از دریچه سر برآورده بجانب حضور مشتاقانه نظر انداخت حضور هم ناوک نظرش بر جگر خورده بسمل وا بدولت خانه مراجعت فرمودند و طلبگارش گردیدند نامبرده بجستجوي او بوده خبر آورد که آن زن سلطانه نام دارد و مادر و خواهرش هستند زن فاحشه نیست که بحضور حاضر آید نواب صاحب ببازار گرمیش زیاده اصرار فرمودند آخر برین انجامید که بوقت شب تن تنها خود حضور بمکانش تشریف ببرند بجز آن ممکن ندارد حضور این را قبول فرموده خفیه از میر علي نقي و میر اسماعیل وغیره بر پالکي سوار شده و نامبرده را همراه گرفته بنصف شب بجای سکونتی سلطانه مذکوره تشریف بردند تا سه ساعت انگریزي توقف نموده مراجعت فرمودند چون بدین نوع سه چهار شب اتفاق افتاد آهسته آهسته طشت از بام گردید و شهرت تمام یافت آخرش نوبت بدین غایت رسید که در روز هم مي رفتند چونکه آن زنکه از قوم ماهي فروشان بود اگرچه خود نکرده باشد بنابر بعض از خیرخواهان وفاکیش و متعلقان دور اندیش تاب سکوت نیاورده پرده از روی کار بر انداختند و نشیب و فراز این معنی را بعرض رسانیدند لیکن سودمند نیامد بلکه دلیر تر شده بیباکانه آمد و شد اختیار کردند و تا چهار پنج روز هم بمکانش مي ماندند چنانچه ازین حرکات نا شایسته از که تا مه ناراض مي بودند و ظهورالنسا بیگم نیز آزرده خاطر شده گفتگوی نا ملائم عندالملاقات مي نمود و سخنان دل خراش و طعنههای نمکپاش میکرد لهذا نواب صاحب یکبار آمدن دولت خانه موقوف ساخته مدتی بمکان دیگر که متصل خانه بود بودرباش اختیار فرمودند *

ذکر داروغگي شیخ کانو مچهوا و میر افضل علي محافظ سرکار نواب صاحب

بایمای سلطانه مذکوره شوهر خواهرش که شیخ کانو نام داشت جمیع امورات سرکار باو تفویض نمودند نامبرده بیواسطهٔ محض راه عداوت پیموده نسبت به میر اسماعیل و میرعلي نقي حرف مطلب خود بسمع مبارک حضور رسانیدن گرفت نواب صاحب را رعایت خاطرش منظور بود بنابر بدرجهٔ اجابت مقرون میگردید میر صاحبان کم التفاتي حضور مشاهده نموده یک یک خانه نشین شدند چون بدولت خانه کسی محافظ نماند ظهورن بیگم که بر خاسته دل بود بمکان نوساخت خود از آئینه محل بر آمده منزل گزیده و از اسباب و لوازمهٔ نقد و جنس که تعلق باو داشت همه را با خود برد حضور باستماع این خبر بهمان مکان دربار نموده رو بروی جمیع متعلقان ارشاد نمودند که به تحقیق شنیدم که ظهورن بیگم باغوای میر اسماعیل از آئینه محل بیرون شده است میر مذکور را از عهدهٔ میر ساماني معزول نمودم و دران خدمت راحت جان شیخ محمد کانو را سرفراز و خواهر

زنش را بخطاب سلطان بیگم ممتاز نمودم باید که بعد ازین همه کسان ایشان را داروغه و اوشان را بیگم صاحبه گفته و دانسته باشند پس ظاهرست که چون نوبت داروغگي سرکار فیض آثار بدین نهایت رسیده باشد حال ضبط و نسق امورات ریاست تا کجا خواهد بود - مختصر اینکه تقسیم مشاهره یکقلم موقوف گشت - اگر بعد دو سه ماه بر آمد هم گردید حاضران خدمت و حاشیه نشینش بهره‌مند مي شدند نجبا و صاحبان غیرت را حال تباه بود اما چاره نمیرفت بعد از چند روز حضور مع بیگم صاحبه و داروغهٔ نو تشریف بدولت خانه آوردند و با همسران داروغه صحبت مي داشتند از قدیمان این خاندان کسی را رسائي نبود چونکه بدنامي از حد گذشت جناب عالیه بدرالنسا بیگم صاحبه از مرشد آباد و حیات‌النسا بیگم صاحبه والدهٔ نواب صاحب خطوط متواتر برای چشم نمائي نواب صاحب به نواب گورنر بهادر و مقرر شدن محافظ برای این سرکار با عرایض استغاثهٔ روسای این دیار و متعلقین سرکار بحضور صاحبان عالیشان کونسل پی در پی ارقام نمودند بر طبق آن میر افضل علي از حضور گورنر بدین عهده مقرره شده آمدند چنانچه حضور را بجز مبلغ جیب خاص هیچ اختیار نماند میر صاحب محافظ برسید مهری خود مشاهرهٔ نواب صاحب از کلکتري حصول نموده تقسیم تنخواه و دیگر ضروریات میکردند و هرچه باقي مي ماند ادای قرض سرکار میکردند نواب صاحب که عادي فضول خرچي شده بودند و بالفعل میسر نمي گردید لهذا در شکایت و خیانت او دائم چتهي‌های انگریزي و فارسي بصاحب کمشنر و کونسل مي نگاشتند اما چیزی حصول نمي شد - چهار پنج ماه بدین نهج گذشته بود که میر افضل علي محافظ برای ضرورتے روانهٔ مرشد آباد گردیدند و آقا عبدالعلي را بجای خود گذاشتند - آقا صاحب از ترس بدنامي خود آنچه حکم احکام مي نمودند اول آن را از صاحب کمشنر استفسار فرموده مطابق رای صاحب موصوف بعمل مي آوردند - درین اثنا صاحب سابق تبدیل شده بجایش مسټر گاردن صاحب مقرر شده آمد نامبرده از خطوط نواب صاحب واجب العرض محافظ تنگ آمده بحضور گورنر صاحب بشکایت رپورت ساخت که مرا از کار سرکار کمپني بهادر فرصتی نیست که بانجام امورات سرکار نواب صاحب پردازم مناسب‌ست که در سر رشته تفویض نموده شود از آنجا منظور شده آمد آقا عبدالعلي از محافظي برخاست شده کاغذات سرکار را فهمانیده دادند و از ساده لوحي خود محنت و مشقت چندین روزها که برای مقرر شدن محافظ بعمل آمده بود برباد دادند مردمان بار دوم بدست شیخ کانو افتادند شیخ مذکور بترس محافظ گذشته هول خورد که چنان نه شود که باز محافظ مقرر گردد و ما بی‌کار گردیم بلحاظ این از خریدن اسباب و فضول خرچیهای و اضافهٔ مشاهره وغیره خواست که حضور را باز دارد بلکه بتعمیل اینگونه احکام سستي و کاهلي میکرد و عند الطلب بدادن روپیه هم عذر مي آورد - نواب صاحب تنگ آمده خفیه میر اسماعیل را طلبیده بمشورت شان قطعهٔ خط بنام مجسټریت آن عصر بدین مضمون ارقام فرمودند که کانو اکثر از اسباب و اجناس سرکار بیرون آورده و براه دغابازي و فریب بخانهٔ خود برده نهایت تغلب و تصرف نموده و مي نماید - مترصد که تدارک این معنی فرمایند - صاحب مجسټریت پروانه بنام کوتوال که در آنوقت مولوي محمد یوسف بود نمود مولوي موصـــوف یکی از دولت خواهان سرکار و مرد بی ریا بودند بمجرد ورود پروانه خانه تلاشي نامبرده نموده اکثری از اسباب سرکار و مبلغ پنج هزار روپیه نقد از خانه اش بیرون آوردند چنانچه کوتوال موصوف اورا بصد خواري و زاري بسته بمحکمه فوجداري حاضر

آورد صاحب مجستریت اورا بداير ساير سپرد از آنجا بميعاد پنج سال مشرف شده بجيل خانه مقيد گرديد و اسبابهای مقروقه نيلام شده بمهاجنان ادا نموده شد *

ذکر داروغگي مير محمد اسماعيل مرتبهٔ دوم و آقا جان

چون از تدبير مير اسماعيل - کانو بسزای خود رسيد نواب صاحب مير صاحب را مرتبهٔ دوم بعهدهٔ مير ساماني بدستور سابق بحال فرمودند مير صاحب از اول مزاج حضور را دريافته امورات سرکار و ضبط و نسق کار و بار را واقف بودند باين مرتبه بسهولت تمام و بوجه احسن انجام وانصرام مي نمودند و تقسيم مشاهره اگرچه ماهواري کردن نمي توانستند ليکن از عهد ديگران بهتر مي نمودند و حضور را هم از حکمت عملي چون باز محافظ مقرر شدن و آزرده خاطري سلطان بيگم وغيره از خود ترسايده مي داشتند خلائق هم عهد ايشان را از ديگران غنيمت شمرده راضي و شاکر مي بودند - سالے دو بدين نوع بر آمد که آقا جان نام زنی از طائفه دار باشندهٔ کلکته بآوازهٔ عياشي و شهرت داد و دهش نواب صاحب وارد شهر جهانگيرنگر شده برای رقص بار ياب گرديد ليکن ميل حضور نه ديده مايوس شده باز گشت روزی قادر بخش نام تحويلدار حقه خانه که از مسماة مذکوره رابطهٔ اتحاد داشت برای بهبوديش فرصت وقت ديده در حضور بر سبيل ذکر عرض کرد که چون آقا جان زنی در شهر نيست و بر خداوند نعمت از جان و دل مبتلا ست چنانچه رو بروی فدوي جيمس پسر هالو کراني يک هزار روپيه برای شب واحد مي داد او قبول نکرده جواب داد که من محض باشتياق ملاقات نواب صاحب از وطن خود آواره گرديده زحمت سفر بر خود اختيار کرده بودم وگرنه در کلکته خواهان من بسيار اند اگر بآرزوی خود برسم فهو المراد ورنه بعرصهٔ قليل روانهٔ ديار خود ميشوم - نواب صاحب از استماع اين سخن فريب خورده بصد اشتياق مشتاق وصلش شدند و نام برده را همان ساعت پيشش فرستاده طلب فرمودند * مصرع * چون قضا آيد طبيب ابله شود - وگرنه همان زنست که بارها برای رقص حاضر شده بود الغرض تحويلدار مذکور از مير صاحب مذکور انديشيده افسونی چند بمسماة مطلوبه آموخت يعنی مير اسماعيل بالفعل محيط ست و تا بودن او قيام تو ممکن ندارد بايد که اول بيخ شان برکني چنانچه مسماة مذکوره سلسله جنبان مدعا گرديد و نام برده پرورش آن مي کرد حضور بسبب صاحبزادگي بيواسطه بر مير صاحب موصوف اعتراض کرده ممانعت فرمودند که ديگر مير مذکور درون ديوڑهي دولت خانه آمدن نتواند - مير مزبور در آن روزها بعارضهٔ سانجر گرفتار بودند ليکن بمجرد شنيدن اين خبر که چون بلای ناگهاني بود افتان و خيزان بحضور حاضر شدند چونکه از که تا مه همه از اوشان راضي بودند بنابر از تعميل حکم چشم پوشي کرده گذاشتند نواب صاحب سرفرود آورده خاموش ماندند مير صاحب دران حالت تپ هرچه مناسب و خير خواهي‌ها بود عرض نمودند نواب صاحب هيچ جواب نداده سکوت ورزيدند آخر ببهانهٔ برخاست درون محل تشريف بردند مير صاحب مايوس شده بخانهٔ خود باز گرديدند *

ذکر داروغگي منشي عنايت علي و لکهي نراين داس و برجو شاه مهاجن و مانک گماشته

بعد خانه نشيني شدن مير محمد اسمعيل نواب صاحب لکهي نرائن داس را بايمای تحويلدار مذکور طلب فرمودند خدمت پيشين را عطا نمودند چونکه لکهي نرائن از سابق خزانچي سرکار بود بالفعل

میر اسمعیل اورا خائن ساخته باطلاع حضور برطرف نموده بجایش برجو شاه را که یکی از مهاجن بود و در سرکار گوته و پتهه و پارچه وغیره میداد مقرر نموده معرفت مانک گماشته‌اش اجرای کار میکردند لهذا عداوت تمام لکهي نرائن را از میر صاحب حاصل بود و چندین روز را او از خدا مي خواست قبول نموده مبلغ یک هزار روپیه که حضور برای بخشش زن فاحشه مذکور طلب فرموده بودند حاضر کرد و امیدوار سند خزانچي گري گردید حضور منشي عنایت علي را که میر منشي سرکار بود طلبیده حکم نوشتن سند فرمودند بعد حاضر شدن سند مطلوبه حضور لکهي نرائن را خزانچي و منشي مذکور را داروغهٔ سرکار مقرر فرمودند منشي مزبور از نام داروغگي تعذرات بسیار آورده بنابر نواب صاحب لفظ امین کار خانجات فرموده سرفراز نموده - چونکه عاصي دران وقت حاضر نبود برای کاری رخصت دو سه روز گرفته بود هرگاه حاضر گردید باستماع در آمد که میر صاحب را حضور خانه نشین فرموده تاسف خورده همانوقت که پنج شش ساعت از شب گذشته بود بمکان میر صاحب رفته استفسار این مکروهات نمودم اوشان چگونگي حالات گذشته و بی مهري فلک کج رفتار بیان کردند این عاصي خواست که اگر ممکن باشد بحضور رفته تصفیه نماید میر صاحب فرمودند مالک اند آنزمان مانک گماشته مهاجن میر صاحب را که حاضر بود تا در دولت همراه آورده اورا گذاشته خود بحضور رفته نواب صاحب از حاضر شدن بیوقت و بغیر طلب تعجب نموده استفسار فرمودند کمترین غیر حاضري سه روزها را بهانه ساخت بعد نشستن از هر در سخن پیوست و خود را ناواقف ساخته به بیمار شدن میر صاحب افسوس نموده حضور فرمودند نشنیدهٔ که من میر مذکور را بر طرف کرده منشي عنایت علي را بعهدهٔ او مقرر نمودم و خزانچي قدیم خود لکهي نرائن را بحال کرده مبلغ یک هزار روپیه گرفتم - این عاصي عرض نمود اگر از میر صاحب هم طلبیده مي شد حاضر مي کردند بلکه اینوقت مانک مهاجن حاضر ست اگر حکم شود یک هزار چه معني چهار هزار میدهد حضور چین بابرو شدهٔ فرمودند که چرا نگوئي آخر از دوستان و خیر خواهان میر موصوف هستي چیزی بشما اقرار کرده باشد و آن زن مذکور و تحویلدار مزبور که حاضر بودند تائید سخن نواب صاحب مي نمودند - عاصي چون مجلس برنگ دیگر پیش آمده دید خود رخصت گردیده چند روز همین رویه را اختیار نمود تا غبار نشسته از دل حضور بر خیزد بعد ازان عندالوقت هر چه از دست بر آید قصور نخواهم کرد چنانچه این راز را بیرون آمده بمانگ مذکور که همراه برده بودم گفته رخصت نمودم - هرگاه نواب صاحب دیدند که عاصي گاهی نام میر محمد اسمعیل بر زبان نمي آرد از سابق زیاده حاضر باش مي ماند صاف دل شده بداروغگي جیب خاص خود نامزد فرموده سرفراز ساختند کمترین نیز غنیمت شمرده سرگرم متابعت حضور بیشتر از پیشتر مي نمود بعد چند روز ارشاد فرمودند که شما بالمتفق منشي عنایت علي عهدهٔ میر ساماني را انجام وانصرام نمائید و داروغگي جیب خاص را موقوف ساخته وهاب خواص را که یکی از محرمان خاص بود تحویلدار فرمودند عاصي قبول نموده چرا که هرچه آید از دوست همه نیکوست چونکه خزانچي مذکور بزعم خویش میداشت که هر دو صاحبان بطفیل من سرفراز شده اند بنابر اصلا بگفتهٔ مایان نبود هر چه مي خواست خود عرض و معروض نموده بر چتهي و خطوط وغیره دستخط و مهر از حضور میکنانید و حساب و کتاب آمدني و خرچ سرکار خود بدیوان و پیشکار و محرران مي نمود منشي صاحب تصفیهٔ آن میکردند و عاصي تائید رای نواب صاحب مي نمود

مي نمود تا که روزی لکهي نرائن بعد آوردن مشاهرهٔ حضور از کلکتري قطعه استعفا بدين مضمون نوشته از خانهٔ خود فرستاد که اخراجات سرکار زياده از آمدني شده در تقسيم مشاهره فتور مي افتد درين صورت سه بندي ملاحظه فرموده کمي نموده شود و مطابق آمدني خرچ گردد پس انجام از فدوي صورت بندد والا استعفا قبول افتد حضور را اين دليريش ناپسند آمد بے دماغ شده ازين عاصي صلاح کار استفسار فرمودند عاصي قابو يافته هر چه توانست درباب عفو قصورات مير صاحب پرداخت غرض آنچه جويان بود ميسر آمد يعني اگر چه بار اول حضور منظور نه نموده فرمودند که من شما را بداروغکي اين سرکار مقرر نمودم شما ديگر کسی را خزانچي مقرر کرده اجرای کار سرکار مي نموده باشيد و ملازمان چون ناظر و جمعدار و محرران را طلب فرموده حکم دادند که من حميد مير را مير سامان سرکار مقرر نمودم شمايان نيز امروز بدستور سلف بمتابعت داروغهٔ معين پردازيد مگر اين عاصي اصرار نموده عرض کرد که آنچه حکم شده همان بظهور خواهد آمد - ليکن عاصي اميد وار است که حکم شود فدوي هر کرا خواهد طلب نموده انجام کار نمايد ارشاد شد که اختيار داري بمجرد فرمودن اين کمترين بخانه مير صاحب آمده و حکم حضور را بيان نموده بصد منت و سماجت راضي ساخته بحضور برد چنانچه بعد عذر خواهي بدستور سابق بعهده مقرري شان بحال فرمودند اگر چه درين اثنا لکهي نرائن ديگر قطعهٔ عرضي باقبال انجام اخراجات سرکار فرستاده بود ليکن پيش نه رفت که گفته اند مرغ از قفس رفته نتوان گرفت *

ذکر داروغگي مير محمد اسمعيل مرتبهٔ سوم

چون مير محمد اسمعيل بمرتبه سيوم بداروغگي سرکار فيض آثار مقرر گرديدند حضور بمد نظر عرضي اميد واري لکهي نرائن خزانچي که بعد استعفا گذرانيده بود مطمئن شده که اگر مير صاحب بتعميل حکم عذر آرند معزول نموده خزانچي مذکور را خواهم طلبيد بی تحاشا دست باطراف کشادند و مير صاحب که هم طريق سابق را که برای تقسيم مشاهره و احکام نا مناسب چون زد و ضرب و اصراف بيجا و اخراجات بی موقع و خريدن اسباب وغيره رد و کد و جد و جهد ميکردند يکقلم موقوف ساخته بدلجوئي و متابعت حضور و بعض کسان پرداخته بقای عهدهٔ خود را غنيمت شمردند - لهذا فتور کمال و ابتری تمام در نظم و نسق و بند و بست سرکار رواده بدناميها از حد گذشت و بايمای بدرالنسا بيگم صاحبه وغيره خطوط چشم نمائي از گورنر صاحب رسيد اما فائده مند نگرديد آخر بتاريخ بست و ششم ماه رجب سنه ۱۲۹۰ هجري مطابق هفتم ماه بهادون سنه ۱۲۵۰ بنگله بروز چهار شنبه بوقت بر آمدن يک و نيم پاس روز اميرالامرا رئيس الرؤسا محب الفقرا رئيس الغربا فيض رسان زمان دست گير درماندگان و محتاجان آقای ما بی نصيبان نواب سيد غازی الدين محمد خان جنت مکان و فردوس آشيان اول بعارضهٔ سانجر مبتلا شده بمرض صرع بعرصهٔ شش و هفت پهر بسرعت تمام ازين عالم فاني بسرای جاوداني مقيم گرديدند (نمود فوت بسال غرس امير کبير) چون خلائق از ناسازي طبيعت هم مطلع نبودند يکايک از خبر فوت آن مرحوم سراسيمه شده دست و پا گم کردند در هر کوچه و بازار رستخيز قيامت نمودار گرديد - مردمان متعلق وغيرآن ديوانه وار بسمت دولت خانه دويدند از صحن تا جلوه خانه گويا صحرای محشر بود صدای شيون و ناله گوش کر و جگر پاره مي شد الغرض پاسی از شب گذشته بود که به

پهلوی والد بزرگوار خود مدفون گردیدند انا لله و انا الیه راجعون خدایش بیامرزد عجب صاحب حوصله و عالي همت بود کسیکه لائق دو روپیه نبود صدها رعایت میکرد و از ادنی تا اعلی ممنون و مرهون رعایت او بودند علاوه ازین کینه در دل نداشت اگر صد بار کسی بدي کرده باشد چون باز رو برو آید بیشتر از پیشتر سلوک و رعایت بیند سوای این خلیق و ظریف و کشاده پیشاني بود صاحبان عالیشان انگلستان بسبب نبودن اولادش دست تاسف مالیدند و متعلقان و منتسبان این خاندان خاک مایوسي بر سر ریخته مسند ریاست بر چیدند و در خودها بی طاقت و بیکار افتادند اگرچه حیات‌النسا بیگم صاحبه والدهٔ آن مغفور ظاهر نمودند که مسماة امیرالنسا ممتوعه حمل چهار ماه از نور چشم سید غازي‌الدین مرحوم دارد مگر صاحبان انگریز را یقین نیامد باقي از مشاهره مقرره حضور برای وجه کفاف چند کسان بطریق پنشن مقرر نموده همگي مشاهره را باز یافت فرمودند سن شریف شان بست و هشت سال و ایام ریاست نه سال و پنج ماه بود خطاب نجم‌الدوله قمرالملک نواب سید غازي‌الدین محمد خان بهادر فیروز جنگ *

ذکر بعض عماید و روسای این دیار

بعد فوت نواب نصرت جنگ جنت مکان تا غازي‌الدین محمد خان مغفور که عرصه بست سال شد از عماید و رؤسای این دیار یک یک فوت نمودند خانهائی که همسري دولت خانهٔ نواب صاحب میکرد نیست و نابود گردید چنانچه میر اشرف علي مرحوم که آمدني در ماه بست هزار روپیه داشتند زمینداري شان بلده کهال بود صدها کسان پرورش مي یافتند و از مردمان شهر کمتر باشند که ممنون احسانش نگردیدند و از وارد و صادر کسی محروم نمي رفت کارخانه عالي و خرچ فراوان بود و فرزندان جوان علي مهدي خان بهادر و علي حسن خان بهادر را گذاشته فوت نمودند با وجود بودن فرزندان قابل و زمینداري بزرگ فلک کج رفتار چنان نیرنگیها بر انداخت که علي حسن خان بهادر غریق دریای رحمت یزداني شدند و مکانات عالیشان چنان نیست و نابود گردید که نشان هم باقي نماند و تمام زمینداري بسرکار کمپني بسبب باقیات خزانه خاص شد سید علي مهدي خان بهادر اگرچه تا حال در قید حیات اند لیکن زنده بگور توان گفت عدم و وجود شان برابر میر نواب مغفور زمیندار عبدالله پوروانهیه آمدني سه هزار روپیه در ماه داشتند عجب خلیق و ظریف بودند خدایش بیامرزد بسیار کسان فیضیاب مي شدند اگر کسی بمکان شان میرفت میگفت که روز عید و شب لیلة‌البرات است پنج پسر و سه دختر مع جائداد مذکور گذاشته انتقال نمودند این چرخ دوار چنان گردشی زد که بالفعل از عمارات سکونتي بزرگ شان خصوص امام باڑه که در شهر نظیر خود نداشت بجز در و دیوار شکسته آثاری ندارد و درصحن آن که هزار گل و ریاحین بود سوای اشجار خبیثه و خار مغیلان بنظر نمي آید - اولاد شان بنان شب در بدر محتاج اند مرزا محمد کاظم خان مرحوم زمیندار بلده کهال و تهرله آمدني زیاده از دو و نیم هزار روپیه ماهانه داشتند - همدران سال که نواب جنت مکان رحلت گزین گردیدند ایشان بجوار مانک گنج غریق دریای رحمت الهي شدند و هرچند جالها بدریا انداختند اما اثری از نعش شان پیدا نشد یک پسر و چهار دختر و یک زوجه بجایش باقي ماندند میر عطاءالرحیم مرحوم زمیندار ثلاثي آمدني دو هزار ماه داشتند مرد پرهیزگار و متقي

اکثر داد و دهش باخفا میکردند و مردمان ازان مرحوم منتفع مي شدند سه پسر و دو دختر گذاشته فوت کردند گردون دون چنان آنخانه را برباد داد که قابل قید قلم نیست اولاد شان گدائي میکنند که بملاحظه حال رقّت مي آید مرزا حسن علي مرحوم زمیندار مجلس پور وغیره آمدني قریب دو هزار روپیه در ماه داشتند بسیار وضع دار و متشرع وصاحب بند وبست بودند دو پسر و سه دختر گذاشته رحلت نمودند بعد فوت والد خود مرزا لطیف حسین بحویلي دیگر سکونت اختیار کردند و مرزا زین‌الدین حسین که از برادر خود کوچک تر بود دران مکان با چند کسان متعلقین گذران میکنند اگر چه کسی را فائده نمي رسد مگر نقصان هم نمي کند هم چنین راجه پرسرام و مرزا حیدر علي و مرزا محمد علي خان بهادر و خواجه اراتون ارمني وغیره که هر یکی برای خود دماغ امیرانه مي داشتند - وعالي حوصلگي را کار مي فرمودند و صدها بلکه هزارها را پرورش میکردند علی‌الخصوص مردمان نجیب که از گردش فلکي برباد شدند بعزت و آبروی تمام بسایهٔ عاطفت آنان گذار اوقات میکردند الحال دولت از خاندان امرای قدیم و رؤسای نامي که از دست فیض هر یکی ازان دامن حاجت مملومي شد منتقل گردیده بخانه های کسان نادیدهٔ دولت و سفله منشان کم همت که برای ذات خود خرچ یک خرمهره شکسته را حرام مي دانند بلکه بترس گرسنگي بخلا هم کمتر میروند فراهم آمده است کسی ازان بزرگواران و امیران باقي نمانده و بنظر نمي آید که پرورش و پرداخت باقي ماندگان از نجبا و شرفا و خبر گیري اهل و عیال رؤسا و سکنا نماید عجب وقت است - حق سبحانه تعالی عزت و حرمت هر کس و ناکس را از آسیب حوادث روزگار در حفظ و حمایت خود نگاهداراد بحق محمد و اله الامجاد *

ذکر متفرقات که نواب نصرت جنگ مرحوم بقید قلم خود در آورده بودند

یعنی شرح احوال عمارات و ابنیهٔ عظیمهٔ شهر جهانگیرنگر اینکه میر ابوالقاسم خان دیوان تن شهزاده عظیم‌الشان بر حسب فرمایش شهزاده مذکور کټره کلان را در سنه ۱۰۵۰ یک هزار و پنجاه هجري ساخته بود چون به پسند شاهزاده نرسید بمیر مشار الیه عنایت شد و عیدگاه را هم او در سنه مذکور برای گذاردن نماز شهزاده تیار نموده الحال بعضی از ورثه‌اش که باقي اند بر کټره وغیره متصرف هستند و کټرهٔ کوچک بنا کردهٔ امیر الامرا نواب شایسته خان ست و لعل باغ تیار ساختهٔ شاهزاده موصوف و هرگاه بعهد عالم گیر بادشاه امیر الامرا مشار الیه بعزل شاهزاده بکار نظامت بنگاله سرفراز شد لعل باغ را از حضور معلی در انعام یافت و هم در وقت شهزاده موصوف میر مراد که از اجلّهٔ سادات و میر عمارت بادشاهي بود و گاه گاهی عامل پیشگي مي نمود دالان مقدس حسیني اینجا را او تعمیر ساخته و کټرهٔ محمد مقیم را در سنه ۱۰۷۲ یک هزار و هفتاد و دو هجري در عهد صوبه‌داري احتشام خان محمد مقیم داروغه نوارّه بنا کرده و هم نواب جعفرخان نصیري که ملقب و مخاطب بکار طلب خان و مرشد قلي خان بود مسجد کار طلب خان و بازار که وقف آن مسجد ست بنا کرده و آراستهٔ اوست

و ایضاً در لعل باغ مقبره ایست که ایران دخت صبیهٔ شایسته خان دران مدفون ست و بروج و قلعه که متصل و مقابل نرائنگنج است بنا کردهٔ خانخانان معظم خان ست و توپ کلان که بسواري گهات افتاد و توپ دیگر که در مغلاني چر مع دو گولهٔ کلان بآب فرو رفته براى تادیب و رفع اذیت ارخنگیان خانخانان ساخته بود و عمارات زنجیره و عبور دریا از آثارات ابراهیم خان صوبه دار سلف ست و در سنه ۱۲۴۶ هجري مستر والترس صاحب مجستریت توپ سواري گهات را از گهات برداشته میان چوک نصب کرده و بهمان سنه پل دولائي که شکسته و ریخته بود بنابر آمد و رفت مردمان بغیر عبور کشتي امکان نداشت صاحب ممدوح بدستگیري خاص و عام آهني تیار ساخته و در سنه ۱۲۶۳ هجري مستر ڈانس صاحب پل در بابو بازار احداث کرده و پل معین الدین و پل چاند خان که خراب شده بود مرمت نموده - رمنه که میدان وسیع است و چندی لشکرگاه کمپني ساخته شده بود و قلعه اورنگ‌آباد که مشهور به لعل باغ ست مع مقبرهٔ بي‌بي پري از زمان سابق تعلق از سرکار نواب صاحبان مرحومین داشت - در سنه ۱۲۵۸ هجري بعهد نواب غازي الدین محمد مرحوم صاحب مجستریت و گاردن کمشنر و پادري شفرڈ و ڈاکٹر ٹیلر همه بالمشورت شده از نواب صاحب خواسته تالاب و مکانات آن را که خراب شده بود صاف نمودند که جاى دلچسپ برآمد و پل ٹونگي را در عهد سلطنت اورنگ زیب عالم گیر بادشاه و زمان صوبه داري ابراهیم خان شاه ٹونگي نام فقیرى بنا کرده است - و از آبادي شهر جهانگیر نگر جانب شمال تخمیناً بفاصله پنج و شش کروه راه واقع ست *

تمام شد

Memoirs of the Asiatic Society of Bengal.

1905—1906.

I. *On certain Tibetan Scrolls and Images lately brought from Gyantse.—By* Prof. Satis Chandra Vidyābhūṣana, M.A., M.R.A.S. (Price Re. 1-8; or 2*s.* 3*d.*)

II. *Sal-Ammoniac: a Study in Primitive Chemistry.—By* H. E. Stapleton, B.A., B.Sc. (Price Re. 1; or 1*s.* 6*d.*)

III. *The Similarity of the Tibetan to the Kashgar-Brahmi Alphabet.—By* The Rev. A. H. Francke. (Price Rs. 2; or 2*s.* 10*d.*)

IV. *Alchemical Equipment in the Eleventh Century, A.D.—By* H. E. Stapleton and R. F. Azo. (Price Re. 1-8; or 2*s.* 3*d.*)

V. *Malaysian Barnacles in the Indian Museum, with a list of the Indian Pedunculata.—By* N. Annandale, B.A., D.Sc. (Price Re. 1-8; or 2*s.* 3*d.*)

VI. *Ashrafpur Copper-plate Grants of Devakhadga.—By* Ganga Mohan Laskar, M.A. (Price Annas 8; or 10*d.*)

VII. *Festivals and Folklore of Gilgit.—By* Ghulam Muhammad. (Price Rs. 2; or 2*s.* 10*d.*)

VIII. *Notes on the Bhotias of Almora and British Garhwal.—By* C. A. Sherring, M.A., F.R.G.S., I.C.S. (Price Re. 1-5; or 2*s.*)

IX. *Religion and Customs of the Uraons.—By* the late Rev. Father Dehon, S.J. (Price Rs. 2; or 2*s.* 10*d.*)

X. *Notes on the Fauna of a Desert Tract in Southern India* (Herpetology and Entomology).*—By* N. Annandale, D.Sc., C.M.Z.S., with a list of Mammals by R. C. Wroughton, F.E.S. (Price Rs. 2; or 2*s.* 10*d.*)

XI. *Amulets as Agents in the Prevention of Disease in Bengal.*—Compiled in the Office of the Superintendent of Ethnography, Bengal. (Price Annas 12; or 1*s.* 2*d.*)

XII. *Earth-Eating and the Earth-Eating Habit in India.—By* D. Hooper and H. H. Mann. (Price Re. 1; or 1*s.* 6*d.*)

XIII. *On a Cup-Mark Inscription in the Chumbi Valley.—By* E. H. C. Walsh, I.C.S. (Price Re. 1; or 1*s.* 6*d.*)

XIV. *A Descriptive List of the Sea-Snakes* (Hydrophiidæ) *in the Indian Museum, Calcutta.—By* Captain F. Wall, I.M.S., C.M.Z.S. (Price Re. 1; or 1*s.* 6*d.*)

XV. *Common Saws and Proverbs collected, chiefly from Dervishes, in Southern Persia.—By* Lieut.-Col. D. C. Phillott. (Price Re. 1; or 1*s.* 6*d.*)

XVI. *The Common Hydra of Bengal: its Systematic Position and Life History.—By* N. Annandale, B.A., D.Sc., C.M.Z.S. (Price Re. 1; or 1*s.* 6*d.*)

XVII. *Animals in the Inscriptions of Piyadasi.—By* Monmohan Chakravarti, M.A. (Price Annas 12; or 1*s.* 2*d.*)

XVIII. *Some current Persian Tales told by Professional Story-Tellers.—By* Lieut.-Col. D. C. Phillott. (Price Re. 1; or 1*s.* 6*d.*)

XIX. *The Dards at Khalatse in Western Tibet.—By* Rev. A. H. Francke. (Price Re. 1-6; or 2*s.*)

Supplement, Miscellanea Ethnographica. Part I. 1. *The Blow-Gun in Southern India* 2. *Miscellaneous objects from the Rāmanād subdivision of the Madura district* 3. *Indian Weighing-beams.—By* N. Annandale, D.Sc. (Price Re. 1.)

Supplement, Miscellanea Ethnographica. Part II. 1. *Some Malayan Weapons—By* N. Annandale. 2. *Plan of a Persian Gentleman's House.—By* Lieut.-Col. D. C. Phillott. (Price Annas 8; or 10*d.*)

Memoirs of the Asiatic Society of Bengal.

Vol. II.

I. *Cirrhipèdes operculés de l'Indian Museum de Calcutta.—Par* M. A. GRUVEL. (Price Rs. 2; or 2*s.* 10*d.*)

II. *The Coinage of Tibet.—By* E. H. C. WALSH. (Price Re. 1; or 1*s.* 6*d.*).

III. *The Exact Determination of the Fastness of the more Common Indigenous Dyes of Bengal, and comparison with typical synthetic Dye-stuffs. Part I. Dyeing on Cotton.—By* E. R. WATSON. (Price Re. 1; or 1*s.* 6*d.*)

IV. *The Saorias of the Rajmahal Hills.—By* R. B. BAINBRIDGE. (Price Rs. 2; or 2*s.* 10*d.*)

V. *Mundari Poetry, Music and Dances.—By* REV. FR. J. HOFFMANN, S.J. (Price Re. 1; or 1*s.* 6*d.*)

VI. *Tarikh-i-Nuṣratjangi.—By* HARINATH DE. (Price Re. 1; or 1*s.* 6*d.*)

An Arabic translation of Controversial Pamphlets in Urdu and Persian by Rafi Al-Khuli.—By HARINATH DE. (In the press).

Monograph on Sea Snakes.—By MAJOR F. WALL, I.M.S. (In the press).

The Exact Determination of the Fastness of the more Common Indigenous Dyes of Bengal, and comparison with typical synthetic Dye-stuffs. Part II. Dyeing on Silk.—By E. R. WATSON. (In the press).

MEMOIRS

OF THE

ASIATIC SOCIETY OF BENGAL

VOL. II, No. 7, pp. 155-168.

THE FASTNESS OF THE INDIGENOUS DYES OF BENGAL.

BY

E. R. WATSON, M.A. (*Cantab.*), B.Sc. (*Lond.*).

CALCUTTA:
PRINTED AT THE BAPTIST MISSION PRESS, AND PUBLISHED BY
THE ASIATIC SOCIETY, 57, PARK STREET.
1908.

Price Twelve Annas; or One Shilling and Twopence.

29-7-08.

The Exact Determination of the Fastness of the more Common Indigenous Dyes of Bengal, and comparison with typical Synthetic Dye-stuffs.

Part II.—Dyeing on Silk.

By E. R. WATSON, M.A. (*Cantab.*), B.SC. (*Lond.*).

List of Natural Dyes examined.

Turmeric or Huldi (*Curcuma longa*, Linn.).
Safflower or Kusum (*Carthamus tinctorius*, Linn.).
Sapan Wood or Bakam (*Cæsalpinia Sappan*, Linn.).
Palas (*Butea frondosa*, Roxb.).
Annatto, Orleans or Latkan (*Bixa Orellana*, Linn.).
Manjista (*Rubia cordifolia*, Linn.).
Lac-dye.
Kamala (*Mallotus philippinensis*, Muell.-Arg.).
Singhar (*Nyctanthes Arbor-tristis*, Linn.).
Jackwood, jak or kanthal (*Artocarpus integrifolia*, Linn. f.).

Methods employed for dyeing with these materials.

As in the case of cotton dyeing I have, in this investigation, also followed as closely as possible the native methods of dyeing. My success has been greater than in the former case; for, with each of the materials examined, I have succeeded in dyeing to a moderately full shade by at least one native method, and in consequence I have had no occasion to resort to any European, as opposed to Indian, method. It may be concluded that the native methods for dyeing silk are, on the whole, more satisfactory than the native methods for dyeing cotton. I have, in each case, aimed at obtaining as full a shade as possible, as such shades are the most useful for this investigation.

The silk used was a sample of cloth purchased from the Rajshahi Diamond Jubilee Industrial School. I was told that the only treatment to which the silk had been subjected was a boiling with sajimati (crude carbonate of soda). The cloth was further cleansed by boiling for half an hour in soap solution, 2½lbs. of soap for every 10 lbs. of silk, and was then rinsed once or twice in cold water.

Turmeric.—Processes essentially as described by Nagendra Nath Banerjee (*Monograph on Dyes and Dyeing in Bengal*, Calcutta, 1896, p. 21, §82 (*i*)).

(1) Five gms. of turmeric were pounded and mixed with 200 cc. of water, and 5 gms. of the silk were worked in this decoction for half an hour at 65°c., then rinsed in water and dipped in water acidulated with acetic acid ['raised' in 2 per cent. (on weight of silk) acetic acid]. Excess of turmeric was taken in order to get as full a shade as possible. A *full bright yellow shade* was obtained.

(2) Five gms. of silk were boiled for 15 minutes in 200 cc. of alum solution (saturated at ordinary temperature), then rinsed in water and worked for half an hour at 65°c. in a turmeric bath as in (1). Rinsed in water. In this case, as in others where alum is used as a mordant, the cloth was mordanted previously to dyeing in order that the effect of the mordant should be as great as possible. A *full bright yellow shade* was obtained.

Safflower or Kusum.—Process as described by Banerjee (*loc. cit.*, pp. 16, 17) and as employed for dyeing on cotton. One quarter of a pound of florets were used in making the bath, and as only 5 gms. of silk were dyed, a very large excess of dye was available. Worked for one hour in the bath a *full pink shade* was obtained.

Sapan Wood or Bakam.—McCann (*Report on the Dyes and Tans of Bengal*, Calcutta, 1883, p. 3) says: "The wood is either cut into small pieces or else pounded into a powder in a native mortar and is then boiled in water for from 5 to 8 hours....Cloth or yarn to be dyed red is sometimes simply steeped in this infusion for about half an hour without the use of any mordant." In my hands this method only gave a light shade, which was not further examined. McCann continues: "But alum is sometimes employed as a mordant to fix the colour, being added to the water in which the pounded bakam-wood is boiled." This method gave a deeper shade, but, owing to the fact that alum added to the decoction of the wood throws down a precipitate, and necessitates keeping the bath vigorously on the stir the whole time the cloth is immersed, it was preferred to adopt the following modification:—

(1) The cloth was mordanted with alum as in dyeing with turmeric (2), then boiled for one hour with a decoction from 5 gms. of the wood (100 per cent. reckoned on weight of silk). A *medium red shade* was obtained.

(2) The cloth was mordanted in an alum-soda bath prepared by dissolving $4\frac{1}{2}$lbs. alum in a little less than $7\frac{1}{2}$ gallons water, adding $7\frac{1}{2}$ oz. soda crystals dissolved in a little water and making up to $7\frac{1}{2}$ gallons exactly. The cloth was worked in this bath for 20 minutes, allowed to steep all night and wrung out. This mordanted cloth was worked at 170°F. for half an hour in a decoction from 10 gms. of the dye-wood (200 per cent. on weight of silk). A *full crimson shade* was obtained.

Banerjee (*loc. cit.*, p. 23) describes the production of a deep maroon, or of a dark purple colour, by soaking the cloth first in water prepared with myrabolams and green vitriol and afterwards in *bakam* water. This process was carried out as follows:—

(3) Silk mordanted for one hour in 10 per cent. solution tannin, wrung out and dried, then worked for half an hour in a solution of 5 gms. cryst. ferrous

sulphate in 150 cc. water (for 5 gms. cloth), wrung out and dried; then boiled for one hour in a decoction made from 10 gms. bakam-wood. A *full shade, purplish black,* was obtained.

Palas.—Banerjee (*loc. cit.*, p. 24).

(1) Boil the silk for 30 minutes in water with an equal weight of the dried flowers. A *light yellow shade* was obtained.

(2) Cloth previously mordanted with alum was similarly treated. A *medium orange yellow shade* was obtained.

The opportunity was taken in February to use fresh flowers in the hope of dyeing deeper shades, but no better result was given than by the old dried flowers.

Annatto, Orleans or Latkan.—Native processes described in considerable detail by Banerjee (*loc. cit.*, p. 24).

The Murshidabad process for dyeing silk with *latkan* was incidentally quoted in Part I of this investigation. The Nadia process for dyeing cotton a fast orange colour was also quoted. Banerjee continues: "Silk is dyed in Nadia in the same way with the following variation in the time for steeping: Three hours in *babul* water, four hours in *latkan* water, three hours again in *babul* water, and 18 hours in alum water."

(1) In following the Murshidabad process, 5 gms. of silk were boiled for 30 minutes in a decoction of 5 gms. *latkan* seeds, 7 gms. sajimati and 200 cc. water. A *full bright orange shade* was obtained.

(2) In following the Nadia process the silk was first mordanted in a solution containing 10 per cent. tannin, wrung out and dried, then dyed in a bath containing 5 gms. *latkan* and 7 gms. sajimati (for 5 gms. silk), then again entered in the tannin solution and finally into an alum solution (saturated at the ordinary temperature) entering in this last bath at the boil and subsequently allowing to cool. A *full bright orange shade* was obtained.

Manjista.—A summary of the processes described by McCann for dyeing with this material has been already given (Part I of this investigation).

On silk neither the dyeing without mordant in the aqueous decoction alone, nor the dyeing after previously mordanting with tannin, gave full shades, and the samples prepared by these processes were not further examined.

(1) In imitation of the Midnapur process, the silk was first mordanted with alum-soda, as described in dyeing with bakam-wood, and then boiled for one hour in a bath made from 10 gms. of manjista (for 5 gms. cloth). A *full orange-red shade* was obtained.

(2) Silk dyed according to (1) was subsequently boiled for half an hour in a soap-bath containing 25 per cent. soap (reckoned on weight of silk), then rinsed and passed for ten minutes through a 3 per cent. solution of acetic acid at 180°F. A *full red shade* remained These subsequent operations were carried out in order that a sample dyed with manjista might compete on equal terms with alizarine dyeings. The dye contained in manjista is known to be similar to alizarine, and this subsequent soaping

and raising, apparently by removing a small quantity of imperfectly fixed dye, is known to improve alizarine dyeings on silk and is invariably resorted to.

Lac-dye.—McCann (*loc. cit.*, p. 54) states that to prepare the dye bath the lac-dye is generally boiled with water to which alum and an alkali are added. In some districts, however, alum is not employed, the dye being merely boiled with saji or wood ashes. In other districts no auxiliary of any kind is employed.

I was unable to obtain satisfactory dyeings either with the lac-dye alone without auxiliary, or by using lac-dye mixed with alkali. Silk mordanted with alum or alum-soda was dyed when boiled with the lac-dye and water only.

(1) Five gms. of crude stick-lac were boiled with water, cooled and strained. The residue was again extracted with hot water. Five gms. of silk mordanted with alum (as previously described) were boiled for 30 minutes in the coloured liquor obtained from the stick-lac. A *medium purplish-red shade* was obtained.

(2) Five gms. of silk mordanted with alum-soda (as previously described) were boiled for 30 minutes in the dye decoction from 10 gms. of crude stick-lac. A *full purplish-red shade* was obtained.

Kamala.—McCann (*loc. cit.*, p. 19): "The kamala-guri powder is used for dyeing silks, and occasionally cottons, a brilliant yellow . . . . In Bengal the red powder is dissolved by the addition of a solution of various alkaline ashes, obtained by burning plants, and the development of the yellow colouring principle is, in no case, brought about by the addition of acids, but merely by allowing the cloth steeping in the red liquid to dry by exposure to the air. It is said not to require a mordant, but frequently *alum* is added for that purpose."

(1) Five gms. of silk were boiled for 30 minutes in a dye-bath containing 5 gms. of sajimati and 5 gms. kamala powder. A *full bright yellow shade* was obtained.

(2) Five gms. of silk mordanted with alum (as previously described), were boiled for 30 minutes in a bath containing 1 gm. of sajimati and 5 gms. of kamala powder. A *full orange yellow shade* was obtained.

Singhar.—Banerjee (*loc. cit.*, p. 24) says with regard to the application of this dye: "The cloth to be dyed is immersed in an infusion of this flower and then dried in the shade. A little acid or alum is sometimes added."

(1) Five gms. of silk boiled for 30 minutes in a bath containing 5 gms. of flowers. A *full bright yellow shade* was obtained.

(2) Silk mordanted with alum was similarly dyed. A similar shade was obtained.

Jackwood.—Banerjee (*loc. cit.*, p. 26): "It is generally used for silks. Ordinarily, cloth is coloured by simply steeping it in a solution obtained by boiling saw-dust of jackwood in water. From Chittagong the following interesting account has been received: "The following process is used by Buddhist priests (Funghi)* or by their disciples in dyeing the yellow robes worn by them. The heart of an old *jack* tree is

* Generally spelt *Hpungyi* (E. R. W.).

immersed in cool water for two or three days, and then boiled in a brass pot with some alum. When the colour is sufficiently deep, the water is poured into a vessel—more is poured into the vessel containing the wood and more colour extracted. The cloth to be dyed is placed in a wooden dish and kept soaked with the dye for two or three days. It is then dried in the sun. The process is repeated from three to six times to the satisfaction of the Funghi."

I did not obtain a satisfactory dyeing from the jackwood decoction alone.

(1) Five gms. of silk was boiled for 30 minutes in a bath containing 5 gms. of jackwood chips and 1 gm. of alum. A *moderately full yellow shade* was obtained.

Synthetic Dyes used for comparison with the Indigenous Dyes.

Unfortunately no systematic determinations of the fastness to various agencies of the dyeings with synthetic dyestuffs on silk appear to have been published. Messrs. Cassella & Co. have undertaken such determinations for their dyes used in cotton and wool dyeing, but apparently not for silk-dyes. The absence of such information has rendered it necessary to examine a more extended series of synthetic dyes than was necessary when studying cotton dyeing. In making a selection of synthetic dyes, care was taken that those selected should be well-known dyes, should include members of each of the more important groups, should include dyes generally recognised as fast, and should give dyeings more or less similar in shade to the dyeings with the indigenous dyes under examination. In making this selection the following works and publications were consulted :—

"Silk Dyeing, Printing and Finishing," by G. H. Hurst.
"Chemical Technology of Textile Fibres," by G. von Georgievics.
"Silk Dyeing," by Messrs. L. Cassella & Co. (Shade-card).
"Silk Dyeings fast to boiling off," by Messrs. L. Cassella & Co. (Shade-card).
"Aniline Colours on Silk" (shade-card, from Badische Anilin und Soda Fabrik).

The dyes selected were :—

Basic—
Auramine II (Badische Anilin und Soda Fabrik).
Safranin, pur, (Dr. G. Grübler & Co.).
Magenta.

Neutral—
Chrysophenine BB (Fr. Bayer & Co.).
Sulphine A (Badische Anilin und Soda Fabrik) = Primuline.
Thiazine Red R (Badische Anilin und Soda Fabrik).

Acid—
Orange No. 2. (Badische Anilin und Soda Fabrik).
Naphthole Yellow S 8960 (Fr. Bayer & Co.).
Metanil Yellow E (Meister Lucius & Brüning).

Scarlet RRR (Fr. Bayer & Co.) = Biebrich Scarlet or Ponceau 3R.
Fast Pink CGL (Fr. Bayer & Co.) = Magdala Red.

Developed—

Primuline, subsequently treated by Soda.
,, developed with Phenol.
,, ,, ,, β. Naphthol.

Adjective—

Alizarine, dry 50% (Fr. Bayer & Co.).

That the dyes chosen are well known and commonly used in the silk-dyeing trade may be judged from von Georgievic's observations; he points out that great fastness is not generally looked for in silk dyeing, and that acid dyes are very generally used. In a short list of the more commonly used dyestuffs Orange II is one out of the only two oranges mentioned, and the Ponceaus and Magdala Red are both mentioned in a list of only seven reds. The shade-card above mentioned issued by the Badische Anilin and Soda Fabrik contains only dyeings with 40 different dyestuffs, and of these six have been used in this investigation, *viz.*, Magenta, Auramine II, Orange II, Metanil Yellow, Naphthol Yellow S and Thiazine Red. Again, that several of the dyes chosen have a high reputation for fastness is shown by the following remarks: Hurst, in speaking of dyeing with Primuline developed by β-Naphthol, says: "The red thus got is bright and fast to acids, soaping and alkalies." Chrysophenine, the same author remarks, "gives bright yellows fast to light and washing" and "all the (neutral) yellow colouring matters are pretty fast to light and resist soaping very well, especially chrysophenine." Auramine "gives greenish yellows very fast to light and soaping." Messrs. Cassella & Co.'s select list of dyeings especially fast to boiling off includes Primuline subsequently treated with Soda, Primuline developed with Phenol and the same dye developed with β-Naphthol. These Primuline dyeings are said to stand a very severe treatment with soap, and their fastness to acids is characterised as very satisfactory. Subsequently treated with Soda, Primuline is designated as eminently fast to light. The same firm includes Orange II in its list of acid colours, all of which are characterised as very fast to rubbing and acids and possessing good resistance to light and ironing.

The dyed samples were prepared according to the methods described in the publications above mentioned.

Determination of Fastness of dyed samples.

As in the case of cotton dyeings, the dyed samples were examined with regard to the following points:—

(i) Fastness to light.
(ii) ,, to washing with soap.
(iii) ,, to alkali.
(iv) ,, to acid.

(*I*). *Fastness to Light.*

Determinations carried out as in the case of cotton dyeings (Part I of this investigation). The samples were exposed to light at the Civil Engineering College, Sibpur, during January 1908 and the early part of February 1908, *viz.*, on the following days: January 2—11, 15—24, 26—31; February 1—6. The Sunshine Records of the Alipore Meteorological Observatory were again utilised and the same correction made for cloudy periods as in Part I. Again the day on which 8·1 hours of consecutive sunshine were recorded was taken as the *unit "one day of bright sunshine,"* in order that the figures in this investigation should be directly comparable with the figures recorded in Part I. It will be observed that the two investigations were carried out in the same season of successive years. Moreover, by exposing along with the silk dyeings a few samples of cotton dyeings prepared in the former part of the work, the assumption that the figures in this paper and in Part I are directly comparable was shown to be justified.

In Table O the corrected values for the days of exposure are given:

Table O.

Date.	Number of hours' sunshine recorded.	Value of day in arbitrary units.	Date.	Number of hours' sunshine recorded.	Value of day in arbitrary units.
January 2	7·6	0·98	January 21	7·8	0·99
,, 3	7·9	1·00	,, 22	7·9	1·00
,, 4	8·1	1·01	,, 23	7·9	1·00
,, 5	7·7	0·99	,, 24	7·8	0·99
,, 6	6·9	0·94	,, 26	6·3	0·90
,, 7	8·1	1·01	,, 27	6·0	0·88
,, 8	8·2	1·01	,, 28	7·3	0·96
,, 9	7·5	0·98	,, 29	8·0	1·00
,, 10	7·1	0·95	,, 30	8·1	1·01
,, 11	7·5	0·98	,, 31	8·0	1·00
,, 15	8·1	1·01	February 1	8·2	1·01
,, 16	8·2	1·01	,, 2	7·0	0·94
,, 17	8·3	1·02	,, 3	3·4	0·72
,, 18	8·1	1·01	,, 4	7·6	0·98
,, 19	8·0	1·00	,, 5	7·0	0·94
,, 20	7·5	0·98	,, 6	2·5	0·67

The results of the observations on the fading of the dyed samples are recorded in Table I. In the last column of this table *the dyeings are placed in Groups I—IV according to their fastness to light. In Group I are placed the most fugitive, in Group IV the most permanent.* These groups are identical with the corresponding groups into which cotton dyeings were classified, that is to say, a silk dyeing belonging to Group I has the same fastness to light as a cotton dyeing which was classed in Group I; and so on.

The change of shade from orange to pink, which was noted in the case of *latkan* dyeings on cotton, was scarcely noticeable on silk.

It is interesting to note the irregular way in which the nature of the textile material affects the fastness of the dyeings. Thus in the case of *palas*, *latkan*, *manjista* and *primuline developed with β-Naphthol* the dyeings on silk are faster to light than the corresponding dyeings on cotton; but the reverse is true for *safranine* and for *primuline developed with phenol*.

(*II*). *Fastness to washing with soap.*

The samples were treated in the same way as were the cotton samples previously, *i.e.*, they were all steeped for 15 minutes at 60°C. in an aqueous solution of neutral soap containing 15 gms. per litre, 250 cc. of solution being used for 1 gm. of silk. The results are recorded in Table II; and here again the groups are identical with the corresponding groups into which cotton dyeings were classified in the previous paper. As a result of experience gained in examining the cotton dyeings, it was considered advisable to make a further set of observations, *viz.*, as to the tendency of the dyed cloth to stain a piece of white cloth placed in contact with it in the soap-bath. It was found that there was a tendency to over-rate the fastness of dyeings of a full shade and to under-rate the fastness of dyeings of light shades. The reason for this is fairly obvious: a deep shade can lose a considerable amount of colouring matter and still not be rendered *relatively* much lighter than the original shade, whereas the loss of even a smaller quantity of colouring matter from a light shade would be very noticeable. On the other hand the sample losing the large amount of colouring matter would be more likely to stain white fabrics in contact with it in the soap-bath. (The problem, it is true, is complicated by the fact that the extent to which the white fabric would be stained would depend not only on the amount of dyestuff brought into solution in the bath, but also on the nature and preliminary treatment of the white fabric). An equal weight of pure white silk cloth was folded and loosely knotted together with the dyed sample before entering in the soap-bath, and after the 15 minutes' treatment in the bath the previously white piece of cloth was rinsed, dried and examined. The scale employed to indicate the extent of the marking is (1) not marked; (2) scarcely marked; (3) slightly marked; (4) considerably marked; and (5) much marked.

These observations show that the majority of dyeings with synthetic dyestuffs do not stand soaping at all well, and in this respect the indigenous dyes *manjista*, *bakam* on tannin-iron mordant, *lac* and *kamala* compare very favourably with the synthetic products.

(*III*). *Fastness to Alkali.*

Determined as in case of cotton dyeings, *i.e.*, samples were all steeped for 10 minutes in a solution of sodium carbonate (10 gms. cyst. carbonate per litre) at 60°C., washed, dried and compared with original. For 1 gm. of cloth 250 cc. of solution were used. The groups into which the dyeings are classified are identical with the corresponding groups for cotton dyeings.

(*IV*). *Fastness to Acid.*

Also determined as in case of cotton dyeings, *i.e.*, samples were all steeped for one hour in 10 per cent. acetic acid solution at 40°C., washed, dried and compared with original. For 1 gm. of cloth 250 cc. of solution were used. The groups into which the dyeings are classified are identical with the corresponding groups for cotton dyeings.

Conclusion.

A summary of the results of the work recorded in this paper is given in Table V.

The general result of the present work has been to show that the indigenous dyes of Bengal are considerably more useful for dyeing on silk than for cotton dyeings, and that the dyeings obtained are frequently considerably faster on silk than on cotton This, taken in conjunction with the fact that many of the commonly used synthetic dyes do not give at all fast dyeings on silk, causes the indigenous dyes to compare much more favourably with their synthetic adversaries in this field than was the case in the field of cotton-dyeing. The shades obtained from *bakam* on a tannin-iron mordant, from *manjista*, from *lac*, *kamala* and *jackwood* may be said to have all-round good fastness, as in no respect does any one of these dyeings come lower than III in the scale. Thus of 10 dyestuffs examined, 5 have yielded dyeings which may be characterised as all-round good. Of the 12 synthetic dyestuffs used for comparison only 4, *viz.*, alizarine, primuline, chrysophenine and magdala red are capable of yielding dyeings which may by the same criterion be similarly characterised. My work would lead me to form a somewhat higher opinion of the value of *kamala* as a silk dye than has been recorded by A. G. Perkin (*Journ. Soc. Chem. Industry*, XIV, 1895, p. 460). The dyeings with *lac* proved to be faster to soaping even than the synthetic dyes which were fastest in this respect. In fact the general fastness of *lac* dyeings made it appear to me a matter of surprise that this material has been so completely superseded by synthetic dyes, the more so as it is necessarily obtained as a by-product in the purification of *lac*, a material for which there is an ever rapidly increasing demand.

Finally it may be remarked that in the matter of brightness and cleanness of shade the vegetable dyeings do not compare unfavourably with those obtained from synthetic materials, nor is it any more troublesome to dye with the vegetable materials than with those synthetic materials which yield the faster dyeings.

It may be that I have attached more importance than is usual, when considering silk dyes, to the fastness of the dyeings to washing and soaping; but I can scarcely imagine a dyeing which is very sensitive to washing to be altogether satisfactory for any class of textiles.

Table I.—Fastness to Light of Dyeings on Silk.

DYEING.	Fulness of shade.	No. of days' bright sunshine required to produce first sign of fading.	No. of days' bright sunshine required to reduce shade to one-quarter original intensity.	No. of days' bright sunshine required to completely bleach.	GROUP.
Turmeric, raised with acid ..	full	1	3	6	I
,, alum mordant ..	full	1	3	6	
Kusum	full	1	3	11	I
Bakam, alum mordant ..	medium	1	5	15	II
,, alum-soda mordant ..	full	3	9	†	II—III
,, tannin-iron mordant ..	full	13	†	†	IV
Palas, without mordant ..	light	5	22	28	III
,, alum mordant ..	medium	3	22	28	
Latkan, Murshidabad process ..	full	2	8	†	II
,, Nadia process ..	full	2	8	†	
Manjista, alum-soda mordant ..	medium	5	28	†	IV
,, ditto	full	9	†	†	
,, ditto followed by soaping and raising ..	medium	4	28	†	
,, ditto ditto ..	full	8	†	†	
Lac, alum mordant ..	medium	4	28	†	III—IV
,, alum-soda mordant ..	full	2	9	†	II
Kamala, without mordant ..	full	3	17	†	II—III
,, alum mordant ..	full	2	9	†	II
,, ditto* ..	full	4	10	†	
Singhar, without mordant ..	full	2	9	†	II
,, alum mordant ..	full	2	9	†	
Jackwood, alum mordant ..	med.-full	1	†	†	III
Orange II, 3% ..	..	9	22	†	IV
Naphthole Yellow S., 0·5% ..	..	2	3	7	I
,, ,, 4% ..	..	2	7	14	
Metanil Yellow E., 1% ..	..	3	17	28	III
,, ,, 3% ..	..	3	28	†	
,, ,, 5% ..	..	3	†	†	
Scarlet RRR., 3% ..	..	3	12	†	II
Fast Pink, 5% ..	..	6	19	†	III—IV
Auramine II, 3% ..	..	1	8	20	I
Magenta, 0·13% ..	..	1	4	12	I
,, 1% ..	..	2	7	28	
Safranin, 0·4% ..	..	1	4	11	II
,, 4% ..	..	2	15	†	
Chrysophenine BB, 3% ..	..	9	†	†	IV
,, 6% ..	..	9	†	†	
Primuline, 2% ..	..	1	..	†	II
Thiazine Red R, 5% ..	..	8	29	†	IV
Primuline 8%, treated with soda	..	4	19	†	III
,, 8%, developed with Phenol ..	..	4	19	†	III
,, 8%, developed with β Naphthol ..	..	3	15	†	II—III
Alizarine (Hurst *loc. cit.*, 31 appendix)	..	†	†	†	IV

* The whole sample was exposed to sunlight for two days before the tests were started.

† More than 30 days.

Table II.—Fastness to Soaping of Dyeings on Silk.

Dyeing.	Fulness of shade.	Intensity and tint after soaping, washing and drying. (Original intensity = I.)	Appearance of white silk soaped along with the dyed sample.	Group.
Turmeric, raised with acid	full	I., duller tint	much marked	II—III
,, alum mordant	full	I., duller tint	considerably ,,	III
Kusum	full	$\frac{1}{8}$ I., tint unaltered	much ,,	I
Bakam, alum mordant	medium	$\frac{1}{4}$ I., much bluer tint	slightly ,,	II
,, alum-soda mordant	full	$\frac{1}{4}$ I., ditto	considerably ,,	II
,, tannin-iron mordant	full	$>\frac{1}{2}$ I., tint unaltered	considerably ,,	III—IV
Palas, without mordant	light	$\frac{1}{4}$ I., duller tint	considerably ,,	I
,, alum mordant	medium	I., warmer tint	considerably ,,	III
Latkan, Murshidabad process	full	$>\frac{1}{2}$ I., tint unaltered	considerably ,,	III
,, Nadia process	full	$>\frac{1}{2}$ I., slightly colder tint	slightly ,,	III—IV
Manjista, alum-soda mordant	medium	$\frac{1}{2}$ I., tint unaltered	slightly ,,	III—IV
,, ditto	full	$>\frac{1}{2}$ I., ditto	slightly ,,	III—IV
,, ditto followed by soaping and raising	medium	I., ditto	scarcely ,,	IV
,, ditto ditto	full	I., ditto	scarcely ,,	IV
Lac, alum mordant	medium	I., ditto	not ,,	IV
,, alum-soda mordant	full	I., ditto	not ,,	IV
Kamala, without mordant	full	I., ditto	scarcely ,,	IV
,, alum mordant	full	$>\frac{1}{2}$ I., ditto	slightly ,,	III—IV
,, ditto*	full	$\frac{1}{2}$ I., ditto	slightly ,,	III—IV
Singhar, without mordant	full	$\frac{1}{2}$ I., ditto	considerably ,,	II—III
,, alum mordant	full	$\frac{1}{2}$ I., ditto	considerably ,,	II—III
Jackwood, alum mordant	med.-full	I., warmer tint	scarcely ,,	III—IV
Orange II, 3%	..	$<\frac{1}{8}$ I., tint unaltered	much ,,	I
Napthole Yellow S., 0·5%	..	nil	not ,,	I
,, ,, 4%	..	nil	not ,,	I
Mentanil Yellow E., 1%	..	nil	much ,,	I
,, ,, 3%	..	$<\frac{1}{8}$ I., tint unaltered	much ,,	I
,, ,, 5%	..	$<\frac{1}{8}$ I., ditto	much ,,	I
Scarlet RRR., 3%	..	$<\frac{1}{8}$ I., ditto	considerably ,,	I—II
Fast Pink, 5%	..	$\frac{1}{2}$ I., ditto	slightly ,,	III
Auramine II., 3%	..	nil	much ,,	I
Magenta, 0·13%	..	$\frac{1}{8}$ I., tint unaltered	much ,,	I
,, 1%	..	$\frac{1}{8}$ I., ditto	much ,,	I
Safranin, 0·4%	..	$\frac{1}{8}$ I., ditto	much ,,	I
,, 4%	..	$<\frac{1}{8}$ I., ditto	much ,,	I
Chrysophenine BB., 3%	..	$\frac{1}{2}$ I., ditto	considerably ,,	III
,, 6%	..	$>\frac{1}{2}$ I., ditto	considerably ,,	III
Primuline, 2%	..	$\frac{1}{2}$ I., ditto	considerably ,,	II—III
Thiazine Red R., 5%	..	$>\frac{1}{2}$ I., ditto	much ,,	II—III
Primuline 8%, treated with soda	..	I., ditto	scarcely ,,	IV
,, 8%, developed with Phenol	..	I., ditto	scarcely ,,	IV
,, 8%, developed with β Napthol	..	I., ditto	slightly ,,	III—IV
Alizarine (Hurst *loc. cit.*, 31 appendix)	..	I., ditto	scarcely ,,	IV

* The whole sample was exposed to sunlight for two days before the tests were started.

Table III.—Fastness to Alkali of Dyeings on Silk.

Dyeing.	Fulness of shade.	Intensity and tint after treatment with alkali, washing and drying. (Original Intensity = I.)	Colour of alkaline bath afterwards.	Group.
Turmeric, raised with acid ..	full	I., duller tint	full orange	II
,, alum mordant ..	full	I., much duller tint	medium orange	II—III
Kusum	full	nil	medium orange	I
Bakam, alum mordant ..	medium	$\frac{1}{4}$ I., much bluer tint	medium pink	II
,, alum-soda mordant ..	full	$\frac{1}{2}$ I., much bluer tint	full claret	
,, tannin-iron mordant ..	full	I., tint almost unchanged	full claret	III—IV
Palas, without mordant ..	light	$\frac{1}{4}$ I., much duller tint	medium orange	II
,, alum mordant ..	medium	I., warmer tint	medium orange	II—III
Latkan, Murshidabad process ..	full	I., tint unaltered	med.-full yellow	III
,, Nadia process ..	full	I., ditto	medium yellow	
Manjista, alum-soda mordant ..	medium	I., ditto	light salmon-pink	
,, ditto ..	full	I., ditto	light salmon-pink	
,, ditto followed by soaping and raising ..	medium	I., ditto	colourless	IV
,, ditto ditto ..	full	I., ditto	colourless	
Lac, alum mordant ..	medium	I., ditto	colourless	IV
,, alum-soda mordant ..	full	I., ditto	light pink	
Kamala, without mordant ..	full	I., ditto	light yellow	III—IV
,, alum mordant ..	full	I., ditto	medium yellow	III
,, ditto* ..	full	I., ditto	medium yellow	
Singhar, without mordant ..	full	$>\frac{1}{2}$ I., ditto	med.-full yellow	II—III
,, alum mordant ..	full	$>\frac{1}{2}$ I., ditto	med.-full yellow	
Jackwood, alum mordant ..	med.-full	I., warmer tint	medium orange	III
Orange II., 3% ..	..	$\frac{1}{8}$ I., tint unchanged	full orange	I
Naphthole Yellow S., 0·5% ..	..	nil	light yellow	I
,, ,, 4% ..	..	nil	med.-full yellow	
Metanil yellow E., 1% ..	..	$\frac{1}{4}$ I., tint unchanged	medium yellow	
,, ,, 3% ..	..	$<\frac{1}{2}$ I., ditto	med.-full orange	II
,, ,, 5% ..	..	$\frac{1}{2}$ I., ditto	full yellowish orange.	
Scarlet RRR., 3% ..	..	$\frac{1}{8}$ I., ditto	full crimson	I
Fast Pink, 5% ..	..	$\frac{1}{2}$ I., ditto	light-med. pink	II—III
Auramine II., 3% ..	..	I., ditto	colourless	IV
Magenta, 0·13% ..	..	I., ditto	colourless	IV
,, 1% ..	..	I., ditto	colourless	
Safranin, 0·4% ..	..	I., ditto	colourless	III
,, 4% ..	..	I., ditto	med.-full pink	
Chrysophenine BB., 3% ..	..	I., ditto	almost colourless	IV
,, 6% ..	..	I., ditto	light yellow	
Primuline, 2% ..	..	I., ditto	colourless	IV
Thiazine Red R., 5% ..	..	$>\frac{1}{2}$ I., ditto	full crimson	II—III
Primuline 8% treated with Soda	..	I., ditto	colourless	IV
,, 8% developed with Phenol	..	I., ditto	colourless	IV
,, 8% developed with β-Napthol ..	..	I., ditto	colourless	IV
Alizarine (Hurst *loc. cit.*, 31 appendix)	..	I., ditto	colourless	IV

* The whole sample was exposed to sunlight for two days before the tests were started.

Table IV.—Fastness to Acid of Dyeings on Silk.

Dyeing.	Fulness of shade.	Intensity and tint after treatment with acid, washing and drying. (Original Intensity = I.)	Colour of acid bath afterwards.	Group.
Turmeric, raised with acid ..	full	I., tint unaltered	medium yellow	III
,, alum mordant ..	full	I., ditto	light yellow	III—IV
Kusum	full	I., ditto	colourless	IV
Bakam, alum mordant ..	medium	$<\frac{1}{8}$ I., ditto	light yellow	I
,, alum-soda mordant ..	full	$<\frac{1}{8}$ I., ditto	medium orange	I
,, tannin-iron mordant ..	full	I., tint almost unchanged	light yellow	III—IV
Palas, without mordant ..	light	$>\frac{1}{2}$ I., tint unaltered	almost colourless	IV
,, alum mordant ..	medium	$\frac{1}{4}$ I., ditto	almost colourless	II
Latkau, Murshidabad process ..	full	I., ditto	colourless	IV
,, Nadia process ..	full	I., ditto	colourless	IV
Manjista, alum-soda mordant ..	medium	$>\frac{1}{2}$ I., ditto	colourless	IV
,, ditto	full	I., ditto	colourless	
,, ditto followed by soaping and raising ..	medium	$>\frac{1}{2}$ I., ditto	colourless	
,, ditto ditto ..	full	I., ditto	colourless	
Lac, alum mordant	medium	I., ditto	colourless	IV
,, alum-soda mordant ..	full	I., ditto	light orange	III—IV
Kamala, without mordant ..	full	I., ditto	colourless	IV
,, alum mordant ..	full	$>\frac{1}{2}$ I., ditto	colourless	
,, ditto*	full	$\frac{1}{2}$ I., ditto	colourless	
Singhar, without mordant ..	full	$>\frac{1}{2}$ I., ditto	med.-full yellow	III
,, alum mordant ..	full	$>\frac{1}{2}$ I., ditto	med.-full yellow	
Jackwood, alum mordant ..	med.-full	$>\frac{1}{2}$ I., ditto	almost colourless	IV
Orange II., 3% ..	..	I., ditto	medium orange	III
Naphthole Yellow S., 0·5% ..	..	I., ditto	colourless	IV
,, ,, 4% ..	..	I., ditto	colourless	
Metanil Yellow E., 1% ..	..	I., ditto	colourless	IV
,, ,, 3% ..	..	I., ditto	colourless	
,, ,, 5% ..	..	I., ditto	colourless	
Scarlet RRR., 3% ..	..	I., ditto	colourless	IV
Fast Pink, 5% ..	..	I., ditto	colourless	IV
Auramine II., 3% ..	..	$<\frac{1}{8}$ I., ditto	full yellow	I
Magenta, 0·13% ..	..	$\frac{1}{8}$ I., ditto	med.-full magenta	I
,, 1% ..	..	$\frac{1}{8}$ I., ditto	full magenta	
Safranin, 0·4% ..	..	$\frac{1}{8}$ I., ditto	medium pink	I
,, 4% ..	..	$\frac{1}{8}$ I., ditto	full red	
Chrysophenine BB., 3% ..	..	I., ditto	colourless	IV
,, 6% ..	..	I., ditto	colourless	
Primuline, 2% ..	..	I., ditto	colourless	IV
Thiazine Red R., 5% ..	..	I., ditto	colourless	IV
Primuline 8% treated with Soda ..	..	I., ditto	colourless	IV
,, 8% developed with Phenol	..	I., ditto	colourless	IV
,, 8% developed with β Napthol ..	..	I., ditto	colourless	IV
Alizarine (Hurst, *loc. cit.*, 31 appendix)	..	I., ditto	colourless	IV

* The whole sample was exposed to sunlight for two days before the tests were started.

Table V.—Summary—Fastness to various Agencies of Dyeings on Silk.

Dyeing.	Fastness to light.	Fastness to soaping.	Fastness to alkali.	Fastness to acid.
Turmeric, raised with acid ..	I	II—III	II	III
,, alum mordant ..		III	II—III	III—IV
Kusum ..	I	I	I	IV
Bakam, alum mordant ..	II	II	II	I
,, alum-soda mordant ..	II—III			
,, tannin-iron mordant ..	IV	III—IV	III—IV	III—IV
Palas, without mordant ..	III	I	II	IV
,, alum mordant ..		III	II—III	II
Latkan, Murshidabad process ..	II	III	III	IV
,, Nadia process ..		III—IV		
Manjista, alum-soda mordant ..	IV	III—IV	IV	IV
,, alum-soda mordant followed by soaping and raising ..		IV		
Lac, alum mordant ..	III—IV	IV	IV	IV
,, alum-soda mordant ..	II			III—IV
Kamala, without mordant ..	II—III	IV	III—IV	IV
,, alum mordant ..	II	III—IV	III	
Singhar, without mordant ..	II	II—III	II—III	III
,, alum mordant ..				
Jackwood, alum mordant ..	III	III—IV	III	IV
Orange II. ..	IV	I	I	III
Naphthol Yellow S. ..	I	I	I	IV
Metanil Yellow E. ..	III	I	II	IV
Scarlet RRR. ..	II	I—II	I	IV
Fast Pink ..	III—IV	III	II—III	IV
Auramine II. ..	I	I	IV	I
Magenta ..	I	I	IV	I
Safranin ..	II	I	III	I
Chrysophenine ..	IV	III	IV	IV
Primuline ..	II	II—III	IV	IV
Thiazine Red R. ..	IV	II—III	II—III	IV
Primuline followed by Soda ..	III	IV	IV	IV
,, developed with Phenol ..	III	IV	IV	IV
,, ,, ,, β-Napthol ..	II—III	III—IV	IV	IV
Alizarine ..	V	IV	IV	IV

Memoirs of the Asiatic Society of Bengal.

1905—1906.

I. *On certain Tibetan Scrolls and Images lately brought from Gyantse.—By* PROF. SATIS CHANDRA VIDYĀBHŪṢAṆA, M.A., M.R.A.S. (Price Re. 1-8; or 2*s*. 3*d*.)

II. *Sal-Ammoniac: a Study in Primitive Chemistry.—By* H. E. STAPLETON, B.A., B.Sc. (Price Re. 1; or 1*s*. 6*d*.)

III. *The Similarity of the Tibetan to the Kashgar-Brahmi Alphabet.—By* The REV. A. H. FRANCKE. (Price Rs. 2; or 2*s*. 10*d*.)

IV. *Alchemical Equipment in the Eleventh Century, A.D.—By* H. E. STAPLETON and R. F. AZO. (Price Re. 1-8; or 2*s*. 3*d*.)

V. *Malaysian Barnacles in the Indian Museum, with a list of the Indian Pedunculata.—By* N. ANNANDALE, B.A., D.Sc. (Price Re. 1-8; or 2*s*. 3*d*.)

VI. *Ashrafpur Copper-plate Grants of Devakhadga.—By* GANGA MOHAN LASKAR, M.A. (Price Annas 8; or 10*d*.)

VII. *Festivals and Folklore of Gilgit.—By* GHULAM MUHAMMAD. (Price Rs. 2; or 2*s*. 10*d*.)

VIII. *Notes on the Bhotias of Almora and British Garhwal.—By* C. A. SHERRING, M.A., F.R.G.S., I.C.S. (Price Re. 1-5; or 2*s*.)

IX. *Religion and Customs of the Uraons.—By* the late REV. FATHER DEHON, S.J. (Price Rs. 2; or 2*s*. 10*d*.)

X. *Notes on the Fauna of a Desert Tract in Southern India* (Herpetology and Entomology).*—By* N. ANNANDALE, D.Sc., C.M.Z.S., with a list of Mammals by R. C. WROUGHTON, F.E.S. (Price Rs. 2; or 2*s*. 10*d*.)

XI. *Amulets as Agents in the Prevention of Disease in Bengal.*—Compiled in the Office of the Superintendent of Ethnography, Bengal. (Price Annas 12; or 1*s*. 2*d*.)

XII. *Earth-Eating and the Earth-Eating Habit in India.—By* D. HOOPER and H. H. MANN. (Price Re. 1; or 1*s*. 6*d*.)

XIII. *On a Cup-Mark Inscription in the Chumbi Valley.—By* E. H. C. WALSH, I.C.S. (Price Re. 1; or 1*s*. 6*d*.)

XIV. *A Descriptive List of the Sea-Snakes* (Hydrophiidæ) *in the Indian Museum, Calcutta.—By* CAPTAIN F. WALL, I.M.S., C.M.Z.S. (Price Re. 1; or 1*s*. 6*d*.)

XV. *Common Saws and Proverbs collected, chiefly from Dervishes, in Southern Persia.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Re. 1; or 1*s*. 6*d*.)

XVI. *The Common Hydra of Bengal: its Systematic Position and Life History.—By* N. ANNANDALE, B.A., D.Sc., C.M.Z.S. (Price Re. 1; or 1*s*. 6*d*.)

XVII. *Animals in the Inscriptions of Piyadasi.—By* MONMOHAN CHAKRAVARTI, M.A. (Price Annas 12; or 1*s*. 2*d*.)

XVIII. *Some current Persian Tales told by Professional Story-Tellers.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Re. 1; or 1*s*. 6*d*.)

XIX. *The Dards at Khalatse in Western Tibet.—By* REV. A. H. FRANCKE. (Price Re. 1-6; or 2*s*.)

Supplement, Miscellanea Ethnographica. Part I. 1. *The Blow-Gun in Southern India* 2. *Miscellaneous objects from the Rámanád subdivision of the Madura district* 3. *Indian Weighing-beams.—By* N. ANNANDALE, D.Sc. (Price Re. 1.)

Supplement, Miscellanea Ethnographica. Part II. 1. *Some Malayan Weapons—By* N. ANNANDALE. 2. *Plan of a Persian Gentleman's House.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Annas 8; or 10*d*.)

Memoirs of the Asiatic Society of Bengal.

Vol. II.

MEMOIRS

OF THE

ASIATIC SOCIETY OF BENGAL

VOL. II, No. 8, pp. 169—251.

A MONOGRAPH OF THE SEA SNAKES.

BY

MAJOR F. WALL, I.M.S., C.M.Z.S.

(*WITH FOUR PLATES.*)

CALCUTTA:

PRINTED AT THE BAPTIST MISSION PRESS, AND PUBLISHED BY
THE ASIATIC SOCIETY, 57, PARK STREET.

1909.

Price Rs. 5 ; or 7s.

6-7-09.

A Monograph of the Sea-Snakes (Hydrophiinæ).

(With four plates).

By Major F. Wall, I.M.S., C.M.Z.S.

More than ten years have now elapsed since the publication of Professor Boulenger's colossal work, Catalogue of Snakes in the British Museum, the third and last volume of which appeared in 1896. This last volume contains, among other matter, a detailed classification and description of the *Hydrophiinæ*, which remains the standard work on this admittedly difficult subject.

Within the last few years I have examined all the specimens of this sub-family contained in the following institutions: The Royal College of Surgeons, London; The Indian Museum, Calcutta; The Natural History Society, Bombay; The Government Museum, Colombo; The Medical College Museum, Madras; The Bangalore Museum; The City Hall Museum, Hongkong; The Shanghai Museum, and lately the entire British Museum collection. In addition I examined in Yokohama a large collection made by Mr. A. Owston in the seas about Japan and the Loo Choo Islands, a second large collection from the same source, a fine collection made by Mr. J. R. Henderson in Madras, and many smaller private collections from various parts as well as many specimens obtained by myself on the coasts of India and Burmah.

I have detailed notes of every specimen examined and propose in the following monograph to review this confused subject, which, I venture to think, requires a thorough revision; and this must necessarily entail much allusion to Professor Boulenger's work.

As collections become enriched it almost inevitably follows that with a larger series of specimens available, previous views require modification and correction. It is therefore not surprising that my views are in many ways substantially different from those held by Professor Boulenger a decade back. Since that authority's treatment of the subject the British Museum collection has acquired, as a matter of course, many additions, and the collections in many of the other institutions referred to above have grown, in most instances considerably, since any account of their contained material has been published. I am very decidedly of opinion that the actual number of species is much below that set forth in Professor Boulenger's work. This authority has already in his catalogue, in some instances, united under one heading many forms that had been previously considered distinct, and I think the generalisation commenced by him should be pushed very much further.

The conception of a species is of course, to a more or less extent, a matter of personal opinion. I shall therefore, in the following remarks, take every pains to set forth in detail the reasons in support of my views. But, beyond this, there are discrepancies between Mr. Boulenger's work and mine affecting questions of actual fact; I refer in particular to the supposed presence or absence of grooves in the posterior maxillary teeth, a point of material importance in the present accepted classification. Where my observations differ from Mr. Boulenger's, I can only explain the discrepancy on the supposition that my vision may be keener than his, and the lens I worked with of higher power. Certain it is that grooves which were invisible under the lens I had previously used under the assurance that it was the strongest made, became clearly revealed by a new lens of the very highest power and quality specially recommended me for this work by Messrs. Baker, opticians, Holborn. More recently inspection with the aid of the microscope has confirmed my observations with this pocket lens.

Mr. Boulenger records the occurrence of solid posterior maxillary teeth in the genera *Hydrus*, *Acalyptus*, *Hydrelaps*, *Enhydrina*, *Platurus* and *Hydrophis* (in all of which, however, I can discern grooves). So far as the first five are concerned, this point does not influence his classification, but the genera *Hydrophis* and *Distira* are divided solely on the assumption that the small teeth are solid in *Hydrophis*, grooved in *Distira*. Now I find that in *Hydrophis* the small teeth are all grooved (not solid as Mr. Boulenger states), and being so, conform to the condition he claims to characterise the genus *Distira*. The error is one easy to understand, for many of his species of *Hydrophis* are snakes with very small constricted heads, and some of them, even when adult, are of notably small proportions. I could find no specimen for instance, of *H. gracilis* in the British Museum collection that enabled me to clear up this point, but in the Colombo Museum I saw three well-grown adults in which the grooves were plainly visible. In this connection I may point out that Mr. Boulenger in the "Fauna of British India Reptiles and Batrachia," published in 1892, says that the small maxillary teeth behind the fangs in the genera *Naia* and *Bungarus* are solid, but recognises and corrects these mistakes four years later in his Catalogue, Vol. III, pp. 373 and 365, where he rightly pronounces them grooved. This question of grooves has led to much confusion, for Mr. Boulenger has, in many cases, been led to describe as a new *Distira* a well-grown specimen of some previously known species of *Hydrophis*, the grooves well marked in the large adult snake having escaped detection in smaller or less perfect specimens. I have failed to discover a single species in the whole of the sub-family *Hydrophiinæ* with the posterior maxillary teeth ungrooved.

Some remarks upon the external characters concerning classification are, I think, called for, and in dealing with these I shall refer to them in what I consider their order of relative importance beginning with the ventrals.

Ventrals.—The presence or absence of these shields, and their development especially as regards breadth, are of the greatest importance in the separation of genera and species. They are absent in *Astrotia stokesi* being replaced by scales but little modified from those of the adjacent costal rows (see fig. 65 D). They are so ill-developed in the genus *Enhydris* that, except anteriorly in *E. curtus*, they might be better considered absent (see fig. 63). They are barely as broad as the last costal row in *Hydrus*, *Acalyptus* and *Thalassophis*. In *Hydrelaps*, *Enhydrina* and *Distira* they are rather less than twice the last costal row (see fig. 38). In *Distira viperina* they are unique, the anterior shields being three or four times as broad as the last costal row, the rest of the series barely twice as broad (see fig. 57). In *Platurus*, *Emydocephalus*, and *Aipysurus* they attain their maximum development, being more than three times as broad in the whole body length and very similar to the same shields in Colubrine terrestrial snakes.

Numerically the value of these shields is of importance in distinguishing certain genera, but in closely allied species like those of the genus *Distira*, the range of variation in individuals is so considerable, and the figures of the specific ranges overlap so much, that the assistance to be derived from the number of these shields is decidedly limited. They are fewest in the genera *Emydocephalus*, *Aipysurus*, and *Hydrelaps*, being less than 200; most numerous in *Distira fasciata* where they may exceed 500.

The specific range of variation depends largely upon the numerical strength of the individuals available. If we exclude species but poorly represented numerically, the smallest range of variation is that met with in *Distira jerdoni* (219 to 248), and *D. viperina* (235 to 267); on the other hand the largest ranges of variation are seen in *Distira fasciata* (376 to 531), *D. torquata* (310 to 438), and *D. cyanocincta* (280 to 397).

The ventrals of most species are entire or mostly entire in the whole body length, the few shields that are divided being seen about the umbilical scar and before the anus. In *Hydrus platurus*, and in some specimens of *Distira major*, many of the shields are divided, but subject to a good deal of variation in number and position in individuals. In *D. cantoris* and *D. gracilis* all the shields in the posterior half or so of the body are very constantly divided (see fig. 13). In the very broad shields in some *Emydocephalus* and *Platurus* a median obtuse keel is seen posteriorly, but this is an inconstant feature found in only certain individuals, and, I believe, irrespective of age and sex.

The remarks made with reference to keels, tubercles, etc., under *costals* apply equally to these shields.

The ventrals in many of the species, specially in the genus *Distira*, are often very difficult to count accurately. The difficulty may arise from the detail of these shields being obscured by damage, desquamation, a local sodden condition, or the puckering in places occasioned by the way the specimen has been folded in the bottle. Often too small scales are interpolated on one or other side, which would alter the count on the two sides. Some observers count these, some do not. Again some appear not to count the shields which may be broken up, especially those just before the anus, and others again do not count the early ill-developed ones in the neck. The result is that the counts of various authors for the same specimen differ considerably. To take a single instance, the type-specimen of *Distira cyanocincta* has 308 ventrals according to Russell, 296 according to Boulenger, more than 320 according to Günther, and I count them 310. It is not very unusual for me to make these shields a little different in three or four counts in the same specimen, which may appear extraordinary for one to confess who strives at accuracy: still it is the fact.

COSTALS.—(The "scales" of other authors). The importance of these shields in classification is only second to that of the ventrals.

Numbers.—These may be the same or proximately the same (within 2) in the whole body length, or relatively more numerous posteriorly than anteriorly, and this is of great importance in separating genera. In *Platurus*, *Emydocephalus* and *Aipysurus* the rows are the same throughout, or vary but slightly. The same is a noticeable feature of *Distira jerdoni*, and one of my strongest reasons for believing that this species should occupy a place apart under a genus to itself. The degree to which the rows posteriorly may exceed those anteriorly in the same specimen varies considerably in different genera and species, but the range of variation to be met with in these two counts in individuals of the same species is such as to detract considerably from the assistance to be derived from this condition, especially in closely allied forms. In order to obtain the best results, I count these scales in three situations, *viz.*, anteriorly, *i.e.*, two headslengths behind the head, in mid body, and posteriorly, *i.e.*, two headslengths before the anus. The terms "anterior" and "posterior" used throughout this monograph are therefore precise. In *Distira spiralis* they may be from two to nine more posteriorly than anteriorly, in *D. fasciata* 10 to 22 more, and between these extremes every degree is to be met with in various other species.

The actual numbers of rows are very important in another way, assisting the distinction of genera and species. They are fewest in *Emydocephalus* (17 to 19), *Aipysurus* (except *lævis*) (17 to 19), and *Distira jerdoni* (19); most numerous in *Thalassophis annandalei* (90 to 100), *Enhydrina* (50 to 70), *Hydrus* (45 to 62), and *Astrotia* (48 to 59). In *Distira gracilis* they are very few anteriorly (17 to 21), and rather numerous posteriorly (27 to 35). Again the numbers of rows may be very constant in individuals of the same species, or the reverse, a condition influencing generic and specific classification. In *Platurus*, *Emydocephalus* and *Aipysurus*, individuals have a like number of rows, or range within two of the normal; on the other hand in certain species the rows counted at the same site vary in individuals very considerably, notably in *Enhydrina* from 50 to 70, *Hydrus* 45 to 62, *Distira fasciata* 37 to 51. Every degree of variation may be met with between these extremes.

Imbrication.—The costals may be imbricate, subimbricate, or juxtaposed, and this condition is of great importance generically, as well as assisting the separation of certain species in the genus *Distira*. In the genera *Platurus*, *Emydocephalus*, *Aipysurus* and *Astrotia* imbrication is pronounced in the whole body length, also in *Distira jerdoni*. In *Hydrus* and *Enhydris* the costals are juxtaposed throughout, and in certain species, notably *Distira cantoris* and *D. gracilis*, these scales are imbricate anteriorly, juxtaposed posteriorly. In certain species this condition is subject to variation, notably in *Distira fasciata*, *D. torquata*, *D. ornata*, *D. cærulescens*, etc., specimens being met with in which these scales are juxtaposed, and others in which they are distinctly imbricate or subimbricate posteriorly. This fact shows that, important as this condition is, it cannot be completely relied upon, and one is to expect a similar aberration in individuals of other allied forms.

Size.—This varies in the genera and in some species. The costals are comparatively large in the genera *Platurus*, *Emydocephalus* and *Aipysurus*, and in *Distira jerdoni*, but comparatively small in *Hydrus* and some *Distira*, notably *fasciata*, *cærules-*

cens, and *torquata*, and very small in *Thalassophis annandalei*. With rare exceptions the costals are of equal or sub-equal size in the whole body length. In the genus *Enhydris*, however, there is a notable enlargement of the three or four rows near the ventral median line. This point is not very well brought out in figure 63, which is intended to show the imperfect ventrals. In *Emydocephalus ijimæ* some vertebrals are much enlarged, but even in this species this is not a constant feature throughout the same individual, nor in different individuals.

Shape.—As a general rule the costals are rhomboidal when imbricate, more or less hexagonal where juxtaposed. The edges of the scales are peculiar in one species especially, *viz.*, *Astrotia stokesi*, where in the lowest rows they are irregularly dentate, and the apices emarginate (see fig. 66 D).

Carination.—In many genera the costals are quite smooth as in *Platurus*, *Emydocephalus* and *Aipysurus*, but in other genera they are furnished with short, median keels or tubercles to which many authors have attached considerable importance. Personally I do not share their views. Much attention to this character leads me to think little if any weight can be attached to it, either in the separation of genera or species. I find the degree to which these tubercles are developed varies very much in individuals from birth to maturity, and in individuals of the same species of similar growth. It is not unusual to see young specimens with these tubercles so little in evidence that the scales feel smooth, or almost smooth to the touch, and to meet with old examples which are very rough to the touch. Some authors are inclined to think the degree of development dependent upon the sexes, the males especially showing more pronounced tuberculation. In the case of *Enhydris curtus*, I have seen specimens in which the lowest and enlarged costal rows have the tubercles modified, so as to form spines resembling in size and shape the teats of some small mammals like the guinea-pig. Mr. Boulenger believes this occurs in males (Catalogue, Vol. iii, page 300), but my notes on this point are too imperfect to criticise this, or the belief entertained by others that males are more strongly tuberculate than others. In many species the scales are bi-, tri- or pluri-tuberculate or spinose, but I cannot see in this condition any means of assisting the classification of genera or species.

HEAD SHIELDS.—The actual presence in their entirety of many of these shields is of great importance in the separation of genera and species, but the relationship of these shields is of far less importance, and very secondary to most characters which affect the ventrals and costals. I find that the relationship of many of those shields which preserve the greatest degree of constancy in individuals, and which one must employ in the separation of species, is open to some variation in certain of these species, and it is therefore impossible to lay down hard-and-fast rules regarding head shields for distinguishing the various forms. A very open mind must be kept to prevent creating new species on insufficient grounds.

I find these shields in most, if not in all, species very prone to become rough and granular with age. In the young they are usually quite smooth, and often glossy, but in very old specimens the asperities are sometimes very pronounced. A good example is to be seen in the type-specimen of *Hydrophis aspera* from Singapore now considered by Mr. Boulenger as *D. cyanocincta*, an opinion with which I am in accord. This specimen in this respect, as in all other important ones, is exactly like the large specimens labelled *grandis* in the British Museum, which I cannot separate from *cyanocincta*.

I cannot derive any help in distinguishing either species or genera from this condition, which appears to me one dependent largely upon age, possibly too upon sex.

ROSTRAL.—This is entire in all the genera except *Thalassophis*, where it is divided in one species. A partial, median vertical suture is seen sometimes as an aberrant feature in some species, especially in *Platurus schistorhynchus*.[1] In *Emydocephalus ijimæ* it may be furnished with a prominent, sharp spine directed forwards (see fig. 4), but this only occurs in certain individuals and has, I believe, no relation to sex.

The portion of this shield reflected backwards on the snout varies in some species, but the ranges of variation met with in individuals of the same species overlap so considerably that the point is of very limited importance. In *Distira cantoris* and *D. gracilis* the visible portion is from two-thirds to greater than the inter-nasal suture, and in two other slender-necked species, viz., *obscura* and *fasciata*, but little less. In nearly all other forms it is less than two-thirds, or even distinctly less than half.

The contact with surrounding shields is quite constant. In the genus *Platurus* and *Thalassophis*, owing to the presence of internasals, it touches five or six shields, five in *P. schistorhynchus*, six in the rest; but in all the other genera it touches four shields only. The sutures made with contiguous shields are peculiar in *Platurus*, the rostro-labial being the longest. In *Platurus laticaudatus* and *P. colubrinus* again the height exceeds the breadth of this shield, whereas in all the other species in the subfamily the reverse condition obtains; but the degree of breadth relative to height is subject to so much variation in individuals of many of the same species that I cannot utilise this feature in attempting to separate different forms.

In *Enhydrina* the lower margin of the shield is projected downwards to be received into the gap in the mental region, and this feature is peculiar to this snake only.

NASALS.—These are present in every species. Their position is of generic importance in *Platurus* only, owing to the presence in this genus of internasals. Here the nasals are lateral and separated, and the nostrils lateral; but in all other genera, except perhaps *Thalassophis*, the species have nasals in contact with one another on the snout behind the rostral, and the nostrils are superior. Where these shields are superior, sutures are frequently seen running from the nostril to adjacent shields. These are very inconstant in all the species, but there is a decided tendency for a suture to run outwards to the supralabials, backwards to the præfrontals, or inwards towards the opposite nasal. Sometimes three such sutures may radiate from the nostril, and in so doing split each nasal into three parts. The suture running outward is the one most constantly seen, and when present it almost invariably runs to the second supralabial. Exceptions

---

1 A similar condition is seen in a specimen of *D. cærulescens* in the British Museum presented by Annandale and Robinson from the Malayan Region.

occur in *Enhydris hardwickii*, where it always runs to the first supralabial, and in rare examples of *Distira ornata* and *Enhydrina valakadyn* where it takes a similar course. The tendency for these shields to split is seen not infrequently in *Acalyptus peroni*, both *Thalassophis*, *Enhydris hardwickii*, *Enhydrina valakadyn*, *Distira nigrocincta*, *D. viperina* and *D. ornata*. (See figs. 40, 55 and 59). The condition is too inconstant to offer any help in classification.

INTERNASALS.—These shields are present in the genera *Platurus* only, where there are two, except in *P. schistorhynchus*. In this species there are two rows of shields, one anteriorly and usually two behind. (See fig. 1).

PRAEFRONTALS.—These are present in all the species and consist of a pair with a few exceptions, which occur in the genera *Platurus*, *Emydocephalus* and *Aipysurus* and *Thalassophis*. In *Platurus schistorhynchus* there are three, and in *Emydocephalus ijimæ* and in *Aipysurus* there may be four, but the condition in the two last is an inconstant one, the usual præfrontals seen in other forms being subdivided on one or both sides in some specimens only, so that the number of these shields does not aid classification. In *Thalassophis annandalei* there are many.

Normally in all the species the fellows of the pair are in contact, but in rare individuals of certain species the frontal is projected so far forward as to completely separate the fellows. I have seen this most frequently in *Distira viperina*, but also in *D. jerdoni* and some other species. It occurs in the type-specimen of Jan's *frontalis*, in a specimen in the British Museum referred by Mr. Boulenger to *frontalis* (Jan), but which I take to be *ornata* (Gray), and in the type-specimen of *brookii* (Günther). In the latter case the specimen is a gravid female, and the condition is not inherited by her unborn young (Boulenger Catalogue, vol. iii, p. 283). The relationship of the præfrontals with the supralabials is, I consider, of great importance. I find the relationship invariable in most genera, but in individuals of *Enhydrina* and *Astrotia* it is subject to some variation, and also in individuals of some species of *Distira*. In order to justify this assertion, I may remark that in some examples the relationship differs on the two sides, and it is usually very obvious when attention is paid to other characters which to consider the abnormal side. The unilateral abnormality naturally prepares one for the still rarer exception, in which the abnormality is bilateral. This remark applies with equal force to many other abnormalities alluded to as such in the headshields of individuals. In many genera these shields touch no supralabial, as for instance *Platurus*, *Aipysurus*, *Emydocephalus*, *Acalyptus*, *Thalassophis* and a few species of *Distira*, notably *jerdoni*, *nigrocincta* and *viperina*. In nearly all the other species the contact is with the second supralabial. In *Hydrelaps darwiniensis* it touches the second and third, as it does also in some specimens of *Astrotia stokesi* and *Hydrus platurus*. In *Distira cantoris* it touches the third supralabial only (rarely the second also). The contact of this shield with the eye is unique in *Hydrelaps darwiniensis*. (See fig. 8). I have, however, seen this as an aberrant feature in *D. obscura* owing to a confluence of the praeocular with the praefrontal. In one specimen it occurs on one side only, in another on both sides, and in one example of *D. jerdoni* on both sides. The praefrontal is sometimes, too, divided externally so as to produce a pseudo-loreal. I have seen this in *Distira ornata* and some other species, but it is an obvious abnormality.

FRONTAL.—This is present in all species, and, with few exceptions, is normally entire. In *Aipysurus australis* and *Acalyp us peroni* it is divided into fragments, the integral parts of which, however, taken collectively, clearly reveal the conformation of the shield as normally met with in other species.

It is occasionally divided by a partial or complete longitudinal suture, but the condition is an abnormal one. I have seen it in examples of *Hydrus platurus*, *Enhydris curtus*, *Distira cærulescens*, *D. cyanocincta*, and others (see figs. 34 and 42). The length of this shield relative to that of the supraoculars and parietals has a limited importance. In *Platurus colubrinus* it is much longer, and may even be twice as long as the supraocular. In most other species the lengths of each are subequal. In *Platurus schistorhynchus* it is longer than the parietals, but in all other species it is usually distinctly shorter. Its length compared with the length of the snout varies considerably in individuals of the same species, and the ranges of variation for the different species overlap so considerably that I cannot utilise the point in their separation, though Mr. Boulenger attaches much importance to it.

The breadth of the shield relative to that of the supraoculars, with few notable exceptions, is of no use in assisting the isolation of species. In all the species it is about as broad as or a little broader than the supraocular, but in *Distira viperina* the breadth is remarkable, amounting to more than twice and often thrice that of the supraoculars (see figs. 55 and 56); and in *Platurus colubrinus* and *P. laticaudatus* it is about twice that of the supraoculars. Of equally limited importance is the length of this shield relative to its breadth, which I find is about equal in *Distira viperina*. In other species the length is distinctly in excess of the breadth, but the relative proportions are so closely alike in all the species that the point offers no further help in isolating them.

Again the relative lengths of the sutures it makes with contiguous shields is practically the same in all the species, being subequal, or the fronto-praefrontals rather the shortest, and the fronto-parietals rather the longest. In the genus *Distira*, however, two species are peculiar. In *D. viperina* the fronto-supraoculars are the shortest and only about half the length of the fronto-parietals. In *D. nigrocincta* the fronto-praefrontals are shortest and only about half the length of the fronto-parietals.

SUPRAOCULARS.—These shields are present and entire in all forms excepting the genus *Aipysurus*. In *A. australis* and *A. lævis* they are divided.

PARIETALS.—These are present and normally entire in all species except *Aipysurus australis*, *A. lævis* and *Enhydris curtus*, but a tendency to division is very frequently seen in individuals of many other species, notably *Emydocephalus ijimæ* and *Thalassophis annandalei*. I have seen them divided in a specimen of *Distira cærulescens* in the Indian Museum (No. 13160), and the tendency to division is also seen in figures 34A, 45C, 60A and 66A. They are in contact with the postocular in all the species of the subfamily except *Distira cærulescens* normally, and in a few aberrant examples of *Hydrus platurus*.

Præoculars.—The absence of these shields is of generic importance in one instance, *viz.*, *Hydrelaps darwiniensis* (see fig. 8); in all other forms they are present, but they do not assist the separation of either genera or species. In most of the species they are single, but I find in some species of *Distira* individuals occur with two where one is the rule, as in *viperina*, and similarly where two is the rule they are replaced sometimes by a single shield. In the latter case a notable example is *nigrocincta*. I have seen a confluence of the præocular and præfrontal in one example of *D. jerdoni* and two examples of *D. obscura*.

Postoculars.—These are present in all the species, but are of no importance in classification. As will be seen under my remarks dealing with supralabials, authors are not agreed what to regard as postoculars, many applying this term to the upper part of a divided supralabial (usually the fifth); even when the term is restricted, as I propose, these shields are of no consequence, for in many of the species, specially of the genus *Distira*, one sees many individuals showing departures from the normal number.

Supralabials.—These are of generic importance in one notable instance, viz. *Emydocephalus*. In this genus the second shield is a remarkably long one, bordering the major length of the upper lip and also touching the eye (see fig. 4B). In all the other genera they number five or more, and the third is the first of the series to touch the eye; but the inconstancy in the number, disposition, and integrity of these shields in individuals of many species is such that a very little, if any, reliance can be placed on them in differentiating species. In *Distira jerdoni* there are six, the last of the series being confluent with a large anterior temporal shield (see fig. 58), but a similar confluence of the ultimate or penultimate supralabial with the anterior temporal is seen in individuals in *D. spiralis*, *D. fasciata*, *D. obscura*, etc. (see fig. 19B). In a few species such as *D. gracilis*, *D. cantoris*, *D. fasciata*, these shields are very constantly six, but in all the other species of *Distira*, in *Hydrus*, *Enhydrina*, *Enhydris* and *Astrotia* they vary very much in individuals, and especially the posterior shields in the series which are very prone to subdivision. I have seen the first subdivided in more than one example of *D. nigrocincta* including the type, and in one example of *D. cærulescens* (No. 13158 in the Indian Museum). It is divided, too, in Jan's specimen of *frontalis* (see fig. 34). The second is more frequently so distinguished as an abnormal condition, and the succeeding shields in the series become more and more prone to division. For a good example take *Distira cyanocincta*. In figure 28 from a typical specimen the third, fifth and sixth are divided. I do not think any one could reasonably doubt that this is the correct way of viewing these shields. In figure 29 taken from Jan, and acknowledged by Mr. Boulenger among others to represent the same species, the same three shields are seen entire on the right side, whilst the fourth and sixth are divided on the left side of the same specimen. I think it a mistake to record these shields in figure 28 as 8, with the fourth touching the eye, and in figure 29B, 8 with the third and fifth touching the eye. It appears to me obvious that in all three profile views the third, fourth and fifth touch the eye. In recording these shields in my notes I use the following formula: In fig. 28, Lab. 8 ; 12 $(\frac{3}{3}\ 4\ \frac{5}{5})\ \frac{6}{6}$, the bracketted figures implying contact with the eye. To take another example of the tendency to variation in these shields see figure 66. Here these shields are 9, the anterior 7 entire, the fourth, fifth and sixth touching the eye. In figure 67B representing the same species, the third, fourth, fifth and sixth shields are divided, the upper portions of the fourth and fifth being confluent. I would use the formula 10, $12\frac{3}{3}\ ((\frac{4}{4}\ \frac{5}{5})\ \frac{6}{6})$, and in so doing imply that three labials touch the eye, though in reality only two do so. It seems to me the only reasonable way of recording it. Unfortunately many herpetologists have taken a different view, and on the strength of their view created new species on grounds to my mind quite unjustifiable. To take a good case as illustration see figures 39 and 40. Mr. Boulenger presumably on the assumption that the posterior maxillary teeth in *nigrocincta* are not grooved (though this is a mistake) compared the specimen he subsequently described as *hendersoni* only with species he had tabulated as *Distira*, not heeding the many extremely close affinities this specimen bears to *nigrocincta*. In describing the specimen he calls the upper part of the divided second supralabial a loreal, the upper part of the third a præocular, and the upper parts of the fourth and fifth suboculars. He says that no labial touches the eye on the left side, and only the fourth on the right side. Now it appears to me obvious that the supralabials should be considered as follows on the left side : 8, $1\frac{2}{2}\ (\frac{3}{3}, \frac{4}{4}, \frac{5}{5}), \frac{6}{6}$. On the right side in this specimen they are 8, $1\frac{2}{2}\ (\frac{3}{3}, 4\ \frac{5}{5})\ \frac{6}{6}$. On both sides three shields touch the eye. A comparison of these figures side by side with those of *P. cyanocincta* and *A. stokesi* shows how complete is the analogy. In the majority of species the third and fourth supralabials touch the eye with great constancy, though they may be divided or not; in many species, however, examples are to be found in which the fifth also finds contact. The result is that with the one or two exceptions first noted these shields do not assist classification in any way.

TEMPORALS.—These shields have been conceded, I consider, undue prominence in classification ; for although it is true that a single large anterior shield is to be seen with great constancy in many of the species including many of the genus *Distira*, such as *gracilis*, *cantoris*, *fasciata*, *obscura*, etc., it is equally true that in many of the species of *Distira* especially, these shields present in many individuals departures from the normal. As in the case of *præoculars* and *postoculars*, the number of these shields depends, to a large extent, upon the tendency of the supralabials to subdivision, for many herpetologists regard as lower temporals what appear to me to be the upper parts of divided supralabials. I find, however, that even when these shields are viewed, as I regard them, they vary considerably in the individuals of many species, and their value has, I think, been overrated. There are some instances of an abnormal condition in these shields prompting the creation of a new species.

INFRALABIALS.—I regard as infralabials only those enlarged shields which are in contact with the sublinguals. They are distinctive and of generic value in one instance, *viz.*, *Emydocephalus*, where the second of the series is a very long shield bordering most of the lower lip (see fig. 4B) ; specifically their value is but limited. In

Distira jerdoni (fig. 58) there are three only, but in all the other forms four are present excepting *Aipysurus australis*, where they are too ill developed to deserve the name.

The first on each side meet behind the mental (except in a few abnormal individuals of a few species) and form a suture, the length of which compared with that between the anterior sublinguals has some importance. In *Distira cantoris*, *D. gracilis*, *D. obscura* and *D. fasciata*, etc., this suture is much longer than that between the anterior sublinguals, but in almost all the other species it is little longer and often shorter. The last infralabial is peculiar in *Aipysurus eydouxii*, *Acalyptus peroni*, *Platurus schistorhynchus*, *Distira cantoris*, *D. gracilis* and *D. jerdoni*, in that it touches but two scales behind. In all the other species it touches three or four.

MARGINALS.—I apply this term to certain small cuneate scales which are, in many species, intercalated between the infralabials at the labial margin. They are very distinctive in form, and not to be confused with divided infralabials, the outer parts of which are not cuneate in outline. Examples of divided infralabials are shown in figs. 12B where the third is divided on the left side, in 24C where the first is so distinguished on the left side, and in 59C where the fourth is divided on both sides.

Their constancy though apparently complete in many species is less so in others, thereby detracting somewhat from their value; still they are fully as important as many other characters upon which one has to rely in separating species, especially those of the genus *Distira*. They are absent in *D. gracilis*, *D. cantoris* and *D. jerdoni*, there being no exceptions in the large series of each that I have examined. Similarly, one or more are present in the large series of *viperina* (20), *cærulescens* (29), *fasciata* (34), *torquata* (29), without any exception. In most of the other species of *Distira* the constancy is not so complete though very striking. The constancy in the number of these little shields when present is not so striking, for though a very large number of individuals in many species have but one, and that wedged between the third and fourth infralabials, there is a tendency for more to be present and they may succeed the second infralabial. In *fasciata*, for instance, five specimens out of 38 have two marginals occurring after the second or third infralabials on one or both sides, in all the rest there is but one, and that after the third. The constancy in number and disposition though not complete is as striking in *obscura*, *cærulescens*, etc.

SUBLINGUALS.—The "Chin shields" of other authors. There are usually two pairs, the fellows of each in contact with one another. In *Astrotia* both pairs are absent. In *Hydrus*, *Enhydris* and *Enhydrina* they are poorly developed, especially the posterior, if they can be said to be present at all; and the anterior pair frequently present though small, has the fellows widely separated. In *Distira major*, *D. ornata* and *D. cærulescens* they may also be small, but the anterior pair is very generally present and the fellows in contact; the posterior, when recognisable, are usually well separated by small scales.

The contact or separation of the posterior pair when developed, though showing great constancy in some species, manifests frequent variation in individuals of other species, so that this character is one not to be relied on. Its value and place is on a par with the contact of the præfrontal and supralabials, the condition of the anterior temporals and the arrangement of the marginals, and in no case should new species be based upon any of these characters singly, or even when combined, on the existence of a solitary example, unless there are other good grounds for doing so.

COLOUR AND MARKINGS.—These vary so in examples from birth to senility, and in many individuals of similar growth, in such well differentiated forms as, for instance, *Enhydrina valakadyn* and *Hydrus platurus*, about which there can be no confusion, that I cannot attach the slightest importance to them in classification. So far as the genus *Distira* is concerned, the species of which present the greatest difficulties in identification, it may be said, as a general rule, that they are marked with annuli in the young. These are usually well defined, complete and conspicuous, but tend to become less defined, partially or entirely obscured, or completely obliterated with age. It is noteworthy, too, that in many species where the head is completely black in the juvenile state, it loses its depth of hue with age, very frequently becomes mottled with lighter hues which show a great tendency to the formation of a horse-shoe, or crown-shaped mark, and this in turn may disappear as the whole head acquires a yellowish or light colour. These changes are very remarkable.

BODILY CONFIGURATION.—This in certain forms is very distinctive, but does not influence generic separation owing chiefly to the fact that the genus *Distira*, as at present understood, contains species exhibiting extremes in the relative proportions of their bodies, between which every degree of relative variation may be found; thus we see the extremely slender-necked forms of *cantoris*, *gracilis*, etc., associated with those of remarkably even girth throughout such as *jerdoni* and *spiralis*. I cannot but think that anatomical conditions will be revealed, which will enable the genus, as herein represented, to be split up into three or four genera at least.

In certain genera the bodies are cylindroid or feebly compressed throughout as *Platurus*, *Emydocephalus* and *Aipysurus*. In the others the posterior part of the body is moderately or extremely compressed. In certain *Distira* the anterior part of the body is cylindrical, the posterior very distinctly compressed, especially so in *cantoris gracilis*, *fasciata*, *obscura* and *neglecta*. I find that the relative girths of the neck and body vary considerably from birth to adult life, in the sexes, and in the female from conception to parturition. In an example of *Distira obscura*, I have found the forebody considerably more than one-fourth the greatest body depth, and in another very distinctly less than one-fifth, and a very proximate range of variation is seen in other species. In many cases, however, the range given by me is likely to be considerably increased by measurements taken from heavily gravid females.

The difference in individuals in *obscura* is considerable, so much so that it is evident that in closely allied species corporeal habit cannot be relied upon to assist the isolation of species. Such terms as "small," "moderate" and "large" used by many herpetologists in application to calibre are, I need hardly say, far too indefinite. A further remark is necessary regarding the laxity that the tissues acquire in old age in sea snakes in common with many other creatures. This laxity is to be seen especially in the bloated features, puffy lips, and about the chin shields of senile specimens which alters the approximation of the shields, obliterates their detail, destroys the clearness and definition of the head lines to such a purpose, that a dapper juvenile specimen of the same species appears a different creature. Figures 22 and 25 exemplify this statement. In case, however, my views with regard to these two forms being identical are not shared by others, I may say that I have seen as great a difference in general aspect between young and old specimens in such well differentiated species as *Enhydrina valakadyn*.

With the exception of the characters above made reference to I can find none which possess any weight at all in the separation of the species, and, as has been already remarked, many of those referred to are subject to some degree of inconstancy in certain species, making them at the best of somewhat uncertain value. Many of these very characters, however, cannot be dispensed with; they are essential to the separation of the species of *Distira*, but in making use of them one has to guard against allowing a single or dual aberration to form the basis of a new species as has undoubtedly so often been the case. Naturally it is the species that most lack definite characters that have suffered most separation and confusion, especially *Distira spiralis* and *cyanocincta*.

It is more than probable that many of my views expressed above may not be completely shared by other herpetologists, and I would remark that I believe that the only possible way to establish the constancy of the various shields in a given species is by a comparison of these in the gravid female with those of her unborn progeny. My opportunities for doing so have been limited, but in one species in particular I have been fortunate viz., *Enhydrina valakadyn*. I have had many gravid females, and examined the scale characters of each attentively with that of their contained foetus. The result was instructive, and modified my previous views considerably. The inconstancy of many shields relied upon by other authors implicitly in classification was found to be proximately similar in the few gravid females of other species, notably those of the genus *Distira*, which fortune has from time to time offered me for examination.

A series of gravid *Distira spiralis* and *D. cyanocincta* would alone, I feel assured, clear up the conception of these species as viewed by me in partial opposition to those held by other herpetologists. So far as the numbers of the costals and ventrals are concerned, I think it is reasonable to expect to find a proximate range of variation in individuals of species which are similar in corporeal habit. Now if one takes a well differentiated species such as *Enhydrina valakadyn*, which could not be confused with any other, the costals in the neck according to Mr. Boulenger's showing vary within twenty in individuals. A similar range is recorded by him for the body scales. The ventrals by the same authority's showing vary by 84. Now in some of the genus *Distira*, where a large series of specimens is available and these from the widest geographical area, a proximate degree of variation is seen in the costals, and even an excess in the range of the ventrals amounting to 155 in *fasciata*. Moderate departures from the range hitherto recorded are to be expected as the series available becomes enriched in numbers, and especially when specimens are derived from a larger geographical area. It will be seen that my figures for both costals and ventrals in many species exceed those given in Mr. Boulenger's catalogue; at the same time they are well within the range given for certain other species even in *Distira spiralis* and *cyanocincta* into which I have tried to justify the absorption of many other forms previously considered distinct. It certainly appears significant that of 44 species recognised by Mr. Boulenger as distinct, and included by him in his genera *Hydrophis* and *Distira*, no less than 14 are known from the British Museum alone. It appears to me remarkable that none of these 14 are represented in the many continental and other museums, many of which have large collections of sea snakes. I am forced to think that other herpetologists have recognised the inconsistency of the characters used by Mr. Boulenger in classification, and in consequence have been deterred from describing new species on the uncertain basis offered by many of them.

Key to the Genera.

A. Ventrals three or more times as broad as the last costal row in whole body-length.
- (*a*) Rostral touches 6 shields .. .. Platurus.
- (*b*) ,, ,, 4 ,,
  - (*a′*) Two or three supralabials, second very large .. .. Emydocephalus
  - (*b′*) Six or more supralabials .. .. Aipysurus.

B. Ventrals nearly or more than twice the last costal row in midbody.
- (*a*) Præfrontal touching the eye, no mental furrow. Ventrals less than 200 Hydrelaps.
- (*b*) Præfrontal not touching the eye. Ventrals more than 200.
  - (*a′*) A mental furrow .. .. Enhydrina.
  - (*b′*) No mental furrow .. .. Distira.

C. Ventrals not as broad or little broader than last costal row.
- (*a*) Costals subimbricate. Præfrontal touches no labial. Frontal and parietals broken up .. .. Acalyptus.
- (*b*) Costals juxtaposed. Præfrontal broken up, or if entire not touching second labial .. .. Thalassophis.
- (*c*) Costals juxtaposed. Præfrontal touches second labial.
  - (*a′*) Lowest three or four costal rows enlarged. Ventrals less than 250 Enhydris.
  - (*b′*) Lowest costals not enlarged. Ventrals more than 350 .. Hydrus.

D. Ventrals absent. Replaced by imbricate scales like the costals .. Astrotia.

Synopsis of Generic Shield Characters.

Rostral.	Internasals.	Præfrontals. Number.	Præfrontals. Contact with supralabials.	Præfrontals. Touching eye.	Frontal.	Supraoculars.	Parietals.	Supralabials.	Marginals present.	Pairs of sublinguals.	Costals. Anterior.	Costals. Midbody.	Costals. Imbricate or juxtaposed in posterior body.	Vertebrals enlarged.	Ventrals. Number.	Ventrals. Breadth compared with last row in midbody.	Genus.
Entire	1 or 2	2 or 3	0	No	Entire	Entire	Entire	7 to 8	Yes or no.	1 or 2	19 to 25	19 to 25	Imbric	No	178—246	Thrice or more.	PLATURUS.
do.	0	2 to 4	0	do.	do.	do.	do.	3	No	2	15 to 17	17 to 19	do.	In one species	137—143	do.	EMYDOCEPHALUS.
do.	0	2 to 4	0	do.	Entire or divided	Entire or divided.	Entire or divided.	6 to 10	do.	2 or 0	17 to 25	17 to 25	do.	Yes or no.	137—166	do.	AIPYSURUS.
do.	0	2	2nd and 3rd.	Yes	Entire	Entire	Entire	6	do.	2	27	27 to 28	do.	No	172—173	About twice.	HYDRELAPS.
do.	0	2	2nd (0)	No	do.	do.	do.	7 to 9	do.	Small hidden 1 or 2	40 to 60	50 to 70	Imbric or subimbric.	do.	230—314	Less than twice.	ENHYDRINA.
do.	0	2	2nd or 0	do,	do.	do.	do.	5 to 11	Yes or no.	2	17 to 48	17 to 54	Imbric or juxt.	do.	219—531	do.	DISTIRA.
do.	0	2	0	do.	Divided	do.	Divided	7	Yes	2	19 to 23	24 to 29	Subimbric.	do.	156—209	Less than	ACALYPTUS.
Divided or entire	0*	4 or many	0	do.	Entire or divided.	do.	Subentire.	7 to 12	No	1 or 2	?	31 to 100	Juxt	do.	247—370	Small or Absent	THALASSOPHIS.
Entire	0	2	2nd (3rd)	do.	Entire	do.	Entire or divided.	7 to 8	Yes	2 or 0	29 to 36	27 to 45	do.	do.	130—219	do.	ENHYDRIS.
do.	0	2	2nd	do.	do.	do.	Entire	7 to 10	No	1 or 2 small.	40 to 54	45 to 62	do.	do.	378—440	Small	HYDRUS.
do.	0	2	2nd, 3rd or 0	do.	do.	do.	do.	7 to 9	Yes	2 or 0	41 to 48	48 to 59	Imbric	do.	Absent. Replaced by 230—267 costals.		ASTROTIA.

* See remarks on these shields in description.

PLATURUS.

Key to the species of Platurus.

(A Rostral touches five shields	.. ..	*schistorhynchus.*
(B) Rostral touches six shields		
(*a*) Frontal touches six shields	.. ..	*laticaudatus.*
(*b*) Frontal touches seven shields	.. ..	*colubrinus.*

PLATURUS SCHISTORHYNCHUS (Günther).

Platurus schistorhynchus, *Günther in Proc. Zool. Soc.*, 1874, p. 297; pl. xlv,
,, ,, fig. A. *Boulgr. in Blanford, Fauna Brit. Ind. Rept.* 1890, p. 375, *and Cat.* iii, 1896, p. 309.

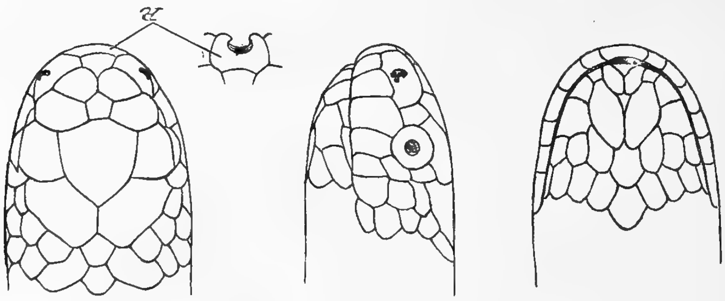


Fig. 1.—*Platurus schistorhynchus* (nat. size).

I have examined over 40 examples.

Description. Rostral,—touches five shields; the rostro-labial and rostro-internasal sutures subequal, largest. Internasals,—one anterior succeeded by one rather irregular row which might be considered either posterior internasals, or anterior præfrontals. Præfrontals,—three in one transverse series, the outer not touching any supralabial Frontal,—touches seven shields; the fronto-parietal and fronto-supraocular sutures subequal and largest. Supraoculars,—entire; about half as broad and three quarters as long as the frontal. Parietals,—entire; as broad or broader than long, shorter than the frontal. Nasals,—lateral; in contact with the first three supralabials. Præoculars,—one. Postoculars,—two. Temporals,—two (rarely three) small. Supralabials,—seven; the third and fourth touching the eye. Infralabials,—the fourth is the largest of the series, and in contact with three scales behind. Marginals,—usually after the fourth infralabial. Sublinguals,—anterior well-developed; the posterior if they can be recognised as such, small, and quite separated. Costals,—anteriorly 21 to 23, midbody 21 to 23 (usually 23), posteriorly 19 to 21; smooth; imbricate. Ventrals 178 to 200; three or more times as broad as the last costal row, the last one or two frequently divided; the posterior obtusely keeled in the median line. Anal,—divided. Colour,—broadly banded, dark brown and yellowish or greyish; the bands well defined, and the brown rather broader.

Habitat.—Loo Choo Islands, Moluccas, Savage Island, Society Islands, Samoa.

PLATURUS LATICAUDATUS (Linnæus).[1]

Coluber laticaudatus, *Linn. Mus. Ad. Fred.*, 1754, p. 31, pl. xvi, fig. 1.
Platurus laticaudatus, *Boulgr. in Blanford, Fauna Ind. Rept.*, 1890, p. 395 and fig. *and Cat.* iii, 1896, p. 307.
,, ,, *Sclater, List Snakes Ind. Mus.*, 1891, p. 61.
,, ,, *Wall in Proc. Zool. Soc. Lond.*, 1903, pp. 96 and 101.
,, fischeri, *Günther, Rept. Brit. Ind.* 1864, p. 356, pl. xxv, fig. A.
,, ,, *Jan, Icon. Gén.*, 1872, *livr.* 40, pl. 1, fig. 2.
,, ,, *Fayrer, Thanat. Ind.*, 1874, pl. xix.
,, muelleri, *Boulgr., Cat.* iii, 1896, p. 309.
? ,, affinis, *Anderson in Proc. Zool. Soc. Lond.*, 1871, p. 190.

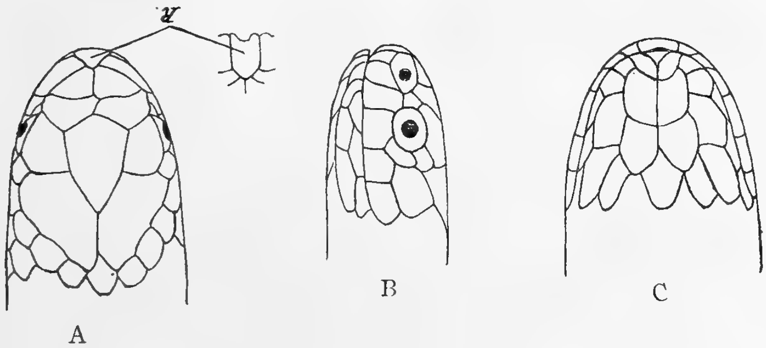


Fig. 2.—*Platurus laticaudatus* (nat. size).

Description. Rostral,—touches six shields, the rostro-labial suture is much the largest; portion visible above about onefourth the internasal suture. Internasals,—a pair. Præfrontals,—two; not in contact with any supralabial Frontal,—touches six shields; the fronto-parietal sutures largest. Supraoculars,—single; from $\frac{1}{2}$ to $\frac{3}{4}$ the length, and breadth of the frontal Parietals,—entire. Nasals,—lateral; in contact with the first and second supralabials. Præoculars,—one. Postoculars,—two. Temporals,—one. Supralabials,—seven or eight; the third and fourth touching the eye (the fourth only in one specimen on one side). Infralabials,—the fifth is the largest of the series, and in contact with three scales behind. Marginals,—a complete row after the second or third infralabial usually (the first rarely). Sublinguals,—two pairs in contact with their fellows. Costals,—anteriorly 19, midbody 19, posteriorly 17; smooth; imbricate; the vertebrals are enlarged where the costals number 17. Ventrals,—210 to 246 three or more times as broad as the last costal row; with a more or less distinct lateral obtuse keel in the basal half of each shield; sometimes with an obtuse median keel posteriorly; the last shield sometimes divided. Anal,—divided. Colour,—alternately banded with dark brown, and yellowish, or greyish. The bands well defined, and the dark rather broader.

Habitat. Bay of Bengal, through the Malayan Region, China, Loo Choos, Philippines to New Guinea and Australia (Van Diemen's Land, Günther).

[1] I did not see the type-specimen said to be in the Indian Museum, Calcutta, nor does Sclater mention it in his List (1891, p. 61.) It may prove to be the specimen figured by Fayrer, pl. xix.

PLATURUS COLUBRINUS (Schneider.)

Hydrus colubrinus, *Schneid., Hist. Amph.*, 1799, i, p. 238.

? Hydrophis colubrinus, *Schlegel, Phys. Serp.* ii, 1837, p. 514, pl. xviii, figs. 21 and 22.

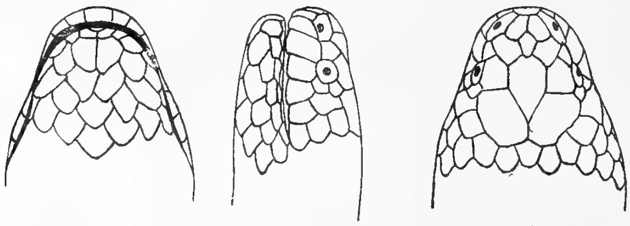
Platurus colubrinus, *Boulgr. in Blanford, Fauna Ind. Rept. and Batrach.*, 1890, p. 395 *and Cat.* iii, 1896, p. 308.

,, ,, *Sclater, List Snakes Ind. Mus.*, 1891, p. 62.

,, ,, *Wall in Proc. Zool. Soc. Lond.*, 1903, pp. 96 and 101.

,, fasciatus, *Jan, Icon. Gén.*, 1872, livr. 40, pl. i, fig. 1.

,, scutatus, *Günther, Rept. Brit. Ind.*, 1864, p. 356.



A B C

Fig. 3.—*Platurus colubrinus* (nat. size).

I have examined upwards of twenty of this species.

Description.—Rostral,—touches six shields; the rostro-labial sutures much the largest. Internasals,—a pair. Præfrontals,—three subequal shields in one transverse row; the outer touching no supralabial. Frontal,—entire; touches seven shields; the fronto-parietal sutures largest. Supraoculars,—half to about two-thirds as broad, and as long as the frontal. Parietals,—entire. Nasals,—lateral; in contact with the first three supralabials usually (sometimes only the first two). Præoculars,—one. Postoculars,—two. Temporals,—one (sometimes two). Supralabials,—seven; the third and fourth touching the eye. Infralabials,—the fourth is the largest of the series, and in contact with three or four scales behind. Marginals,—a complete row after the second infralabial. Sublinguals,—two well developed pairs, the fellows of each in contact. Costals, anteriorly 21 to 25, midbody 21 to 25, posteriorly usually 21 (rarely 23); imbricate; smooth. Ventrals,—195 to 240; three or more times as broad as the last costal row; the last one or two very frequently divided. Anal,—divided. Colour,—like the last, but in old specimens the bands are often effaced ventrally, and converted into dorsal bars.

Habitat.—From the Bay of Bengal through the Malayan Region, China, Philippines to Australia and New Zealand.

EMYDOCEPHALUS.

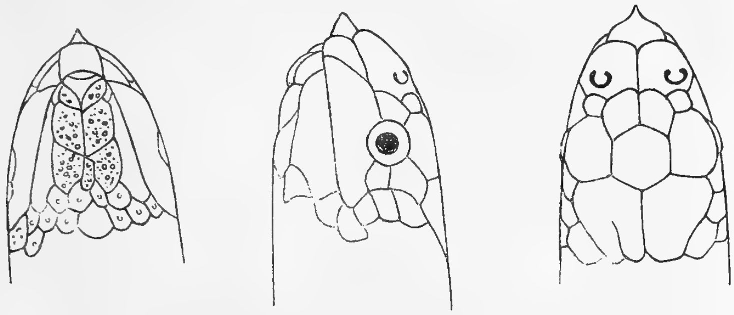
Key to the species of *Emydocephalus*.

(A) Præfrontals 4; vertebrals much enlarged; costals smooth; a ventral keel posteriorly .. .. *ijimæ.*

(B) Præfrontals 2; vertebrals not enlarged; costals tuberculate; no ventral keel .. .. *annulatus.*

EMYDOCEPHALUS IJIMÆ (Stejneger).

Emydocephalus ijimæ, *Stejneger in Journ. Sci. Coll. Tokyo,* xiii, pt. 3, p. 223.
Aipysurus annulatus, *Boulgr. Cat.,* vol. iii, 1896, p. 304, in part.
,, ,, *Wall in Proc. Zool. Soc.,* 1903, pp. 95, 101; and 1905, ii, p. 517.



A B C

Fig. 4.—*Emydocephalus ijimæ* (nat. size).

In my paper referred to above which appeared in 1903, I alluded to this species under the title *Aipysurus annulatus*. I had not then seen Stejneger's description of this snake, but had formed the opinion that the specimens I saw in Mr. Owston's collection in Yokohama belonged to a species up to that time not described. Discussing the matter with Mr. Boulenger at the British Museum, I reluctantly suppressed my opinion in deference to the views held by so great an authority. Having now examined more specimens from the same locality and collector, and seen all the specimens in the British Museum labelled *Aipysurus annulatus*, I am more than ever convinced that under the latter title Mr. Boulenger includes two distinct species, *viz.*, the *annulatus* of Krefft, and the *ijimæ* of Stejneger. The former has two præfrontals, little or no enlargement of the vertebral row, the scales rough with many tubercles and no ventral keel. The latter on the other hand has normally four præfrontals in a transverse series, very markedly enlarged vertebrals, smooth scales, and an obtuse ventral keel.

In both the arrangement of the supralabials and infralabials is sufficiently distinctive to warrant their separation from *Aipysurus*, and their inclusion in a genus apart. I have examined nine examples all collected by Mr. Alan Owston around the Loo Choo Islands.

Description. Rostral,—touches four shields; with or without a sharp spine. Præfrontals,—normally four, but sometimes the pair on one or both sides is fused into one: in one example by this fusion there are but two, in two others there are three. The outer do not touch any supralabial. Frontal,—entire; in contact with six, seven or eight shields, depending upon the sub-division of the præfrontals; about three-fourths the length of the supraoculars. Parietals,—entire, usually partially split by a suture posteriorly. Nasals,—touch the first and second supralabials. Præoculars,—one. Postoculars,—two. Temporals,—two, small. Supralabials,—two or three, the second very long, and touching the eye. Infralabials,—the second very long. Marginals,—none. Sublinguals,—two pairs, the posterior separated by one scale. Costals,—anteriorly 15 to 17, in midbody 17 to 19, posteriorly 15 to 17; smooth; the vertebrals enlarged and twice as broad as the next row of costals in the posterior part of the body, but in three specimens where the costals numbered 19 for a limited extent in the middle of the body the corresponding vertebrals were little if at all larger than the upper costal row. In these specimens the reduction of rows to the normal 17 was occasioned by the absorption of the uppermost costal row into the vertebral, and the great enlargement of this row was re-established. Ventrals,—137 to 143, broad as in land snakes, the posterior obtusely keeled in the median line; the last one or two sometimes divided. Anal,—divided (entire in one). Colour,—banded broadly with yellow, and blackish brown, the latter broader.

Habitat.—Loo Choo Islands, Formosa.

I append a synopsis of the specimens I have seen showing the shields which are subject to variation.

	Rostral with spine.	Præfrontals.	Costals. Anterior.	Costals. Midbody.	Costals. Posterior.	Ventrals.	Last ventrals divided.	Anal.
1	Yes	1 R, 1 L	16	17	15	143	Last two	2
2	,,	2 R, 2 L	17	17	17	141	,,	2
3	No	2 R, 2 L	15	17	15	140	None	2
4	,,	2 R, 1 L	16	17	17	138	,,	2
5	Yes	2 R, 1 L	17	19	17	141	,,	2
6	,,	2 R, 2 L	17	19	15	142	,,	2
7	No	2 R, 2 L	15	17	15	137	,,	1
8	Yes	2 R, 2 L	?	17	?	138	,,	2
9	,,	2 R, 2 L	17	19	15	142	,,	2

Emydocephalus annulatus (Krefft).

Emydocephalus annulatus, *Krefft in Proc. Zool. Soc. Lond.*, 1869, p. 322.

Aipysurus annulatus, *Boulgr. Cat.*, vol. iii, 1896, p. 304, in part.

Similar to the above, but differing in having but two præfrontals, little if any enlargement of the vertebral row, costals pluri-tuberculate and rough, and no ventral keel posteriorly.

Habitat.—Loyalty Islands.

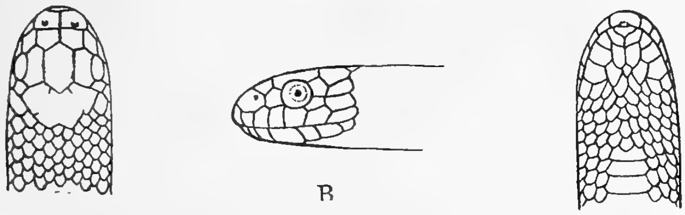
AIPYSURUS.

Key to the species of Aipysurus.

(A)	Costals in midbody	17	*eydouxii.*
(B)	Ditto	19	*australis.*
(C)	Ditto	21 to 25	*lævis.*

Aipysurus eydouxii (Gray).

Tomogaster eydouxii, *Gray, Cat.*, 1849, p. 59.
Aipysurus anguillæformis, *Günther, Rept. Brit. Ind.*, 1864, p. 357.
,, lævis, *Jan, Icon. Gen.*, 1872, livr. 40, pl. ii, fig. 1.



A B C

Fig. 5.—*Aipysurus eydouxii* (*lævis*). After Jan, *Icon. Gén.*, 1872, livr. 40, pl. ii, fig. 1.

I have examined six specimens.

Description.—Rostral,—touches four shields; the portion visible above about half the internasal suture. Præfrontals,—touch no supralabial, usually undivided, but sometimes divided longitudinally on one or both sides into two parts. Frontal,—touches six shields, all the sutures sub-equal; one-third to one-fourth longer than the supraoculars, longer than the parietals. Parietals,—entire; sometimes obliquely divided. Nasals,—in contact with the first and second supralabials. Præoculars,—one. Postoculars,—two. Temporals,—one or two. Supralabials,—six, the sixth longest, the fourth only touching the eye (the third also in one specimen on the left side). Infralabials,—the fourth is the largest of the series, and touches two scales behind. Marginals,—absent. Sublinguals,—two pairs, the posterior quite separated by a scale. Costals,—smooth; anteriorly 17, midbody 17, posteriorly 15, (17 in one) the reduction from 17 to 15 takes place close to the site where I count the scales posteriorly and is effected by a fusion of the third and fourth rows above the ventrals. Ventrals,—138 to 142, three or more times as broad as the last costal row; obtusely keeled in the posterior part of the body. Colour,—yellow or yellowish, with dark brown dorsal bars ending in the flanks, or broken up into ventral spots.

Habitat.—Indian Ocean, Singapore, Java, Philippines.

Aipysurus australis (Sauvage).

Aipysurus australis, *Sauvage in Bull. Soc. Philom.*, (7), i, 1877, p. 114.
,, fuscus, *Günther, Rept. Brit. Ind.*, 1864, p. 358.

(For a figure of this see fig. 6 on plate vii.)

I have examined three specimens only, all in the British Museum.

Description. R o s t r a l, – touches four shields. N a s a l s,—touch the first and second supralabials (the first only in one specimen on the right side). S u p r a l a b i a l s,—eight or nine, the anterior five or six are well developed, the rest divided; the fifth only touches the eye in one example. The other head, and chin shields are all broken up, and irregular. C o s t a l s,—anteriorly 19, midbody 19, posteriorly 17; the reduction from 19 to 17 is due to the fusion of the third and fourth rows above the ventrals; smooth or indistinctly keeled. V e n t r a l s,—156 to 166, three or more times as broad as the last costal row. C o l o u r,—brown, or yellowish with irregular dorsal bars of brown spots.

Habitat —New Guinea, and Australia

Aipysurus læVIS (Lacépède).

Aipysurus lævis, *Lacép. in Ann. Mus.*, iv, 1804, pp. 197, 210 and pl. lvi, fig. 3
,, ,, *Günther, Rept. Brit. Ind.*, 1864, p. 358.
Hypotropis jukesii, *Gray in Ann. and Mag. Nat. Hist.*, 1846, p. 284.
Aipysurus fuliginosus, *Jan, Icon. Gen*, 1872, livr. 40, pl. i, fig. 3.

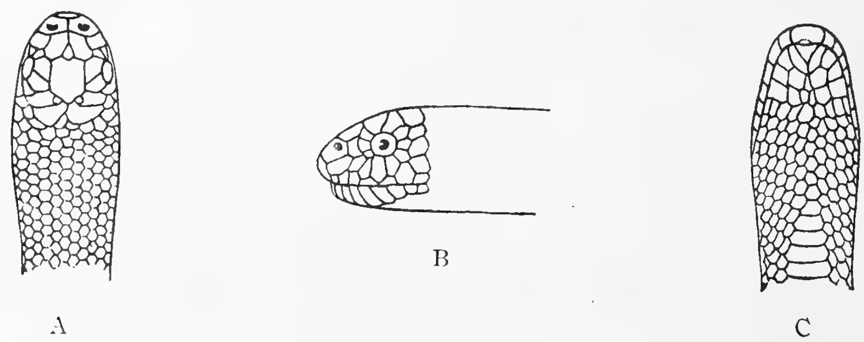


Fig. 7.—*Aipysurus lævis* (*fuliginosus*). After Jan, *Icon. Gén.*, 1872, livr. 40, pl. i, fig. 3.

I had insufficient time to bestow upon the specimens available in the British Museum, but the constancy of the scales in individuals of the species of this genus, and its closest allies (*Emydocephalus* and *Platurus*), is so remarkable that I think the range given by Boulenger, *viz.*, 21 to 25, makes it likely that more than one form is embraced within his conception of the species. The only four specimens referred by Günther to this species had the costals in 21 rows. Under the circumstances I have no course other than to accept Mr. Boulenger's views.

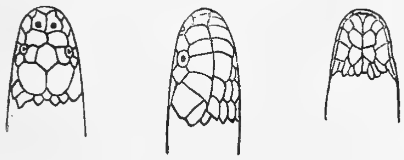
Description. R o s t r a l,—touches four shields, the portion visible above half, or less than half the internasal suture. P r æ f r o n t a l s,—very variable, sometimes a single row of four, sometimes a double row of three or four; the outer not in contact with any supralabial. F r o n t a l,—entire or broken up. S u p r a o c u l a rs,—divided into two. P a r i e t a l s,—broken up. N a s a l s, – touch no supralabial. P r æ o c u l a r,—one, two or three. P o s t o c u l a r s,—two or three. T e m p o r a l s, – three or four. S u p r a l a b i a l s,—7 to 10; very variable; some or all transversely divided; the fourth, fifth and sixth, or fifth and sixth, would touch the eye if not divided. I n f r a l a b i a l s, – the fourth is the largest of the series, and in contact with three scales behind. M a r g i n a l s,—

absent. Sublinguals,—two small pairs; both or the posterior only quite separated by scales. Costals,—anteriorly 21 to 25, midbody 21 to 25, posteriorly 19 to 21; smooth; the vertebrals may or may not be enlarged. Ventrals,—137 to 162. Three times or more than three times as broad as the last costal row; sometimes with a ventral obtuse keel posteriorly. Anal,—divided into two. Colour,—uniform dark brown.

Habitat.—Pacific Ocean from Celebes to the Loyalty Islands.

Hydrelaps darwiniensis (Boulenger).

Hydrelaps darwiniensis, *Boulgr. Cat. iii*, 1896, p. 270.



A B C

Fig. 8.—*Hydrelaps darwiniensis.* After Boulenger.

I have examined two examples only, both in the British Museum.

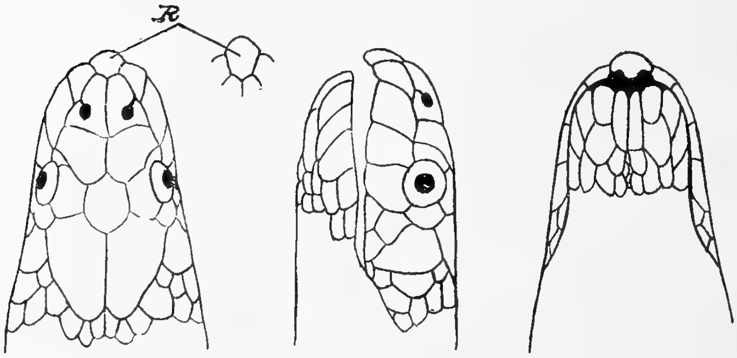
Rostral,—touches four shields; the portion visible above from one-third to one-fourth the internasal suture. Præfrontals,—touch the second and third supralabials and the eye. Frontal,—touches six shields; the fronto-parietal sutures twice or nearly twice the fronto-præfrontals. Supraoculars,—length and breadth about two-thirds that of the frontal. Parietals,—entire. Nasals,—touch the first and second supralabials. Præocular,—absent. Postoculars,—one. Temporals,—one. Supralabials,—6; the third and fourth touch the eye. Infralabials,—the fourth is the largest of the series, and touches three or four scales behind. Marginals,—absent. Sublinguals,—two well developed pairs, in contact with their respective fellows. Costals,—anteriorly 27, midbody 27 (28), posteriorly 25 (24); smooth, imbricate. Ventrals,—172 to 173; under three times as broad as the last costal row. Anal,—divided. Colour,—banded with 37 yellowish and black rings, the black rather broader than the yellowish dorsally, rather narrower ventrally. The posterior maxillary teeth are grooved.

Habitat.—Port Darwin.

Enhydrina valakadyn (Boie).

"Hoogli pattee" and "valakadyn," *Russell, Ind. Serp.*, 1801, ii, pls. x & xi.
Hydrus Valakadyn, *Boie, Isis.*, 1827, p. 554.
Hydrophis schistosa, *Daudin, Rept.*, 1803, vii, p. 386.
,, ,, *Schlegel, Phys. Serp.*, 1837, ii, p. 500, pl. xviii, figs. 1 to 3.
,, ,, *Jan, Icon. Gén.* 1872, livr. 41, pl. ii, fig. 1.
,, bengalensis, *Gray in Zool. Misc.*, 1842, p. 62.
,, fasciatus, *Jan, loc. cit.*, livr. 41, pl. iii, fig. 2.
Pelamis schistosus, *Merrem, Tent.*, 1820, p. 139.
Hydrus ,, *Cantor, Cat. Mal. Rept.*, 1847, p. 132.

Enhydrina bengalensis, *Gray*, *Cat.*, 1849, p. 48.
,, ,, *Günther*, *Rept. Brit. Ind.*, 1864, p. 381.
,, ,, *Fayrer*, *Thanat. Ind.*, 1874, pl. xviii.
,, ,, *Nicholson*, *Ind. Snakes*, 1893, p. 118, pl. x, fig. 6.
,, valakadyen, *Gray*, *Cat.*, 1849, p. 48.
,, ,, *Boulgr. in Blanford*, *Fauna Ind. Rept. and Batrach.* 1890, p. 406 and fig.; *and Cat.*, iii, 1896, p. 302.
,, ,, *Sclater*, *List Snakes Ind. Mus.*, 1891, p. 64.
,, ,, *Wall and Evans in Journ. Bomb. Nat. Hist. Soc.*, xiii, pp. 347 and 616.
,, ,, *Wall in Journ. Bomb. Nat. Hist. Soc.*, xvi, p. 311, and *in Spol. Zeylan.*, Augt. 1907, p. 172.



A B C

Fig. 9.—*Enhydrina valakadyn* (nat. size).

The type-specimen, which had previously been lost sight of, I discovered in the Royal College of Surgeons' Museum, London. It is No. 523 of their catalogue (1859, p. 78), and is the original specimen from Tranquebar figured by Russell in his second volume, plate xi. It was one of Russell's collection which was presented to the above Institution by the East India Company, most of which has since been transferred to the British Museum.

I do not concur with Boulenger in thinking plate x. of Russell's same volume a distinct species. I think there can be no doubt that this figure represents the same species as plate xi, viz. *valakadyn* (Boie), a view I may state taken by many other herpetologists. If this assumption is correct, and I cannot think otherwise, this species should rest under the title given it by Daudin in 1803, viz., *schistosa*, and Boie's *valakadyn* should be suppressed. I have examined a very large series of this species. In Cannanore on the Malabar Coast of India the fishermen brought them to me in bucketfuls, and I have frequently seen a dozen or more in a net at one haul on the Coromandel Coast (Gopalpore). It is a very easy snake to identify. The downward projection of the rostral and the groove in the symphysis menti are to be seen in no other sea snake.

Description.—Rostral,—touches four shields; the portion visible above is one-third or less than one-third the internasal suture. Præfrontals,—touch the second supralabial (except in rare examples where they fail to touch any).

Frontal,—touches six shields; the fronto-parietal sutures are longest, the fronto-præfrontal shortest. Nasals,—touch the first and second supralabials; sometimes two or more sutures radiate from the nostril and subdivide this shield, forming a pseudo-loreal or other pseudo shields. Præoculars,—one. Postoculars,—one or two. Temporals,—one, two or three superposed small shields. Supralabials,—irregular; the anterior two to five are well developed, the rest small, occasioned by horizontal sub-division, the extent to which this occurs affecting the contact with the eye, and the number of postoculars and temporals; the third and fourth usually touch the eye, sometimes the fifth also, more rarely the fourth only, or none at all touch the eye. Infralabials,—the fourth or fifth is the largest of the series, and in contact with three or four scales behind. Marginals,—absent. Sublinguals,—imperfectly developed, but an anterior pair at least can usually be discerned, the fellows of which are widely separated. Costals,—anteriorly 40 to 60, midbody, 50 to 70, posteriorly 50 to 70; sub-imbricate, or imbricate. Ventrals,—230 to 314, little larger, or not as large as the last costal row. Colour,—very variable. The young are bluish or bluish-grey with many well defined, black annuli, often dilated vertebrally. As age advances these bands become more and more obscured, first disappearing ventrally, and so converted into dorsal bars, which in old specimens may disappear altogether. In old adults the dorsum is frequently a uniform bluish or bluish-grey, merging at midcosta to yellow or yellowish ventrally. Both dorsal and ventral hues again are subject to much modification according to whether the specimen has recently desquamated or is about to do so. In the latter case the yellow on the belly becomes often tinged with brown.

Habitat.—From the Persian Gulf, through the Indian and Malayan region to New Guinea.

The post maxillary teeth I find all grooved.

DISTIRA.

Having failed to discover a single species in which the posterior maxillary teeth are ungrooved, I have no course open to me but to unite the two genera *Hydrophis* and *Distira* (held by Mr. Boulenger to be distinct on this understanding); and as *Distira* is the older title, I retain this name to designate the genus.

I cannot but think, judging from external characters, that osteological differences will be discovered, to separate the slender-necked species from those of more even relative proportions, and I also expect to discover anatomical grounds for the isolation of *viperina* and *jerdoni* from the other species herein included in this genus. There seems to me sufficient justification for doing so on external characters alone; however, I prefer for the present to let them remain as placed by Mr. Boulenger.

KEY TO THE GENUS *Distira*.

A. Ventrals present; anterior three to four times breadth of last costal row. (See fig. 57) .. .. *viperina.*

B. Ventrals present; anterior not more than twice breadth of last costal row. (See fig. 38).

- (*a*) Scales in midbody 19 to 21 .. .. *jerdoni.*
- (*b*) Scales in midbody more than 21.
  - (a^1) Ventrals with median suture or furrow in posterior half of body. (See fig. 13).
    - (a^2) Præfrontal touches second supralabial, but not third. Anterior costals 17 to 21. Ventrals 225 to 298 .. *gracilis.*
    - (b^2) Præfrontal touches third supralabial (rarely second also). Anterior costals 21 to 25. Ventrals 377 to 474 .. *cantoris.*
  - (b^1) Ventrals unfurrowed; a few posterior irregularly divided, especially about umbilical scar.
    - (a^2) Posterior costals juxtaposed (except rare examples of *fasciata* and some *torquata*).
      - (a^3) One or more marginals.
        - (a^4) One large anterior temporal.
          - (a^5) Anterior costals 1 to 9 less than posterior .. *torquata.*
          - (b^5) Anterior costals 10 to 22 less than posterior *fasciata.*
        - (b^4) Two small superposed anterior temporals.
          - (a^5) Anterior costals 25 to 29 ... .. *mamillaris.*
          - (b^5) Anterior costals 31 to 37; parietals touching postocular .. .. .. *lapemoides.*
          - (c^5) Anterior costals 36 to 45; parietals not touching postocular .. .. *cærulescens.*
      - (b^3) No marginals.
        - (a^4) Anterior costals 29 to 41 .. .. *ornata.*
        - (b^4) Anterior costals 45 .. .. .. *ocellata.*
    - (b^2) Posterior costals imbricate or sub-imbricate (except rare examples of *cærulescens* and some *torquata*).
      - (a^3) Anterior costals 19 to 23. Neck $\frac{1}{4}$ to $\frac{1}{5}$ greatest body depth .. .. *obscura.*
      - (b^3) Anterior costals 23 or more. Neck $\frac{1}{3}$ to $\frac{2}{3}$ greatest body depth.
        - (a^4) Ventrals 250 or less .. .. .. *major.*
        - (b^4) Ventrals 270 to 375.
          - (a^5) Costals in midbody 29 to 36. One large anterior temporal. Præfrontal touching 2nd labial .. .. .. *spiralis.*
          - (b^5) Costals in midbody 33 to 44. Two superposed anterior temporals. Præfrontal touching 2nd labial .. .. *cyanocincta.*

(c^5) Costals in midbody 36 to 43. Two superposed anterior temporals. Præfrontal touching no labial .. .. .. *nigrocincta.*

(d^5) Costals in midbody 37 to 54. One large anterior temporal. Præfrontal touching 2nd labial .. .. .. *torquata.*

(e^5) Costals in midbody 42 to 53. Two superposed anterior temporals. Præfrontal touching 2nd labial .. .. *cærulescens.*

(f^5) Costals in midbody 47. One large anterior temporal. Præfrontal touching no labial *bituberculata.*

(c^4) Ventrals 375 to 531.

(a^5) Anterior costals 25 to 36. Two superposed anterior temporals. Ventrals 375 to 397 *cyanocincta.*

(b^5) Anterior costals 25 to 41. One large anterior temporal.

(a^6) Anterior costals 1 to 9 less than posterior. Ventrals 376 to 438 .. *torquata.*

(b^6) Anterior costals 10 to 22 less than posterior. Ventrals 376 to 531 .. *fasciata.*

(c^5) Anterior costals 48 .. .. .. *neglecta.*

SYNOPSIS OF SPECIFIC CHARACTERS IN THE GENUS *Distira*.

Rostral—Part visible above compared with internasal suture.	*Præfrontal*—Contact with supralabials.	*Frontal*—Relative length of sutures.	*Supraoculars*—Breadth compared with frontal.	*Parietal*—In contact with postocular.	*Postoculars.*	*Anterior Temporals.*	*Supralabials.* Number.	*Supralabials.* Touching eye.*	*Infralabials.* Number.	*Infralabials.* Scale touching the last.	*Marginals.*	*Sublingual* pairs.	Post-sublinguals in contact.	*Costals.* Anterior.	*Costals.* Midbody.	*Costals.* Imbricate or juxtaposed.	*Ventrals.* Number.	*Ventrals.* Breadth of Ant. compared with last costal row.	*Ventrals.* Number divided in posterior half of body.	SPECIES.	Number of examples examined.
$\frac{3}{4}$ to >	(2nd) (0)	Parietals about $\frac{1}{3}$ > rest.	$\frac{3}{4}$ to =	Yes.	1	1	6	3rd and 4th.	4	2	None ..	2	Yes	19 (17 21)	27 to 31	Juxt.	225 to 298	About twice.	All	*gracilis* ..	32
$\frac{3}{4}$ to >	3rd (2nd also.)	Parietals about $\frac{1}{3}$ > rest.	$\frac{3}{4}$ to =	Do.	1, (2)	1	6	3rd and 4th.	4	2	Do. ..	2	Yes (No).	21 to 25	27 to 37	Do.	377 to 474	Do.	do.	*cantoris* ..	22
$\frac{1}{2}$ to $\frac{3}{5}$	2nd	Parietals about $\frac{1}{3}$ > rest.	$\frac{1}{2}$ to $\frac{2}{3}$	Do.	1	1	6	3rd and 4th.	4	3 or 4	1 after 3rd (2 after 2nd).	2	Yes (No).	19 to 23	25 to 32	Imb.	296 to 354	Do.	None or few.	*obscura* ..	15
$\frac{1}{2}$ to $\frac{3}{5}$	2nd (0)	Parietals about $\frac{1}{3}$ > rest or subequal.	$\frac{2}{3}$ to =	Do.	1, (2)	1	6 to 7	3rd and 4th.	4 4	3 or 4	1 after 3rd (2 after 2nd or 3rd).	2	Yes (No).	25 to 33	37 to 51	Imb. or juxt.	376 to 531	Do.	Do.	*fasciata* ..	38
$\frac{1}{2}$	(2nd)	Subequal ..	$\frac{3}{4}$	Do.	1	1 or 2	7	3rd and 4th.	4	3	1 after 3rd	2	Yes	48	54	Imb.	More than 420	Do.	Do.	*neglecta* ..	1
$\frac{1}{2}$ to $\frac{3}{5}$	(2nd)	Parietals about $\frac{1}{4}$ > rest.	$\frac{2}{3}$ to =	Do.	2	2 (1 or 3)	7	3rd and 4th.	4	3 or 4	1 after 3rd (2 after 2nd or 3rd).	2	Yes	25 to 29	31 to 40	Juxt.	287 to 367	Do.	Do.	*mamillaris* ..	6
$\frac{1}{2}$ to $\frac{3}{5}$	(2nd) (0)	Parietals about $\frac{1}{4}$ > rest or subequal.	$\frac{2}{3}$ to =	Do.	1 or 2	1 (2)	6 to 8	3rd, 4th, or 3rd, 4th and 5th.	4	3 or 4	1 or more after 2nd or 3rd. (0)	2	Yes (No).	23 to 31	29 to 36	Imb.	282 to 373	Do.	Do.	*spiralis* ..	65
$\frac{1}{2}$ to $\frac{3}{5}$	2nd (0)	Parietals about $\frac{1}{4}$ > rest or subequal.	$\frac{2}{3}$ to =	Do.	2 (1)	2 (1)	7 to 8	3rd, 4th, or 3rd, 4th and 5th.	4	3 or 4	All after 2nd or 3rd.	2	Yes (No).	25 to 36	33 to 44	Do.	280 to 397	Do.	Do	*cyanocincta* ..	81
$\frac{1}{2}$ to $\frac{3}{5}$	0	Parietals twice or nearly twice præfrontals.	$\frac{1}{2}$ to $\frac{2}{3}$	Do.	2 or 3	2 or 3	7 to 9	3rd, 4th, or 3rd, 4th and 5th.	4	3 or 4	1 or more after 3rd. (0)	2	No (Yes).	27 to 32	36 to 43	Do.	311 to 339	Do.	Do.	*nigrocincta* ..	9
$\frac{1}{2}$ to $\frac{3}{5}$	(2nd) (0)	Parietals about $\frac{1}{4}$ > rest.	$\frac{2}{3}$ to =	Do.	2 or 3	2 or 3	7 to 8	3rd and 4th.	4	3 or 4	All after 2nd or 3rd).	2	Yes No.	31 to 37	40 to 49	Juxt.	300 to 387	Do.	Do.	*lapemoides* ..	9
$\frac{2}{3}$	0	Subequal.	$\frac{3}{4}$	Do.	2	1	7	3rd and 4th.	4	3 or 4	1 after 3rd	2	Yes	28	47	Imb.	278	Do.	Do.	*bituberculata* ..	0

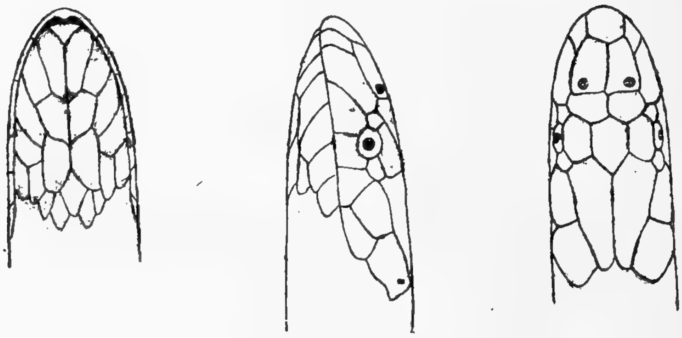
$\frac{1}{2}$ to $\frac{3}{5}$	2nd (o)	Parietals $\frac{1}{4}$ to $\frac{3}{4}$ > rest.	$\frac{2}{3}$ to =	Do.	1 (2 or 3)	1 (2)	7 to 8	3rd and 4th, or 3rd, 4th and 5th.	4	3 or 4	1 or 2 after 3rd (or after 2nd).	2	Yes No.	30 to 41	37 to 54	Do. or juxt.	310 to 438	Do.	Do.	*torquata* ..	29
$\frac{1}{2}$ or less.	2nd	Parietals $\frac{1}{3}$ to $\frac{1}{4}$ > rest.	$\frac{2}{3}$ to =	No (Yes.)	1 or 2	2 (3)	6 to 8	3rd, 4th (and 5th).	4	3 or 4	1 after 3rd	Small or none.	No (Yes).	36 to 45	42 to 53	Imb. or juxt.	277 to 339	Do.	Do.	*cærulescens* ..	29
$\frac{1}{2}$ to $\frac{3}{5}$	2nd (o)	Parietals $\frac{1}{3}$ to $\frac{1}{4}$ > rest.	$\frac{2}{3}$ to =	Yes.	2 or 3	2 or 3 (1)	7 to 8	3rd, 4th (and 5th or 6th).	4	3 or 4	None (1 after 3rd).	2 (1)	Yes (No).	29 to 41	33 to 46	Juxt.	227 to 300	Do.	Do.	*ornata* ..	36
rather more than $\frac{1}{2}$	2nd	Parietals $\frac{1}{3}$ > rest.	$\frac{3}{4}$	Do.	2	2	6	3rd and 4th.	5	2	None ..	2	No	45	58	Do.	290	Do.	Do.	*ocellata* ..	1
$\frac{1}{2}$ or less.	2nd	Parietals $\frac{1}{3}$ >, or subequal.	$\frac{3}{4}$	Do.	2 (1)	2	8 (9)	3rd and 4th.	4	3 or 4	All after 3rd	2	No	31 to 35	33 to 42	Imb.	233 to 250	Do.	None or many.	*major* ..	5
$\frac{1}{2}$ to $\frac{3}{5}$	o	Parietals twice or thrice supraoculars, latter smallest.	$\frac{1}{2}$ to $\frac{1}{3}$	Do.	2 (1)	2 or 3 (1)	7 to 9	3rd and 4th; or 3rd 4th and 5th.	4	3 or 4	1 or 2 after 3rd.	2	Yes or No.	27 to 34	39 to 50	Juxt.	235 to 267	Four or more times.	None or few.	*viperina* ..	21
$\frac{3}{4}$ to =	o (2nd)	Parietals rather longest or all subequal.	$\frac{2}{3}$ to $\frac{3}{4}$	Do.	1 (2)	1	6	3rd and 4th.	3	2	None ..	2 small or absent.	Yes	17 (16 to 18)	19 to 21	Imb.	219 to 248	About twice.	Do.	*jerdoni* ..	17

N.B.—Bracketted figures imply rare exceptions.

* It is possible that in many more of the species individuals occur with the 5th touching the eye, as well as the 3rd and 4th, as many of my earlier notes recorded the unbroken shields only in this connection.

DISTIRA GRACILIS (Shaw).

"Tatta pam," *Russell, Ind. Serp.*, 1801, i, pl. xliv(?) and vol. ii, pl. xiii.
Hydrus gracilis, *Shaw, Zool.*, 1802, iii, p. 560.
Anguis mamillaris, *Daudin, Rept.*, 1803, vii, p. 340.
Microcephalophis gracilis, *Gray, Cat.*, 1849, p. 46.
Liopala gracilis, *Gray in Zool. Misc.*, 1842, p. 60.
? Hydrophis gracilis, *Schlegel, Phys. Serp.*, 1837, pl. xviii, figs. 6 and 7.
,, ,, *Günther, Rept. Brit. Ind.*, 1864, p. 373.
? ,, ,, *Murray, Vert. Zool. Sind*, 1884, p. 395.
,, ,, *Boulgr. in Blanford, Fauna Brit. Ind. Rept. and Batrach.*, 1890, p. 404, and fig., p. 398.
,, ,, *Sclater, List Snakes Ind. Mus.*, 1891, p. 64.
,, ,, *Wall in Mem. As. Soc. Bengal*, 1906, p. 283, and *in Spol. Zeylan., Augt.* 1907, p. 167.
? ,, microcephala, *Jan, Icon. Gén.*, 1872, 41, pl. v, fig. 2.
? ,, guentheri, *Murray, loc. cit.*, p. 396, and plate (non Theobald).



A B C

Fig. 10.—*Distira gracilis* (× 4).

I have examined 32 of this common, and very well differentiated species.

I do not concur with Mr. Boulenger's view concerning plate xliv in Russell's first volume, which I think clearly represents this species. Mr. Boulenger seeks to make this the type of his *mamillaris* (see Catalogue, vol. iii, p. 277). I only know two species, in which the portion of the rostral visible above ever equals the length of the internasal suture as shown in this plate, viz., *gracilis* (Shaw), and *cantoris* (Günther). It seems probable that the large anterior and posterior temporal shields shown in the same plate are single though this point is not quite certain. The relative proportions of depth in the neck and body are not apparent owing to the dorsal aspect of the snake being shown *in toto*. The breadth, and number of the bands, their vertebral dilation, and the juxtaposed character of the scales mentioned in the letterpress, are as typical of *gracilis* (Shaw) as *mamillaris* (Boulenger), but the condition of the rostral and the anterior temporal, followed by a larger posterior shield, are so typical of *gracilis* (Shaw) that I cannot escape the conviction that it is this snake which is represented.

Again, I do not share Mr. Boulenger's opinion with regard to the snake figured by Schlegel (Phys. Serp., 1837, plate xviii, figs. 6 and 7) which he considers *fasciata* (Schneider). The specimen is so faithfully depicted that one can count 21 rows of scales in the neck (*fasciata* has 25 to 31). It appears to me to agree perfectly with *gracilis* (Shaw).

I find the posterior maxillary teeth in this species grooved in at least three well-grown specimens.

gracilis (Shaw) shares with *cantoris* (Günther), a combination of characters which occurs in these two species alone amongst *Distiræ*. The portion of the rostral visible above is nearly equal to or even exceeds the length of the internasal suture; the fourth infralabial touches two scales only behind, and the ventrals in the major part of the posterior half of the body are grooved or divided in the median line, so that each is represented by a pair of pentagons with apposed bases. The commissure of the mouth seen in profile resembles the italic letter *f*. (Not well shown in figure 10). Some of these characters are suggested or approached in others of the very slender-necked species, viz., *obscura* (Daudin), *fasciata* (Schneid.) and *neglecta* (Wall), but the ventrals are quite peculiar to *gracilis* and *cantoris*.

Description.—Body anteriorly three-tenths to one-fourth the greatest depth. The last measurement was from a gravid female.

The head shields show great constancy.

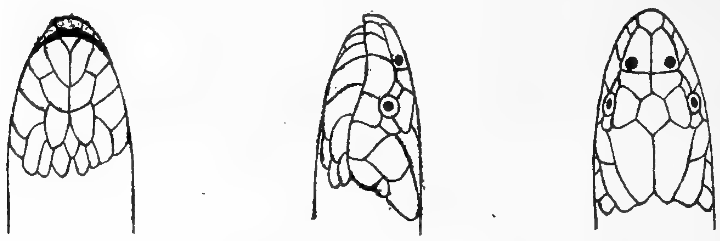
Rostral,—the portion visible above, three-fourths to greater than the internasal suture. Præfrontals,—touch the second supralabial (five exceptions on one or both sides). Postoculars,—one. Temporals,—one large anterior succeeded by another even larger shield, the anterior touching the fifth and sixth supralabials. Supralabials,—6, not subject to division. Infralabials,—4, the last touching two scales only behind; the suture between the first longer than that between the anterior sublinguals. Marginals,—none. Sublinguals,—two pairs, the fellows of each in contact. Costals,—anterior 19 (17 in two, 18 in three, and 21 in one), midbody 27 to 31, posterior 27 to 35; the anterior imbricate, the posterior juxtaposed. Ventrals,—225 to 298; entire anteriorly and about twice the breadth of the last costral, row divided or furrowed in the median line in the posterior half of the body. Colour,—in the young the head is quite black. The body is surrounded with from 42 to 61 annuli, usually dilated, and often more or less confluent vertebrally, and ventrally especially in the forebody. With age the rings may lose definition, or become much obscured especially ventrally, and the head often assumes a much lighter hue.

Habitat.—All the specimens I have examined were procured from shores between the Persian Gulf and Mergui on the Tenasserim Coast.

DISTIRA CANTORIS (Günther).

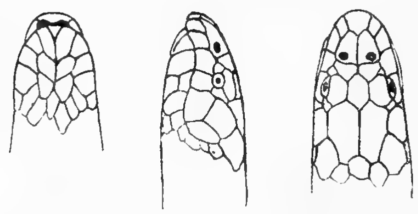
Liopala fasciata, *Gray in Zool. Misc.*, 1842, p. 60.
Hydrophis fasciata, *Gray, Cat.*, 1849, p. 50, spec. C.
,, cantoris, *Günther, Rept. Brit. Ind.*, 1864, p. 374, pl. xxv, fig. V.

Hydrophis cantoris, *Boulgr. in Blanford, Fauna Ind. Rept. and Batrach.*, 1890, p. 405.
,, ,, *Sclater, List Snakes Ind. Mus.*, 1891, p. 64. (Except No. 8232).
,, ,, *Boulgr. Cat. Brit. Mus.*, 1896, iii, p. 281, and pl. xiv.
,, ,, *Wall in Mem. As. Soc. Bengal*, 1906, p. 284.
,, fasciatus, *Sclater, loc. cit.*, p. 63, No. 8258.
Distira gillespiæ, *Boulgr. in Journ. Bomb. Nat. Hist. Soc.*, xii, p. 642, and plate.
,, ,, *Wall in Journ. Bomb. Nat. Hist. Soc.*, xv, p. 723 and fig.
,, ,, *Wall, loc. cit.*, xvi, p. 311.



A B C

Fig. 11.—*Distira cantoris.*



A B C

Fig. 12.—*Distira gillespiæ.* After Boulenger.

This species is poorly represented in the British Museum, where there are but five examples. These, however, include the type obtained by Cantor in Penang. I have examined in all 22 specimens exclusive of the type of Mr. Boulenger's *Distira gillespiæ*[1] which I consider identical.

Distira gillespiæ (Boulenger).—This is known from a single large specimen from Karachi. Mr. Boulenger finding grooves in the post-maxillary teeth, placed it with his genus *Distira*, and made it a new species. I find, however, that typical specimens of *cantoris* have grooves in these teeth contrary to Mr. Boulenger's belief, and in the enormous specimen of *cantoris* presented by Rogers to the British Museum since the publication of Mr. Boulenger's catalogue, they can be seen with the naked eye. *Cantoris* is an extremely well differentiated member of the family, and marked off from all the other species of this genus by one feature peculiar to itself, *viz.*, the contact of the præfrontal with the third labial. Added to this it presents a combination of characters which it shares with *gracilis* alone, *viz.*, the shape of the commissure of the mouth, the great length of the rostral, the contact of only two scales behind the fourth infralabial, and the peculiar divided condition of the posterior ventrals. All of these

[1] Journ. Bomb. Nat. Hist. Soc., vol. xii, p. 642.

characters, besides many other unusual ones found in *cantoris*, are all found in *gillespiæ*. The slight and only differences apparent in Mr. Boulenger's descriptions of the two, concerning the body scales, and the ventrals disappear within the range my 19 specimens cover.

Description.—The body anteriorly is about one-third to one-fourth the greatest body depth. The snout projects well over the chin, and the commissure of the mouth resembles an italic *f* in profile.

The headshields are very constant.

Rostral,—the portion visible above is from three-fourths to greater than the internasal suture. Præfrontals,—touch the third supralabial (the second also rarely). Postoculars,—one (two rarely). Temporals,—one large anterior, succeeded by another even larger posterior shield, the anterior touching the fifth and sixth supralabials. Supralabials,—6, not subject to division. Infralabials,—4, the last in contact with only two scales behind; the suture between the first as long or longer than the suture between the anterior sublinguals. Marginals,—none. Sublinguals,—two well developed pairs, the fellows of each in contact (separated in one specimen). Costals,—anterior 21 to 25 (21 in one only), midbody 27 to 37, posterior 39 to 46; the anterior imbricate, posterior juxtaposed. Ventrals 377 to 474, entire anteriorly and twice or nearly twice the breadth of the last costal row, divided by a median furrow in the posterior half of the body.

Colour,—yellowish ventrally, olivaceous dorsally. Surrounded by 51 to 61 black rings in the young which become obscured ventrally, and converted into bars, these in turn becoming more and more obscured as age advances Head black in young, fading later. The bands much confluent ventrally anteriorly and usually expanded vertebrally. All the specimens are from the Indian shores (Karachi to the Gangetic Delta), except Cantor's specimen which is from Penang. A specimen in the Indian Museum (No. 8260) measures 6 feet 1 inch.

DISTIRA OBSCURA (Daudin).

"Shootur sun," and "Kalla shootur sun," *Russell, Ind. Serp.*, 1801, ii, figs. vii and viii.
Hydrophis obscurus, *Daud., Rept.*, 1803, vii, p. 375.
,, chloris, *Daud., loc. cit.*, p. 377, pl. xc.
? Pelamis obscurus, *Merrem., Tent.*, 1820, p. 139.
? ,, chloris, *Merrem., loc. cit.*
Hydrophis coronata, *Günther, Rept. Brit. Ind.*, 1864, p. 372, pl. xxv, M, and M'.
? ,, ,, *Anderson in Proc. Zool. Soc. Lond.*, 1871, p. 192.
? ,, ,, *Fayrer, Thanatoph. Ind.*, 1874, pl. xxvi.
,, ,, *Boulgr. in Blanford, Fauna Brit. Ind. Rept. and Batrach.*, 1890, p. 402.
,, ,, *Boulgr. Cat. Brit. Mus.*, 1896, iii, p. 279.
,, ,, *Sclater, List Snakes Ind. Mus.*, 1891, p. 63.
,, ,, *Wall in Mem. As. Soc. Bengal*, 1906, i., p. 282.

? Hydrophis latifasciatus, *Günther, loc. cit.*, p. 372, pl. xxv, fig. T.
,, ,, *Blanford in Journ. As. Soc. Bengal*, 1879, p. 132.
,, ,, *Boulgr. in Blanford, Fauna Brit. Ind. Rept. and Batrach.*, 1890, p. 401.
,, ,, *Boulgr. Cat.*, 1896, iii, p. 279, and pl. xiii.
,, ,, *Sclater, loc. cit.*, 1891, p. 63.
,, ,, *Wall, loc. cit.*, 1906, p. 281.

(For figure 13 see plate vii.)

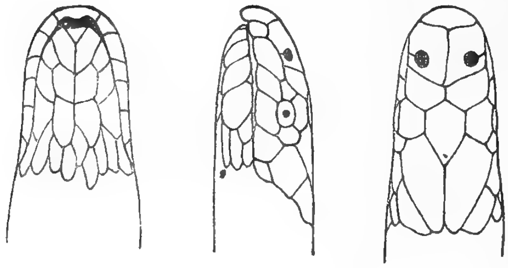


Fig. 14.—*Distira obscura*, × 3.

Mr. Boulenger is without doubt in error in his consideration of this species.[1] Daudin's *obscurus* is based upon two specimens figured by Russell,[2] the originals of which are in the British Museum. Daudin gave to one (plate vii) the name *obscurus*, and to the other (plate viii) the title *chloris*. Both these snakes being now recognised by Mr. Boulenger as identical, an opinion with which I am in accord, they are united under the former title, *i.e.*, *obscura*. Under *obscura*, however, Mr. Boulenger describes a totally different snake, which is obviously the *torquata* of Günther! One point alone will suffice here in support of this statement, *viz.*, the neck scales in *obscura* as described by Mr Boulenger are from 33 to 40, whereas in Russell's type-specimens just alluded to they are 21! This snake the true *obscura* of Daudin he describes under the name *H. coronata* (Günther).[3]

The following description is based upon 15 examples including those labelled *coronata* and *latifasciata* in the British Museum, which there is no doubt are the same. Two of these are Russell's types, six are in the Indian Museum (five of these from the Gangetic Delta), two are specimens of mine from Burma, and two others in the Bombay Natural History Society's collection from Karwar on the coast near Bombay.

H. latifasciata (Günther). The descriptions of this, and *coronata* (Günther) given in Mr. Boulenger's catalogue are almost identical. The only differences are that in *coronata* the temporal is stated to descend to the labial border whereas this is not specified in *latifasciata*. The post-chin shields are in contact in *coronata*, separated in *latifasciata*. I find on examining these specimens that the temporal descends to the labial border on the right side in the type-specimen of *latifasciata*, a species only known from a solitary specimen; and in two specimens of *coronata* in other collections,

[1] Cat., vol. iii, p. 284.
[2] Ind. Serp., vol. ii, 1801, plates vii and viii.
[3] *Loc. cit.*, p. 279.

I find the post-chin shields separated. I can find no point of difference therefore between the two species.

Daudin's name *obscura* has preference over both *coronata* and *latifasciata*, and must therefore be retained to denote this species. It is an extremely well-marked form, that should never be confused with any others up to now described. The scales in the neck alone (19 to 23) mark it off from all the other species of *Distira* excepting *gracilis*, which it resembles in some ways, especially in bodily conformation, the relative proportions of neck and body, and in the head shields generally, but it is very definitely a species apart, owing to the imbrication of the costals posteriorly, the greater number of ventrals, the presence of marginals and the much greater length to which it attains.

Description.—The body anteriorly varies from more than one-fourth to less than one-fifth the greatest body depth. I find the posterior maxillary teeth grooved, in specimens labelled *coronata* in the British Museum and my own specimens (and in the type-specimen of *latifasciata*). The head shields as in the other slender-necked species are mostly very constant, but certain shields, notably the anterior temporal and the posterior sublinguals, are less so than in *gracilis* and *cantoris*.

Rostral,—the portion visible above is from half to three-fifths the internasal suture. Præfrontals,—touch the second supralabial. Postoculars,—one. Temporals,—one large anterior succeeded by another as large or larger. Supralabials,—six; the fifth and sixth usually separated by the descent between them of the anterior temporal; they are not subject to division. Infralabials,—four, the last in contact with three or four scales behind, the suture between the first as long or longer than the suture between the anterior sublinguals. Marginals,—one after the third infralabial usually, sometimes two after the second (absent on one side in two examples). Sublinguals,—two well developed pairs, the fellows of each in contact. (In two examples the posterior fellows are separated). Costals,—anterior 19 to 23, midbody 25 to 32, distinctly imbricate everywhere. Ventrals, 296 to 354, entire throughout, and twice or nearly twice the breadth of the last costal row throughout. Colour,—much like the last two. The head is uniformly black in the young, and the body surrounded by from 34 to 60 broad annuli which are dilated, and often more or less confluent vertebrally, and ventrally especially in the forebody and neck. With age the colour of the head may change, and become bluish or olivaceous blue, and acquire or retain a yellow spot or horse-shoe mark on the crown. The bands become less defined with age especially posteriorly.

Habitat.—Shores between Karwar on the Coromandel Coast of India and Mergui on the Tenasserim Coast. Theobald's specimens have no habitat recorded, but are probably from the Burmese Coast. My figures are from a specimen of mine from Burma in which the scales are 21 to 22 anteriorly, 29 in midbody, and 31 posteriorly; imbricate everywhere. The ventrals are 318. The neck is one-fifth the greatest body depth.

DISTIRA FASCIATA (Schneider).

? Hydrophis gracilis, *Jan*, *Icon. Gén.*, 1872, 41, pl. iv, fig. 2.

,, chloris, *Günther*, part, *Rept. Brit. Ind.*, 1864, p. 370 (non Daudin).

Hydrophis atriceps, *Günther, loc. cit.*, p. 371, pl. xxv, fig. i.
Aturia lindsayi, *Gray in Zool. Misc.*, 1842, p. 61.
Hydrophis lindsayi, *Gray, Cat.*, 1849, p. 50.
,, ,, *Günther, loc. cit.*, p. 371.
? ,, fasciatus, *Peters in Mon. Berl. Ac.*, 1872, p. 849, pl. 1, fig. 1.
,, ,, *Boulgr. in Blanford, Fauna Brit. Ind. Rept. and Batrach.*, 1890, p. 404.
,, ,, *Sclater, List Snakes, Ind. Mus.*, 1891, p. 63. Nos. 8257, 8259, 8261, 8264, 8265, 13393.
,, ,, *Boulgr., Cat. Brit. Mus.*, 1896, iii, p. 281.
,, ,, *Wall in Mem. As. Soc. Bengal*, 1906, p. 285.
,, melanocinctus, *Wall, loc. cit.*, p. 287.
,, cantoris, *Sclater, loc. cit.*, p. 64, No. 8232.
,, leptodira, *Cantor in Trans. Zool. Soc. Lond.*, 1840, p. 311, pl. lvi.
,, brookii, *Günther in Proc. Zool. Soc. Lond.*, 1872, p. 597 and fig.
Distira rhombifer, *Boulgr. in Ann. and Mag. Nat. Hist.* 1900, p. 306.

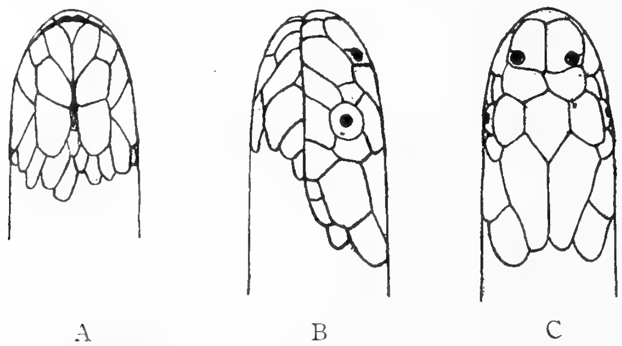


Fig. 15.—*Distira fasciata.*

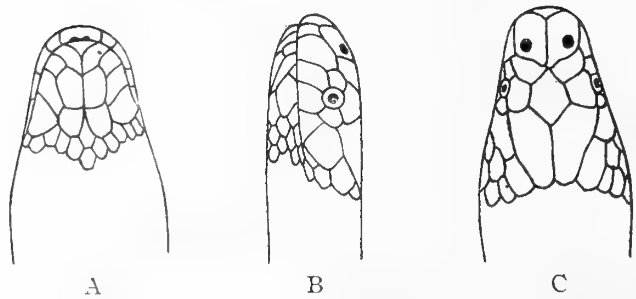


Fig. 16.—*Hydrophis brookii.* After Günther, *Proc. Zool. Soc.*, 1872, p. 597.

I have examined 38 examples of this snake including the four species *leptodira* (Cantor), *brookii* (Günther), *rhombifer* (Boulenger), and *melanocincta* (Wall), all of which I consider the same. It is very well differentiated, as much so as any of the preceding.

In bodily configuration, general appearance, colour, and markings it is exactly like *gracilis*, a fact which has led to the confusion of the two, though there are many, and considerable differences between them.

H. leptodira is known from a single specimen, described by Cantor,[1] and now in the British Museum. The description given by Mr. Boulenger exactly accords with that given by him of *fasciata* (Schneider), except that *leptodira* has 58 scales round the body. That authority counts the scales differently from me, taking them round the extreme body girth. I count them in three definite situations as already stated in my prefatory remarks under "costals." The scales in these three places number 30, 50 and 47, and the snake accords perfectly in this, as in all other respects, with typical examples of *fasciata*. In three other specimens I find them 50 in midbody, and in three 49.

H. brookii (Günther).[2]—I have examined the only known specimen which is in the British Museum. The description of this specimen in Mr. Boulenger's catalogue[3] compared with that of *fasciata* shows one solitary difference, *viz.*, in the length of the frontal which in *brookii* equals its distance to the end of the snout, but in *fasciata* equals its distance to the rostral only. I find, however, that in many specimens of *fasciata* the frontal equals its distance to the end of the snout. Even if it did not, so extremely slender a distinction occurring in a solitary individual should deter one from ranking it as a species. I think I am nearly accurate if I say that probably no individual is found of any species exactly in accord with the type, and if one were to create species on differences as slender as has here been the case, almost every individual would have equal claim to such rank. I have examined the type with many specimens of *fasciata*, and can find nothing to separate them

Distira rhombifer.—A single example only of this is known, described by Mr. Boulenger[4] from a specimen now in the British Museum. He remarks upon its close affinities to *fasciata*, and separates it on the broader rostral, larger number of body scales (55) and the colour. The first distinction affecting the rostral is a very minute one, and affects a shield which in breadth is subject to much variation in individuals of the same species. I find other specimens which I consider *fasciata* where it is relatively quite as broad. The scales in this specimen I count 32, 49 to 51, and 45 in anterior, mid, and posterior body. It thus accords perfectly with other specimens of *fasciata* in the British Museum. As regards colour there are at least four other examples of *fasciata* in the British Museum exactly similar, *i.e.*, with rhombs dorsally instead of complete rings. I see no difference between this and *fasciata*.

H. melanocinctus.—Last year I described as a new snake[5] what I considered at the time a very definite species, but which now I must regard as a somewhat aberrant *fasciata*. I took my original view because the specimen had only 25 rows of scales anteriorly, the præfrontal failed to touch the second supralabial, and the scales were imbricate posteriorly. Though the anterior scales are unusually low, I find a a specimen of *fasciata* in the British Museum with 26, *viz.*, the type of Günther's *atriceps*, I find the præfrontal does not touch the second labial in four other specimens I have seen, and the scales I observe are imbricate posteriorly, contrary to the rule,

---

1 Trans. Zool. Soc. Lond., 1840, p. 311, and plate lvi.
2 Proc. Zool. Soc. Lond., 1872, p. 597.
3 III, 1896, p. 282.
4 Ann. Mag. Nat. Hist., 1900, p. 306.
5 Memoirs, As. Soc. Bengal, 1906, p. 287.

in certain specimens of *fasciata* in the British Museum. In all other respects this specimen agrees with typical *fasciata*, and should, I feel certain now, be considered as such.

Description.—Fasciata like the three preceding, has an extremely slender neck in relation to its body, and is almost as regular in the arrangement of its headshields. The neck is from one-third to one-fourth the extreme body depth.

The posterior maxillary teeth are grooved.

Rostral,—The portion visible above is from half to three-fifths the length of the internasal suture. Præfrontals,—touch the second supralabial (except in five examples where they fail to, and in four of these on both sides). Postoculars,—one (in one example two) Temporals,—one large anterior succeeded by a posterior of equal or greater size. The anterior in five examples descends to the labial margin. (In two specimens only the posterior are broken up, and in both on one side only.) Supralabials,—six or seven; not subject to division. Infralabials,—four; the last in contact with three or four scales behind; the suture between the first as long or longer than that between the anterior sublinguals. Marginals,—present, usually one only after the third infralabial, sometimes two after the second or third. Sublinguals,—two well developed pairs, the fellows of each in contact (in three examples at least the posterior are quite separated by a scale). Costals,—anterior 25 to 33 (usually 29 to 31), midbody 37 to 51 (usually 41 to 47); posterior 37 to 51 (usually 41 to 47); the anterior imbricate, the posterior usually juxtaposed (rarely imbricate). Ventrals,—376 to 531, entire, twice or nearly twice the breadth of the last costal row. Colour,—exactly like the last two in young specimens. The annuli vary from 48 to 71, are well defined and about as broad at midcosta as the interspaces. They are often expanded vertebrally and tend to lose their definition in old specimens, sometimes indeed they are entirely lost ventrally, and the dorsum is then marked with black or blackish diamond marks.

Habitat.—All the specimens have been obtained along the shores between Malabar and China, one from Borneo, and two others from the Malay Archipelago, the exact locality not specified (Bleeker's specimens in the British Museum). It appears to be common on the Coromandel Coast of India specially. One solitary specimen has been recorded from the Malabar Coast, the exact spot not specified.

DISTIRA NEGLECTA (Wall).

Hydrophis obscurus, *Sclater, List Snakes Ind. Mus.*, 1891, p. 63, No. 8598.
,, neglectus, *Wall in Mem. As. Soc. Bengal*, 1906, p. 288.

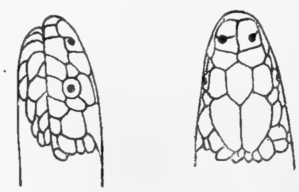


Fig. 17.—*Distira neglecta.*

Known from a single very young specimen in the Indian Museum, described by me.

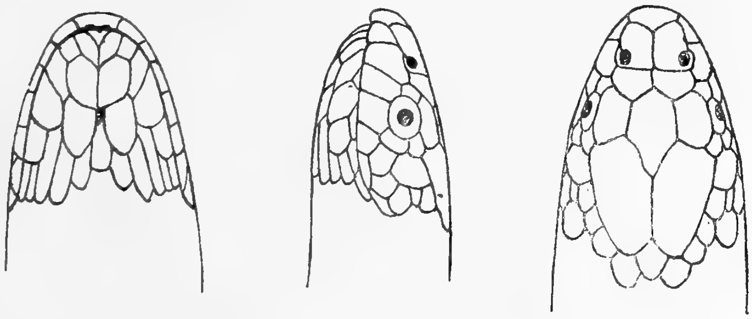
It presents very definite characters which demarcate it very clearly from other species. These are notably the scales in the neck and body which are 48 and 54 respectively. These numbers only accord with *cærulescens* and *ocellata*. The number of the ventrals (over 420) and imbricate character of the scales posteriorly are sufficient to exclude both *cærulescens* and *ocellata*. In general appearance it is extremely like *fasciata*.

Description.—The portion visible above is about half the suture between the nasals. Præfrontals,—touch the second labial. Postoculars,—one. Temporals,—one anterior on the right side, two on the left. Supralabials,—seven, none divided. Infralabials,—four, the fourth largest and in contact with three scales behind; the suture between the first pair subequal to that between the anterior sublinguals. Marginals,—one after the third infralabial. Sublinguals,—two well developed pairs, the fellows of each in contact. Costals,—anterior 48?[1] midbody 54?[1] posterior 45; imbricate everywhere. Ventrals,—exceed 420 (probably are 15 to 30 more, but the neck is rent), entire and about twice the breadth of the last costal row everywhere. Colour,—head and neck black; body with 59 well defined annuli not confluent ventrally except in front, about as broad as the interspaces at midcosta.

Habitat.—Rangoon.

DISTIRA MAMILLARIS (Boulenger, nec Daudin).

Hydrophis fasciata, Günther, Rept. Brit. Ind., 1864, p. 374, pl. xxv, fig. Q and Q′.
,, mamillaris *Boulgr. in Blanford, Fauna Brit. Ind. Rept. and Batrach.*, 1890, p. 401, and *Cat.*, 1896, iii, p. 277.



A B C

Fig. 18.—*Distira mamillaris*, × 2.

The name *mamillaris* originated with Daudin, who applied it to the original of plate xliv of Russell's first volume. This plate, I consider, represents without doubt the *gracilis* of Shaw as already mentioned under that species, so that the form now under discussion has no right to this designation.

The type-specimen of the form referred to by Mr. Boulenger as *mamillaris* is, I

[1] The specimen is sodden, and the scales difficult to count with certainty.

consider, undoubtedly Beddome's specimen in the British Museum, which was figured by Günther[1] and referred by him to *fasciata* (Schneider). I agree with Mr. Boulenger in considering this specimen distinct from *fasciata*, but I do not agree with him in associating it with Russell's plate xliv. Whether or not this form should rank as a definite species, or be considered a *lapemoides* or a variety of *cyanocincta*, it is difficult to say.

I have seen six specimens which are so alike in scale characters and colour that I feel sure they are identical. Two of these are the specimens labelled *mamillaris* in the British Museum, one in the College of Surgeons' Museum (No. 521C); one in the Indian Museum, Calcutta (No 13392); and two in the Bombay Natural History Society's collection. The range of variation in the anterior costals is 25 to 29, in the costals at midbody 31 to 40. The ventrals range between 287 and 367. The annuli vary from 43 to 56, are well defined, and broader than the spaces; and in all other particulars including postoculars, temporals and labials they are alike.

The sole character I can find to differentiate these from *lapemoides* is that the costals are fewer. From *cyanocincta* they are characterised only by the juxtaposed condition of the costals.

Description.—The forebody is from one-third to one-fourth the greatest body depth The head shields are almost as regular as in the preceding species of *Distira*.

Rostral,—the portion visible above from half to three-fifths the internasal suture. Præfrontals,—touch the second supralabial. Postoculars,—two. Temporals,—ill developed and irregular, usually two superimposed scales anteriorly (in one specimen three on one side, and a single large shield on the other). Supralabials,—seven, the posterior three or four subject to division. Infralabials,—four, the last in contact with three or four scales behind. The suture between the first shorter than that between the anterior sublinguals. Marginals,—present; usually one after the third infralabial, sometimès two after the second or third (in one example none on one side, one after the third on the other). Sublinguals,—two well developed pairs, the fellows of each in contact. Costals,—anterior 25 to 29, midbody 31 to 40, posterior 34 to 41; the anterior imbricate, posterior juxtaposed. Ventrals,—287 to 367, entire, twice or nearly twice the breadth of the last costal row throughout. Colour,—head black, body surrounded by from 43 to 56 well defined black annuli, which are much broader than the interspaces at midcosta, and usually much confluent ventrally, especially anteriorly.

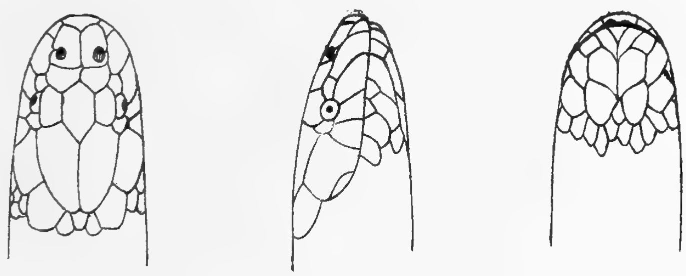
Habitat.—The shores of Peninsular India. Apparently rare. My figure is from a specimen in the Bombay Society's collection from Bombay.

DISTIRA SPIRALIS (Shaw).

Hydrus spiralis, *Shaw, Zool.* iii., 1802, p. 564, pl. cxxv.
Hydrophis spiralis, *Gray, Cat.*, 1859, p. 54.
,, ,, *Günther, Rept. Brit. Ind.*, 1864, p. 366, pl. xxv, fig. D.

[1] Rept. Brit. Ind., pl. xxv, figs. Q and Q′.

Hydrophis spiralis, *Boulgr. in Blanford, Fauna Ind. Rept. and Batrach.*, 1890, p. 401; and *Cat. Brit. Mus.*, 1896, iii, p. 273.
,, ,, *Wall and Evans in Journ. Bomb. Nat. Hist. Soc.*, xiii, p. 348; *Wall. in Spol. Zeylan., Augt.*, 1907, p. 166.
? ,, nigrocinctus, *Jan, Icon. Gén.* 1872, 41, pl. ii, fig. 2.
,, robusta, *Günther, loc. cit.*, p. 364, in part.
,, ,, *Fayrer, Thanat. Ind.*, 1874, pl. xxi.
Distira robusta, *Boulgr. in Blanford, Fauna Brit. Ind. Rept. and Batrach.*, 1890, p. 409.
,, ,, *Sclater, List Snakes Ind. Mus.*, 1891, p. 65.
,, ,, *Wall and Evans in Journ. Bomb. Nat. Hist. Soc.*, xiii, p. 615.
,, ,, *Wall in Mem. As. Soc. Bengal*, 1906, p. 290.
? Hydrophis rappii, *Jan, loc. cit.*, 41, pl. iv, fig. 1.
? ,, temporalis, *Blanford in Proc. Zool. Soc. Lond.*, 1881, p. 680, and fig.
? ,, bishopii, *Murray, Vert. Zool. Sind*, 1884, p. 391, and pl.
,, subcinctus, *Gray in Zool. Misc.*, 1842, p. 63; *and Cat.*, 1849, p. 52.
,, ,, *Günther, loc. cit.*, p. 368, pl. xxv, fig. F.
,, melanocephalus, *Gray, Cat.*, 1849, p. 53, in part.
,, ,, *Boulgr., Cat. Brit. Mus.*, iii, p. 283, and pl. xv.
,, melanosoma, *Günther, loc. cit.*, p. 367, pl. xxv, fig. E.
Distira melanosoma, *Boulgr., Cat.*, 1896, iii, p. 291.
,, brugmansii, *Boulgr., Cat.*, 1896, iii, p. 292.
,, ,, *Wall in Proc. Zool. Soc. Lond.*, 1903, p. 96; and in *Spol. Zeylan.*, August, 1907, p. 169.
Hydrophis alcocki, *Wall in Mem. As. Soc. Bengal*, 1906, p. 288, pl. xv, fig. 3.
,, floweri, *Boulgr. in Proc. Zool. Soc. Lond.*, 1898, p. 106, and plate.
,, longiceps, *Günther, loc. cit.*, p. 375, pl. xxv, fig. O.
Chitulia fasciata, *Gray, Cat.*, 1829, p. 56.



A B C

Fig. 19.—*Distira spiralis.*

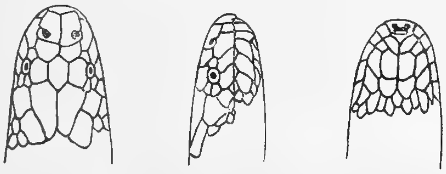
Under this title I include six species considered distinct by Mr. Boulenger, *viz.*, *brugmansii* (Boie), *subcinctus* (Gray), *melanocephalus* (Gray), *melanosoma* (Günther), *wrayi* (Boulenger), *floweri* (Boulenger), and one described by myself, *alcocki* (Wall), all divided I consider, on insufficient grounds, affecting shields known to be subject to variation in this and other allied species.

spiralis.—There are in the British Museum only five specimens labelled *spiralis*, all of which appeared to me to be the young of the species labelled in the British Museum *brugmansii* (Boie). Upon examining the posterior maxillary teeth I could discern grooves in them. The one important difference between the two supposed species judging from the descriptions of the two in Mr. Boulenger's Catalogue was therefore abolished. The other apparent differences affect the supralabials and the ventrals. Though Mr. Boulenger's description of *spiralis* gives the supralabials as "six or seven," in all the specimens so labelled in the British Museum they are seven except in one specimen on one side only where they are six. It is to be noted, too, that in four of the twelve specimens labelled *brugmansii* in the same institution, there are six supralabials on one or both sides and seven in the rest. As regards ventrals the same authority gives the range for *spiralis* 270 to 334, that for *brugmansii* 300 to 354. The overlapping is great, and the available species meagre in the case of *spiralis* and not very numerous in the case of *brugmansii*. I would point out that four of the five specimens of *spiralis* are so alike in size and general appearance as to leave one with the conviction that they are hatchlings of the same brood, an idea supported by the fact that they are all preserved in the same bottle, and presented by the same donor. A careful examination of the available specimens of the two supposed species side by side strengthened my conviction, for I failed to discover any difference between them. The slight difference apparent in the number of ventrals entirely disappears within the range given me by the large series of specimens I have examined.

The vertebral spots which occur between the annuli by no means form a complete series in some of the specimens of *spiralis*; and it is to be specially remarked that a very good series of these spots occurs in Beddome's specimen labelled *brugmansii* from Malabar, and there is at least one pronounced vertebral spot in one of Henderson's specimens. I think the most that can be conceded to the two forms is the rank of colour varieties retaining for the species the name *spiralis* which has precedence. My figure (19) is from a specimen of mine from Pegu now in the Bombay Society's collection referred to by Evans and me as *Distira robusta* in the Bombay Journal, Vol. xiii, p 615. The scales in the neck are 27, midbody 34, posteriorly 34. The ventrals are 320.

brugmansii (Boie).—Of the twelve specimens so named in the British Museum, only nine appear to me to be identical, and should, I think, be included under the older specific title *spiralis* with the five small specimens already so described by Mr. Boulenger. This species I propose, for the present, to consider distinct as above constituted, but it is so extremely closely allied to the forms *cyanocincta* (Daudin) and *lapemoides* (Gray) that I cannot escape the conviction that the three will eventually be united. Certain specimens, indeed, can be definitely referred to one or other of these three forms by the possession of certain groups of characters which seem to mark very definite specific differences. But, on the other hand, many specimens present these same characters in varying combinations of such extreme confusion that it is impossible to place them with certainty with either of the three species, to all of which they show almost equal affinity. I am strongly of opinion that these specimens are intermediate forms which unite the three supposed species, and am opposed to the view held by all previous herpetologists that such forms should each rank as species apart. This old view seems to me responsible for much of the extreme confusion into which the subject has fallen, and this is not surprising since the characters made use of to differentiate these pseudo-species are precisely those which I have remarked upon above as very variable in individuals of many well defined species of this genus.

subcincta (Gray).—This species was described over 60 years ago from the solitary type in the British Museum which still remains the only specimen known. In Mr. Boulenger's key to the genus *Distira* (vol. iii, p. 287), it is separated from *brugmansii* on two points, *viz.*, that the neck scales in *subcincta* are 23 to 25, in *brugmansii* 27 to 31, and that the frontal is hardly as long as its distance to the rostral in *subcincta*, whereas it is as long or longer in *brugmansii*. To make any reference to the length of the frontal as a distinction between these two supposed species amounts to an eloquent admission of the extremely close resemblance between them, for the length of this shield in *brugmansii* by Mr. Boulenger's own showing varies considerably, *viz.*, between its distance to the rostral and its distance to the end of the snout. I



A B C

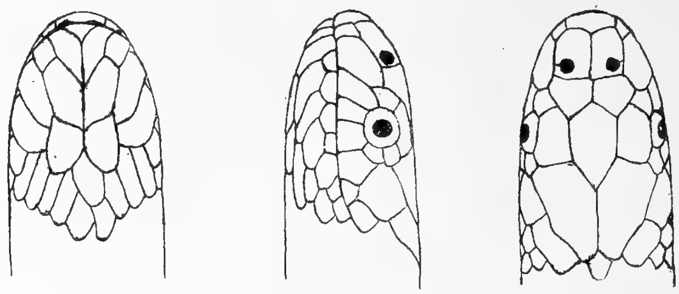
Fig. 20.—*Distira subcincta*. After Günther, *Rept. Brit. Ind.*, pl. xxv, fig. F.

can find no points of difference in the two species, nor does Mr. Boulenger mention any in his detailed descriptions other than those already referred to, and I cannot doubt that this solitary specimen of *subcincta* should, therefore, be considered a *spiralis vel brugmansii*. The low number of neck scales is not by itself sufficient to form the basis of a distinct species, and, moreover, agrees with that of some specimens of *melanocephalus*, which I am unable to separate from *spiralis*.

The colour of *subcincta* is unusual, in that there are round costal spots below the dorsal bars, a peculiarity, however, not necessarily opposed to its inclusion with *spiralis*, since an exactly similar colour variety is included by Mr. Boulenger with his species *ornata*, a form usually characterised by dorsal bars.

melanocephalus (Gray), described in 1849 from a single specimen in the British Museum, remained the sole representative till 1901. In that year I saw in Mr. Owston's collection 19 specimens from the Loo Choo Islands which I examined (nine in detail) and identified as *D. robusta* (Günther), i.e., *brugmansii* (Boie). One of these I sent to the British Museum and learnt from Mr. Boulenger he considered *H. melanocephalus*. This species, in his catalogue description, differs from *brugmansii* in two points only, *viz.*, that the head and fore-body are smaller and the neck scales fewer in number in *melanocephalus*.

I have re-examined the specimen I presented to the British Museum, and find that the posterior maxillary teeth are grooved, and it exactly accords with specimens of *spiralis* (*vel brugmansii*) except in the lower number of neck scales. These in the two museum specimens of *melanocephalus* are 25 and 24, but in the nine I specially

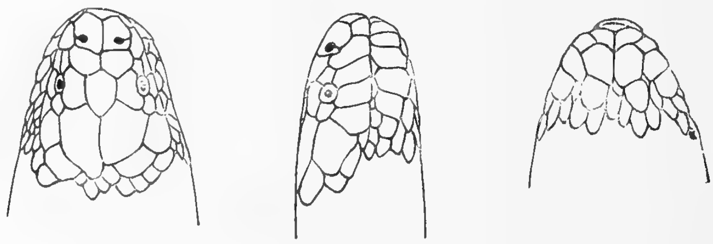


A B C

Fig. 21.—*Distira melanocephala*, × 2.

examined in Japan they ranged from 23 to 27, the latter number being already recorded for *spiralis*. It is, therefore, impossible to draw a dividing line between the two species, and I take the view that *melanocephalus* is a local variety of *spiralis* characterised by rather fewer neck scales.

melanosoma (Günther).—This is only known from a single specimen in the British Museum which I cannot see differs in any way from *spiralis*, vel *brugmansii*, except in colour. The sole distinction between the two utilised by Mr. Boulenger in his key (p. 287) is that the posterior chin shields are in contact in *brugmansii*, separated in *melanosoma*. His detailed descriptions of the scale characters in each show complete accord in every other particular, nor can I, by careful examination of the specimens side by side, find any differences between them. As regards the chin

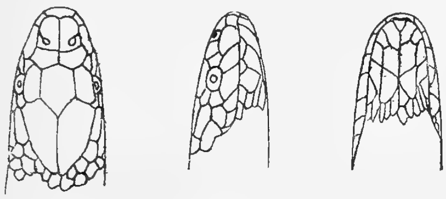


A B C

Fig. 22.—*Distira melanosoma*. After Günther, *Rept. Brit. Ind.*, pl. xxv, fig. E.

shields, they are variously separated or in contact in many species, and are separated in at least three others of the large series of *spiralis* examined by me. The colour is certainly peculiar, in that the black bands are unusually broad, and *melanosoma* might, I think, be conceded the rank of a colour-variety, characterised by the breadth of its annuli. The postocular is single, as correctly stated in Mr. Boulenger's description (p. 291), not two as incorrectly given in his key (p. 287).

longiceps (Günther).—This is known from a single specimen in the British Museum in which I find the post-maxillary teeth are grooved. Its affinities are extremely close to both *spiralis* and *cyanocincta*, in fact it combines the distinguishing characters of both these forms so intimately that it is difficult to decide to which to refer it. I incline to the opinion that it should rank with *spiralis* on account of the costals in the fore, and midbody being repectively 28, and 33 to 34. I hold that the costals carry greater weight than the postoculars and temporals. The latter, in this specimen, conform to the generality of examples of *cyanocincta*, but these shields being subject to some



A B C

Fig. 23.—*Distira longiceps*. After Günther, *Rept. Brit. Ind.*, pl. xxv, fig. O.

variation in both these forms prompts me to regard them as abnormal in this instance.

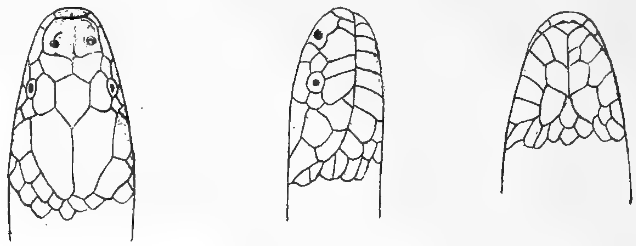
The one other departure from the normal mentioned by Mr. Boulenger is the juxtaposed character of the posterior costals. Personally I found it extremely hard to decide for myself whether these scales were imbricate or juxtaposed, and finally decided they were juxtaposed dorsally and subimbricate ventrally. I do not attach sufficient weight to this character to consider it should justify separating this form from *spiralis*, and even granting that the scales are juxtaposed ventrally behind, the fact that Mr. Boulenger himself in one case at least, viz., *fasciata* (Schneider), places specimens with the scales imbricate, together with others that are juxtaposed, makes it probable that a similar deviation from the normal may be expected in other species.

wrayi (Boulenger).—As recently as 1900 Mr. Boulenger described this as a new species from a specimen sent from Perak. I have examined the three available specimens so labelled in the British Museum, the only ones known. One of them is so labelled by an oversight, for it is obviously a very typical specimen of *gracilis* (Shaw). Of this there is no possible doubt. The other two I examined beside specimens of *spiralis* and *brugmansii*, but failed to detect in them one feature by which they could be distinguished. One of them is peculiar in having no marginals. Referring to Mr. Boulenger's description of *D. wrayi*,[1] and comparing it with his description of *brugmansii* in his catalogue,[2] I find they completely agree, except in two extremely minute details, *viz.*, the length of the frontal which it is claimed is rather shorter in *wrayi*, and carination which is more pronounced in *wrayi*. Such minute differences, especially affecting features which are subject to considerable variation, appear to me very unconvincing. I cannot even agree that the differences claimed are any more noticeable than is seen in certain examples of *brugmansii* in the British Museum.

floweri (Boulenger).—This is known from two specimens only, both in the British Museum. Though placed by Mr. Boulenger with his genus *Hydrophis*, the post-maxillary teeth are grooved, and had this circumstance been noticed by him, I cannot but think he would have referred them to *brugmansii*. From this species I can only separate it by (1) the absence of marginals, and (2) the failure of the præfrontal to meet the second supralabial. The absence of marginals is remarkable, the only other instance of these shields being wanting among the specimens I consider alike being

[1] Ann. and Mag. Nat. Hist. v, 1900, p. 307. [2] III, p. 293.

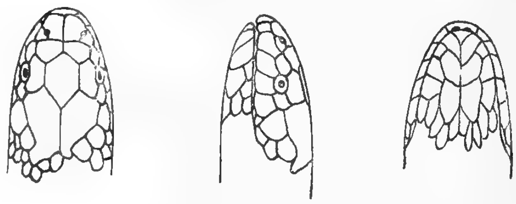
in one of the specimens labelled *wrayi,* and it is noteworthy that the specimens labelled *wrayi* and *floweri* are all from the same locality, *viz.,* Perak. The failure of the præfrontal to meet the second supralabial is only partial, for this contact occurs on one



A B C

Fig. 24.—*Distira* (*Hydrophis*) *floweri*, × 1½. After Boulenger in *Proc. Zool. Soc.*, 1898.

side in one of the specimens. I have observed the same abnormality in eight of the large series I consider *spiralis.* I am strongly of opinion these specimens should be regarded as an abnormal form of *spiralis* (Shaw).



A B C

Fig. 25.—*Distira alcocki.*

alcocki (Wall).—Last year I described[1] what I considered at the time a very well marked new species under the above title. I could not satisfactorily view the teeth, as the specimen was a very small one, and placed it with the *Hydrophis* on account of the slender proportions of the neck.

In most respects very like *brugmansii* the fact that the præfrontal shield did not meet the second supralabial, taken with the low number of scales in the neck (25), and body (30), and the small number of ventrals (282) made it difficult to know where to place it. I find now, however, that of 65 specimens in my notes which I identify as *spiralis* the præfrontal fails to meet the second supralabial in seven other instances,[2] including the type-specimen of *spiralis* in the British Museum. I find also that other examples afford parallel or nearly parallel departures from the normal with reference to the three other details made mention of, and so I have no hesitation whatever in considering this snake now as a somewhat aberrant example of *sipralis.*

The characters upon which reliance is placed to separate *spiralis* from *cyanocincta* are all subject to some variation in both species, and specimens occur combining these characters sometimes so intimately that it is difficult to decide with which form to place them; indeed, it seems to me very dubious whether they can be considered apart. Of 12 specimens labelled *brugmansii* in the British Museum, a form I hold to be synonymous with *spiralis*, three I consider are misplaced, and should be included with

[1] Memoirs As. Soc. Bengal, 1906, p. 288.

[2] I have signally failed to bring these six specimens together by any combination of characters

cyanocincta. These specimens are Jayakar's from Muscat, the type of *H. sublævis*, and Cantor's specimen from Penang. They are all included with *brugmansii*, presumably on their possession of a large single anterior temporal, but there are, I consider, weightier reasons for supposing them aberrant examples of *cyanocincta* to which I will refer again. The differences I can see between typical examples of each form are as follows:—

	spiralis.	*cyanocincta*.
(1)	One postocular.	Two postoculars.
(2)	One anterior temporal.	Two anterior small superposed temporals.
(3)	A single marginal after the third infralabial.	A complete row of marginals after the second infralabial.
(4)	Costals in midbody 29 to 36; 2 to 7 more than anteriorly.	Costals in midbody 33 to 44; 7 to 11 more than anteriorly.

I attach far greater weight to the costal rows than any of the other characters concerned; and in the three specimens I refer to, I make them 39, 39 and 41 respectively, and from eight to ten more in midbody than anteriorly. In addition to this there is a complete row of marginals after the second infralabial in all, and two postoculars in one specimen. On the other hand, each has a single anterior large temporal, and two a single postocular. I may remark here that the features which I take to be abnormal in these specimens are exactly on a par with those made use of to separate *grandis* from *cyanocincta*, and it seems most inconsistent to grant to one trio, viz., *grandis*, the rank of a species and withhold this distinction from the other trio.

Description.—This is based on my conception of the species based on 65 examples.

Body anteriorly from one to two-thirds the greatest depth, probably less as my notes on this point are scanty, and I have no record of a gravid female.

Rostral,—the portion visible above less than two-thirds the internasal suture. Præfrontals,—touch the second supralabials (eight exceptions, one of these on one side only). Postoculars,—one. (Eleven exceptions, of which five are normal on one side only). Temporals,—one large anterior succeeded by a subequal shield. In 23 examples the anterior by a confluence with a supralabial reaches the labial margin, and in 12 of these this occurs on one side only. In six examples there are two superposed anterior small shields, in four of these on one side only. The posterior shield is subject to greater variation than the anterior. Supralabials,—6 to 8; the anterior 4, 5 or 6 usually undivided and well developed; the third and fourth (and in nine examples, the fifth also) touch the eye. Infralabials,—four; the last in contact with three or four scales behind; the suture between the first usually smaller than that between the anterior sublinguals. Marginals,—one usually, after the third sublingual (sometimes two or more after the second or third. Wanting in three examples, one of *wrayi* and both *floweri* in the British Museum). Sublinguals,—two well developed pairs, the fellows of each in contact. (The posterior separated completely in four specimens). Costals,—anteriorly 23 to 31 (usually 25 to 29), midbody 29 to 36 (usually 31 to 35), posteriorly 28 to 36; imbricate anteriorly; imbricate or subimbricate posteriorly; usually smooth in the young, feebly or strongly tuberculate in large adults, the tubercles often bi- or tridentate. Ventrals,—282 to 373; entire throughout, except a few posteriorly; twice or less than twice the breadth of the last costal row. Colour,—olivaceous or greenish dorsally, merging to yellowish costally and ventrally, or yellowish with dark bars or bands, which may number from 34 to 70, but are most usually from 40 to 55. I group the various forms as follows, and it will be noticed how very alike the varieties of this are to those of *cyanocincta*:—

Group (A) completely banded. The bands are very variable. In some examples they are narrow throughout, in others broad. In some they are of even breadth from dorsum to ventrum; in others dilated vertebrally; in others tapering ventrally. Some of the posterior ones are interrupted costally in some specimens. In some instances the black is only preserved for a variable depth dorsally, but the indication of the completely black band of younger days can, though faint, be distinctly traced ventrally, and also the ventral connecting band so commonly retained in adult life.

In some the bands are discrete vertebrally and ventrally, and in others more or less confluent, especially ventrally, where a broad stripe very frequently passes from the throat to a variable extent backwards, and not uncommonly in the whole length of the snake.

(1) *brugmansii* (Boie).—Bands narrower than interspaces; no vertebral nor ventral spots. It is one of the commonest varieties. *robusta* (Günther), *bishopi* (Murray), and *melanocephalus* (Gray) I place here.

The form is very analogous to var. B of *cyanocincta*.

(2) *spiralis* (Shaw).—Differing from the last only in exhibiting one or more vertebral spots placed singly in the interspaces. There are usually a few only anteriorly or posteriorly, but a regular series is exceptional. In fig. 26 on plate vii these are not visible at all. It is from a specimen so labelled in the British Museum.

(3) Similar to the last, with in addition a series of similarly placed ventral spots, which may be as variable in number as the vertebral series of the last. It is an unusual form. The only example I have seen, an adult, is in the Colombo Museum (No. 113). The vertebral and ventral spots are very black, and form unusually regular series.

(4) Bands nearly as broad, or broader than the light intervals, and frequently connected in part, or wholly, by a broad ventral stripe of black. Head black. With this I place *melanosoma* (Günther) (see fig. 27 on plate viii), *floweri* (Boulenger), and *alcocki* (Wall). It is rather an unusual variety analogous to variety A of *cyanocincta*.

(5) *subcincta* (Gray).—With a series of costal spots. An unusual variety, the type of which is from the Indian Ocean. It is analogous to variety 4 of *ornata*, and somewhat like variety D(*a*) of *cyanocincta*.

(6) Barred dorsally but no costal spots. The type-specimen is from the Indian Ocean. With this I place the *temporalis* of Blanford, the type of which came from the Persian Coast, and *longiceps* (Günther). I have

seen other specimens from Bombay and Karachi, but it is an uncommon form. Analogous to variety D(*b*) of *cyanocincta*.

6(*a*) A form intermediate between these two groups is to be seen in a specimen in the British Museum from Madras presented by Mr. Henderson. In this there are complete bands anteriorly, and dorsal bars posteriorly Analogous to variety A (*c*) of *cyanocincta*.

Group (B) with transverse dorsal bars.

DISTIRA CYANOCINCTA (Daudin).

"Chittul," *Russell, Ind. Serp.*, 1801, ii, pl. ix.
Hydrophis cyanocincta, *Daud., Rept.*, 1803, vii, p. 383.
? ,, ,, *Peters in Mon. Berl. Acad.*, 1872, p. 852, pl. 1, fig. 2.
,, ,, *Günther, Rept. Brit. Ind.*, 1864, p. 367.
,, ,, *Fayrer, Thanatoph. Ind.*, 1874, pl. xxiii.
,, ,, *Ewart, Pois. Snakes Ind.*, 1878, pl. 17.
? ,, ,, *Murray, Vert. Zool. Sind*, 1884, p. 391.
,, tuberculata, *Anderson in Journ. As. Soc. Bengal*, 1871, pt. 2, p. 18.
,, ,, *Murray, loc. cit.*, p. 393.
,, dayanus, *Stoliczka in Proc. As. Soc. Bengal*, 1872, p. 89.
,, subannulata, *Gray, Cat.*, 1849, p. 54.
,, aspera, *Gray, Cat.*, p. 55.
,, ,, *Günther, loc. cit.*, p. 365.
,, crassicollis, *Anderson, loc. cit.*, p. 19.
,, ,, *Fayrer, loc. cit.*, pl. xxii.
,, ,, *Ewart, Pois. Snakes Ind.*, 1878, pl. 16.
,, trachyceps, *Theobald, Cat. Rept. As. Soc. Mus.*, 1868, p. 70.
,, phipsoni, *Murray in Journ. Bomb. Nat. Hist. Soc.*, ii, p. 32 and pl.
? ,, westermanni, *Jan, Icon. Gén.*, 1872, 39, pl. v, fig. 1.
,, doliata, *Gray, Cat.*, 1849, p. 51.
Aturia belcheri, *Gray, Cat.* (1849), p. 46.
Hydrophis belcheri, *Günther, Rept. Brit. Ind.*, 1864, p. 364.
Distira belcheri, *Boulgr., Cat.* iii, 1896, p. 296.
? Hydrophis frontalis, *Jan, loc. cit.*, 39, pl. v, fig. 2 (*non Boulgr.*).
,, sublævis, *Gray in Zool. Misc.*, 1842, p. 62, and *Cat.*, 1849, p. 52.
,, elegans, *Günther, loc. cit.*, p. 369, pl. xxv, figs. K & K′.
? ,, semperi, *Garman in Bull. Mus. Comp. Zool.*, 1881, p. 85.
,, pacificus, *Boulgr., Cat.*, 1886, iii, p. 278, pl. xii, fig. 2.
,, kingii, *Boulgr., Cat.*, 1896, iii, p. 276.
? ,, striatus, *Schlegel, Phys. Serp.*, 1837, p. 502, pl. xviii, figs. 4 and 5.
Aturia elegans, *Gray in Zool. Misc.*, 1842, p. 63.
Chitulia fasciata, *Gray, Cat.*, 1829, p. 56.
Distira belcheri, *Boulgr., Cat.*, iii, p. 296.
,, semperi, *Boulgr., Cat.*, iii, p. 292.

Distira tuberculata, *Boulgr. in Blanford, Fauna Brit. Ind. Rept. and Batrach.* 1890, p. 409, and *Cat.*, iii, p. 293.

,, ,, *Sclater, List Snakes Ind. Mus.*, 1891, p. 65.

,, lapemidoides, *Sclater, loc. cit.*, p. 66, Nos. 8278 and 8632.

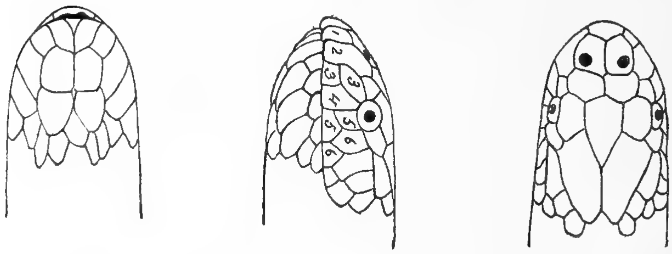
,, grandis, *Boulgr., Cat.*, iii, p. 292, and pl. xvi.

,, macfarlani, *Boulgr., Cat.*, iii, p. 294, and pl. xvii.

,, cyanocincta, *Boulgr. in Blanford, Fauna Brit. Ind. Rept. and Batrach.*, 1890, p. 410, and *Cat.*, iii, p. 294.

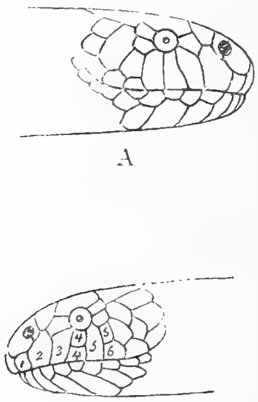
,, ,, *Wall in Proc. Zool. Soc. Lond.*, 1903, p. 96, and *Mem. As. Soc. Bengal*, 1906, p. 291, and *in Spol. Zeylan.*, *August* 1907, p. 171.

,, ,, *Sclater, loc. cit.*, p. 65. (Except No. 8242).



A B C

Fig. 28.—*Distira cyanocincta.*



A

B

Fig. 29.—*Distira westermanni.* After Jan, *Icon. Gén.* livr. 39, p. v, fig. 1.

The specific title originated with Daudin, who applied it to the original of plate ix. in Russell's second volume. A specimen now in the British Museum collected by Russell and labelled from the Sunderbunds is, without doubt, this very specimen; for Russell, on the last page of this volume, mentions the Sunderbunds as the locality from which the original of this plate was obtained. Mr. Boulenger omits to record the discovery of this type, which had previously been lost sight of.

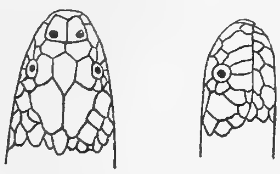
With this species, I am of opinion, should be united several forms previously described as distinct by various authors, and considered as such by Mr. Boulenger in his Catalogue (1896). All of these appear to me to be separated on insufficient grounds affecting shields, which analogy shows to be inconstant in many individuals of certain species. Most of these specimens I have carefully compared side by side with the specimens labelled *cyanocincta* in the British Museum, and my opinion is the only possible one I see open to me. The forms are as follows: *kingi* (Boulenger), *elegans* (Gray), *pacificus* (Boulenger), *semperi* (Garman), *tuberculata* (Anderson), *grandis* (Boulenger), *macfarlani* (Boulenger), *belcheri* (Gray), and *frontalis* (Jan).

kingi (Boulenger).—This form rests on the single specimen so named by Mr. Boulenger which is in the British Museum. Contrary to his belief the posterior maxillary teeth are grooved. The only differences apparent in the descriptions of this and *cyanocincta* in Mr. Boulenger's catalogue are trifling and affect the proportions of the rostral, nasals and frontal, the scales in the body and the relative proportion of the head to the body. I think the slender differences claimed in the head shields may be dismissed without comment. The scales in the body in *kingi* (37) are only two less than the range given by Mr. Boulenger for *cyanocincta*, and come well within the range given me by my large series of specimens (35 to 44). The head in *kingi* recorded as one-third the extreme body depth is within the variation I have observed in examples of *cyanocincta*.

I see no reason, therefore, to suppose this a species separable from *cyanocincta*.

It is to be noted that this specimen was placed by Gray with his *doliata*, a form subsequently united by Mr. Boulenger with *elegans* of the same author (Gray), which form I am unable also to separate from *cyanocincta*.

elegans (Gray).—The three young specimens so named in the British Museum and the only ones known, constitute, I think, a very distinct colour variety of *cyanocincta*, but no more. I have failed, I find, to record the condition of the posterior maxillary teeth, possibly owing to the small size of the specimens. A comparison of Mr. Boulenger's descriptions of the two forms shows they are identical except for the single anterior temporal, and the slightly shorter frontal shield in *elegans*. A single anterior temporal occurs in at least five of the British Museum specimens of *cyanocincta*, so this feature cannot be made use of to differentiate this from allied forms. A comparison of these three specimens with many *cyanocincta* made it impossible for me to consider them apart.



A B

Fig. 30.—*Distira pacifica*. After Boulenger, *Cat.*, vol. iii, pl. xii, fig. 2.

pacificus (Boulenger).—Known from a single adult specimen in the British Museum from New Britain. I find that the posterior maxillary teeth are grooved, and a careful comparison of this with specimens labelled *cyanocincta* in the same collection shows no points by which it is possible to separate it from them. The neck-scales of *pacificus*, correctly stated in Mr. Boulenger's description (Catalogue, page 279), are wrongly given in his key (page 272); the correct count, *viz.*, 27 to 29, agrees with that of typical *cyanocincta*. According to Mr. Boulenger the rostral shield in *pacificus* is a little narrower and the frontal a little longer than in *cyanocincta*, and there is a single anterior temporal, but the remarks made on *elegans*, *kingi*, etc., apply equally here. I cannot doubt that, had Mr. Boulenger recognised the grooved condition of the posterior maxillary teeth in these species, he would long ago have included them in his *D. cyanocincta*, as the varying scale characters on which they are separated from each other are all to be found in one or other of the large series of 29 specimens in the British Museum assigned to that species, *e.g.*, the two anterior temporals of *kingi* and the one of *elegans* and *pacificus*.

semperi (Garman).—Not represented in the British Museum and known only from Garman's description of a single specimen from Lake Taal, Luzon. Mr. Boulenger includes this specimen in his genus *Distira*, but separates it in his key under the points—(*a*) "Second pair of chin shields, if distinct, separated by several scales." (*b*) "A single anterior temporal." Garman's description makes no mention of the separation of the posterior chin shields, and there is no plate of the specimen. Further, he says that the seventh labial is separated from the temporal by a large pentagonal plate, which clearly must constitute what many consider an *inferior* temporal shield. I cannot, therefore, separate this from *cyanocincta*.

tuberculata (Anderson).—Of this there is no specimen in the British Museum, but I have examined in the Indian Museum the type and only specimen which was described by Anderson in 1871, and have no hesitation in considering it *cyanocincta*. From this species Mr Boulenger separates it by its single anterior temporal and the large number of neck scales given as 38. This number is Anderson's count, close behind the head where the rows are always too variable to give reliable results. The scales counted two heads-lengths behind the head number 32, and at midbody 40, both of which numbers accord with those usually found in specimens of *cyanocincta*; and it has already been pointed out that a single temporal shield is sometimes present in members of that species. The head shields of Anderson's *tuberculata* are granular and the body scales bi-tuberculate, as is so often the case in large specimens of *cyanocincta*, e.g., the *H. aspera* of Gray incorporated by Mr. Boulenger in this species.

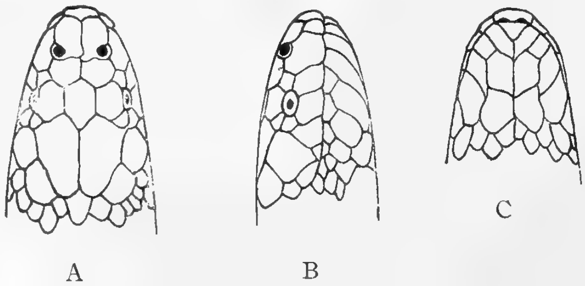
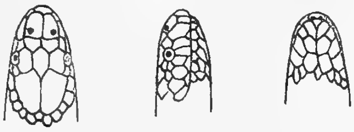


Fig. 31.—*Distira grandis*. After Boulenger, *Cat.*, vol. iii, pl. xvi.

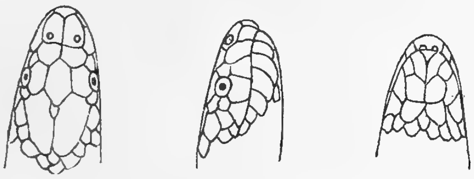
grandis (Boulenger).—This species rests on three specimens so named in the British Museum. These, on careful examination, I cannot separate from the species *cyanocincta*. The distinctions made use of in Mr. Boulenger's key are that in *grandis* there is a single anterior temporal shield only, the rostral is slightly narrower and the ventrals rather more in number, 372—400 against 281—385 (*cyanocincta*). As before stated, a single anterior temporal shield occurs in several museum specimens of *cyanocincta*, the breadth of the rostral is always more or less variable in every species, and I count the ventrals 306, 325 and 375 in the three specimens labelled *grandis*, these numbers falling well within the limits given for *cyanocincta*.



A B C

Fig. 32.—*Distira macfarlani*. After Boulenger, *Cat.* iii, pl. xviii, fig. 1.

macfarlani.—Only known from two young specimens in the British Museum considered a distinct species by Mr. Boulenger. His description of them differs only from that of *cyanocincta* in the following points: The nasal and frontal shields appear to be proportionately a shade longer in *macfarlani*, the neck scales slightly more and the ventrals considerably fewer in number. The first points are of no importance in differentiation, and the neck scales given as 31—35 in the two specimens are 33 in both at the point two headslengths behind the head which I find to give the most consistent results. With regard to the ventrals, Mr. Boulenger's numbers 220 and 256 are incorrect, and by repeated counts I find them to be 342 to 349 and 385 to 392 respectively.[1] I have, therefore, no hesitation in including these two specimens in the species *cyanocincta*.



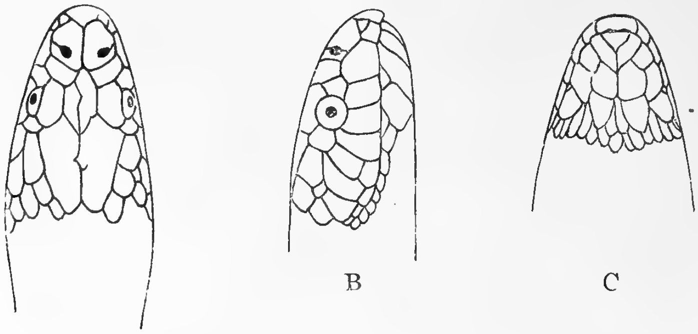
A B C

Fig. 33.—*Distira belcheri*. After Boulenger, *Cat.*, vol. iii, pl. xvii, fig. 2.

belcheri (Gray).—This is known from a solitary specimen, which was obtained 58 years ago from New Guinea, and is preserved in the British Museum collection. The only points claiming attention I can see between this and typical specimens of *cyanocincta* are: (1) The absence of marginals; (2) the contact of the fourth supralabial only with the eye; and (3) the number of costal rows. Of these, the absence of marginals I consider a very important point, though previous herpetologists have completely ignored the existence of these shields. In my large series of *cyanocincta*, no specimen has these shields wanting; but as a certain degree of inconstancy in this direction is to be seen in individuals of some other species, I think the absence in this case is best considered an aberrant feature. I attach little importance to the contact of the fourth supralabial only with the eye, as the third is only just excluded. The costal rows anteriorly (25) are but one less than the limits furnished by my numerous examples,

[1] It may appear strange to record the ventrals variously in the same individual, but it is extremely difficult to count these shields accurately in certain specimens (see my final remarks under ventrals in my prefatory notes).

and in midbody the number (34), though low, agrees with Anderson's specimens in the British Museum labelled *cyanocincta* from Mergui, in which they are 33 to 34. The affinities of the specimen are so extremely close to *cyanocincta* that I cannot believe it is distinct.



A B C

Fig 34.—*Distira frontalis* ($\times 1\frac{1}{2}$). After Jan, livr. 39, pl. v, fig. 2.

frontalis (Jan).—This name was given by Jan to a single specimen which he described and figured; and Mr. Boulenger similarly names one specimen in the British Museum collection. The two were probably considered identical on their common possession of one unusual feature, *viz.*, that the anterior angle of the frontal shield projects, and separates the præfrontal pair. This, however, is clearly an abnormality, for I have seen the same condition in more than one specimen of *viperina* and occasionally in other species; and Mr. Boulenger notes that it occurs in the type-specimen of *brookii* (Catalogue, vol. iii, p. 283), a gravid female, though absent in her fully developed young. Apart from this abnormality the British Museum specimen appears to me to be an almost typical *ornata* (Gray), and the posterior maxillary teeth being grooved, I include it in that species. Jan's specimen, however, I am unable to separate from members of the species *cyanocincta* (Daudin). It does not accord with Mr. Boulenger's description of *H. frontalis* on page 276 of the Catalogue in the following particulars: The neck is not very slender, being about three-fifths the body depth; the labials are eight, with the third, fourth and fifth touching the eye; both pairs of chin shields are well-developed and the posterior are only just separated. I count 30 scales in the anterior body. Though unable to verify the presence of grooves in the teeth, it appears to me probable that this will prove to be a *cyanocincta* aberrant in the division of the first supralabial, the division of the frontal and the separation of the præfrontals, all of which conditions are to be met with as abnormalities in certain individuals of other species.

Description.—This is based on 81 examples, inclusive of 12 considered distinct by Professor Boulenger, which I think the same. The body anteriorly is from one-third to two-thirds the greatest depth, probably less, my notes on this point being very incomplete; and I have no record of the measurements in a gravid female.

Rostral,—the portion visible above is less than two-thirds the internasal suture. Præfrontals,—touch the second supralabial. (Two exceptions and on one side only.) Postoculars,—two usually. (In eleven examples only one, and in five of these on one side only.) Temporals,—usually broken up and replaced by two or more superposed scales anteriorly. (A well developed single anterior shield occurs in sixteen specimens,[1] and in four of these on one side only.) Supralabials,—subject to great variation, the third and succeeding shields subject to division; the third and fourth, and usually the fifth, touch the eye. Infralabials,—four; the last in contact with three or four scales behind; the suture between the first usually less than that between the anterior sublinguals. Marginals,—usually a complete row after the second supralabial[2] (sometimes one, or more after the third). Sublinguals,—two well-developed pairs, the fellows of each in contact. (In six examples the posterior are quite separated.) Costals,—anterior, 25 to 36 (usually 28 to 33); midbody 33 to 44 (usually 36 to 41); posteriorly 34 to 43, imbricate, or subimbricate throughout. Ventrals,—280 to 397, distinct everywhere; twice or nearly thrice the breadth of the last costal row.

Colour.—The many varieties have been summed up by Mr. Boulenger, and I have little to add to his arrangement.

A. Well-defined black bands, more or less connected ventrally. Analogous to variety A. (4) of *spiralis*.

- (*a*) All the bands complete. A common form ranging from the Persian Gulf to the Philippines. With this I would place the *semperi* of Garman.
- (*b*) Some of the posterior bands interrupted costally or subcostally. Not uncommon. In the British Museum, in Reeves' specimen from China, and others, the bands are briefly interrupted costally. In a specimen of Jayakar's, from Muscat, the interruption is subcostal, and more extensive. Ventral spots occur corresponding to the dorsal bars. With this *macfarlani* (Boulenger) should be placed (see fig. 36 on plate viii). It occurs between the Persian Gulf and Australia.
- (*c*) Some of the posterior bands deficient ventrally, and thus converted into bars. Not uncommon. With this I would include *kingi* (Boulenger) from Australia. Analogous to variety 6(*a*) of *spiralis*.

B. Well-defined black bands not united ventrally. A common form occurring between the Persian Gulf and China. With this I would place the *tuberculata* of Anderson. Analogous to variety *brugmansii* of *spiralis*.

C. Obscure bands or bars. A common form usually met with in adult specimens, and occurring between the Persian Gulf and the Philippines. With this, I think, should be included the *crassicollis* of Anderson, the *grandis* of Boulenger, *aspera* of Gray, and *pacificus* of Boulenger. Analogous to specimens of variety A(6) of *spiralis*.

D. Well-defined dorsal bars.

- (*a*) Costal, and subcostal spots. An uncommon form from Australia, *viz.*, the *elegans* of Gray (see fig. 37 on plate viii). Somewhat comparable to variety A(5) of *spiralis*.

---

[1] Five of these are British Museum specimens labelled *cyanocincta*.

[2] None in one specimen, viz., *belcheri*, in the British Museum.

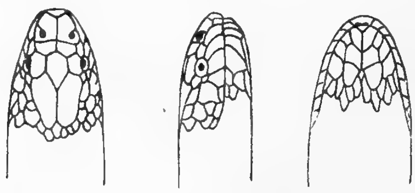
(*b*) No costal spots. A common form seen in examples from the Persian Gulf to China. Comparable to variety A(6) of *spiralis*.

E. A continuous, black, dorsal band (see fig. 35 on plate viii), a rare form—the *phipsoni* of Murray known from a single specimen from Bombay. Completely analogous to variety *inornata* of *ornata*, and *jayakari* of *viperina*.

Habitat.—From Persian Gulf to North Australia. With the exception of two *grandis*, none that I have seen are from the Malayan Archipelago.

DISTIRA NIGROCINCTA (Daudin, nec Jan, nec Cantor).

Hydrophis nigrocinctus, *Daud., Rept.*, 1803, vii, p. 380.
? ,, ,, *Schlegel, Phys. Serp.*, 1837, xviii, figs. 11 and 12.
,, ,, *Gray, Cat.*, 1849, p. 51.
,, ,, *Günther, Rept. Brit. Ind.*, 1864, p. 368, pl. xxv, fig. L.
,, ,, *Fayrer, Thanatoph. Ind.*, 1874, pl. xxv.
,, ,, *Ewart, Pois. Snakes Ind.*, 1878, pl. 19, fig. 2.
,, ,, *Boulgr. in Blanford, Fauna Brit. Ind. Rept. and Batrach.*, 1890, p. 400.
,, ,, *Sclater, List Snakes Ind. Mus.*, 1891, p. 63, Nos. 8239 and 8240.
,, ,, *Boulgr., Cat. Brit. Mus.*, 1896, iii, p. 277.
,, ,, *Wall in Mem. As. Soc. Bengal*, 1906, p. 281.
? Enhydris nigrocinctus, *Merrem., Tent.*, 1820, p. 140.
Distira lapemidoides, *Sclater, List Snakes Ind. Mus.*, 1891, p. 66, No. 8235.
,, cyanocincta, *Wall and Evans in Journ. Bomb. Nat. Hist. Soc.*, xiii, p. 364.
,, hendersonii, *Boulgr. in Journ. Bomb. Nat. Hist. Soc.*, xiv, p. 719, and plate.
,, ,, *Wall in Mem. As. Soc. Bengal*, 1906, p. 294.
,, ,, saravacensis, *Boulgr. in Proc. Zool. Soc. Lond.*, 1900, p. 184, and fig. 2, pl. xiv.



A B C

Fig. 39.—*Distira nigrocincta*. After Günther, *Rept. Brit. Ind.*, pl. xxv, fig. L.

I have examined eight examples, not including the *Distira hendersonii* (Boulenger), which I consider the same species.

One of General Hardwicke's specimens in the British Museum, labelled *nigrocinctus*, I consider misplaced. It is in reality a *cyanocincta* (Daudin). In Bleeker's specimen I could distinctly discern grooves in the post-maxillary teeth, and it agrees, therefore, in this respect, with examples I have examined in the Indian Museum and my own specimens from Burma. I consider the species fairly well differentiated, but it is in most respects extremely like *cyanocincta*. The præfrontal, however, does not touch the second labial, in which respect it differs from *cyanocincta*.

I find the head shields in this species very liable to be broken up, especially the supralabials, and many departures from the type-specimen are, in consequence, to be met with. This I will refer to again

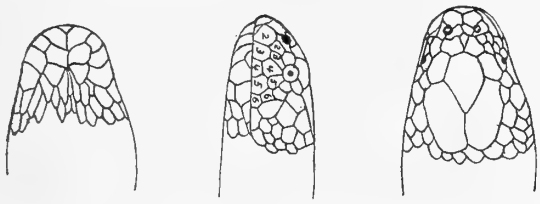


Fig. 40 —*Distira hendersoni*. After Boulenger, *Journ. Bomb. Nat. Hist. Soc.*, vol. xiv, p. 719.

Distira hendersoni.—This is known from a single specimen from Burma described by Mr. Boulenger. A specimen very like it I referred to under that title in the paper I wrote on the Sea Snakes in the Indian Museum. I remarked at the time upon the very close affinities between this and *nigrocinctus* (Daudin). Now that I have examined the types of both and the other specimens of *nigrocincta* in the British Museum, I feel convinced that the two forms are identical, though this view is not borne out by the first glance at the figures I attach herein—the one from Günther representing one of General Hardwicke's specimens labelled *nigrocinctus*, and the other reproduced from Boulenger's figure of the type of *hendersoni*.

The most important distinction between the two claimed by Mr. Boulenger affects the posterior maxillary teeth, which, he observes, are grooved in *hendersoni*. I find these teeth also grooved in *nigrocincta*. In colour and markings the two are peculiar and exactly similar. In the numbers of the scales, ventrals, and in most of the head shields, the two are alike; the apparent differences affecting the latter only, I think, obviously arise from a tendency many of these shields have to division. This same tendency, I may remark, is seen in certain other well defined species, *viz.*, *cyanocincta*, *ornata*, *viperina*, etc. It is particularly noticeable in the supralabials and nasals, though by no means confined to these shields.

The type-specimen of *hendersoni* has, I consider, the second, third, fourth, fifth and sixth supralabials divided on the left side, and the second, third, fifth and sixth on the right. The upper part of the second Mr. Boulenger considers a loreal, the upper part of the third a præocular, and the upper parts of the fourth and fifth on the left side suboculars. On the right side the fourth, being undivided, touches the eye; but if my view, which appears to me the obvious one from analogy, is accepted, the third, fourth and fifth labials touch the eye on both sides. Now some of these shields are similarly divided in specimens labelled *nigrocinctus* in the British Museum, *viz.*, in two out of the three available specimens. (The fourth has been already referred to as a wrongly identified specimen of *cyanocincta*). In the type, and in Bleeker's specimen, a similarly formed "pseudo loreal" is to be seen on the left side only. In the type-specimen the first supralabial is divided into an upper and a lower part.

As regards the shields referred to by Mr. Boulenger as internasals (the sole remaining difference between the two supposed forms) it appears to me that the nasals have been divided into three parts by three sutures radiating from the nostril, and "pseudo-internasals" thus formed. This view is the obvious one suggested by analogy, and, when the three component parts are taken together, it will be noticed they conform to the normal shape of the nasal shields seen in others of this family. A precisely similar division is met with in aberrant examples of *viperina* and *major* and in *Enhydrina valakadyn*, etc., and the condition reminds one of that seen in the parietals in *Enhydris curtus*, which shields, though broken up, preserve their contour. I may remark on other specimens I have examined. One in the Indian Museum, *viz.*, No. 8240 (in which the scales are 31 anteriorly, 43 in midbody, imbricate posteriorly, ventrals 338) has the second, third and fifth supralabials divided as in the type of *hendersoni*, and the fourth entire on both sides. Strictly speaking, the third, fourth and fifth touch the eye. I enter the condition in my note-books thus 9; $1\frac{2}{2}\ (\frac{3}{3}\ 4\ \frac{5}{5})\ \frac{6}{6}$, the bracketed figures of the formula implying contact with the eye.

In another specimen of mine from Burma (in which the scales are 32 anteriorly, 42 in midbody, imbricate posteriorly, ventrals 311) the supralabials are 9, the second and all the succeeding shields are divided, and the fourth and fifth only touch the eye. In another specimen of mine from Burma (in which the scales are 31 anteriorly, 39 in midbody, imbricate posteriorly, ventrals 325), the supralabials are 9, the fifth and subsequent shields are divided on the right side, the second, fourth and succeeding shields on the left, and the third, fourth and fifth touch the eye. Exactly parallel variations are to be met with in specimens of *cyanocincta*, *ornata*, etc., in the same genus, and in *Astrotia stokesi*, *Enhydrina valakadyn*, etc.

Description.—Neck one-third to two-fifths the greatest body depth. Rostral,—the portion visible above is from half to three-fifths the suture between the nasals. Præfrontals,—touch no supralabial. (It does so on one side only in two specimens). Frontal,—is very distinctive, and differs from all the others of this genus, in that the fronto-parietal sutures are about twice as long as the fronto-præfrontals. Præoculars,—one or two independently of any division of the subjacent labials. Postoculars,—two or three. (One on one side in two examples). Temporals,—irregular and scale-like; two or three superposed anteriorly. Supralabials,—very inconstant. All are liable to be divided transversely, and by their division scales formed which may occupy the position of loreals, præ-, sub- or postoculars and temporals; the third and fourth, or third, fourth and fifth may touch the eye. Infralabials,—the fourth is the largest of the series and in contact with three or four scales behind; the suture between the first pair subequal to that between the anterior sublinguals. Marginals,—one after the third infralabial usually (rarely two after the second. In two examples they are completely absent). Sublinguals,—two fairly well-developed pairs, the posterior fellows separated. (In contact in four examples). Costals,—anterior 27 to 32, midbody 36 to 43, posterior 36 to 42; imbricate throughout. Ventrals,—311 to 339, entire, and nearly twice as broad as the last costal row throughout. Colour,—olivaceous green dorsally, merging to bright yellow ventrally. From 42 to 62 dark, well-defined greenish-black bands surround the body, which are from half to two-thirds the breadth of the interspaces at midcosta, and preserve their width throughout, excepting vertebrally where they are expanded. They are not joined ventrally in the anterior part of the body. Head distinctively marked with a curved black moustache on the upper lip, an occipito-nuchal narrow streak to behind the gape, and some black mottling on the crown. A short lateral black band in the neck just behind the occipito-nuchal band.

Habitat.—From the Gangetic Delta to the Malay Archipelago.

Distira lapemoides (Gray).

Aturia lapemoides, *Gray, Cat.*, 1849, p. 46.
Hydrophis lapemoides, *Günther, Rept. Brit. Ind.*, 1864, p. 375.
,, holdsworthii, *Günther in Ann. and Mag. Nat. Hist.*, 1872, p. 33.
,, stewartii *Anderson in Proc. Zool. Soc. Lond.*, 1872, p. 399.
,, ,, *Fayrer, Thanatoph. Ind.*, 1874, p. xxiv.
,, ,, *Ewart, Pois. Snakes Ind.*, 1878, p. 49, pl. 18, 1.
Distira lapemidoides, *Boulgr. in Blanford, Fauna Ind. Rept. and Batrach.*, 1890, p. 412.
,, ,, *Boulgr. Cat.*, 1896, iii, p. 297.
? Hydrophis hybridus, *Schlegel, Abbild.*, 1844, p. 115, and pl. xxxvii.
? ,, ,, *Jan, Icon. Gén.*, 41, pl. v, fig 1.
,, ,, *Boulgr. Cat.*, 1896, iii, p. 274.

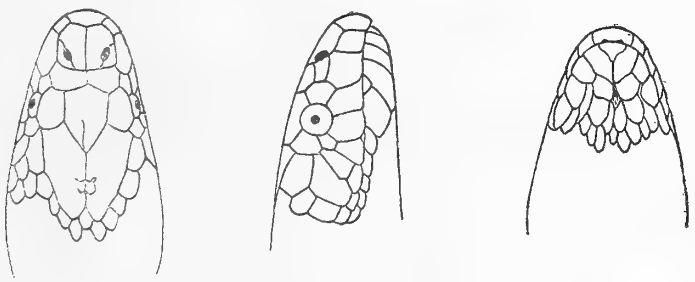


Fig. 42—*Distira hybrida.* After Jan, *Icon. Gén.*, 41, pl. v, fig 1.

hybridus (Schlegel). This form is only known from the single example described, and figured by Schlegel in 1844, and subsequently by Jan in 1872. Not having seen this I am unable to pronounce upon the posterior maxillary teeth, but after an examination of the figures referred to above, and a consideration of the detailed description, the specimen appears to me to agree with *lapemoides* (Gray) as Mr. Boulenger records the costals as juxtaposed, otherwise it would completely agree with *cyanocincta* (Daudin).

This form is separated from *cyanocincta* in Mr. Boulenger's key on one point only, *viz.*, the juxtaposition of the posterior costals. In all other characters it appears by his own showing they agree, and I can find no other difference between the two after a careful comparison. It is very dubious whether this single peculiarity justifies the separation of the two, especially as specimens of *fasciata* (Schneider) are to be found with the costals imbricate, though normally juxtaposed in that species. I note, too, in reference to a specimen labelled *cyanocincta* in the British Museum, *viz.*, the one presented by Lort Phillips from Bushire, "scales almost juxtaposed." As there is in that Institution a series of nine specimens labelled *lapemoides* in which the posterior costals are very definitely juxtaposed, I think it wiser to adhere to Mr. Boulenger's opinion, though I think it probable these may, at a later date, be relegated to the rank of a variety only of *cyanocincta*. I have examined in all only nine examples.

Description.—Rostral,—the portion visible above from half to three-fifths the internasal suture. Præfrontals,—touch the second supralabial (two exceptions in which they touch none). Postoculars,—two or three (one on one side in one example). Temporals,—broken up and replaced by small scales, two or three of which are superposed anteriorly. (One large shield occurs on one specimen on one side). Supralabials,—seven or eight subject to much variation, the third and subsequent shields sometimes divided. In Jerdon's specimen from Madras in the British Museum the third and succeeding shields are all divided, and according to some authorities, therefore, none touch the eye. In Layard's specimen the fourth is divided on the left side, and the same arrangement only reversed on the two sides is seen in the type. In one of Holdsworth's examples the third is divided, and the fourth entire. Infralabials,—four, the last in contact with three or four scales behind; the suture between the first usually less than that between the anterior sublinguals. Marginals,—a complete row succeeds the second or third infralabial. Sublinguals,—two well-developed pairs, the fellows of the posterior pair separated (in at least two examples they just touch). Costals,—anterior 31 to 37, midbody 40 to 49, posterior 37 to 51, juxtaposed posteriorly. Ventrals,—300 to 387, all entire or a few divided posteriorly, twice or less than twice the breadth of the last costal row. Colour,—very variable. Some specimens are completely banded, in others the bands are obsolete ventrally, and converted into dorsal bars. In one of Holdsworth's examples from Ceylon, there are vertebral spots between the bars constituting a variety analogous to the *forma typica* of *spiralis*. In Blanford's specimen from Gwadar the annuli are complete, and about as broad as the intervals at midcosta. In a specimen of Holdsworth's from Ceylon, the bands are complete, and only about one quarter the breadth of the intervals at midcosta. The analogy of these varieties with varieties of *spiralis* and *cyanocincta* is very striking.

Habitat.—Shores between the Persian Gulf and Puri on the Coromandel Coast of India.

DISTIRA BITUBERCULATA (Peters).

Hydrophis bituberculata, *Peters in Mon. Berl Acad.*, 1872, p. 855, pl. ii, fig. 2.
Distira bituberculata, *Boulgr. in Blanford Fauna Brit. Ind. Rept. and Batrach.*, 1890, p. 411, and *Cat.*, 1896, iii, p. 296.

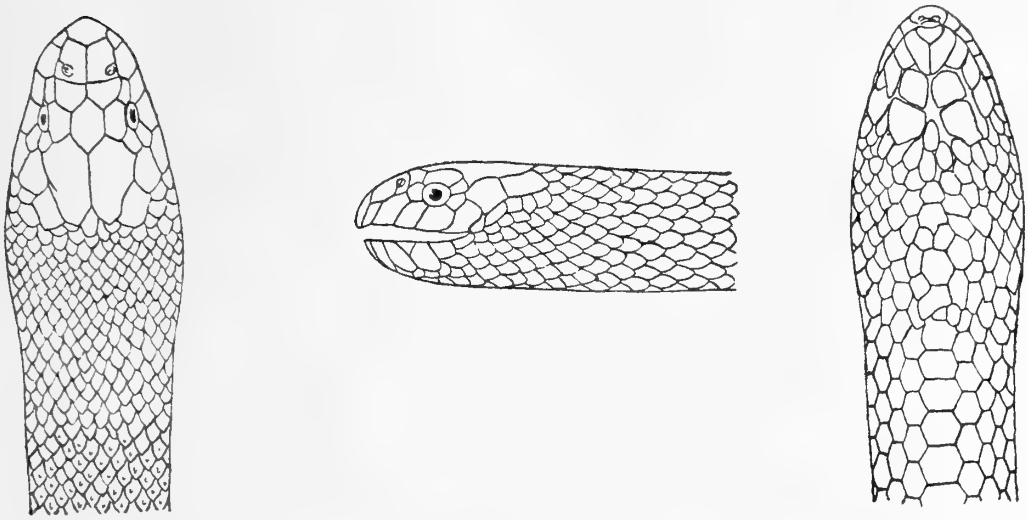


Fig. 43.—*Distira* (*Hydrophis*) *bituberculata*. After Peters, *Mon. Berl. Acad.*, pl. ii, fig 2.

This form is only known from a single example which is preserved in the Berlin Museum. As already observed by Mr. Boulenger its affinities are extremely close to *lapemoides*, and I am dubious whether it has sufficient claim to be considered distinct from this or *cyanocincta*, uniting as it does the characters of each. The difference in the number of rows anteriorly and in midbody is remarkable, *viz.* 19, a disparity beyond that seen in any other species of approximately similar corporeal habit. The greatest difference I have met with in *lapemoides* is in Fayrer's specimen from Puri now in the British Museum, and in this it amounts to 16. In the other specimens I have seen it ranges between 9 to 11. The single large anterior temporal is probably abnormal, as seen in certain specimens of *cyanocincta*, and other species in which these shields are normally small.

Not having examined the specimen I prefer to leave it as placed by Peters and Boulenger.

Description.—Rostral,—the portion visible above about two-thirds the internasal suture. Præfrontals,—touch no supralabial. Postoculars,—two. Temporals,—one large anterior shield, followed by another subequal shield. Supralabials,—seven, the anterior five well-developed, the third and fourth touching the eye. Infralabials,—four, the last touching three or four scales behind; the suture between the first subequal to that between the anterior sublinguals. Marginals,—one after the third infralabial. Sublinguals,—two well-developed pairs, the fellows of the posterior pair separated. Costals,—anteriorly 28, in midbody 47; imbricate posteriorly. Ventrals,—278, about twice as broad as the last costal row. Colour,—dorsally dark brown, ventrally yellowish.

Habitat.—Ceylon.

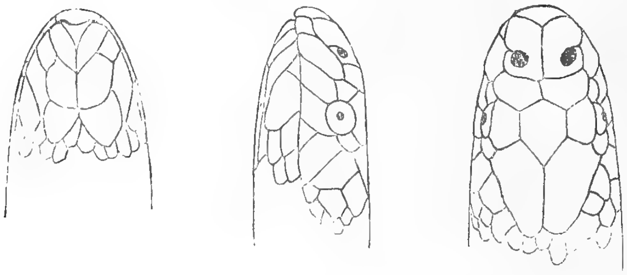
DISTIRA TORQUATA (Günther).

Hydrophis torquatus, *Günther, Rept. Brit. Ind.*, 1864, p. 369, pl. xxv, fig. H.

,, ,, *Boulgr. in Blanford, Fauna Brit. Ind. Rept. and Batrach.*, 1890, p. 402.

,, ,, *Boulgr., Cat. Brit. Mus.*, 1896, iii, p. 283.

Hydrophis obscurus, *Boulgr. in Blanford, Fauna Brit. Ind. Rept. and Batrach.* 1890, p. 403.
,, ,, *Sclater, List Snakes Ind. Mus.*, 1891, p. 63, Nos. 8254, 8256 and 8262.
,, ,, *Boulgr., Cat.*, iii, p. 284.
,, ,, *Wall in Mem. As. Soc. Bengal*, 1906, p. 286.
,, diadema, *Günther, loc. cit.*, p. 373, pl. xxv, fig S.
,, stricticollis, *Günther, loc. cit.*, p. 376, pl. xxv, fig. R.
? ,, *Anderson in Proc. Zool. Soc. Lond.*, 1872, p. 397.
,, *Fayrer, Thanatoph. Ind.*, 1874, pl. xxviii.
? ,, nigrocinctus, *Cantor, Cat. Malay Rept.*, 1847, p. 128.
Distira lapemidoides, *Wall and Evans in Journ. Bomb. Nat. Hist. Soc.*, xiii, pp. 346 and 615.



A B C

Fig. 44.—*Distira torquata* (× 2).

I have examined 29 examples of this very well differentiated species. The types are in the British Museum. With them I think should be united 11 of the 13 specimens at present labelled *obscurus* in that institution. As already mentioned under *obscura* in this paper, the remaining two specimens are Russell's types of Daudin's *obscurus*, and do not accord in any way with the description given by Mr. Boulenger under that title. His description, however, fits the remaining 11 examples labelled *obscurus* which I cannot see differ in any way from Günther's *torquatus*. Reference to Mr. Boulenger's descriptions of these two species (viz., *obscurus* and *torquatus*) in his Catalogue shows the following differences: the frontal is slightly shorter in *torquatus*, and the posterior shields in contact. The first point is too trifling to consider of specific value, and as regards the chin shields, in 7 out of the 11 specimens above alluded to as labelled *obscurus*, seven have the posterior fellows in contact. I have examined the examples of each supposed species side by side, and can find no means of discriminating between them. The two should, I think without any doubt, be united and Günther's name *torquatus* retained to designate the species, as all names given prior to this are preoccupied The posterior maxillary teeth in the type specimens labelled *torquatus* are grooved, as I find them in specimens labelled *obscurus*.

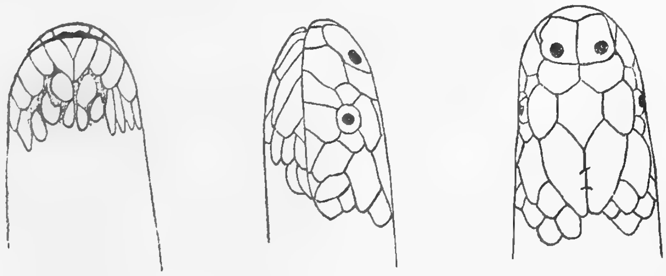
Description.—The body anteriorly is from less than one-third to two-thirds the extreme depth behind. The former measurement is from a specimen of mine from Burma (figure 44) in which the costals are anterior 41, midbody 49, posterior 41, juxtaposed, and ventrals 427. The latter is from another specimen of mine from the same locality in which the costals are anterior 38, midbody 48, posterior 42 juxtaposed, and ventrals 398. Rostral,—the portion visible above from half to three-fifths the internasal suture. Præfrontals,—touch the second supralabial. (This contact fails in one example on both sides, and in two others on one side). Postoculars,—one. (In one example there are two on one side, and in another three on one side). Temporals,—usually one large anterior shield, and sometimes a subequal posterior one. (There are two superposed anterior on one side in two specimens, and on both sides in one). Supralabials,—seven or eight, the anterior four, five or six entire; the third and fourth touch the eye (The fifth also in at least four examples). Infralabials,—four, the last in contact with three or four scales behind, the suture between the first usually less than that between the anterior sublinguals. Marginals, one or more after the third (sometimes the second) infralabial. Sublinguals,—two well-developed pairs, the fellows of the posterior as frequently separated as in contact. Costals,—anterior 30 to 41, midbody 37 to 54, posterior 34 to 46; subimbricate, or juxtaposed posteriorly. Ventrals,—310 to 438; mostly entire; twice or less than twice the breadth of the last costal row.

Colour.—Olivaceous dorsally merging to yellow ventrally. From 40 to 65 black rings surround the body, which gradually lack definition with increasing age. Some of these are interrupted costally sometimes, especially the posterior ones. At midcosta the rings are about as broad as the spaces. Head mottled above with yellow and black.

Habitat.—All are from coasts between the Gangetic Delta and Borneo. By far the majority of specimens are from the Burmese Coast.

DISTIRA CÆRULESCENS (Shaw).

Hydrus cærulescens, *Shaw, Zool.*, 1802, iii, 561.
Hydrophis cærulescens, *Gray in Zool. Misc.*, 1842, p. 62, and *Cat.*, 1849, p. 55.
,, ,, *Günther, Rept. Brit. Ind.*, 1864, p. 365, pl. xxv, fig C.
,, ,, *Boulgr. in Blanford, Fauna Brit. Ind. Rept and Batrach.*, 1890, p. 400.
,, ,, *Boulgr., Cat. Brit. Mus.*, 1896, iii, p. 275.
,, ,, *Sclater, List Snakes Ind. Mus.*, 1891, p. 62.
Hydrophis obscurus, *Sclater, loc. cit.*, p. 63, Nos. 11498 and 11499.
,, cyanocincta, *Sclater, loc. cit.*, p. 66, No. 8242.



A B C

Fig. 45.—*Distira caerulescens.*

I have examined 29 of this well-differentiated species. Eleven of these which I examined in the Indian Museum, I omitted by an oversight to make any mention of in my paper on the Sea Snakes in that Institution (Mem. Asiat. Soc. Bengal, 1906, Vol. 1, No. 14).

The costals in the neck and body are unusually numerous for members of this genus, and the sublinguals are poorly developed or absent. One feature it possesses which is peculiarly its own, and in fact is only seen in one other species of the sub-family as an abnormal trait, *viz.*, in *Hydrus platurus*. This feature concerns the parietal shield which usually fails to touch the postocular. Unfortunately this is not quite constant though constant enough to prove of considerable value in assisting identification.

I find the posterior maxillary teeth are grooved.

Description.—The forebody is from one-third to two-thirds the extreme body depth. Rostral,—the portion visible above is about half the internasal suture. Præfrontals,—touch the second supralabial. Postoculars,—one or two, the upper not touching the parietal on one or both sides (except in five examples). Temporals,—absent, replaced by small scales, two or more being superposed anteriorly (one large anterior on one side in one specimen). Supralabials,—six to eight, the first four or five entire, the rest divided. Infralabials,—four, the last in contact with three or four scales behind ; the suture between the first shorter than that between the anterior sublinguals when the latter are developed. Marginals,—one after the third infralabial. Sublinguals,—one or two pairs, one or both often ill-developed or absent, the posterior when developed usually separated (in two examples in contact). Costals,—anterior 36 to 45, midbody 42 to 53, posterior 37 to 46, imbricate or sub-imbricate anteriorly, imbricate, subimbricate, or juxtaposed posteriorly. Ventrals,—277 to 339; entire twice or rather less than twice as broad as the last costal row.

Colour.—Bluish, or greyish-blue, darker dorsally, surrounded with from 35 to 58 dark purplish or bluish black bands, which are as broad or broader than the interspaces at midcosta, complete in the young, but lose definition and become obscured or lost ventrally with advancing age. In some adults these are very obscure.

Habitat.—Coasts between Bombay and Penang.

DISTIRA ORNATA (Gray).

Aturia ornata, *Gray in Zool. Misc.*, 1842, p. 61, and *Cat.*, 1849, p. 45.
Chitulia inornata, *Gray, Cat.*, p. 56.
? Hydrophis schlegelii, *Jan, Icon. Gén.*, 1872, 40, pl. vi, fig. 1.
,, ornata, *Günther, Rept. Brit. Ind.*, 1864, p. 376, pl. xxv, fig. V.
,, ellioti, *Günther, loc. cit.*, p. 377, pl. xxv, fig. N.
? ,, striatus, *Jan, loc. cit.*, 40, pl. v, fig. 1.
? ,, polyodontus, *Jan., loc. cit.*, 41, pl. 1, fig. 1.
,, ,, *Boulgr., Cat.*, 1896, iii, p. 274.
Distira ornata, *Boulgr. in Blanford, Fauna Ind. Rept. and Batrach.*, 1890, p. 411.
,, ,, *Boulgr. Cat. Brit. Mus.*, 1896, iii, p. 290.

Distira ornata, *Wall in Proc. Zool. Soc. Lond.*, 1903, pp. 95 and 101.
,, ,, *Wall in Mem. As. Soc. Bengal*, 1906, p. 289, *and Spol. Zeylan.*, August, 1907, p. 168.
,, andamanica, *Annandale in Journ. As. Soc. Bengal*, 1905, p. 194.
? Hydrophis godeffroyi, *Peters in Mon. Berl. Acad.*, 1872, p. 856, pl. 1, fig. 3.
,, ,, *Boulgr., Cat.*, 1896, iii, p. 291.
? ,, pachycercos, *Fischer in Abhandl. Nat. Hamb.*, iii, 1856, pl. ii, and p. 44.
,, pachycercus, *Günther, loc cit.*, p. 378.
,, ,, *Jan, loc. cit.*, 39, pl. vi.
,, ,, *Boulgr., Cat.*, iii, p. 297.
,, frontalis, *Boulgr., Cat.*, iii, p. 276 (non Jan).
Hydrophis ocellata, *Gray, Cat.*, p. 53, in part.
,, ,, *Günther, Rept. Brit. Ind.*, 1864, p. 378, in part.
Distira ornata, *Boulgr., Cat*, 1896, iii, p. 290, in part.

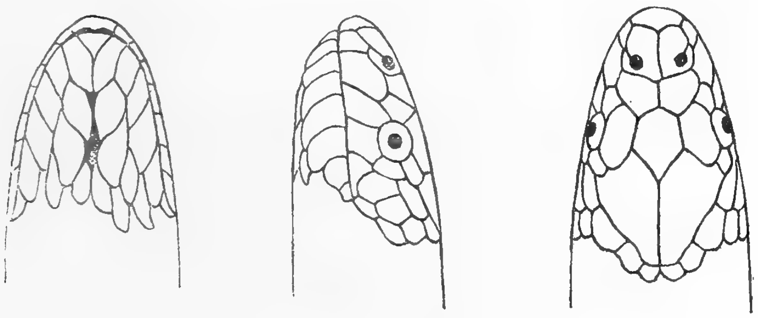


Fig. 46.—*Distira ornata* (× 1½).

I have examined 36 specimens exclusive of those I consider should be absorbed under this title.

It is, I consider, well marked off from the other species. Thus it is one of the few that have no marginal scales. The only other species that are so distinguished are *cantoris*, *gracilis* and *jerdoni*, all of which are too well differentiated to be confused.

One specimen referred by Mr. Boulenger to this species, *viz.*, the one presented by Lord Derby to the British Museum and originally described by Gray[1] as a distinct species under the name *ocellata*, has, I consider, such well marked characters, that I take the same view as Gray, supported by Günther.[2] I refer to it again under the title *H. ocellata*.

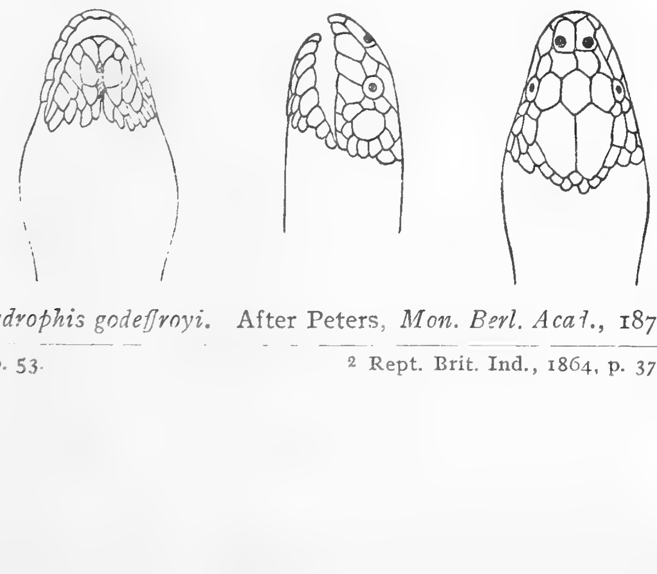


Fig. 47.—*Hydrophis godeffroyi*. After Peters, *Mon. Berl. Acad.*, 1872, pl. 1, fig. 3.

[1] Catalogue, 1849, p. 53.

[2] Rept. Brit. Ind., 1864, p. 378, plate xxv, fig. P.

I think that the *Hydrophis godeffroyi* (Peters), *H. pachycercos* (Fischer), and *H. polyodontus* (Jan) will probably prove to be specimens of this species and think the *Distira andamanica* (Annandale) which I have examined, cannot be separated.

Hydrophis godeffroyi was described by Peters in 1872[1] from two specimens. Only two other specimens are known, both of which are in the British Museum. The two latter I have examined, and cannot find to differ in any way from specimens of *ornata* in the British Museum. The only differences claimed for them by Mr. Boulenger[2] affect the rows of scales in the neck and body. Thus these are in *ornata* 35 to 42 in the neck 40 to 50 in the body; in *godeffroyi* 28 to 33 in the neck, and 38 to 43 in the body. I find, however, that in specimens of *ornata* in the British Museum the anterior scales vary from 31 to 39, and in the *godeffroyi* from 30 to 33. Again the scales in midbody in *ornata* vary from 36 to 45; in *godeffroyi* from 37 to 39. Examined side by side with specimens of *ornata* they seem to agree in every respect.

The description of Peters' type-specimens, one of which he figures, entirely agrees with specimens of *ornata*.

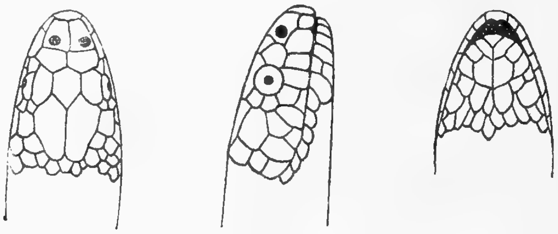


Fig. 48.—*Hydrophis pachycercos.* After Jan, *Icon Gén.*, 1872, 39, pl. vi.

Hydrophi pachycercos was described and figured in 1856 by Fischer from a single specimen. Jan figures another specimen, and a third so named is in the British Museum. This last specimen, I have seen and consider, has every right to be called *ornata*. The differences claimed by Mr. Boulenger if one refers to his descriptions are—

ornata.	*pachycercos.*
(1) Head moderate.	(1) Head rather small.
(2) Rostral broader than deep.	(2) Rostral as broad as deep.
(3) Posterior chin shields not in contact.	(3) Posterior chin shields in contact.
(4) Neck scales 35 to 42.	(4) Neck scales 27 to 29.
(5) Body scales 40 to 50.	(5) Body scales 38 to 39.

Of these differences the first is too indefinite, and the second too minute to discuss. The third is again minute for the posterior chin shields only just touch in the British Museum specimen labelled *pachycercus*. This is, moreover, a character constant in but very few of the species. As regards neck and body scales, the differences claimed vanish when the scales are counted as I count them at definite spots in the body length, and then come within the range taken from my 36 specimens. Thus I make the range for the anterior scales in *ornata* 30 to 41, the scales in midbody 33 to 46. In *pachycercus* they are 29 anteriorly, and 39 in midbody. The British Museum

[1] Mon. Berl. Acad., p. 856, plate 1, fig. 3.

[2] Cat., 1896, vol.iii. pp. 290 and 291.

specimen agrees with Jan's in the failure of the præfrontal to meet the second labial, which must be considered an abnormal feature. The same abnormality occurs in 12 of my 36 specimens; in 4 of these, however, only on one side, the usual contact with the second labial occurring on the other. In all respects Jan's description and figure accord with *ornata*, and so apparently does Fischer's type.

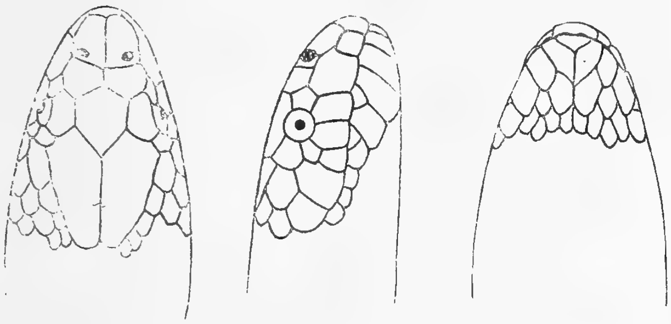


Fig. 49.—*Hydrophis polyodontus*. After Jan, *Icon. Gén.*, 1872, 41, pl. 1, fig 1.

Hydrophis polyodontus.—This is only known from Jan's original specimen. The only apparen tdifferences between this and *Distira ornata* are that it has one anterior temporal, and only one pair of chin shields. It appears to me in his figure that the lower anterior temporal is confluent with the sixth labial, and hence wanting. As regards the one pair of chin shields, in some *ornata*, the posterior pair is so small that it may be considered wanting. For instance, I think the type-specimen of *ornata* in the British Museum can hardly be said to have posterior chin shields. This poor development of the posterior pair is in consonance with what one sees in individuals of other species, for instance *jerdoni* and *cærulescens*.

Distira andamanica.—Only one specimen is known, which is in the Indian Museum. I have examined it, and find it accords perfectly with specimens of *ornata*. The scales in the neck and body, which Dr. Annandale thought too few, come well within the range given by my 36 specimens.

Description.—The neck is about half to two-thirds the extreme body depth.

The head shields are constant if one excludes the postoculars, temporals and labials.

Rostral,—portion visible above from about half to three-fifths the internasal suture. Præfrontals,—touch the second supralabial (12 exceptions, and in four of these on one side only). Postoculars,—two (three in six examples, and in three of these on one side only). Temporals,—usually broken up, two or three superposed scales occurring anteriorly (in five examples a well-developed single anterior shield, in two of these on one side only). Supralabials,—seven or eight, the first three entire, but any or all of the rest may be divided; the third and fourth, third, fourth and fifth, or fourth, fifth and sixth may touch the eye. Infralabials,—four, the last in contact with three or four scales behind, the suture between the first usually less than that between the anterior sublinguals. Marginals,—none (one after the third on one or both sides in three examples only). Sublinguals,—two well-developed pairs, the posterior fellows separated, or the posterior pair ill-developed or absent. Costals,—anterior 29 to 41, midbody 33 to 46, posterior 28 to 42, feebly imbricate anteriorly, feebly imbricate or juxtaposed posteriorly. Ventrals,—227 to 300, entire or a few divided posteriorly, about twice or less than twice the breadth of the last costal row.

Habitat.—From the Persian Gulf to Australia and as far north as the Loo Choo Islands and Japan.

Colour.—The adornment of this species is very diversified, and at least six well defined varieties may be met with.

(1) Completely banded. This is seen more often in young specimens, but in rare instances, the bands are preserved towards or into adult life. Figure 51 furnishes a good illustration from the specimen presented by me to the British Museum. It was collected by Mr. Owston in the Loo Choo Islands. The specimens of *godeffroyi* (Boulenger) in the British Museum which I cannot separate from *ornata* are very similar. The bands taper ventrally, are complete anteriorly, but incomplete ventrally in the hinder part of the body. A specimen from Karwar in the Bombay collection has dorsal bars anteriorly, and nearly complete tapering annuli behind. This form is analogous to variety (1) of *viperina*.

(2) *Forma typica* (Gray). Dorsum beset with blackish bars which are discrete, and broader than the intervals. Much the commonest variety in adults and young. The specimens of *pachycercus* in our National Collection which I cannot distinguish from *ornata* are much the same, but the bars are less distinct. It is analogous with the *forma typica* of *viperina*.

(3) Like the last but the dorsal bars modified into rhombs, the angles of many of which may be confluent vertebrally. *Polyodonta* (Jan) which I regard as merely a variety of *ornata* is a good example. It is very analogous to var. (3) of *viperina*.

(4) Dorsum ornamented as in "*forma typica*," and the costal region with a single, more or less complete, series of large spots or bars alternating with the dorsal series. It is not uncommon, Jerdon's example in the British Museum (Fig. 50) is an excellent illustration. It is from Madras. A specimen in the Colombo Museum (No. 127) is presumably of local origin. A young specimen in the Indian Museum presented by Captain Lloyd, I.M.S., is from Sandaway Island on the Burmese coast. In this the costal spots are smaller than in the other examples. Of this variety is, also, I consider, *frontalis* (Boulenger, non Jan). It is very comparable to var. *subcincta* of *spiralis*.

(5) *inornata* (Gray). The whole dorsum black as though all the dorsal bars of "*forma typica*" had become confluent. The band so produced occupies the upper two-fifths or half of the body depth, and is sharply defined, reminding one of the colour disposition of the common variety of *Hydrus platurus*. It is a rare form. The type, *viz. inornata* (Gray), is

from the Indian Ocean, and another specimen also in the British Museum is Kempe's from India, the exact locality not known. This form is very comparable to var. *jayakari* of *viperina* and var. *phipsoni* of *cyanocincta*.

(6) Ornamented with many ocelli of very variable size and capricious distribution, the largest occurring for the most part dorsally. This form is only known from Australia, and has been confused with *ocellata* (Günther) which latter is very similar in coloration, but I consider it a very distinct species. It deserves the name *pseudocellata*. I think it very analogous to the variety *elegans* of *cyanocincta*.

Distira ocellata (Gray).

Hydrophis ocellata, *Gray, Cat.*, p. 53, in part.
,, ,, *Günther, Rept. Brit. Ind.*, 1864, p. 378, pl. xxv, P., in part.
Distira ornata, *Boulgr. in Blanford, Fauna Brit. Ind. Rept. and Batrach.*, 1890, p. 411, in part.
,, ,, *Boulgr. Cat.*, 1896, iii, p. 290, in part.

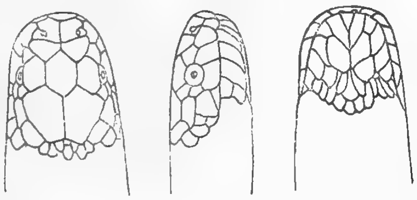


Fig. 53.—*Distira ocellata.* After Günther's figure of the type specimen, *Rept. Brit. Ind.*, pl. xxv, fig. P.

I cannot accept *in toto* the view held by Mr. Boulenger in uniting *ocellata* (Gray) with *ornata* (Gray). So far as the type-specimen of *ocellata* is concerned I find the rows of costals much greater than in the other specimens so named, and they exceed by 12 the outside limits given by my series of 36 examples of *ornata* at midbody.

The difference is enormous. My view regarding the type-specimen of *ocellata* supports that previously held by Gray and Günther.

The other specimens referred by Gray and Günther to *ocellata* I consider distinct, and I agree with Mr. Boulenger that they are but colour varieties of *ornata* (Gray).

The species *ocellata* thus rests on a single specimen which is in the British Museum.

Description.—The neck is about half the extreme body depth.

Rostral,—the portion visible above is rather more than half the suture between the nasals. Præfrontals,—touch the second labial. Postoculars,—two. Temporals,—two, ill-developed, superposed scales anteriorly, the lower reaching the labial border. Labials,—six; (if the lower temporal is not considered as such) the third and fourth touching the eye. Infralabials,—five, the fourth largest, and in contact with the fifth, and one small scale behind; the suture between the first pair subequal to that between the anterior sublinguals Marginals,—none. Sub-

Sublinguals,—two pairs, the posterior ill-developed and separated. Costals,—anterior 45, midbody 58, posterior 56; imbricate anteriorly, juxtaposed posteriorly. Ventrals,—290; entire and nearly twice the breadth of the last costal row throughout. Colour,—yellowish with 31 black broad dorsal bars, alternating with narrow bars, all rounded laterally. Several series of round spots costally very variable in size, and capricious in distribution.

Habitat.—Australia.

DISTIRA MAJOR (Shaw).

Hydrus major, *Shaw, Zool.*, 1802, iii, p. 558, pl. cxxiv, in part.
Disteira doliata, *Günther, Rept. Brit. Ind.*, 1864, p. 359.
Hydrophis mentalis, *Gray in Zool. Misc.*, 1842, p. 62, and *Cat.* 1849, p. 53.
? Disteira dumerilii, *Jan, Icon. Gén.*, 1872, 39, pl. iv.
Hydrophis major, *Günther, loc. cit.*, p. 363, pl. xxv, fig. G.
Distira major, *Boulgr. in Blanford, Fauna Brit. Ind. Rept. and Batrach.*, 1890, p. 407, and *Cat. Brit. Mus.*, 1896, iii, p. 289.

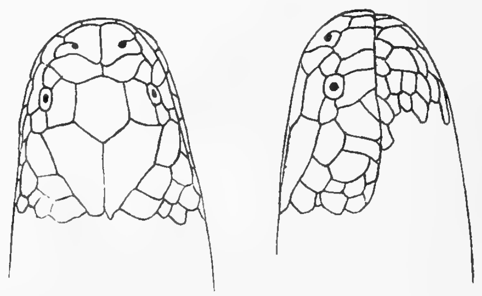


Fig. 54.—*Distira major.* After Günther, *Rept. Brit. Ind.*, 1864, pl. xxv, fig. G.

The only specimens I have seen are the five in the British Museum. In many respects the species shows close affinities with *Astrotia stokesi.*

Description.—Body anteriorly more than half the extreme depth posteriorly.

Rostral,—the portion visible above about half the internasal suture. Præfrontals,—touch the second supralabial. Postoculars,—two. (One on one side in one example, and on both sides in one). Temporals,—two small superposed scales anteriorly. Supralabials,—eight or nine, the first four entire, the rest variously divided; the third and fourth touch the eye. Infralabials,—four, the last in contact with three or four scales behind; the suture between the first about equal to that between the anterior sublinguals. Marginals,—a complete row after the third infralabial. Sublinguals,—usually two pairs, the posterior fellows separated. Sometimes one or both poorly developed. Costals,—anterior 31 to 35, midbody 33 to 42, posterior 34 to 39; imbricate everywhere. Ventrals,—233 to 250 (200 to 236, Boulenger). Mostly entire or many divided posteriorly; rather less than twice as broad as the last costal row. Colour,—yellowish ventrally with from 26 to 30 dorsal bars and sometimes an intermediate line: sometimes a series of costal spots, alternate with the bars

Habitat.—With the exception of one from the Indian Ocean all are from Australia

Distira viperina (Schmidt).

? Hydrophis obscurus, *Jan, Icon. Gén.*, 1872, 40, pl. vi, fig 2 (non Daud.).
,, viperina, *Günther, Rept. Brit. Ind.*, 1864, p. 378.
Distira viperina, *Boulgr. in Blanford, Fauna Brit. Ind. Rept. and Batrach.*, 1890, p. 413.
,, ,, *Boulgr., Cat. Brit. Mus.*, 1896, iii, p. 298.
,, ,, *Sclater, List Snakes Ind. Mus.*, 1891, p. 66.
,, ,, *Wall in Proc. Zool. Soc Lond.*, 1903, p. 96, and in *Mem. As. Soc. Bengal*, 1906, p. 292.
Hydrophis jayakari, *Boulgr. in Ann. and Mag. Nat. Hist.*, 1887 (5), xx p. 408.
,, nigra, *Anderson in Proc. Zool. Soc. Lond.*, 1872, p. 399.
,, ,, *Fayrer, Thanatoph. Ind.*, 1874, pl. xxv.
,, ,, *Ewart, Pois. Snakes Ind.*, 1878, pl. 19, fig. 1.
,, ,, *Boulgr., Cat. Brit. Mus.*, 1896, iii, p. 274.
Distira lapemidoides, *Sclater, loc. cit.*, p. 66. No. 8269.

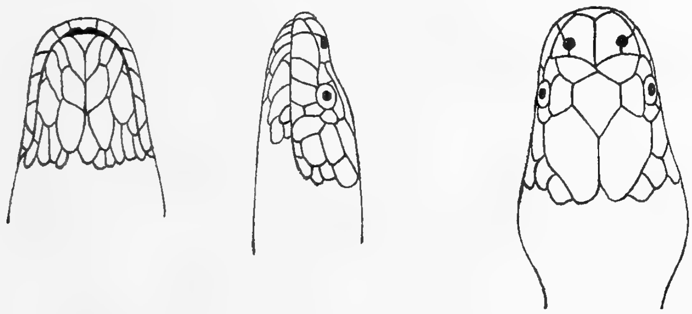


Fig. 55.—*Distira viperina*.

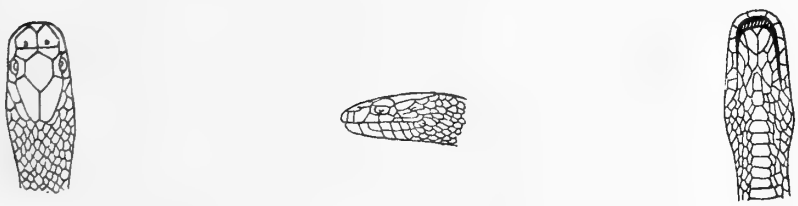


Fig. 56.—*Distira* (*Hydrophis*) *nigra* (Anderson). After Fayrer, *Thanatoph. Ind.*, pl. xxv.

I have examined 21 specimens. No Hydrophid with the exception of *jerdoni* presents such well-marked characters to differentiate it from the rest of this genus. It has at least two shields with characters peculiar to itself, and so pronounced that either will suffice to declare its ident'ty. These are the frontal and the anterior ventrals.

In all the other species of this genus the frontal equals, or is rather greater in breadth than, the supraoculars. In *viperina* it is at least twice as broad (often three times). Again in all the other species the sutures made by the frontal with its contiguous shields are subequal, or the fronto-parietal sutures are rather the longest. In *viperina* the fronto-supraocular sutures are the shortest, and only half as long as the fronto-parietals. The anterior ventrals in all the other species are barely twice as broad as the last costal row. In this they are four times as broad or broader. I think it extremely probable that osteological peculiarities will be found justifying its separation from this genus and the creation of a genus apart.

Hydrophis nigra. This is known from a solitary specimen which is now in the British Museum. It was originally described by Anderson,[1] and subsequently figured by Fayrer.[2] It has the peculiar frontal and anterior ventrals typical of *viperina* and agrees with this species in all other respects except colour, being black throughout. (The specimen is now shrivelled, and the detail of some of the head shields in consequence no longer discernible with certainty. Where I have had any doubt, however, reference to Anderson's description from the fresh specimen has cleared it up).

I reproduce Fayrer's figures of this snake. From an artistic point of view the figures leave much to be desired, but the two most important and clinching characteristics of *viperina* (Schmidt) are well shown, and to my mind can leave no possible doubt that the specimen is a melano-*viperina*.

Description.—The neck is about half to three-fourths the extreme body depth. Some of the head shields are very irregular in individuals, notably the postoculars, temporals, supralabials, and posterior chin shields. Rostral,—the portion visible above is about half (sometimes rather more or less) the suture between the nasals. Præfrontals,—touch no supralabial. Frontal,—twice to three times the breadth of the supraoculars. Fronto-parietal sutures twice as long as the fronto-supraoculars. Postoculars,—two usually (in four examples one). Temporals,—very irregular, and usually broken up. (In four examples a fairly well-developed anterior shield). Supralabials,—subject to much variation. Sometimes 7, 8, or 9. Often one or more of these shields from the third backwards divided. The third and fourth, third, fourth and fifth, or fourth and fifth touch the eye. Infralabials,—four, the last in contact with three or four scales behind; the suture between the first, equal to or greater than that between the anterior sublinguals. Marginals,—one usually after the third infralabial (sometimes two). Sublinguals,—two fairly well-developed shields, the fellows of each in contact. (In five examples the posterior separated). Costals,—anterior 27 to 34 (usually 27 to 31), midbody 39 to 50 (usually 39 to 46), posterior 35 to 45; imbricate anteriorly, juxtaposed posteriorly. Ventrals,—235 to 267. Entire throughout, anteriorly four or five times, midbody and posteriorly barely twice as broad as the last costal row.

Habitat.—Persian Gulf to South China. It is remarkable that though not an uncommon species, no specimen that I have seen has come from the Malayan Archipelago.

Colour.—This is very variable. Most specimens are adorned with from 26 to 37 dorsal bars or complete bands. I group the varieties as follows:—

---

[1] Proc. Zool. Soc. London, 1872, p. 399.

[2] Thanatoph. Ind., 1874, plate xxv.

(1) Completely banded. This is an unusual form seen generally in young specimens. Jerdon's example in the British Museum from Madras affords a good illustration. Another such is No. 8277 in the Indian Museum from Puri. I have seen one other in the Bombay Society's collection from Karwar. Some of the bands are frequently confluent vertebrally.

It is analogous to var. (1) of *ornata*.

A young specimen in the Indian Museum, No. 8274, is intermediate between this and the next form. It has dorsal bars anteriorly, and complete bands posteriorly.

(2) *Forma typica* (Schmidt). With black dorsal bars, sometimes confluent vertebrally. This is one of the commonest forms, and very comparable to the *forma typica* of *ornata*.

(3) Like the last but the bars modified into rhombs, the angles of which are very prone to vertebral confluence. It is one of the commonest varieties. I have seen specimens from Karachi, Malabar, and Swatow in South China. (The last in the City Hall Museum, Hong-Kong, No. 2, labelled *Hydrus major*).

It is analogous to var. (3) of *ornata*.

(4) *jayakari* (Boulenger). The whole dorsum black as from a confluence of the bars seen in *forma typica*. The band thus produced sharply defined costally. Two such examples are in the British Museum including the type which is from Muscat. The other is from the Indian Ocean. A similar specimen in the Indian Museum (No. 8276) is from Puri. A somewhat modified form is that from Bombay presented to the British Museum by Mr. Phipson in which very indistinct bars can be discerned across the dorsal band. This variety is analogous to variety *phipsoni* of *cyanocincta*, and *inornata* of *ornata*.

(5) *nigra* (Anderson). This is known from a unique example now in the British Museum, which is young and completely black. It should be considered a melanotic freak, but it is convenient to tabulate it here as a colour variety. It is from Puri.

DISTIRA JERDONI (Gray).

"Shiddil," *Russell, Ind. Serp.*, 1801, ii, pl. xii.

? Hydrus nigrocinctus, *Cantor, Cat. Malay Rept.*, 1847, p. 129, pl. xl, fig. 8 (nec Daudin, nec Jan).

Kerilia jerdonii, *Gray, Cat.*, 1849, p. 57.

Hydrophis jerdonii, *Günther, Rept. Brit. Ind.*, 1864, p. 362, pl. xxv, fig. B.

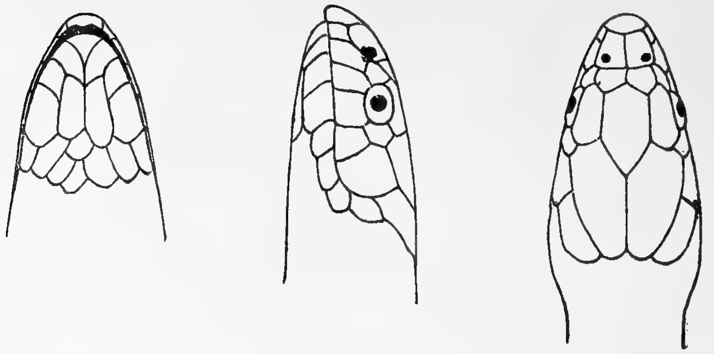
,, ,, *Fayrer, Thanatoph. Ind.*, 1874, pl. xx.

,, ,, *Ewart, Poisonous Snakes Ind.*, 1878, pl. 14.

Distira jerdonii, *Boulgr. in Blanford, Fauna Brit. Ind. Rept. and Batrach.*, 1890, p. 408, and *Cat. Brit. Mus.*, 1896, iii, p. 299.

,, ,, *Sclater, List Snakes Ind. Mus.*, 1891, p. 65.

,, ,, *Wall in Mem. As. Soc. Bengal*, 1906, p. 293, and in *Spol. Zeylan.*, August, 1907, p. 171.



A B C

Fig. 58.—*Distira jerdoni* (× 2).

I believe Mr. Boulenger is in error in supposing Jerdon's specimen in the British Museum the type (*vide* Catalogue, 1896, vol iii, p. 299). A specimen of this species (No. 528) in the Royal College of Surgeons' Museum, London, collected by Russell, on comparison with Russell's plate xii (Ind. Serp., vol. ii, 1801) leaves little doubt in my mind is the original of the figure, and if my conviction is correct should be acknowledged the type.

I have examined 17 examples. It is so very well differentiated from all the other species in the subfamily, and those of the genus to which it has been attached, that it is one of the few snakes that has not been confused with other forms. The costal rows (19 to 21) are fewer than in any other species of this genus. The infralabials being three only are absolutely distinctive, and so is the peculiar turtle-like snout. The descent of the large anterior temporal to the labial border is only seen in aberrant examples of two or three other species.

Description.—Body anteriorly from about one-half to two-thirds the greatest depth posteriorly.

Rostral,—the portion visible above is from three quarters, to equal to the internasal suture. Præfrontals,—touch no supralabial. (In one they touch the second on one side, and in another on both sides). Postoculars,—one (two in four examples, three of which on one side only). Temporals,—confluent with sixth supralabial to form a large shield. Often succeeded by another subequal shield. Supralabials,—five anterior to the temporo-labial, the third and fourth touching the eye. Infralabials,—three, the last touching two scales only behind, only the first two in contact with the anterior sublinguals; the suture between the first subequal to or rather shorter than that between the anterior sublinguals. Marginals,—none. Sublinguals,—two rather poorly developed pairs, or only an anterior pair. Sometimes a confluence between the anterior and posterior on one or both sides occurs. Costals,—anterior 17 (16 in one, 18 in two examples), midbody 19 to 21, posterior 19 to 21; imbricate throughout. Ventrals,—219 to 248 entire everywhere, twice or hardly twice the breadth of the last costal row.

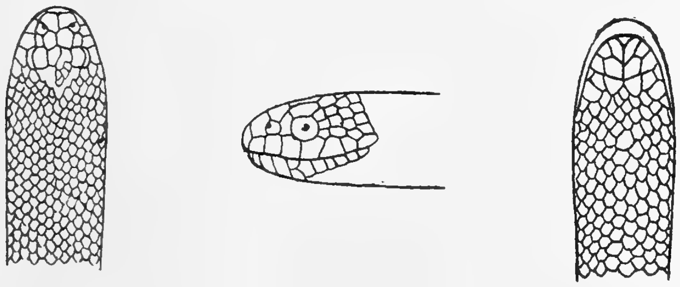
Colour.—Olivaceous dorsally, yellowish ventrally. Surrounded by 31 to 41 black bands, with usually an intermediate black spot or bar dorsally. In old specimens the bands may become obscured ventrally, and be converted into bars. In a specimen in the British Museum, the præocular is confluent with the præfrontal on both sides. In another I obtained from Madras the præfrontals fail to meet one another owing to the forward projection frontal.

Habitat.—All were captured along the shores between Ceylon and Penang.

ACALYPTUS.

ACALYPTUS PERONI (Duméril et Bibron).

Acalyptus superciliosus—
vel peroni, *Duméril et Bibron, Erp. Gen. Hist. Nat.*, vii, p. 1340.
Acalyptus peronii, *Duméril in Mem. Acad. Sc. Paris*, 1853, xxiii, p. 522.
Acalyptophis superciliosus, *Günther, Rept. Brit. Ind.*, 1864, p. 359.
,, ,, *Jan, Icon. Gén.*, 1872, 40, pl. ii, fig. 2.
,, peronii, *Boulgr., Cat.*, iii, 1896, p. 269.



A B C

Fig. 59.—*Acalyptus* (*superciliosus*) *peroni.* After Jan, *Icon. Gén.*, 40, pl. ii, fig. 2.

I have examined three specimens only, all in the British Museum. The two examples presented by Dr. Günther, and the Earl of Crawford appear to me alike, but that presented by Dr. Fischer will, I think, prove to be a species apart. In the last named the costals are 19 anteriorly, 24 in midbody, and 23 posteriorly. The ventrals 156, and narrower than the last costal row. On the other hand the two former have 23 costal rows anteriorly, and 29 in the mid and posterior parts of the body. The ventrals are 195 ? and 209, and about as broad as the last costal row. Fischer's specimen is from Hong-Kong. The habitat of Günther's is unknown, and the Earl of Crawford's is from Torres Straits. I think Fischer's specimen should be given specific rank, but there being only one specimen I prefer to follow Mr. Boulenger's ruling in the matter.

Description.—The head shields are studded with asperities.

Rostral,—in contact with four shields, the portion visible above about two-thirds the internasal suture. Præfrontals,—touch no supralabial. Frontal,—broken up. Parietals,—broken up. Nasals,—touch the first and second supralabials; nostril in the nasal shield, a suture runs from it to the præfrontal, and another to the second supralabial, so that the shield is divided into two parts. The detached fragment, however, is obviously a part of the nasal, and not a separate shield. A similar condition is met with in individuals of many other hydrophids, viz., *Enhydrina valakadyn*, *Enhydris hardwickii*, *Distira ornata*, *D. viperina*, *D. nigrocincta*, and others. Præocular,—one. Postoculars,—three. Temporals,—many, small, and scale-like. Supralabials,—seven, the anterior five entire and well-developed, the rest small; the third and fourth touch the eye. Infralabials,—four, the fourth divided, the last in contact with two scales behind. Marginals,—one or more after the third infralabial. Sublinguals,—two well-developed pairs, the fellows of each in contact. Costals,—anterior 19 to 23, midbody 24 to 29, posterior 23 to 29; subimbricate. Ventrals,—156 to 209 about as broad, or narrower than the last costal row.

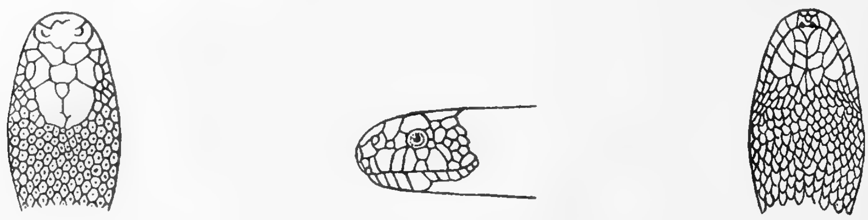
Colour.—Yellowish-grey with a series of dorsal black cross-bars, tapering subcostally, and a series of ventral bars alternating with the above.

Habitat.—Torres Straits, Hong-Kong.

THALASSOPHIS.

THALASSOPHIS ANOMALUS (Schmidt).

Thalassophis anomalus, *Schmidt in Abhandl. Nat. Hamb.*, 1852, ii, p. 81, pl. iv.
,, ,, *Boulgr., Cat.*, iii, 1896, p. 269.
Hydrophis anomala, *Günther, Rept. Brit. Ind.*, 1864, p. 379.
? ,, ,, *Jan, Icon. Gén.*, 1872, 40, pl. iv, fig. 1.



A B C

Fig. 60.—*Thalassophis anomalus.* After Jan, *Icon. Gén.*, 40, pl. iv, fig. 1

I have seen no specimen.

Description.—Rostral,—broken up. Internasals,—narrow, longer than the præfrontals. Personally I regard these as detached fragments of the nasals which in this species like other head shields are prone to subdivision. (In Jan's figure confluent with the nasals). Præfrontals,—four? in one transverse series, the outer not in contact with any supralabial. Frontal,—entire? (divided transversely in Jan's figure). Supraoculars,—entire. Parietals,—entire (showing a tendency to disintegration in Jan's figure). Nasals,—lateral; in contact with the first three supralabials. Præoculars,—one. Postoculars,—two. Temporals,—two or three, small, scale-like. Supralabial,—seven to nine, showing a tendency to subdivision (in Jan's figure the first and sixth are horizontally divided); the fourth, fifth and sixth touching the eye. Infralabials,—the fourth is the largest of the series, and in contact with four scales behind. Marginals,—absent. Sublinguals,

—two small pairs, the posterior quite separated by scales. Costals,—31 to 33 in midbody; juxtaposed, strongly tubercular. Ventrals,—small, subequal or smaller than the last costal row.

Colour.—Yellowish with dark annuli dilated vertebrally.

Habitat.—Java.

THALASSOPHIS ? ANNANDALEI (Laidlaw).

Distira annandalei, *Laidlaw in Proc. Zool. Soc. Lond.*, 1901, vol. ii, p. 579, and figure.

,, ,, *Boulgr., Fasc. Malay Zool.*, 1903, pt. 1, p. 166.

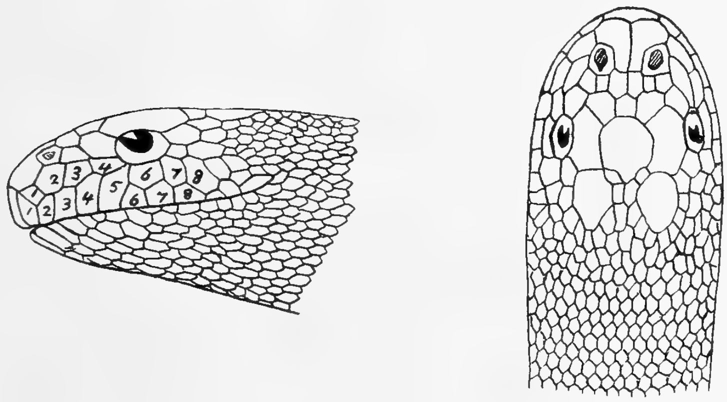


Fig. 60*a*. *Thalassophis annandalei*, × 2. After Laidlaw, in *Proc. Zool. Soc.*, vol. ii, 1901.

I have not seen a specimen.

Description.—Rostral,—not broken up. ? Internasals,—broad in front, narrowed behind, separating the nasals. Præfrontals,—many arranged in two transverse series. Frontal,—more or less broken up behind, and thus separated by detached fragments from the parietals. Parietals,—irregular; an isolated part surrounded by small scales apparently derived from peripheral disintegration. Nostrils placed in single small scales which appear to be derived from the large shields anterior to them, designated herein as internasals. Analogy seems to indicate that the internasals so called herein should be considered nasals. Præoculars,—one. Postoculars,—two. Temporals,—three, small, hardly deserving recognition as such. Supralabials—9 to 12, all subject to division. (I have numbered these shields in the annexed figure as I consider they should be regarded), the 4th to the 7th may touch the eye. Sublinguals,—one pair present, entire, or divided. Infralabials,—apparently irregular. Costals,—about 76 rows round the neck, 90 to 100 at midbody, juxtaposed, more or less tuberculate. Ventrals,—barely enlarged, 350 to 370.

Colour.—Pale greyish-olive above, white below; back with dark cross-bars, narrower than the interspaces, tapering to a point on the sides.

Habitat.—Malay Peninsula (Patani).

ENHYDRIS.

Key to the species of Enhydris.

(A) Parietals broken up ; suture from nostril to second labial .. *curtus.*
(B) Parietals entire ; suture from nostril to first labial .. *hardwickii.*

Enhydris curtus (Shaw).

Hydrus curtus, *Shaw, Zool.*, 1802, iii, p. 562.
Lapemis curtus, *Gray in Zool. Misc.*, 1842, p. 60, *and Cat.*, 1849, p. 44.
Hydrophis curta, *Günther, Rept. Brit. Ind.*, 1864, p. 379.
,, ,, *Stoliczka in Proc. As. Soc. Bengal*, 1872, p. 91.
,, ,, *Fayrer, Thanatoph. Ind.*, 1874, pl. xxiv.
,, propinquus, *Jan., Icon. Gén.*, 1872, 41, pl. i, fig. 2.
Enhydris curtus, *Boulgr. in Blanford, Fauna Brit. Ind. Rept. and Batrach.*, 1890, p. 396, *and Cat.*, iii, 1896, p. 300.
,, ,, *Sclater, List Snakes Ind. Mus.*, 1891, p. 62.
,, ,, *Wall in Jour. Bomb. Nat. Hist. Soc.*, xvi, p. 310, *and in Spol. Zeylan., August* 1907, p. 172.

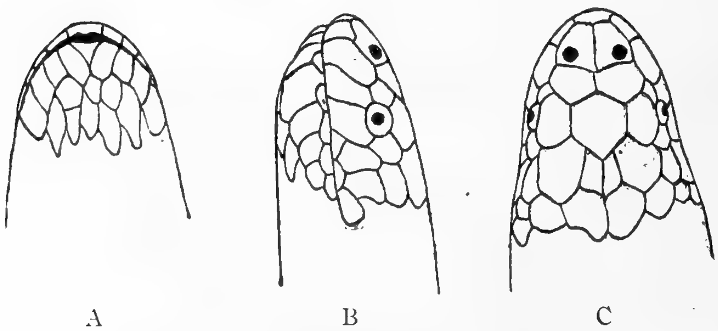


Fig. 61.—*Enhydris curtus* (× $1\frac{1}{2}$).

I have examined in detail 21 examples of this species, which is very common around the Coasts of India. On the Malabar Coast it was the commonest sea snake after *Enhydrina valakadyn.*

It is a very easy species to recognise. It shares with *E. hardwickii* alone the peculiar enlargement of the lowest three or four costal rows. The completely broken up condition of the parietals is only seen in the genus *Acalyptus* among the Hydrophiinæ with this one exception.

Description.—Rostral,—touches four shields ; the portion visible above is one-third or less than one-third the length of the internasal suture. Præfrontals,—touch the second supralabial (the third also in one, no supralabial in one example). Frontal,—entire. Parietals,—broken up ; very frequently into three, sometimes more parts, which, however, taken together preserve the contour of these shields as seen in other species of the family.[1] Nasals,—touch the first and second supra-

[1] One exception No. 11531 in Indian Museum where they are entire.

labials; a suture runs from the nostril to the second supralabial (in three examples to the first). Præoculars,—one. Postoculars,—one or two. Temporals,—two or three small shields. Supralabials,—seven usually, sometimes eight; the third and fourth usually touch the eye (sometimes the fifth also, rarely the fourth only). Infralabials.—the fourth is the largest of the series, and in contact with three or four scales behind. Marginals,—a more or less complete row after the second infralabial. Sublinguals,—poorly developed, often so small, they hardly deserve the name. The anterior and posterior fellows are widely separated. Costals,—anteriorly 29 to 36, midbody 30 to 45, posteriorly 31 to 42; juxtaposed everywhere; the lowest three or four rows distinctly enlarged, and in many males the tubercles are remarkably spinose. Ventrals,—151 to 219, ill-developed except anteriorly.

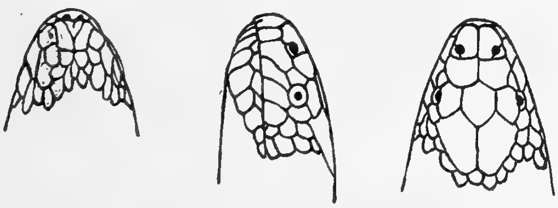
Colour.—Olivaceous with dark, ill-defined dorsal transverse bars, as wide or wider than the interspaces.

Habitat.—Coasts from the Persian Gulf to Borneo.

The post-maxillary teeth are grooved.

ENHYDRIS HARDWICKII (Gray).

Lapemis hardwickii, *Gray, Ill. Ind. Zool.*, 1834, ii, pl. lxxxvii, f. 2, *and Cat.*, 1849, p. 44.
,, loreatus, *Gray in Ann. Mag. Nat. Hist.*, 1843, xi, p. 46.
,, loreata, *Günther, Rept. Brit. Ind.*, 1864, p. 380.
Hydrophis pelamidoides, *Jan, Icon. Gén.*, 1872, 41, pl. iii, fig. 1.
,, abbreviatus, *Jan, loc. cit.*, 40, pl. iv, fig. 2, and v, fig. 2.
,, fayreriana, *Anderson in Journ. As. Soc. Bengal*, 1871, p. 19.
Enhydris hardwickii, *Günther, Rept. Brit. Ind.*, 1864, p. 380, pl. xxv, fig. W; *Boulgr. in Blanford, Fauna Ind. Rept. and Batrach.*, 1890, p. 397, *and Cat.*, iii, 1896, p. 301.
,, ,, *Sclater, List Snakes, Ind. Mus.*, 1891, p. 62.
,, ,, *Wall in Proc. Zool. Soc. Lond.*, 1903, p. 96.



A B C

Fig. 62.—*Enhydris (Hydrophis) hardwickii.* After Günther, *Rept. Brit. Ind.*, 1864, pl. xxv, fig. 4.

I have examined at least 22 examples. It is an easy snake to recognise. One feature requires special mention as being almost peculiar to itself, *i.e.*, suture runs from the nostril to the first supralabial. I have seen but two exceptions, and it is a feature I have only seen in a few aberrant examples of *E. curtus* and *Distira ornata* among all the species of this family, the suture when present running to the second supralabial. The ventrals are very small and few, and the costals are juxtaposed everywhere.

Description.—Rostral,—touches four shields, the portion visible above is about one-third, or less than one-third the internasal suture. Præfrontals,—touch the second supralabial. Frontal,—entire, touches six shields; the fronto-parietal sutures are longest, the fronto-præfrontal shortest. Parietals,—entire. Nasals,—touch the first and second supralabials, a suture from the nostril runs to the first supralabial; sometimes other sutures radiating from the nostril divide this shield into two or three segments, one of which may resemble a loreal (hence the *loreata* of Gray and Günther). Præoculars,—one. Postoculars,—one, two, or three. Temporals,—two, three, or four small superposed shields. Supralabials,—seven or eight, the third and fourth usually touch the eye (rarely the fourth or fifth only, or the third and fifth). Infralabials,—the fourth is the largest of the series, and in contact with three or four scales behind. Marginals,—a more or less complete row behind the second infralabial. Sublinguals,—small or absent. Costals,—anteriorly 26 to 32, midbody 27 to 37, posteriorly 27 to 34; juxtaposed everywhere; the lowest three or four rows enlarged. Ventrals,—130 to 200, smaller than the last costal row.

Colour.—Olivaceous-grey or yellowish with distinct though ill-defined blackish bands, or dorsal bars, the latter often confluent vertebrally.

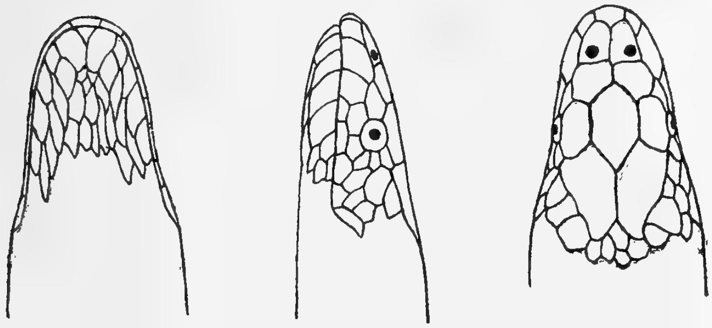
Habitat.—The Coromandel Coast of India (Puri), through the Malayan Archipelago to New Guinea. It is rare in the Bay of Bengal, but appears to be not uncommon about the Philippines.

The post-maxillary teeth are grooved.

HYDRUS.

Hydrus platurus (Linnæus).

Anguis platura, *Linn.*, *Sys. Nat.*, 1766, i, p. 391.
"Nalla Wahlagillee pam," *Russell*, *Ind. Serp.*, 1796, i, pl. xli.
Pelamis bicolor, *Daudin*, *Rept.*, 1803, vii, p. 366, pl. lxxxix.
,, ,, *Gray*, *Cat.*, 1849, p. 41.
,, ,, *Günther*, *Rept. Brit. Ind.*, 1864, p. 382.
,, ,, *Fayrer*, *Thanatoph. Ind.*, 1874, pl. xvii.
,, ornata, *Gray*, *Cat.*, 1849, p. 43.
Hydrophis bicolor, *Jan*, *Icon. Gén.*, 1872, 40, pls. ii and iii.
Hydrus platurus, *Boulgr. in Blanford*, *Fauna Ind. Rept. and Batrach.*, 1890, p. 397, and *Cat.*, iii, 1896, p. 267.
,, ,, *Sclater*, *List Snakes Ind. Mus.*, 1891, p. 62.
,, ,, *Wall in Proc. Zool. Soc. Lond.*, 1903, pp. 95 and 101, *and in Journ. Bomb. Nat. Hist. Soc.*, xvi, p. 310, *and in Spol. Zeylan.*, August 1907, p. 166.



A B C

Fig. 64.—*Hydrus platurus.*

I have examined 47 specimens besides those in the British Museum. I find the posterior maxillary teeth grooved.

Description.—Rostral,—the visible portion above one quarter to one half the internasal suture. Præfrontals,—touch the second supralabial (rarely the third also). Frontal,—sutures subequal, or the fronto-supraocular rather the longest. Postoculars,—one or two. Temporals,—absent, replaced by small scales. Supralabials,—seven to ten very irregular, the third and succeeding shields very frequently divided, two sometimes three touch the eye, *viz.*, the third, fourth or fifth. Infralabials,—five or six, the last in contact with three or four scales behind. Marginals,—none. Sublinguals,—small, an anterior pair usually more or less distinct, but widely separated, a posterior pair still less distinct if recognisable at all as such. Costals,—anterior 40 to 54, midbody 45 to 62, posterior 41 to 52 juxtaposed everywhere. Ventrals,—370 to 440, small but rather larger than the last costal row, very irregular, many being divided.

Colour.—Vary variable. I quote from Boulenger's Catalogue (1896).

"*A.*—Yellow, with brown, black edged cross-bands; black bars between the cross-bands on the sides of the belly (*P. ornata*, Gray).

B.—Anterior third of body with a black dorsal stripe; further back, a series of transverse dorsal rhombs on the back, and black spots on the sides and belly. (Var. *maculata*, Jan).

C.—Dorsal region black; sides and belly yellow, with a lateral series of black spots, which may be partly confluent into a stripe; tail with dorsal and lateral spots.

D.—Dorsal region black, ventral region brown, the two separated by a yellow lateral stripe; tail spotted as in the preceding.[1]

E.—Black above, sides and belly yellow; tail spotted as in the preceding (*H. bicolor*, Schn.).

F.—Yellow, with a black vertebral stripe, broken up into spots posteriorly; no lateral spots on the body or tail.

G.—Yellow, with a vertebral band and spots on the tail pale brown or olive."

Habitat.—The tropical area of the Pacific Ocean, and connected waters. In Asia the litoral from the Persian Gulf to Yezo (N. Japan). In Africa the East Coast

[1] A modified form of this without the yellow lateral stripe occurs. One such is No. 153 in the Colombo Museum.

(including Madagascar) to the Cape. In Australia, as far East as New Zealand. In America the Western Coast (Mexico, Ecuador, Panama).

ASTROTIA.

Astrotia stokesi (Gray).

Hydrus major, *Shaw, Zool.*, 1802, iii, p. 558, in part.
,, stokesii, *Gray, Stokes Discov. Austral.*, 1846, p. 502, pl. iii, and *Cat.*, 1849, p. 58.
Hydrophis annulatus, *Gray, Cat.*, 1849, p. 59.
? Astrotia schizopholis, *Jan, Icon Gén.*, 1872, 39, pl. iii.
Hydrophis stokesii, *Günther, Rept. Brit. Ind.*, 1864, p. 363.
? ,, guttata, *Murray in Journ. Bomb. Nat. Hist. Soc.*, 1887, p. 34.
,, ocellata, *Günther, loc. cit.*, p. 378, and pl. xxv, fig. P.
Distira stokesii, *Boulgr. in Blanford, Fauna Brit. Ind. Rept. and Batrach.*, 1890, p. 408, *and Cat. Brit. Mus.*, 1896, iii, p. 288.
,, ,, *Wall in Spol. Zeylan.*, August 1907, p. 168.

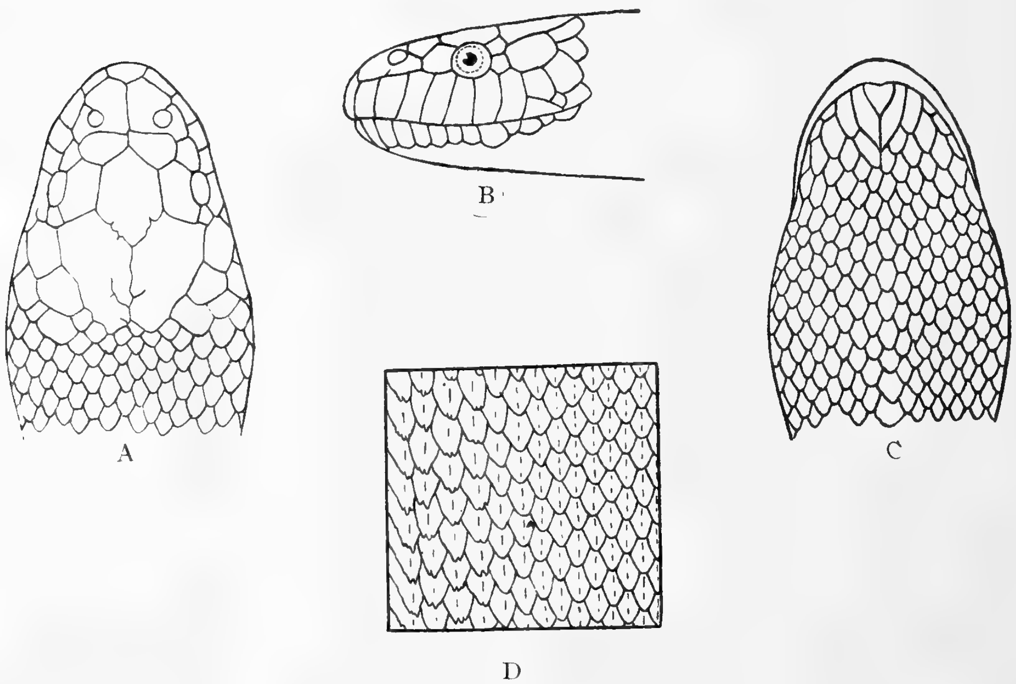


Fig. 65.—*Astrotia (Schizopholis) stokesi.* After Jan, *Icon. Gén.*, 1872, 39, pl. iii.

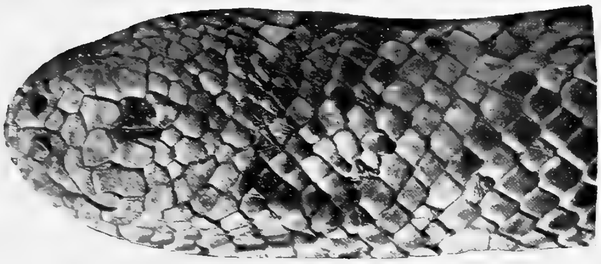
I have examined seven examples. The species is not only very well differentiated, but possesses ventrals peculiar to itself, and I cannot but think that this alone warrants its separation from the genus *Distira*, where Mr. Boulenger places it. These shields are best considered absent ; they are replaced by scales similar to the adjacent costals in that they are strongly imbricate, and serrate or dentate at the margins. They are little broader than the adjacent costal rows, and rather more pointed. There are from 230 to 267 of these scales in the series. The number of costal rows exceeds that of nearly all the other species of this subfamily, the exceptions being *Hydrus platurus*, *Enhydrina valakadyn* and *Thalassophis annandalei*. The head shields vary much in individuals, and the supralabials are especially prone to division.

Description.—The neck is more than half the extreme body depth.

Rostral,—touches four shields; the portion visible above is about half the suture between the nasals. Præfrontals,—usually touch the second labial only (sometimes the third also, rarely none). Postoculars,—two usually (sometimes three). Temporals,—absent, replaced by scales of which there are two or three superposed between the parietals and subjacent labials. Supralabials,—eight to eleven, very irregular, the third, fifth and succeeding members of the series frequently divided into an upper and lower part. The fourth is not divided in any of these specimens, but from analogy there is every reason to believe this merely a coincidence. The fourth, fifth and sixth are the usual ones to find contact with the eye. Infralabials,—Very irregular, all are prone to division, but the first, second or third may be entire. Marginals,—a row succeeds the first, second or third infralabials. Sublinguals,—absent, replaced by small scales. Here from analogy I would expect to see specimens in which the anterior and possibly the posterior of these shields are sufficiently developed to merit the name; this is justified from the condition of these shields in individuals of *viperina*, *cærulescens*, and *ornata*. Costals,—anterior 41 to 48, midbody 48 to 59, posterior 41 to 50, strongly imbricate everywhere, the last rows irregularly dentate, marginally and apically emarginate. Ventrals,—230 to 267 (Boulenger). Absent, replaced by pairs of scales similar in size and shape to the adjacent costals except they are more pointed. (Anteriorly there are generally a few entire shields similar to those seen in other species).

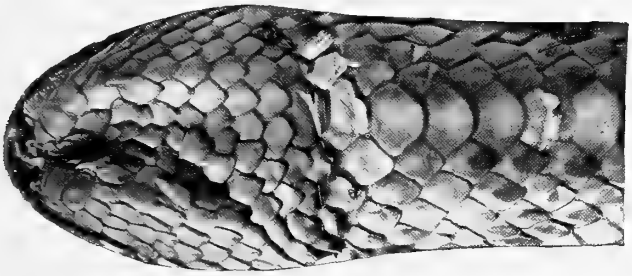
Colour.—Yellowish with black bands, or more frequently bars. Often there is a dorsal and a ventral series of bars in mid and posterior body which alternate costally. The ventral series is sometimes modified into several series of spots of variable size, *H. guttata* (Murray). A dorsal line occurs between the bars or bands usually.

Ranges between the Mekran Coast and Australia, but appears to be decidedly rare everywhere.



A

B



C

Fig. 6.

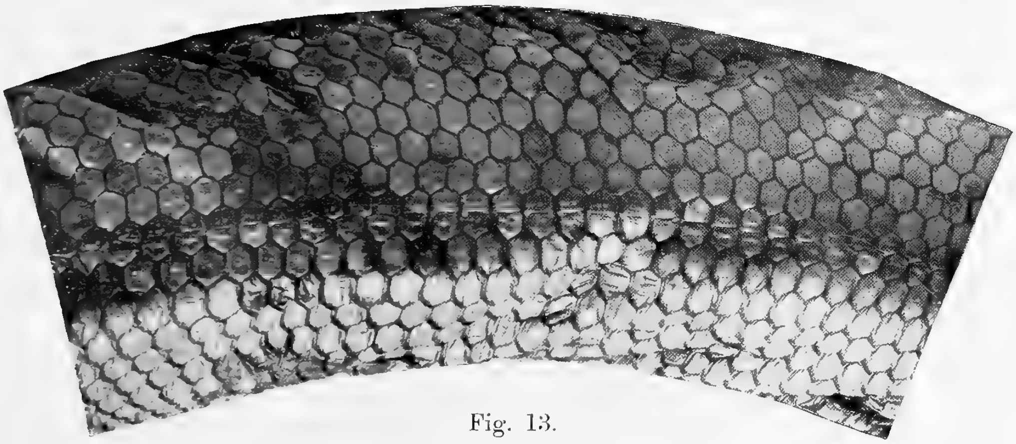


Fig. 13.

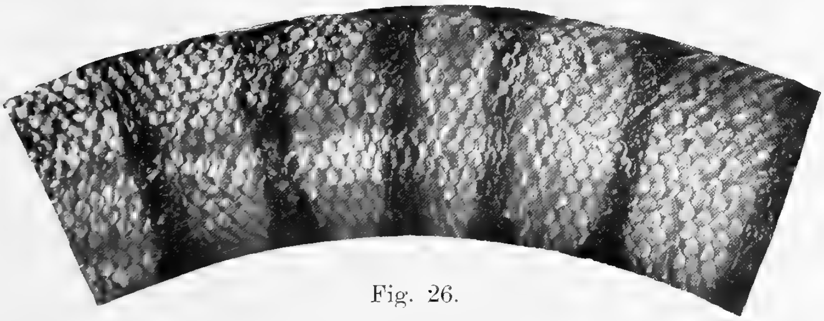


Fig. 26.

Survey of India Offices, Calcutta, 1908

Fig. 6. A, B, C, Aipysurus australis.
„ 13. Distira cantoris to show median furrow in posterior ventrals.
„ 26. „ spiralis, var forma typica.

Fig. 27

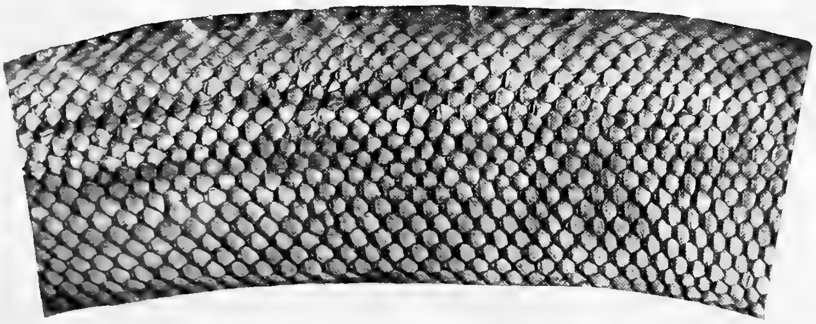


Fig. 35.

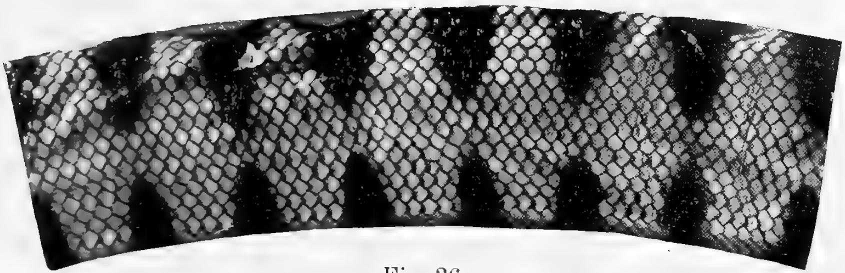


Fig. 36.

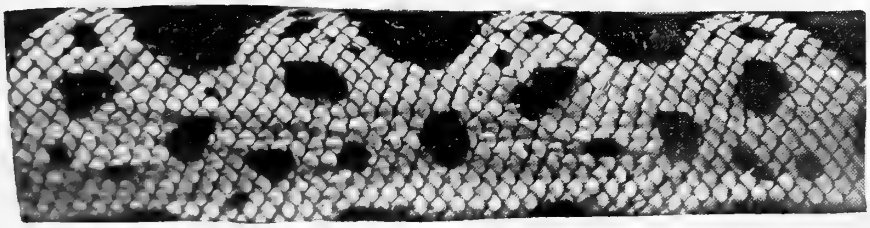


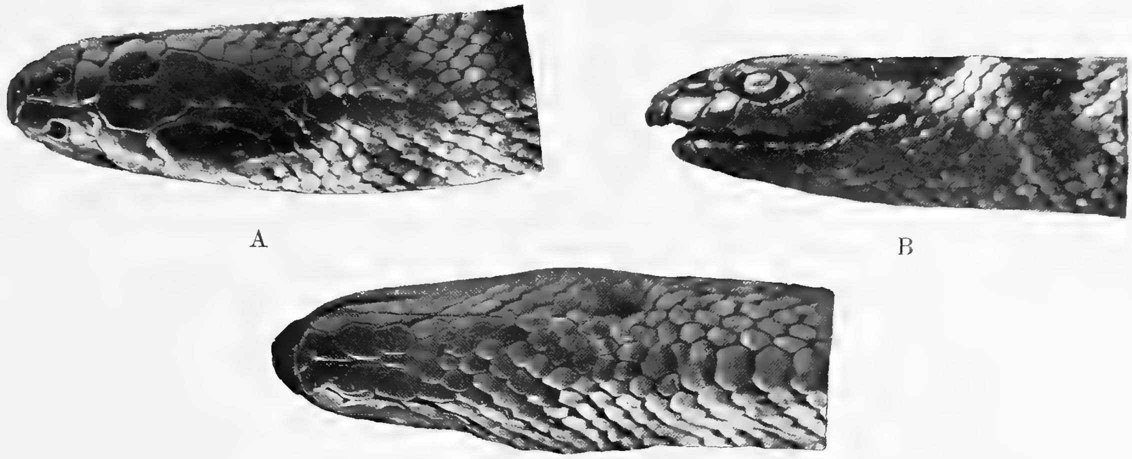
Fig. 37.

Half-tone Block

Survey of India Offices, Calcutta, 1908

Fig. 38.

Fig. 27. Distira spiralis var melanosoma.
,, 35. ,, cyanocincta var phipsoni.
,, 36. ,, ,, ,, macfarlani.
,, 37. ,, ,, ,, elegans.
,, 38. ,, ,, to show ventrals.



C

Fig. 41.

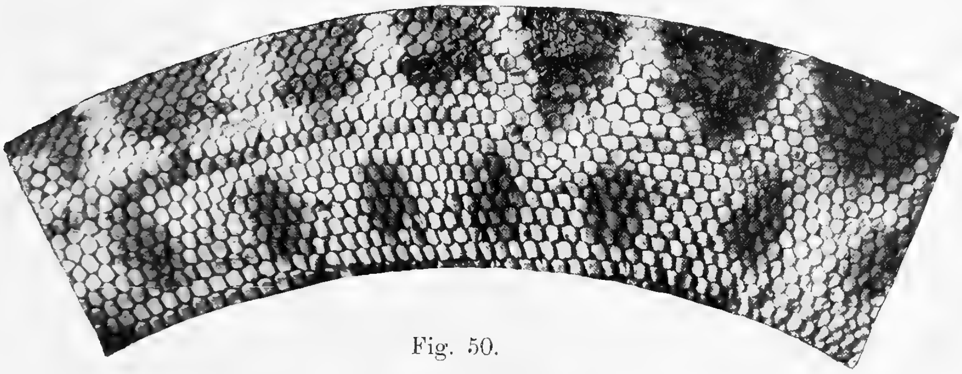


Fig. 50.

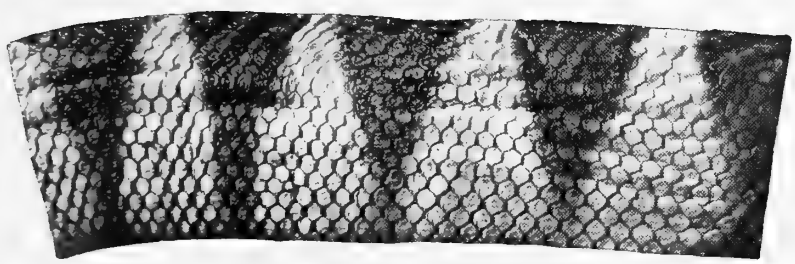


Fig. 51.

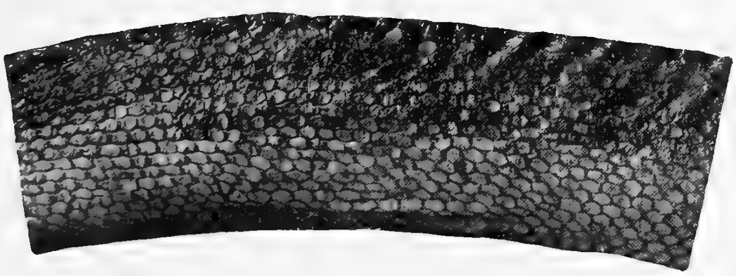


Fig. 52.

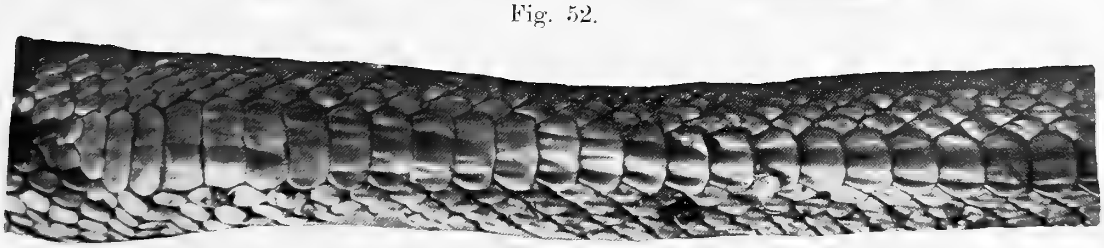


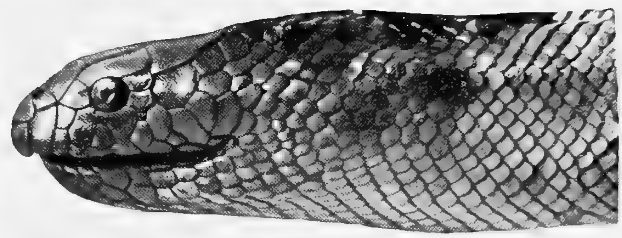
Fig. 57.

Survey of India Offices, Calcutta, 1908

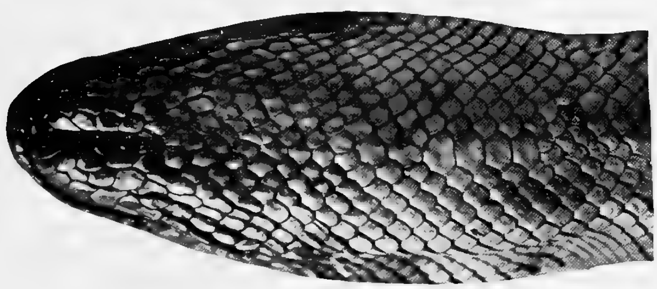
Fig. 41. A, B, C, Distira lapemoides.
,, 50. Distira ornata var 4, from Jerdon's specimen in the British Museum.
.. 51. ,, ,, ,, 1, from the Loo Choo Islands in the British Museum.
,, 52. ,, ,, ,, 5, Inornata from the type in the British Museum.
.. 57. ,, viperina. Showing enlarged anterior ventrals.

Fig. 63.

A



B



C

Fig. 66.

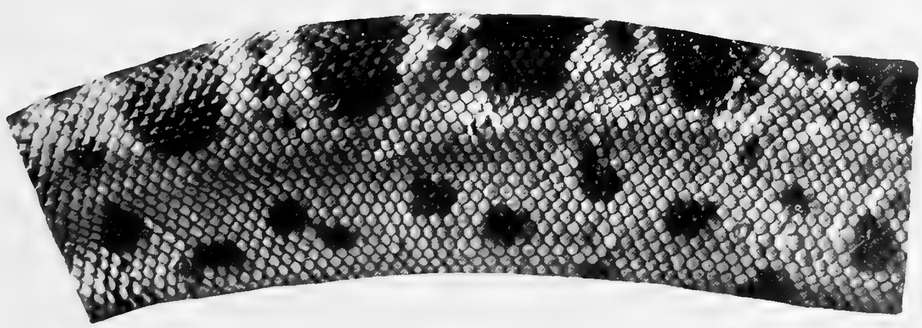


Fig. 67.

Half-tone Block.

Survey of India Offices, Calcutta,

Fig. 63. Enhydris hardwickii. Showing the ill developed irregular ventrals.

,, 66. A, B, C, Astrotia stokesi.

,, 67. Astrotia stokesi.

Memoirs of the Asiatic Society of Bengal.

1905—1906.

I. *On certain Tibetan Scrolls and Images lately brought from Gyantse.—By* PROF. SATIS CHANDRA VIDYĀBHŪṢAṆA, M.A., M.R.A.S. (Price Re. 1-8; or 2*s.* 3*d.*)

II. *Sal-Ammoniac: a Study in Primitive Chemistry.—By* H. E. STAPLETON, B.A., B.Sc. (Price Re. 1; or 1*s.* 6*d.*)

III. *The Similarity of the Tibetan to the Kashgar-Brahmi Alphabet.—By* The REV. A. H. FRANCKE. (Price Rs. 2; or 2*s.* 10*d.*)

IV. *Alchemical Equipment in the Eleventh Century, A.D.—By* H. E. STAPLETON and R. F. AZO. (Price Re. 1-8; or 2*s.* 3*d.*)

V. *Malaysian Barnacles in the Indian Museum, with a list of the Indian Pedunculata.—By* N. ANNANDALE, B.A., D.Sc. (Price Re. 1-8; or 2*s.* 3*d.*)

VI. *Ashrafpur Copper-plate Grants of Devakhadga.—By* GANGA MOHAN LASKAR, M.A. (Price Annas 8; or 10*d.*)

VII. *Festivals and Folklore of Gilgit.—By* GHULAM MUHAMMAD. (Price Rs. 2; or 2*s.* 10*d.*)

VIII. *Notes on the Bhotias of Almora and British Garhwal.—By* C. A. SHERRING, M.A., F.R.G.S., I.C.S. (Price Re. 1-5; or 2*s.*)

IX. *Religion and Customs of the Uraons.—By* the late REV. FATHER DEHON, S.J. (Price Rs. 2; or 2*s.* 10*d.*)

X. *Notes on the Fauna of a Desert Tract in Southern India* (Herpetology and Entomology).—*By* N. ANNANDALE, D.Sc., C.M.Z.S., with a list of Mammals by R. C. WROUGHTON, F.E.S. (Price Rs. 2; or 2*s.* 10*d.*)

XI. *Amulets as Agents in the Prevention of Disease in Bengal.*—Compiled in the Office of the Superintendent of Ethnography, Bengal. (Price Annas 12; or 1*s.* 2*d.*)

XII. *Earth-Eating and the Earth-Eating Habit in India.—By* D. HOOPER and H. H. MANN. (Price Re. 1; or 1*s.* 6*d.*)

XIII. *On a Cup-Mark Inscription in the Chumbi Valley.—By* E. H. C. WALSH, I.C.S. (Price Re. 1; or 1*s.* 6*d.*)

XIV. *A Descriptive List of the Sea-Snakes* (Hydrophiidæ) *in the Indian Museum, Calcutta.—By* CAPTAIN F. WALL, I.M.S., C.M.Z.S. (Price Re. 1; or 1*s.* 6*d.*)

XV. *Common Saws and Proverbs collected, chiefly from Dervishes, in Southern Persia.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Re. 1; or 1*s.* 6*d.*)

XVI. *The Common Hydra of Bengal: its Systematic Position and Life History.—By* N. ANNANDALE, B.A., D.Sc., C.M.Z.S. (Price Re. 1; or 1*s.* 6*d.*)

XVII. *Animals in the Inscriptions of Piyadasi.—By* MONMOHAN CHAKRAVARTI, M.A. (Price Annas 12; or 1*s.* 2*d.*)

XVIII. *Some current Persian Tales told by Professional Story-Tellers.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Re. 1; or 1*s.* 6*d.*)

XIX. *The Dards at Khalatse in Western Tibet.—By* REV. A. H. FRANCKE. (Price Re. 1-6; or 2*s.*)

Supplement, Miscellanea Ethnographica. Part I. 1. *The Blow-Gun in Southern India* 2. *Miscellaneous objects from the Rámanád subdivision of the Madura district* 3. *Indian Weighing-beams.—By* N. ANNANDALE, D.Sc. (Price Re. 1.)

Supplement, Miscellanea Ethnographica. Part II. 1. *Some Malayan Weapons—By* N. ANNANDALE. 2. *Plan of a Persian Gentleman's House.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Annas 8; or 10*d.*)

Memoirs of the Asiatic Society of Bengal.

Vol. II.

I. *Cirrhipèdes operculés de l'Indian Museum de Calcutta.—Par* M. A. Gruvel. (Price Rs. 2; or 2s. 10d.)

II. *The Coinage of Tibet.—By* E. H. C. Walsh. (Price Re. 1; or 1s. 6d.).

III. *The Exact Determination of the Fastness of the more Common Indigenous Dyes of Bengal, and comparison with typical synthetic Dye-stuffs. Part I. Dyeing on Cotton.—By* E. R. Watson. (Price Re. 1; or 1s. 6d.)

IV. *The Saorias of the Rajmahal Hills.—By* R. B. Bainbridge. (Price Rs. 2; or 2s. 10d.)

V. *Mundari Poetry, Music and Dances.—By* Rev. Fr. J. Hoffmann, S.J. (Price Re. 1; or 1s. 6d.)

VI. *Tarikh-i-Nuṣratjangi.—By* Harinath De. (Price Re. 1; or 1s. 6d.)

VII. *The Exact Determination of the Fastness of the more Common Indigenous Dyes of Bengal, and comparison with typical Synthetic Dye-stuffs. Part II. Dyeing on Silk.—By* E. R. Watson. (Price Annas 12; or 1s. 2d.)

VIII. *Monograph on Sea Snakes.—By* Major F. Wall, I.M.S. (Price Rs. 5; or 7s.)

IX. *A Polyglot List of Birds in Turki, Manchu and Chinese.—By* E. Denison Ross, Ph.D. (Price Rs. 4; or 6s.)

An Arabic translation of Controversial Pamphlets in Urdu and Persian by Rafi al-Khuli.—By Harinath De. (In the press.)

Ramacarita by Sandhyakara Nandi.—Edited by Mahamahopadhyaya Haraprasad Shastri, M.A. (In the press.)

On the Correlations of Areas of Matured Crops and the Rainfall, and certain allied problems in Agriculture and Meteorolgy.—By S. M. Jacob, I.C.S. (In the press.)

The Wakf of Movables.—By Dr. Abdullah al-Mamun Suhrawardy, M.A., *Barrister-at-Law.* (In the press.)

MEMOIRS

OF THE

ASIATIC SOCIETY OF BENGAL

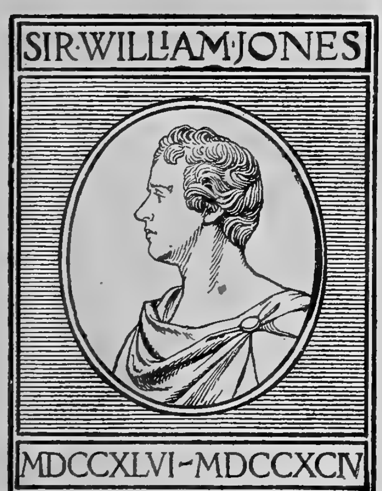
VOL. II, No. 9, pp. 253—340.

A POLYGLOT LIST OF BIRDS IN TURKI, MANCHU AND CHINESE.

Edited with Identifications, Notes and Indices

BY

E. DENISON ROSS, Ph.D.



CALCUTTA:
Printed at the Baptist Mission Press, and published by
The Asiatic Society, 57, Park Street.
1909.

Price Rs. 4; or 6s.

18-5-09.

Vol. II, No. 8, of the "Memoirs" is in press, and will be issued later.

Polyglot List of Birds — Turki, Manchu and Chinese.

By DR. E. DENISON ROSS.

INTRODUCTION.

The present contribution to the "Memoirs" of the Asiatic Society of Bengal owes its inception to a desire on my part to discover what sources, not hitherto utilised, there might be for the Lexicography of that variety of Turkish which is known as Chaghatai or Turki.

While I was examining the resources of the British Museum, during my leave in England in 1907, my friend, Mr. A. G. Ellis, called my attention to a unique work in manuscript, which contained the whole vocabulary of the Manchu-Chinese "Mirror" in five languages, namely, Manchu, Mongolian, Tibetan, Turki, and Chinese.

I must here explain that the Manchu-Chinese "Mirror," the full Manchu title of which is *Han i araha nonggime toktobuha manju gisun i buleku bithe*, is an exhaustive vocabulary of the Manchu language published in 1771.[1]

This vocabulary is arranged according to a number of main headings which practically include all the words to be found in the most complete alphabetical dictionary. Klaproth, in his well-known "Verzeichniss der chinesichen und manschuischen Bücher und Handschriften der königlichen Bibliothek zu Berlin" (1822), has given a list of the main headings included in the Manchu-Chinese "Mirror." This list, in spite of its apparent fulness, does not convey to the general reader a correct impression of the exhaustive character of this famous dictionary.

In the bi-lingual "Mirror" each Manchu word has its Chinese equivalent. The Manchu is transcribed into Chinese (according to the *three-character system* invented by K'ien Lung), while the Chinese characters are transcribed phonetically in Manchu character. Thereafter follows the full definition in Manchu of each word. The pentaglot version of the "Mirror" differs in two respects from the Manchu-Chinese original: (i) the Manchu and the Chinese are not transcribed; (ii) the definitions are

---

1 The principal native Manchu Dictionaries will be found enumerated in Möllendorf's "Essay on Manchu Literature" in the Journal of the China Branch of the Royal Asiatic Society, Vol. xxiv, pp. 1-45.

omitted. At the head of the page is the Manchu, then follows the Mongolian, next comes Tibetan in the Tibetan character, which is transcribed firstly according to the exact spelling, and secondly according to the pronunciation. Next comes the Turki in Persian character, which is duly transcribed into Manchu letters, and finally the Chinese.

On examination I at once determined to put its utility to the test as far as the Turki portion was concerned, but seeing that my furlough was limited (and also that I had other work in the British Museum to occupy me), the great difficulty was to determine which portion to select for study. Finally, I decided to take the chapter on birds, partly because of the existence of other Turki lists of birds, partly because the Mongols had a marked predilection for ornithology as witness Baber's "Memoirs" and the common occurrence of birds' names in Turki nomenclature; and partly again because I felt that the compilers of the vocabulary might have obtained from Turki-speaking men more accurate information on the subject of birds than on any other Fauna of Central Asia. Such was my aim in copying out the birds contained in this work.[1] Ultimately, of course, the whole Turki vocabulary ought to be transcribed and edited.

At first I intended merely to consult the three best-known European Manchu dictionaries,—namely those of Amyot, Zakharoff, and Gabelentz,[2]—and give the translations of the corresponding Manchu word in each case. I soon found, however, that this would be unsatisfactory owing to the imperfections of the three dictionaries referred to. I next turned to the Manchu definitions contained in the original Manchu-Chinese "Mirror." Here again the result was disappointing. I was therefore compelled to turn to the Chinese equivalents. Having worked upon these Chinese names I thought it a pity not to make use of the material I had thus collected. Moreover, I found that on the subject of birds the European Chinese dictionaries were sadly defective, not only as regards compound expressions but also in the matter of actual characters. I therefore thought that the inclusion of the Chinese names of the birds might be of utility to future compilers of Chinese dictionaries, and possibly even to scientific explorers in China. As far as the identification of Chinese names is concerned, I should certainly have derived more help from outside sources had I selected the Chapter on Flowers; for this subject has engaged the attention of several distinguished sinologists who, like Bretschneider, were at the same time botanists. But our sources of information as to the Turki names of plants are too limited to render this portion of the vocabulary a test of the whole.

I must here disclaim any acquaintance with the science of Ornithology, and I wish to forestall the criticism that might be levelled at me for undertaking such a

---

1 The "Mirror" contains a lengthy supplement which gives 300 additional birds, but I have not been able to include these, and most of them are fabulous or absurd.

2 (i) Amyot, Dict. Tartar-Mantchou, Paris, 1789. (ii) Zakharoff, Polniy Mandjursko-Russkiy Slovar, St. Petersburg, 1875. [This work is almost impossible to procure in the market. The copy I used was kindly lent me by Mr. Thomas from the I. O. Library.] (iii) Gabelentz, Abhandlung der Z.D.M.G. III, No. 2 (1864).

work with nothing but linguistic equipment. My hope is that some ornithologist may think the list worthy of study, and will succeed, where I have failed, in establishing the identity of many of these birds with the help of their position in the list and the accompanying definitions.

In many cases the identification is practically certain ; in the majority of cases I fear it is very vague if attempted at all. In such a large list as this, there are no doubt many names which are simple fabrications, as far as one or other of the languages is concerned, though I presume there is always something genuine at the bottom either of the Chinese or the Manchu name. In many cases the Turki seems merely a translation (sometimes a mistranslation) of the Manchu or the Chinese, and in all too many cases the Turki name simply represents the briefest possible summary of the Manchu definition. In spite of these defects I think the list worthy of publication in its entirety if only for the literary curiosity it presents of the Manchu method of Lexicography.

Chapter XXX of the "Mirror" contains, in addition to the list of birds, two short sections, one dealing with the names of the various wings, feathers, etc., and the other with verbs expressive of the flight and habits of birds. I had originally intended to include these in the present memoir, but I have decided to reserve them for a separate paper.

When I began with the aid of the Manchu and Chinese dictionaries to work out the identification of the birds, I at first determined to give *in extenso* the Manchu definitions, both in the original (romanised) and in literal translation. To this end my wife romanised all the definitions occurring in the "Mirror." But when it came to translating these definitions literally and in their entirety, I found there was so much vain repetition and so much vague description that I thought no useful purpose could be served by a reproduction of the whole. Moreover, in view of these repetitions, and also because the Manchu language is very little studied nowadays and is rapidly dying out as a spoken language, I judged that the inclusion of the original text would not add to the utility of my paper.

Anyone consulting both the "Mirror" and Zakharoff's Manchu-Russian Dictionary will see by comparison that they are very often in disagreement. Thus in the case of the birds Zakharoff often gives details not to be found in the "Mirror" and often omits those that are to be found there. It was therefore necessary to have before me a complete translation of all Zakharoff's definitions, and for the preparation of this part of my work, also, I am indebted to my wife.

The above considerations will explain my general method of procedure. The arrangement is as follows:—

(1) Turki name.

(2) Tentative identification.

(3) Manchu name.

(4) Chinese name, with references to Chinese dictionaries.

(5) Definition of Manchu word derived from the "Mirror," Zakharoff, Amyot, and Gabelentz.

(6) Notes and observations.

I cannot close this introduction without a word of grateful thanks to Colonel Phillott, who, in the matter of Persian and Indian falconry, possesses unrivalled knowledge. His name and authority will be found constantly quoted in the sections dealing with the *falconidæ*. I have also to thank Mr. T. Bentham, formerly temporary assistant in the Indian Museum, for assistance received while this Memoir was passing through the Press.

List of the commonest descriptive terms occurring in Turki bird names.

Āla =variegated.
Āq = white. Diminutive, *aqiš* = whitish.
Baš = head.
Búz = (*a*) grey ; (*b*) a bird after first moult.
Čapar = mottled.
Čaqir = (wall-eyed), blue-eyed.
Darya = belonging to the water or sea.
Kičik = small, "lesser."
Kōk = blue, dark-blue, black. Diminutive *kōkiš*.
Máda = male.
Püpeklik = crested.
Qara = black.
Qizil = red. Diminutives, *qizghij*, *qizghinj*, *qizghiš*.
Qum = sand. *Quyruq* = tail.
Sarigh = yellow. Diminutives, *sarghinj*, *sarighič*, *sarighiš*, *sarghinečlik*.
Su = water.
Tagh = mountain.
Uzun = broad, wide, long.
Yawa (*yaba*, *yaban*) = wild.
Yašil = green.
Dükür = a spur.
Tirmaq = a talon or claw.

Method of Transcription.

č	=	ch	چ
š	=	sh	ش
q	=	ḳ	ق

The letter "f" (ف) in the Turki nearly always represents "p," while "b" (ب) very often stands for "w."

N.B.—The Turki is given in each case exactly as it is found in the original manuscript, which is often very curious, especially in regard to the division of syllables.

List of commonest Abbreviations.

H. & H.=Hume and Henderson's *Lahore to Yarkand.*
Z. = Zakharoff's Manchu-Russian Dictionary.
P. de C. = Pavet de Courteille's Dictionnaire Turc-Orientale.
Sang. = Sanglakh. The famous Turki-Persian Dictionary by Mīrzā Mehdī Khān, the Historian Nādir Shāh.
G. = Giles's Chinese-English Dictionary.
B.S. = Bowdler Sharpe. The Scientific Results of the Second Yarkand Mission. Section Aves.
B.M. I. = Or. 1912.
B.M. II. = Or. 404. } Rieu's Catalogue of Persian Manuscripts in the British Museum.
The Mirror = The Manchu Mirror. See Introduction.
Scully S. F. = Stray Feathers.
Houtsma's List. Ein Turkisch-Arabisches Glossar, Leiden, 1894.

PART I.—*Large Birds.*

GROUP I.

1. **Quš.** قوش

This is a generic term for large birds in contradistinction to *qučqač* which is a general name for smaller birds.

The word *quš* is in this place a translation of the Manchu *gasha*, but in the title of the section where the Manchu has likewise *gasha*, the Turki has *janwar*, جانوار.

The terms *janwar* and *quš* are thus, apparently, interchangeable.

Manchu: G a s h a.
Chinese: NIAO.

2. **Sir Murgh.** سیر مرغ

The Male Phœnix.
Manchu: G a r u d a i.
Chinese: FÊNG.

The Turki *Sir Murgh* is obviously a corruption of the Persian Simurgh, سیمرغ. One wonders how the "r" can have crept in. Klaproth, in his Uïghur list, gives the same word in the form of *simrukha*. The Pehlevi form is *sēnmurv*, while in the Avesta it is called *saēnō mergo*.

3. **Mada Sir Murgh.** ماده سیر مرغ

The Female Phœnix.
Manchu: G e r u d e i.
Chinese: HUANG.

It is interesting to observe the introduction of the Manchu feminine principle of vowel modification in the case of a loan-word like *garudai*, which is, of course, the Sanskrit गरुड.

4. **Učar Sir Murgh.** اوچار سیر مرغ

The Flying Phœnix.
Manchu: G a r u n g g ô.
Chinese: LUAN.

5. **Rukh.** رخ [written in the original رغه, which must, I think, be the copyist's misreading of رغ, *i.e.*, the *jazm* over the *ghayn* has been mistaken for a *hé*.]

The famous *Roc* of Oriental fable and romance.
Manchu: H o r o n g u Č e č i k e.

Chinese: CHIN WU. [See Tobar, "Inscriptions Juives de K'ai-fong-fou" in *Variétés Sinologiques*, vol. xvii, p. 50, note 2.]

A very valuable note on the Rukh will be found in Yule's Marco Polo, 3rd Edition, Vol. II, pp. 415-420, *note*.

6. Kharzi. خرزي

A Fabulous Bird.

I have not been able to identify the word *kharzi*.

Manchu: Daipun.

Chinese: PÊNG.

The Manchu *daipun* is simply a transcription of the Chinese *t'ai pêng*, or Great Phœnix.

7. Quqnus. قق نوس (*sic*)

A fabulous crane.

Manchu: Bulehen.

Chinese: HAO.

The Turki *quqnús* is from the Greek κύκνος. In Ottoman Turkish it means a swan, and also the Phœnix of fable.

This crane is regarded by the Chinese as the emblem of longevity.

8. Turna. تورنا

Probably the Siberian crane, *Grus leucogeranus*.

Manchu: Šanyan bulehen.

Chinese: HSIEN HAO. [Giles, *Grus viridorostris.*]

The "Mirror" says: This bird is of uniform white colour.

B.M. II gives as the Persian equivalent "kulang," كلنگ, which is the name of the common crane (*Grus communis*) in Persia and India.

The Chinese *hsien hao* means the "immortal" crane. It is the badge worn by officials of the 1st civil rank, and as such is usually described as representing the Manchurian crane, *Grus montignesia*: and is regarded as the emblem of longevity.

9. Kök Turna. کوک تورنا

The Blue Crane.

Grus cinerea.

Manchu: Yačin bulehen.

Chinese: CH'ING HAO.

10. Kul-rang Turna. تورنا (*sic.*) کول رانک

The Ash-coloured Crane.

? *Grus antigone.*

Manchu: Kôrčan.

Chinese: HUI HAO.

11. Kičik Turna. کیچیک تورنا

The Lesser Crane.
Anthropoides virgo.
Manchu: Ajige Kôrčan.
Chinese: HSIAO HUI HAO.

According to the Chinese this crane is a small variety of No. 10.

The "Mirror" says: Its colouration is grey, neck black, beak long, and in the corner of each eye there are white feathers which seem to protrude from the nape of the neck. The length of the body is one foot, five or six inches.

This may be the fourth of Marco Polo's five cranes (see Chap. lx): "a small kind, having at the ears beautiful pendent feathers of red and black." (The colour of the pendants varies in the texts). See note, Vol I, p. 297, of Yule, 3rd ed.).

There seems to be but slight difference between Nos. 9, 10 and 11. One of them probably stands for the Demoiselle Crane, *Grus virgo.*

12. Kök Laglag. کوک لکلک

The Blue Stork.
Manchu: Lamurčan.
Chinese: LAN.

The *laglag* (alias *laqlaq*, *laklak* or *lailak*) is known as "Ḥajji Laglag" among the Persians, who say that it makes the pilgrimage to Mekka during its annual winter absence; hence the title *ḥajji.*

The "Mirror" says: It somewhat resembles the *bulehen* (No. 7), its colouration is grey; it stands three feet in height, and has a long neck. When kept in private gardens, if it sees anyone in brightly-coloured clothes, it cries out, jumps about, pursues and pecks him.

The Chinese *lan* means "blue," and standing alone this character does not mean a bird (in the dictionaries I have consulted). Possibly the word *hao* is to be supplied. But such omissions are not common in the "Mirror"; compare, however No. 137.

13. Uqar or Auqar. اوقار

A stork or heron.

Both pronunciations seem common. It is also spelt عقار, as if it were an Arabic word.

Manchu: Yadana [Z. white ibis].
Chinese: KU [G. snow-goose, *Anser hyperboreus*].

Scully, "Stray Feathers" (923), says: This is the Turki name for the *Ardea cinerea* or grey heron.

In Klaproth's Uïghur vocabulary we find *ukhar* = the stork.

Scully (S. F. 925) gives *aq uqar*, "*Herodias alba.*"

The "Mirror" says: It is a water-bird, larger than the wild-goose; its plumage is a brilliant white; it soars very high. When settled, it looks thin and spare [*doči ganggahôn ilambi*]; its stride is wide.

The presence of the Chinese *ku* in this place is very remarkable.

14. Sarighiš Uqar. سارغیش اوقار

The Yellowish Heron (or Ibis).
Manchu: Suwayan yadana.
Chinese: HUANG KU.

According to the "Mirror" this is a sacred bird.

15. Ular [or Aular]. اولار

A species of stork.
? *Ciconia boyciana.*

This word is sometimes transcribed *aular*, but B. M. II states that *ular* is the correct pronunciation.

Manchu: Weijun [Z. "large, black stork"].
Chinese: KUAN [G. The common stork, *Ciconia alba:* heron or crane].

The *ular* mentioned by Scully "Stray Feathers," 816 and 816 *bis*, must be quite distinct. According to him, this name is given to two species of snow-cocks or snow-pheasants, viz., *Tetraogallus himalayensis* and *Tetraogallus tibetanus*. It is, however, curious to note that Hume and Henderson, p. 282, give the name of the latter bird as *utar*. But this is no doubt a misprint, for in the short list of birds given in the Report of Yarkand Expedition (1873), p. 70, *ular* is given as the name for the snow-pheasant.

B. M. II translates *ular* by Pers. مهمانه مرغ زرین, *mihmana murgh-i-zarrin*, which I have not been able to trace. An interesting note on "ullar" will be found in Marco Polo, Vol. I, p. 298.

The "Mirror" says: It is like the *yadana* (No. 13) in nature, but has no red markings on the head. The wings and tail are blue-black, and the body white.

Swinhoe (Proc. Zool. Soc., May 1873, p. 12) says: "The existence of any stork in China is very doubtful": but it has now been proved that a stork called *C. boyciana* (very like *C. alba*) and another called *C. nigra* both occur in China.

16. Ta'us. طاوس

The Peacock.
Manchu: Tojin.
Chinese: K'UNG CH'IAO [G. The Malayan peacock, *Pavo muticus*].

This peacock is the badge of rank of Criminal Judges in China.

17. Germa Ta'us. کرمه طاوس

A tail-spreading peacock.
Manchu: Huweijehengge tojin.
Chinese: K'AI P'ING K'UNG CH'IAO.

The word کرمه is presumably to be read *germa* from the verb *germek*, "to spread out."

The Manchu expression is derived from the word *huweijehen*, "a parasol"

18. Aqiš Janwar. آقیش جانوار

The Silver Pheasant.

Euplocamus nycthemerus.

Manchu: Šunggayan gasha.

Chinese: Pai hsien [G. Silver pheasant, *Euplocamus nycthemerus*].

The Turki is apparently merely a translation of the Manchu, "a whitish bird."

The "Mirror" says: Body white, on the side of the wing feathers are black markings. Tail, two feet long. Beak and legs red.

This bird is the badge of office of a Sub-prefect in China.

19. Waq. واق

A Stork or Heron.

Manchu: Gôwasihiya [Z. A stork].

Chinese: Lu ssŭ [G. *Egretta modesta*].

Waq is an onomatopæic name for the Night Heron (*Nycticorax griseus*) derived from the sound which this bird makes at night. A commoner form in Persian is *waq-waq*. In Sanskrit this bird has a similar name. In Kapurthala it is known as the *awank*.

The "Mirror" says: It has a crest on the head; neck long; beak long. It is found in various colours such as white, brown and sky-blue, and in various sizes.

The Chinese *lu ssŭ* is said by some to represent the *Egretta garzetta*, and is one of the badges of a Sub-prefect in China.

20. Kök Waq. کوک واق

The Blue Heron or Stork.

Manchu: Lamun Gôwasihiya.

Chinese: Ch'ing lu.

The "Mirror" says: It is somewhat larger than the white *Gôwasihiya* (No. 19) and it has three feathers of a mixed black and yellow colour on its head.

GROUP II.

21. Yawa Ghaz. یبا غاز

The Wild Goose.

The word for "wild" is pronounced variously *yawa*, *yaba* and *yaban* (Mod. Turkish).

Manchu: Bigan-i niongniyaha.

Chinese: Hung yen.

The "Mirror" says: These birds have long necks, they make a loud cry, and in flight keep a straight course.

No special variety is indicated by this number. In Chinese both *hung* and *yen* mean wild-goose. According to the Japanese Encyclopedia *Kashira gaki zō ho kun mo zu wi*, the large birds are called *hung* and the small ones *yen*.

22. **Qizil Tumšuq Ghaz.** قیزیل تومشوق غاز

? The Grey-Lag Goose [*lit.* red-beaked].
Anser cinereus.
Manchu: Šangkôra niongniyaha.
Chinese: CH'A YEN [*lit.* "the tea-goose"].

The "Mirror" says: This is the largest of the wild-geese, and has a red beak.

Anser cinereus has a reddish, fleshy beak.

23. **Püpeklik Ghaz.** فوفک لیک غاز

The Crested or Tufted Goose.
Manchu: Kanjiha niongniyaha.
Chinese: PIN HUNG [*lit.* "the visitor-goose"].

The "Mirror" says: This is the smallest of the wild-geese. Its beak is red, and on its head is a white, fleshy growth.

The Chinese epithet *pin* or "visitor" may refer to a Chinese saying that the wild-geese which migrate the first to the south are the hosts, while those who arrive later are the visitors. See Pétillon, *Allusions Littéraires*, p. 453.

24. **Waqt-lik Ghaz.** وقت لیک غاز

The Timely Goose.
Manchu: Eringge niongniyaha.
Chinese: HOU YEN.

The "Mirror" says: This is another name for the *kanjiha* goose (No. 23). This goose arrives punctually on the fifth day of "*Šahôrun silenggi.*"

Šahôrun silenggi is one of the 24 atmospheric changes or divisions of the year among the Manchus. It coincides with the beginning of the "cold dews" or the hoar-frost.

25. **Čung Āla Buyun Ghaz.** چونک آلا بویون غاز

A large goose with variegated neck.
Manchu: Amba konggoro niongniyaha.
Chinese: HUANG SHUO YEN.

The "Mirror" says: Its colouration is yellow, and its beak black.

26. **Kičik Āla Buyun Ghaz.** کیچیک آلا بویون غاز

A small goose with variegated neck.
Manchu: Ajige konggoro niongniyaha.
Chinese: HSIAO HUANG SHUO YEN.

The "Mirror" says: It is like No. 25, but smaller.

27. Utra Āla Buyun Ghaz. اوترا آلا بويون غاز

A medium-sized goose with variegated neck.

I take *utra* (اوترا) to be a variation of *orta* (اورته), *cf.* Ott. Turkish بويلى not اورته, "of medium height."

Manchu: Kailun niongniyaha [Z. *Anas crytropus*].

Chinese: LIEN YEN.

28. Kičik Qara Baš Ghaz. كيچيک قرا باش غاز

A small black-headed goose.

? *Anser erythropus.*

Manchu: Kiyoo niongniyaha [Z. Russian, *Kazarka, i.e.,* the Barnacle Goose].

Chinese: HSIAO HEI T'OU YEN.

The "Mirror" says: This goose has a black head and a white throat.

29. Čaqir Ghaz. چقير غاز

The Wall-eyed Goose.

Manchu: Čangkir niongniyaha.

Chinese: CH'IN YEN.

The "Mirror" says: This goose is found in the Koko-Nur District.

For explanation of the Turki word *čaqir*, see No. 53.

30. Qu. قو

? The Cormorant.

Manchu: Kôtan [Z. Russian, *Baklan* (=*Carbo cormoranus*)].

Chinese: T'AO HO.

The "Mirror" says: It somewhat resembles the wild swan (*garu* No. 36) and is grey in colour. Its beak is wide and its crop large. It fills its crop with water [which it then pours into rat holes], and having thus driven out the rats eats them.

I am in doubt whether the swan or the cormorant is intended here. *Qu* is the common Turki word for a swan.

31. Uqar or Auqar. اوقار

The Buff-backed Heron.

? *Ardea bubulcus.*

Manchu: Hoohan.

Chinese: CHUANG.

The "Mirror" says: Like the *gôwasihiya* (No. 19) in nature; the plumage is reddish.

See also No. 13 (above).

32. Kök Baliqči. كوك باليقچي

The Common Heron.
Ardea melanocephala.
Manchu: Lamun hoohan.
Chinese: CH'ING CHUANG [G. The common heron].

The "Mirror" says: This heron has a black back.

Scully, S. F., 986 and 988 gives *baliqči* as the local name of two kinds of tern, *Sterna fluviatilis* and *Sternula minuta*. *Baliqči* means literally a fisherman.

33. Āla Baliqči. آلا باليق چى

? The Purple Heron.
Ardea purpurea.
Manchu: Kuringge hoohan.
Chinese: HU PAN CH'UNG [*lit.* "tiger-marked reptile"].

The "Mirror" says: This bird has red markings on the breast.

34 Čulluq. چوللوق

The young of the white heron (No. 31).
Manchu: Šeyelhen.
Chinese: PAI HO TZŬ [G. white crane].

The "Mirror" says: Šeyelhen is the name given to the young of the white heron.

Čulloq is a name applied to various kinds of plover, see Scully, S. F., 844, 848. In Ottoman Turkish it means a woodcock.

35. Baliqči Quš. باليق چى قوش

? The Osprey or Sea-Eagle.
Pandion haliaëtus, Linn.
Manchu: Niyo-i hoohan [Z. the marsh falcon].
Chinese: SHUI YING, *lit.* The water-falcon.

The "Mirror" says: This bird has claws like those of a falcon (*giyahôn* No. 67) and it frequents marshy land.

Zakharoff adds: Hunters chase the female of this bird.

36. Dughduri. دوغدوري

? The Wild Swan.
Manchu: Garu.
Chinese: T'IEN O [G. Wild swan].

The "Mirror" says: This bird resembles the domestic goose, and has brilliant white plumage.

The Turki word is very like the common Indian name for the *tukdar* (تكدر) Great Indian Bustard, *Eupodotis edwardsii*, Gray. Pavet de Courteille gives *tughduy* as the name for the bustard (*outarde*), while Shaw (Yarkand Mission, 1873) gives *tughdarra* as the name for the Hubara, see No. 40.

37. Čin. چين

A sea-gull.

Čin is perhaps merely a transcription of the Manchu. Radloff gives *qigharčin* = a gull. This may possibly be composed of *qigha*, greedy, and *čin*, a gull; but it is possible that *čin* is in this case merely a termination as in *baldirčin*, a word Baber uses for the quail.

Manchu: Čin [Z. (Russian *chaika*) a gull].
Chinese: JAN O.

The "Mirror" says: The *Čin* somewhat resembles the white *weijun* (No. 15) but is smaller. It sits on the water and feeds on fish.

38. Su Tasqara. سو تاس قرا

The white Ibis.
Ibis melanocephala.
Manchu: Muke tashari [Z. *Carbo cormoranus*, Russian *baklan*].
Chinese: T'U CH'IU [G. bald-headed crane].

Zakharoff (who in this instance gives fuller details than the "Mirror") says: This bird is found in marshy land; it is a very large bird, has red eyes and a long neck; but has no feathers on the head and neck. It feeds on fishes and snakes.

The Turki appears to be a bald translation of the Manchu. *Su* = *muke* (water) *tasqara* is perhaps merely a transcription of *tashari*. In the next number it will be seen that *tashari* is translated by *quš*.

39. Sarigh Quš. سريق قوش

? The Yellow Crane.
Manchu: Sohon tashari.
Chinese: MAI HUANG CH'IU.

The "Mirror" says: It frequents the fields when the corn is ripening.

The same Turki name is applied to an owl, see No. 97.

40. Ghačir. غچير

The Great Bustard.
Otis tarda.
Manchu: Humudu [Z. Bustard; Russ. *dudak* and *drakhvá*].
Chinese: PAO [G. *Otis tarda*].

The "Mirror" says: It is larger than the wild-goose; neck and breast white; back mottled; tail short.

P. de Courteille gives *qačir* as the Turki name for a vulture. Compare No. 36.

41. Quy Ghačir. قوي غچير

? MacQueen's Bustard.
Otis macqueenii.
Manchu: Todo [Z. Russ. *dudak*].
Chinese: YANG PAO [*lit.* "sheep bustard"].

The "Mirror" says: It is a large bird, like the *humudu* in form; it has no spurs; below the chin it has long hanging feathers like a goat's beard.

"Below the chin" is hardly an accurate description of the position of these feathers.

With regard to the name "sheep bustard," my friend, Col. D. C. Phillott, informs me that in Persia the large bustard is called *miš murgh*, or "sheep bird."

42. Su-Buqa. سو بوقا

? Bittern.
Botaurus stellaris.
Manchu: Hônksi (pronounced Hunsi).
Chinese: WEI NIAO, *lit.* the reed-bird.

The "Mirror" says: It is smaller than the large stork, and larger than the small stork. When it puts its beak in the water it makes a very loud noise like the soughing of the wind (*hông seme*).

Dr. Scully has the following note quoted in Bowdler Sharpe's List, No. 287, on the Bittern, *Botaurus stellaris.*

"The Yarkandis call this species *Kul Bughasi*, 'the Stag of the Lake,' and say that it is a permanent resident in the country, breeds in long grass jungle, and makes a very loud booming noise *by sticking its bill into a reed!*"

Now the Turki name *su buqa* means literally 'the water-ox.' Taking together this name, the Chinese name, and the description in the "Mirror," I imagine that this number is identical with Scully's *Botaurus stellaris.*

Colonel Phillott informs me that in Mesopotamia the Arabs call both the pelican and the white heron 'water-sheep'—an appellation given also to gulls by the boatmen in the Persian Gulf.

The popular etymology (*Volksetymologie*) of Botaurus from *bos+taurus* forms an interesting *pendant* to the peculiar Eastern names for the Bittern.

43. Kesma Tumšuq. كسما تومشوق

? Spoon-bill.
Platalea leucorodia.
Manchu: Saibihan [Z. Russian, *Kolpitsa*].
Chinese: TÊNG KÓ TZŬ TSUI.

The "Mirror" says: It somewhat resembles the *Gôwasihiya* (No. 19). The end of the beak is broad (*ončo*).

44. Yesi Tumšuq. يسي تومشوق

? Spoon-bill.
Platalea leucorodia.
Manchu: Halbahan [Z. Russian, *Kolpitsa*].
Chinese: Same as No. 43.

Here we apparently have two words in Manchu and in Turki to express one and the same bird. The Mirror simply says "this is also the *Saibihan*."

Zakharoff translates both words by *Kolpitsa*, which is *Anas latirostra*, whereas a spoon-bill is *Kolpik* in Russian.

Both Turki names refer to the peculiar formation of this bird's beak (*tumšuq*).

45. Biz Tumšuq. بيز تو مشوق

Manchu: W a n g g a. [Not in Zakharoff.]
Chinese: CHIAO CHING.

The "Mirror" says: This bird somewhat resembles the *Saibihan* (No. 43) but has a sharp (*narhôn*) beak.

The following definition of the Chinese *chiao ching* is given in Giles.

"A long-legged bird described as having a mallard's body, long legs and a reddish feathery crust. Its colour is dun-yellow. It makes its nest in the hollows of high trees, and its young hold onto its wings with their beaks, and are carried down to feed on fish."

The Turki name means literally "awl-beaked."

46. Yamghurči. يامغورچي

? Plover, Sanderling or Avocet.
Manchu: W a k a n.
Chinese: SHUI WA TZŬ.

The "Mirror" says: This is a small bird somewhat resembling the *gôwasihiya* (No. 19). It is whitish in colour and has a long, curved neck (*meifen golmin bime gahôngga*).

The Chinese *wa tzŭ*, without *shui* (=water), is translated in the dictionaries by 'lapwing' and by 'common heron.'

The Turki name is derived from *yamghur* (or *yaghmúr*) rain, and means therefore 'the rainy one' or *pluvialis*. It is a common name for all waders. Scully (S. F. 888) gives it as a name for the Sanderling *Calidris arenaria*.

If the "Mirror" had said long, curved *beak* instead of neck, the description might have fitted the Avocet *Recurvirostra avoceta*.

See also No. 242.

47. Buranči. بوران چي

? Moorhen.
Manchu: Č o o g a n.
Chinese: SHU YÜ [Giles, Moorhen].

The "Mirror" says: This is a small water-bird somewhat resembling the *lamun gôwasihiya* (No. 20). It lives on fish.

GROUP III.

48. Qara Salwar. قرا سالبار

A Black Vulture.
? *Otogyps calvus.*
Manchu: A y a n t a s h a r i.
Chinese: LAO TSAO TIAO.

The "Mirror" says: This bird resembles the *damin* (No. 52) in build. Its body is very large; its wings and tail are a glossy black.

49. Salwar. سالبار

The Vulture.
Vultur monachus.
Manchu: T a s h a r i.
Chinese: TSAO TIAO [a general name for eagles].

The "Mirror" says: This bird resembles the *damin* (No. 52) in build. It measures more than two Chinese feet in length; it has black down on the legs.

Scully (S. F. 1) says: *Salwar* is the Turki name for the *Vultur monachus.*

50. Álamán Quš. آلمان قوش

General name for *Raptores.*
Manchu: D a s i h i k u g a s h a [Z. Russian, *Lovchaya ptitsa*].
Chinese: CHIH NIAO [Giles, vulture].

The Chinese *chih* means 'to hold or grasp.' The Turki *álaman* is from *álmaq*, to 'seize,' while the Manchu verb *dasihimbi* means 'to seize with the claws.'

51. Áq Báš. آق باش

The White-headed Vulture.
? *Gypætus barbatus.*
Manchu: Y o l o.
Chinese: KOU T'OU TIAO, *lit.* dog-headed vulture.

The "Mirror" says: This is the largest of all birds (!); its head is white and its body grey (*fulengge* = ash-coloured).

Zakharoff says: This is the *Berkut* of old Russian books. [According to the Dictionary of the Academy, *berkut* = *Falco imperialis.*]

I do not know on what authority Zakharoff makes this identification. The word *berkut* is evidently a Turkish word taken by the Russians from the Tartars, and the compilers of this polyglot dictionary use this word for the translation of the Manchu *damin* (No. 52).

52. Borgut. بورکوت

A general name for eagles, especially for The Golden Eagle or Bearcoote.
Aquila chrysaëtus.
Manchu: D a m i n.
Chinese: TIAO.

Scully says: *Birkut* is the Turki name for the Golden Eagle, but in Kashgar this eagle is known as the *qaraquš.*

According to Vambéry the Turki name is derived from *börk*, a hawk's cap (a corruption of the Arabic برقع), this eagle being much employed for falconry, as we are correctly informed by Marco Polo.

A most vivid description of a stag-hunt with a bearcoote is given on pp. 492-494 of Atkinson's Oriental and Western Siberia (London 1858). Col. Delmé Radcliffe in his article on falconry in the 9th edition of the "Encyclopædia Brittanica" says he does not believe that the bird described by Atkinson and Scully is the Golden Eagle.

53. Čaqir Borgut. چقیر بورکوت

A two-year old eagle.
Manchu: Saksaha damin.
Chinese: Chieh pai tiao.

The "Mirror" says: A two-year old *damin*, whose wing feathers are blackish, but white near the quill, is called *Saksaha damin*.

Saksaha = a magpie.
Chieh pai might mean "beginning to whiten."

The Turki adjective *čaqir* is translated in the dictionaries by "blue-eyed." I remember hearing the term applied to a "wall-eyed" dog in Bokhara. It is very likely connected with the Manchu word *čikiri*, which denotes a grey horse or dog, but is rendered in Turki by *āla* in No. 56 and by *čapar* in No. 70.

54. Bederlik Borgut. بدرلیک بورکوت

The Spotted Eagle.
Aquila clanga, Pall.
Manchu: Kuri damin [= variegated eagle].
Chinese: Hu pan tiao [= tiger-striped eagle].

The Turki word *bederlik* is not to be found in the dictionaries. It presumably means spotted or striped, and may be borrowed from the Manchu word *bederi* = a spot.

The "Mirror" says: This is a full-grown (*lit.* fully aged) eagle, whose wing feathers are striped like a tiger's skin.

55. Sarighič Borgut. سارغیچ بورکوت

The Tawney Eagle.
Aquila fulvescens.
Manchu: Kôwa damin.
Chinese: Huang pai tiao [*lit.* yellow-white eagle].

The "Mirror" says: This eagle is pale-yellow (*gelfiyen sohon*) in colour.

56. Ala Borgut. آلا بورکوت

? The Variegated Eagle.
Manchu: Čakiri damin.
Chinese: Hua pai tiao [*lit.* variegated white eagle].

The "Mirror" says: The colouring of this eagle is a mixture of black, white and crimson.

57. Aqiš Borgut. آقیش بورکوت

A white eagle.
Manchu: Isuka.
Chinese: PAI TIAO.

Zakharoff says: This eagle has white stripes on the primaries, white eyes, and a white tail. The "Mirror" says: It somewhat resembles the *nimašan* (No. 59).

58. Kökiš Borgut. کوکوش بورکوت

A dark-grey eagle.
? *Spizaëtus alboniger.*
Manchu: Yasuka.
Chinese: CH'ING TIAO.

The "Mirror" says: This bird resembles the *isuka* (No. 57) and is found on the lakes of Liao-tung in Manchuria.

59. Qara Tár. قراتار

A dark-coloured eagle.
Manchu: Nimašan.
Chinese: CHIH MA TIAO.

The "Mirror" says: This eagle is like the *damin* (No. 52); body blackish; tail short; on the wings are very small black spots. The tail is sometimes white.

60. Huy Quš. هوي قوش

An eagle.
Manchu: Tarbalji.
Chinese: T'UAN TIAO.

The "Mirror" says: This eagle has a blackish body and variegated wings.

The same Turki name is used for No. 92 below.
Probably an eagle resembling an owl. Compare No. 65 below.

61. Čuli. چولي

An eagle or vulture.
Manchu: Matkala.
Chinese: TAO SHA TIAO.

The "Mirror" says: This bird somewhat resembles the *giyahôn* (No. 67). It is as large as the *damin* (No. 52) but slighter in build. It lives in the depths of forests.

The Turki name *čuli* is not to be found in any of the Turki dictionaries I have consulted, except the "Lughat-i-Turki," where it is given as an alternative form of *čáuli*, and is translated by the Persian چوزه و شاهين, *i.e.*, a chicken or a *sháhín* falcon. B. M. I and II both say that čáuli چاولي is the equivalent of the Persian *jurra* or male falcon.

Perhaps the list changes from *vulturidæ* to *falconidæ* with this number; though the Chinese still has *tiao!*

62. Aq Báš Sár. آق باش سار

The Marsh Harrier.
Circus æruginosus.
Manchu: K a r č i n [Z. A vulture].
Chinese: HUA YAO YING.

Scully, S. F., No. 54, gives *A'q báš sá* as the name for *Circus æruginosus.*

The forms *sār* and *sā* seem to be interchangeable in this list.

Giles says: *Yao ying* is *milvus govinda.* The Chinese name for this bird would therefore be the variegated kite. But *yao ying* is used to express No. 63, the Buzzard.

63. Sár. سار

The Buzzard.
Buteo vulgaris [Scully, S. F., 44].
Manchu: H i y e b e l e.
Chinese: YAO YING [Giles, *Milvus govinda*].

سار again used for more usual سا *sá.*

64. Kökenek. کوکنک

? The Kestrel.
? *Cerchneis tinnunculus.*
Manchu: B a l d a r g a n.
Chinese: CH'ING CHIEN.

The "Mirror" says: This bird resembles the *karanidun* (No. 76). The eyes and feet are yellow. It eats frogs and toads.

Zakharoff says: It belongs to the *Vulturidæ.*

B. M. Or. II gives Kökenek as the equivalent of the Persian *búm*, an owl.

According to Scully the Turki name for the Kestrel is Kurganak, but in B. S. No. 22 one allusion to this bird will be found under "Kukunak Kushkunak" [adult male].

65 Yurtči. يورت چي

? An owl.
Manchu: Še [Gabelentz, "Weisser Sperber." Z. "Crested owl"].
Chinese: FÊNG YING.

The "Mirror" says: This bird somewhat resembles the *tarbalji* (No. 60). It is whitish in colour and its ears are like the ears of a lynx.

Zakharoff seems to be right in saying this bird is an owl. And it is worthy of remark that the bird to which it is compared by the "Mirror," namely, the *tarbalji*, has in the Turki the name *huy quš,* which is also the name for *Bubo maximus*: see No. 92 below.

Side by side with Gabelentz's "Weisser Sperber" or white sparrow-hawk, we have in P. de Courteille's Dictionary *Yurtji* translated by "corneille."

The Turki name *yurtči* (from *yurt*, a camp) was used to designate a man who went ahead of an army and selected the next camping ground. The name as applied to an owl may therefrom be connected with some superstition among the Turki-speaking peoples.

66. Püpeklik yurtči. نوفلك ليک يورت چي

? A crested owl.
Manchu: Gunggulunge Še.
Chinese: CHIAO YING [G. the harpy eagle].

GROUP IV.

67. Qarčigha. قار چغا

The Goshawk.
Astur palumbarius [Scully S. F., 21].
Manchu: Giyahôn.
Chinese: YING.

Scully gives a long description of this bird in "Stray Feathers," and says it is commonly used for hawking in Kashgharia.

Vambery says: *Qarčiga* or *qarčuga* means "black-headed."

68. Sunggar. شونک قار

A species of Gyr-falcon.
Falco Gyr-falco.
Manchu: Šongkon.
Chinese: HAI CH'ING, *lit.*, "sea-blue."

The "Mirror" says: The *Šongkon* resembles the *itulhen* (No. 72) in nature. It is skilful and rapid in flight. It captures swans and other birds of that kind.

A Chinese-Persian Vocabulary in my possession (dated A.D. 1549) gives *Sháh-báz* as the translation of *hai-ch'ing*. *Sháh-báz* is the the Persian name for the crested hawk-eagle, *Limnœtus cristatellus*.

Scully and others maintain that the Turki *Šungqar* or *Šunghar* is the *Falco hendersonii* (Hume). But Col. Phillott assures me that the *Šunggar* of old MSS. is a species of Gyr-falcon. See also No. 72.

69. Aq Šunggar. آق شونك قار

The White Falcon.
Manchu: Šanyan šongkon [Z. Greenland Falcon].
Chinese: PAI HAI CH'ING.

The "Mirror" says: This bird is bigger than the *Šongkon* (No. 68). The feathers on its breast are a brilliant white.

Scully (S. F., p. 78) also speaks of perfectly white *Šungqars*, which he calls albinos. But this may be incorrect as the "Mirror" indicates a distinct white variety.

A'q-sungqar was the name of one of the Amirs of Sultan Mahmud of Ghazna.

70. Čapar Šungqar. چاقار شونک قار

A mottled falcon.
Manchu: Čakiri šongkon.
Chinese: LU HUA HAI CH'ING.

The "Mirror" says: This bird has a white head, while the back and wings present a mixture of black and white.

The word *čapar* is Persian, and means "of two colours."

71. Mašriq-daghi šungqar. مشيريق (*sic*) داقي شونک قار

The Eastern Falcon.
Manchu: Šongkoro.
Chinese: HAI TUNG CH'ING.

The "Mirror" says: This falcon is found on the shores of the Eastern Seas. It catches big and little birds with ease.

Zakharoff says: It is the biggest of this family. It kills even swans.

The Turki-speaking peoples, not knowing the sea, simply call this falcon "one which lives in the East."

The Turki *Šungqár* and the Manchu *Šongkoro* are no doubt identical in origin.

72. Italgu or Aitalgu. ايتلكو

Saker Falcon.
Falco sacer.
Manchu: Itulhen.
Chinese: T'U HU.

Scully says: The *italgu* is the female of the *šungqar* (No. 68), but Col. Phillott says it is *F. sacer*, the "charkh" of India. The Turki name of this falcon, especially of the female, is *aitalgū* or *italgū* (see J.A.S.B., Vol. III, No. 3, 1907).

The similarity of the Turki name *italgu*, with the Manchu *itulhen*, can hardly be fortuitous.

David says: *F. sacer* is called by the Pekinese *huang ying*.

73. Sáng-Sáng. سانک سانک

A variety of Saker (Phillott).
Manchu: Heturhen.
Chinese: LAN HU SHOU.

Col. Phillott (J.A.S.B., Vol. III, No. 3, 1907) says: "A variety of Saker that does not appear to have been yet described is said to be feathered on the tarsi and feet like 'certain breeds of pigeons.' Amongst the professional falconers of Pindi Gheb this variety is called *sang-sang*."

74. Lačin. لاچین

? The Shahin Falcon.
Falco peregrinator, Sundevall.
Manchu: Način.
Chinese: YA HU.

Scully says: The *lačin* is *Falco barbarus*, but Col. Phillott assures me it is the *Shahin* of India.

75. Turumtay Láčin. لاچین *(sic.)* تورومتای

The Merlin Falcon.
Manchu: Indahôn način.
Chinese: YA HU TO ERH.

This may possibly be the Red-headed Merlin, *Æsa'on chicquera* (see J.A.S.B., Vol. III, No. 6, 1907) which in India is called "*turumti.*"

76. Turumtay. (*sic*) توروم طای

The Merlin.
Lithofalco æsalon (Scully, S. F., 15).
Manchu: Karanidun.
Chinese: TO ERH.

The "Mirror" says: This bird has a large head but a small body. The apple of its eye is black. It catches quails and such-like birds, and is very swift and cunning.

77. Qirghuy. قیرغوی

The common sparrow-hawk.
Accipiter nisus.
Manchu: Silmen.
Chinese: CH'IAO YING [Giles, *Milvus govinda*].

The "Mirror" says: "*Silmen*" is the general name for birds which catch quails and the like.

Scully says (karghai) *qarghay* is the Turki name for the sparrow-hawk. I presume that the *qirghuy* of our list is only another form of the same word.

If, as is quite possible, the name is derived from the verb *qirmáq*, to destroy, the form *qirghuy* is the more accurate.

Baber speaks of the *qirghu* in his "Memoirs."

78. Itka Qirghuy. ایتکه قیرغوی

Another name for the sparrow-hawk.
Manchu: Ayan silmen (The white sparrow-hawk).
Chinese: HSI HSIUNG.

The "Mirror" says: This is the name of the male of the *Morin silmen* (No. 79).

The Chinese *hsiung* (G. No. 4699) is used to express the male of birds; *hsi* means fine or delicate, and occurs in a name for *Accipiter nisus* given by Giles, *hsi hsiung* (G. No. 4696).

The Turki word *itka* is defined below: see No. 88.

79. Búz Qirghuy. بوز قیرغوي

Another name for the sparrow-hawk.
Manchu: Morin silmen.
Chinese: YAO TZŬ [Giles, sparrow-hawk].

The "Mirror" says: This bird is the female of the *Ayan silmen* (No. 78): than which it is somewhat larger.

Col. Phillott informs me that *búz* and *búzyúr* are terms applied to birds up to the first moult; the equivalent term in India is *chúz*.

بوز read *boz* means "grey," and *bozdaghan* is the name of a grey falcon. B.M. I gives بوزدم-جانور كه كريز اول خورده باشد

80. Jip Qirghuy. جيف قيرغوي

Another name for the sparrow-hawk.
Manchu: Ajige hiyan silmen.
Chinese: SUNG ERH [G. a brown sparrow-hawk].

The "Mirror" says: This is the male of the *hiyan silmen* (No. 81).

81. Tiš Qirghuy. تيش قيرغوي

Another name for the sparrow-hawk.
Manchu: Hiyan silmen.
Chinese: PAI HSIUNG.

The female of the preceding bird (No. 80).

82. Turi. توري

Another name for the sparrow-hawk.
A term in falconry.
Manchu: Jafata.
Chinese: CH'IN HUANG.

The "Mirror" says: A *silmen*, when it first leaves the nest of its own accord, is called *jafata*.

83. Tölek. تولاک

A term in falconry: "Intermewed."
Manchu: Hukšen.
Chinese: LUNG YING [*lit.* a trapped falcon].

The "Mirror" says: "All eagles, falcons, etc., who have passed a year in the falconer's house are called *hukšen*.

The corresponding Indian terms are خانگي *khanagi*, and خانه گريز *khána guriz*.

B.M. I gives تولک = كريز خانه, that is, the "mews," and تولاک for "intermewed."

84. Taš Tölek. تاش تولاک

A term in falconry: "haggard."

Manchu: Bigan-i hukšen.

Chinese: SHAN LUNG.

The "Mirror" says: Birds which have passed a year in the wild state are called *bigan-i hukšen.*

B.M. I. gives کريز صحرا=تاش تولک

Nos. 80, 81, 82, 83 and 84 are all falconers' terms, but seeing that they are introduced in this place it is quite possible these terms are applied to birds in the state specified without further addition.

85. Ala Quyruq Sár. آلا قوي روق سار

A Buzzard.

? *Archibutes aquilinus.*

Manchu: Huweten.

Chinese: HUA PAO [Giles: *Archibutes aquilinus*].

The "Mirror" says: The *huweten* somewhat resembles the vulture (*hiyebele* No. 63), and is whitish in colour. It catches mice, hares and pheasants, but with difficulty (*arkan*).

The Turki *ála quyruq* means "having a variegated tail."

Giles also gives *pai* (white) *pao* as a name for the Buzzard.

86. Lapang Sár. لفنک سار

A Buzzard.

Manchu: Lahôta.

Chinese: PAI CH'AO.

The "Mirror" says: The *lahôta* resembles the vulture (No. 63), but is smaller. The root of the tail is white. It is an unintelligent bird, *i.e.*, it is useless for hunting.

I have not been able to trace the Turki word *lapang* or *lafang*.

87. Kök Lapang Sar. کوک لفنک سار

A Buzzard.

Manchu: Lamun lahôta.

Chinese: HEI CH'AO.

Apparently a dark variety of No. 86.

88. Itka. ايتکه

A term in falconry.

Manchu: Utan.

Chinese: WO CH'U [*lit.* a nestling or fledgeling].

The "Mirror" says: Hawks and falcons taken from the nest and tamed are called *utan.*

Zakharoff only gives *utan* in the sense of pelican, synonymous with *kutan.*

GROUP V.

89. Selkeš. سلكش

A hybrid falcon.

Manchu: Kiyakôha.

Chinese: P'IAO YING [*lit.* a moulting falcon].

The description in the "Mirror" is lengthy and curious; I therefore give the original.

Kiyakôha amu hačin jaka damin giyahôn silmen hiyan silmen-i jergi jaka de gemu bi tuibulači morin-i adali imu de juru jaka gôwa jaka de ačafi banjihangge be kiyakôha sembi, umesi aldasi bude fusihôn jaka.

Amyot (Vol. III, p. 54, sub-voce *kiakouha*) gives the following definition which represents very fairly the meaning of the above :—

"Nom d'une espèce d'oiseau de proie qui s'accouple indifféremment avec les "oiseaux d'autres espèces; c'est pourquoi leurs petits, tantôt d'une espèce, et tantôt "d'une autre, sont des oiseaux inutiles, qui ressemblent au mulet dans leur genre."

90. Jaghalmay. جغالماى

The Hobby.

Falco subbuteo (Scully, S. F., No. 13).

Manchu: Keikuhen.

Chinese: HSIA MO YING.

Scully gives the form *jaghalbay.*

91. Bay Quš. باى قوش

? The Snowy Owl.

Nyctea nivea (Scully, S. F., 68 *bis*) more probably here *Asio otus.*

Manchu: Ančun gôwara.

Chinese: HÊN HU.

The "Mirror" says: This bird has a large body. Its plumage is yellow, with black markings. It has large eyes, and on its head are feathers which look like lynx's ears.

The above description does not at all fit the Snowy Owl, but would do for the Eagle Owl, *Bubo ignavus*, or the long-eared owl, *Asio otus.*

B. M. Or. 1912 merely translates *bay quš* by *bûm.* B. M. Or. 404 gives *bay ughli* = بوم و جغد. According to Vambery *bay* here means "magic." The word may also mean "rich," and Scully translates the name by "noble bird." D. de Rhins gives *bay ughli* = *Scops giu.* See also No. 97 below.

In Houtsma's List *bay quš* is translated by the Arabic القبيسة, which is only an orthographic variation of القبيصة, which Dozy gives as "*chouette.*"

92. Huy Quš. هوي قوش

The Eagle Owl.
Bubo maximus (Scully, S. F., 70 *bis*).
Bubo turcomanus (B. S. 25).
Manchu: F u g ô w a r a.
Chinese: MU T'U [*lit.* tree rabbit].

The "Mirror" says: In nature this owl resembles No. 91. It is about the size of the *damin* eagle (No. 52).

Compare No. 60, where the same Turki name is applied to a species of eagle.

93. Yapalaq. ياپالاق

The Short-eared Owl.
Otus brachyotus (Scully, S. F., 68).
Manchu: E l b e n g ô w a r a.
Chinese: MAO CH'IH [*lit.* reed-owl].

The "Mirror" says: This bird is like No. 92, but smaller.

This would seem to imply that it was long-eared rather than short-eared.

94. Šúm Quš. شوم قوش

A species of owl.
Manchu: Y a b u l a n.
Chinese: HSIAO NIAO.

The "Mirror" says: This owl resembles No. 93; its cry is disagreeable, but its flesh pleasant to the taste.

Zakharoff adds that it is the size of the turtle-dove; and that its cry is regarded as a bad omen.

Giles says *hsiao niao* is a fabulous bird which devours its own mother, all but the head; but the definition in the "Mirror" does not imply a fabulous bird.

The Turki *šúm quš* is a translation of the Arabic *al-búm al-maš'úm*, the owl of ill-omen. Steingass gives an idiom بوم خواندن "to call or invite the owl, to render desolate."

Persian literature is full of allusions to the ill-luck which owls bring.

95. Čüghündük. چوغوندیک

Athene bactriana (Scully, S. F., 76 A).
Carine bactriana (B. S. 28).
Manchu: H ô š a h ô.
Chinese: YEH MAO ERH [*lit.* the night-cat].

Giles gives *yeh mao tzŭ* = *Scops sunia*, the screech owl.

The Turki word recalls the Persian *chughud* = little night-owls.

96. Ayágh-siz. آیاغ سیز

The Night-jar or Goat-sucker.

Caprimulgus arenicolor (Scully, S. F., 112 A).

Manchu: Yabšahô.

Chinese: CH'IH HSIAO [Giles, the eared-owl].

The "Mirror" merely says: This bird resembles No. 95.

Gabelentz says *yabšahô* is a bird resembling the cuckoo. Zakharoff and Amyot have omitted this word.

The Turki name means literally "the footless one."

97. Sarigh Quš. سریق قوش

? The Scops Owl.

Scops giu.

Manchu: Humše.

Chinese: SHU MAO ERH [*lit.* the tree-cat].

The "Mirror" says: This bird is like the *ančun gowâra* (No. 91) but much smaller.

Now the Turki name for No. 91 is *bay quš*, which I am inclined to identify with *Asio otus*. D. de Rhins, in his short list of birds, mentions one called *bay oghli* = *Scops giu*. *Bay oghli* means literally the rich man's or nobleman's son. And seeing that the bird here called *sarigh quš* is said to be like the *Bay quš*, but much smaller, it is quite possible that in some localities it may have received the name *bay oghli* on account of this resemblance.

The same name is applied to a crane, see No. 39.

98. Leken Tukhosi. لکن توخوسی

A gull or petrel.

Manchu: Suwan.

Chinese: LU SSŬ.

The "Mirror" says: It has a black body and a hooked beak. It is bigger than a crow (*gaha*), and catches fish.

99. Baliqči. بالیق چی

? The Tern.

Sterna hirundo.

Manchu: Suksuhu (Zakh., *Sterna hirundo*).

Chinese: YÜ YING [*lit.* fish-falcon] (Giles, *Sterna hirundo*).

The "Mirror" says: Colouration yellow, wings long, tail short, neck thick. It catches fish.

Scully *apud* Shaw says that the name *baliqči* (or fisherman) is applied both to *Sterna fluviatilis* and to *Sterna minuta*.

The *Sanglákh* translates *baliqčin* by the Persian بوتیمار (*bú-tímár*) = a heron.

In view of the probable identification of No. 100, it seems quite possible that the Osprey or fish-eagle, *Pandion heliaëtus*, Linn., is here intended.

100. Aq Baliqči. آق باليق چى

White Fish-Eagle.
Heliaëtus albicilla, Linn.
Manchu: Šanyan suksuhu.
Chinese: PAI CHÜEH.

The "Mirror" says: It is like the falcon (*giyahôn* No. 67); it has white feathers on the head. The tip of the tail is whitish. It catches fish with great ease.

The word *chüeh* is not given in Giles. But the *pai chüeh* is one of the seventy-two birds illustrated in the *Erh-ya*, where it looks like an eagle.

101. Turna Baliqči. تُورنه باليق چى

The Osprey.
Pandion Heliaëtus.
Manchu: Sisuhu [Z. misprints *sisuku*].
Chinese: O [Giles, Osprey].

The "Mirror" says: This bird has sunken eyes like the owl (*elben gôwara* No. 93).

102. Qara Baliqči. قرا بليق چى

? A black tern or sea-eagle.
Manchu: Dasukô.
Chinese: TIAO CHI.

The "Mirror" says: This is a large gull somewhat resembling an Eagle.

This resemblance is also implied by the Chinese name.

103. Darya Italgu. دريا ايتلكو

? A large sea-eagle.
Manchu: Mutulhen.
Chinese: HAI HU.

The Turki and Chinese names both mean sea-falcon.

104. Darya Qirghuy. دريا قيرغوي

? A sea-hawk.
Manchu: Mulmen.
Chinese: HAI YAO.

The Turki and Chinese names both mean sea-hawk.

105. Qizghiš Baliqči. قيز غيش بليق چى

? A red-beaked gull.
Manchu: Buhere.
Chinese: YÜ KOU (*lit.* fish-dog).

According to the "Mirror" this gull has a red beak and a white neck.

The word *qizghiš* is not to be found in the dictionaries, but it probably means "reddish," *cf. qizimtul.*

106. Yašil Baliqči. یاشیل بلیق چی

? The green gull.
Manchu: Nimargan.
Chinese: Yü hu (*lit.* fish-tiger).

The "Mirror" says: This is a large gull with green plumage.

107. Kökiš Baliqči. کوکوش بلیق چی

? A blue gull.
Manchu: Čurbi gasha.
Chinese: Ts'ui pi (*lit.* blue-green).

The "Mirror" says: A small gull with blue plumage.

108. Čulloq Baliqči. چول لوق بلیق چی

? A small gull.
Manchu: Čunu gasha.
Chinese: Ts'ui nu.

The "Mirror" says: This bird is smaller than the *Čurbi gasha.*

109. Šib Turunghu. شیب تورونغو

? A white gull.
Manchu: Kilahôn (Z. a stork).
Chinese: Ou.

The "Mirror" says: There is no difference between the large and small varieties of this bird. Its colouration is white; it has a stumpy tail, and eats fish.

110. Su Čüghündük. سو چوغوندوک

? A sea-owl.
Manchu: Muke hôšahô.
Chinese: Shui hsiao.

All three names mean sea-owl.

The "Mirror" says: The *kilahôn,* which resembles the owl, is called muke hôšahô.

GROUP VI.

111. Keti Rang Tukhi. کاتی رنک توخی

The Golden Pheasant of China.
Thaumalea picta (Gould).
Manchu: Junggiri čoko.
Chinese: Chin chi [David, Kin ki = *Thaumalea picta*].

Zakharoff says: This is a small golden pheasant. It is used on embroideries as the heraldic emblem of the third and fourth classes.

The "Mirror" says: Five colours are represented on its body.

The Turki *Tukhi* means a fowl, and corresponds to the Manchu *Čoko* and the Chinese *Chi*.

112. Püpišheklik Tukhi. فوني شک ليک توخي

Temminck's Horned Pheasant.
Ceriornis Temmincki.
Manchu: Suihetu čoko.
Chinese: T'u SHOU CHI [Gould, *Tu xou niao*].

The "Mirror" says: It has a red head. The plumage on the breast is a mixture of grey and yellow. On fine days it spreads [its feathers]. From the head two fleshy horns stand out prominently. In the place of a chin it has a fleshy bag hanging down.

Gould says: In the pairing season the membrane can be enlarged or contracted at the will of the bird.

I think the "Mirror's" description and Gould's illustration, taken together, justify this identification.

113. Uštur Murgh. او شتر مرغ

The Ostrich.
Struthis.
Manchu: Temege čoko.
Chinese: T'O CHI [*lit.* camel-fowl].

The "Mirror" says: This bird is found in the Southern Seas and in the south of the Province of Fu-Kien. It is very large, measuring six feet in height. It is unable to fly. When full grown, five colours are represented on its body.

The Turki *uštur* is another form of the Persian *šutur*, a camel.

Giles says *t'o niao* (camel-bird) is the name for the Emu; while the usual Chinese name for the Ostrich is *ta ma ch'iao* (the great horse-bird).

Bretschneider ("Mediæval Researches" I, pp. 143-144) says: The Ostrich, although found only in the deserts of Africa and Western Asia, was known to the Chinese in early times, since their first intercourse with the countries of the Far West.

114. Qaramtil Murgh. قرام تيل مرغ

The Chinese Crossoptilon.
Crossoptilon auritum.
Manchu: Yahana čoko [Z. Russian *glukhar* =grouse].
Chinese: HUO CHI [usually means the Turkey].

The "Mirror" says: It resembles the *šunggin gasha* (No. 18): it is larger than the pheasant; body blackish; head and neck dark-blue; beak white; reddish rings round the eyes; feet all red; tail white, but slightly black at the extremity. It stands two Chinese feet in height.

Underneath the chin, and standing out from the side of the head, are ash-coloured feathers looking like the horns of a wild beast.

This description corresponds so exactly with the illustration of the Chinese Crossoptilon in Gould's "Birds of Asia" that I feel no hesitation in making the identification. Moreover, the matter seems finally settled by the following quotation in regard to the Chinese name: "The Chinese name is *ho chi*, either "river-fowl" or "fire-fowl." From our text we now know it to be the "fire-fowl."

115. Tajilik Murgh. تاجی لیک مرغ

Pencilled Pheasant.
Gennœus nycthemerus (Gould).
Manchu: Gônggala čoko [Z. name of a grouse].
Chinese: Ho chi.

The "Mirror" says: On its head it has black feathers like a tuft (*sorson*), which hang down below the neck. It is a strong fighter.

Zakharoff says: "Name of a grouse (*teterev*). Feathers hang from its head like the tassel of a Chinese hat! It is very quarrelsome.

Giles and Poletti say of the Chinese *ho* (Rad 196 + 73): A variety of pheasant, emblem of courage. Its long tail feathers are worn by actors; it has a crest.

Giles says it is Reeve's Pheasant, but I am inclined, on account of the picture in Gould, to identify it with the Pencilled Pheasant.

See No. 133, which I think is more likely to be Reeve's Pheasant.

116. Ala Buyun Murgh. آلا بویون مرغ

A kind of Francolin.
? *Ithaginis sinensis.*
Manchu: Alhari čoko.
Chinese: Shan hua chi.

The "Mirror" says: It is like the pheasant (*ulhôma*). It is found in the Fu-Kien Province. Head black; the feathers on its cheeks protrude above the head. The feathers on its back are white, with markings of various colours. The feathers of the tail are black, spotted with yellow.

I have not seen a picture of *Ithaginis sinensis*, but David gives *hoa ki* as the Chinese name for this bird, which might represent the same Chinese characters as *hua chi* (*lit.* the variegated fowl).

117. Püpeklik Murgh. پوپک لیک مرغ

A blue-winged pheasant.
Euplocamus lineatus (Vigors).
Manchu: Genggele čoko.
Chinese: Chieh.

The "Mirror" says: It is like the *gônggalo čoko* (No. 115). The wing feathers are blue. It is a strong fighter.

I have not found the Chinese *chieh* in any dictionary.

My tentative identification is based on the circumstance that it is like the pencilled pheasant, and has blue wings.

118. Yašil Güzlük Murgh. یاشیل کوز لوک مرغ

A Peacock Pheasant.
? *Polyplectron Chinquis.*
Manchu: Jihana čoko.
Chinese: CHIN CH'IEN CHI.

The "Mirror" says: It resembles the *fa ulhôma* (No. 132). It is like a peacock. On the feathers are green eyes.

119. Čapar Murgh. چغار مرغ

Pucras Pheasant.
Pucrasia darwinii or *P. xanthospila.*
Manchu: Satangga čoko.
Chinese: SUNG CHI.

The "Mirror" says: It is like the *fiyelenggu* (No. 129). It is found in Mongolia. Its body is all speckled with black and yellow markings. It has yellow down on the legs.

David gives *Song-ki* as the Chinese name for both *P. darwinii* and *P. xanthospila.*

120. Dükür Murgh. دکور مرغ

Manchu: Niyo čoko [*lit.* marsh-fowl].
Chinese: SHUI CHI [*lit.* water-fowl].

The "Mirror" says: It has a black body; it frequents marshy land; and has a red fleshy comb.

Zakharoff adds that the head and neck are black, spotted with red, and the breast-bone and wings yellow, spotted with black.

121. Čuláq Murgh. چولاق مرغ

A species of Pheasant.
Manchu: Simelen čoko.
Chinese: TSÊ CHI [*lit.* marsh bird].

The "Mirror" says: Its colouration is black; it has yellow markings; breast yellow. It has no spurs.

P. de C. says *čuláq* means "*manchot,*" i.e., a penguin. The Turkish word *čulaq* means ordinarily one who is without hands. Here I presume it to imply either a pheasant without spurs, or one which flies with difficulty.

122. Kičik Dükür Murgh. کیچک دکور مرغ

A species of Pheasant.
Manchu: Ajige niyo čoko.
Chinese: HSIAO SHUI CHI.

A small variety of No. 120.

123. Sulaimanlik Murgh. سلیمان لیک مرغ

A species of Pheasant (?).
Manchu: Horki.
Chinese: TZŬ CHIH.

The "Mirror" says: It is like the *fa ulhôma* (No. 132). A very large grey-coloured bird. Tail long. It is found in cold places. It has down on the legs.

The Turki name means Solomon's Fowl. The name looks genuine enough, but I have not been able to trace it.

Murgh-i-Sulaiman is one of the many Persian names for the *hud-hud* or *hoopoe*, but this bird cannot be here intended.

124. Sarghíj Murgh. سارغیج مرغ

A species of Pheasant (?).
Manchu: Niyekserhen.
Chinese: T'IEN TUNG CHI.

The "Mirror" says: This bird is found in the Province of Fu-Kien. Head yellow; breast black; wings bordered with yellow. Lives on fish and shell-fish.

125. Miyana Murgh. میانه مرغ

A kind of Chicore.
? *Caccabis chukor.*
Manchu: Itu.
Chinese: PAN CH'IH [*lit.* half-winged].

The "Mirror" says: It is like a pheasant (*ulhôma*), but smaller. Its tail is short.

126. Keklik. ککلیک

The Chicore.
Caccabis pallescens (Hume).
Manchu: Engge fulgiyan itu.
Chinese: SHIH CHI.

The "Mirror" says: In nature it is like the *čoko* (fowl); beak red; legs short and red. Its body is the colour of natural woollen stuffs (*funiyesun*).

127. Čil Murgh. چیل مرغ

A Bamboo-Partridge.
Bambusicola sonorivox.
Manchu: Čuse moo-i itu.
Chinese: CHU CHI.

The "Mirror" says: In nature it is like the *čoko* (fowl). Its body is the colour of natural woollen stuffs (*funiyesun*), and is speckled all over. It is fond of screeching and fighting. It lives in bamboo forests.

Some dictionaries say that the Chinese *chu-chi* = a snipe.

128. **Čil.** چيل

Pallas' Sandgrouse.
Syrrhaptes paradoxus.
Manchu: Nuturu.
Chinese: SHA CHI.

The "Mirror" says: It is like the *itu* (No. 125). Its foot resembles the foot of a hare. In the winter season the birds flock together, and they make a small chuckle in flight.

Mr. Rockhill (*Journey*, p. 9, note), speaking of the Syrrhaptes, writes: "I for my part never heard any other name than *sha-ch'i* (*sic*) 'sand-fowl' given them."

Marco Polo's "*Barguerlac*" has been identified with this bird. (*Yule*, 2nd ed., p. 272), but on the authority of this list it would seem to be *Syrrhaptes tibetanus*. See No. 129.

129. **Baghirtaq.** بغير تاق

Tibetan Short-toed Sand-grouse.
Syrrhaptes tibetanus.
Manchu: Fiyelenggu.
Chinese: SHU CHI.

The "Mirror" says: It is like the female *itu* (No. 125) or grey partridge.

David gives *chou ki* as the local Pekinese name of the *Tetrastes bonasia*. This may possibly be our *shu chi*.

On Marco Polo's *Bargeurlac* see preceding number (128).

130. **Čedüki Baghirtáq.** چدوکی بغيرتاق

The Northern Sand-grouse.
Manchu: Jase-i amargi fiyelenggu.
Chinese: PEI SHU CHI.

The "Mirror" says: Is smaller than No. 129. It is found on the northern frontier (of China).

GROUP VII.

131. **Qirghul.** قير غول

A generic name for pheasants.
Manchu: Ulhôma.
Chinese: YEH CHI [*lit.* wild fowl].

The "Mirror" says: It is like the *čoko* (fowl); tail long; the male has brilliant glistening feathers, while the female is yellowish in colouration.

According to the Manchu transcription the pronunciation is *qirghul*, but the usual forms are *qirghaul* and *qirghawal*.

132. Qaramtil Qirghul. قرام تیل قیرغول

A black partridge or francolin.
Manchu: Fa ulhôma.
Chinese: U CHIH [*lit.* black pheasant].

The "Mirror" says: The colouration of this bird is blackish. Its body is smooth (*halfiyan*). Tail short, like that of a duck. It perches in trees. It has down on its legs.

Zakharoff says: It is a grouse (Russian, *teterev*), but Amyot only says "une sorte d'oiseau."

133. Khitay Qirghul. خطای قیرغول

Reeves's Pheasant.
Syrmaticus reevesii.
Manchu: Nikan ulhôma [Z. *Gallina sylvestris*].
Chinese: CHIH CHI [*lit.* the pheasant fowl].

The "Mirror" says: It is like the *ulhôma*. It is found in the depths of forests. Its tail is long.

Perè David says: *Djeu-ky* is the local Pekinese name for Reeves's Pheasant. This is probably identical with the name here given in Mandarin transcription.

The Turki and the Manchu names both mean "Chinese Pheasant."

134. Purmuy Qirghul. فورموی قیرغول

The Tartar Pheasant.
Manchu: Juwaringga junggidei.
Chinese: HSIA TI (or CHAI) [*lit.* the summer (Tartar) pheasant].

The "Mirror" says: A mountain pheasant, whose plumage becomes a very brilliant colour during the summer season.

135. Ala Qirghul. آلا قیرغول

A species of pheasant.
Manchu: Ala ulhôma.
Chinese: YÜAN-NIAO.

The "Mirror" says: Resembles the pheasant. Makes its nest on mountain crags.

The Manchu word *ála* here corresponds with the Chinese word *yüan* = a high plateau. The Turki *ála* means variegated.

Zakharoff says: This is a grouse which is called by the Kirghiz *ular*. See No. 15.

136. Aq Qirghul. آق قیرغول

The White Pheasant.
Manchu: Šanyan ulhôma.
Chinese: PAI CHIH.

The "Mirror" says: The whitish pheasant is called *šanyan ulhôma*.

137. Ranglik Qirghul. رنگ لیک قیر غول

A variegated pheasant.
Manchu: Fiyangga ulhôma [Z. A Chinese Pheasant].
Chinese: HUI.

The "Mirror" says: A beautiful variegated pheasant of five colours.

The Chinese word *hui* means variegated, but the word *chih*, which is not repeated here, is perhaps implied. Giles, however, says *hui* alone means a pheasant, and that *hui chih* = the Tartar Pheasant.

138. Qara Qirghul. قرا قیرغول

The "Sea" Pheasant.
Manchu: Mederi ulhôma.
Chinese: HAI CHIH [*lit.* the sea-pheasant].

The "Mirror" says: A black pheasant, also called the sea-pheasant to distinguish it from other black pheasants.

139. Tagh Qirghul. تاغ قیرغول

The Mountain Pheasant.
Manchu: Alin-i ulhôma.
Chinese: SHAN CHIH.

All these names mean "the mountain pheasant."

The "Mirror" says: Mountain pheasant, with long tail.

140. Baldir Qirghul. بالدیر قیرغول

A species of pheasant.
Manchu: Koksin ulhôma.
Chinese: CH'Ü CHIH.

The "Mirror" says: A pheasant which heralds approaching thunderstorms by its cry.

The word *baldir* apparently forms part of a name for the quail, *balderčin*.

The Chinese *ch'ü* is another name for *ch'ü yü*, the Mynah. See No. 178.

Shaw says: *baldir* means "first," but P. de C. and the "Sanglakh" say *baldir* means "the fat part of the leg, the calf."

141. Čoqušghaq Qirghul. چوقوش غاق قیرغول

A fighting pheasant.
Manchu: Bečun ulhôma [*lit.* fighting pheasant].
Chinese: FÊN CHIH.

The Manchu *bečun* comes from *bečunambi*, to fight.

The Chinese *fên* means "impetuous."

The Turki *čoqušghaq* comes from the verb *čoqušmaq* = to peck one another.

142. Dürlam Qirghul. دورلام قیرغول

The Sand-grouse.
Syrrhaptes sp.
Manchu: Fenihe ulhôma.
Chinese: K'OU CHIH [Giles = *Syrrhaptes paradoxus*].

The "Mirror" says: Resembles the *kuwečihe* (pigeon) (No. 194); body small. They flock together when flying.

I have not been able to trace the Turki word *dürlam*.

143. Čuja. چوجه

Name for the young of pheasants.
Manchu: Šoron.
Chinese: LIN [Giles says, a species of "lark" known as *t'ien* (heaven) *lin*].

There seems to be considerable difference of opinion as to the meaning of this number. The "Mirror" says this is a name for the young of pheasants. Gabelentz and Zakharoff say, a name for the young of geese and ducks; and Zakharoff also adds, a name for the nest itself, where the young are reared. Poletti, like Giles, says it is a species of lark.

The Turki *čuja* is the common word for a chicken.

144. Yawa Urdak. یبا اوردیک

Wild duck, in general.
Manchu: Bigan-i niyehe.
Chinese: YEH YA.

The "Mirror" says: A general name for many varieties of wild duck.

Scully says the Yarkandis distinguish twenty species of duck. It will be seen that the present list includes no less than twenty-six.

145. Karrak Urdak. کرّک اوردیک

The Teal.
Querquedula circia.
Manchu: Yangsimu niyehe.
Chinese: KUAN YA [*lit.* crested duck].

The "Mirror" says: A crested wild duck with variegated feathers.

Karak or *karrak* (as it is always written in the MS.) means "patch-work." The *Sanghlakh* says *karak* is the Turki name for a species of quail.

B. S. 299 says, *karak urdak* is the Turki name for the Blue-winged Teal, *Querquedula circia*. But from the description and the Chinese and Manchu names, it might be the Tufted Pochard (*Fuligula fuligula*) which migrates to North India and China in the winter.

146. Kičik Ala Urdak. كيچيک آلا اوردیک

A species of duck.
Anas clangula.
Manchu: Ajige yangsimu niyehe.
Chinese: HSIAO KUAN YA.

The "Mirror" says: Resembles the *yangsimu niyehe* (No. 145). Body small.

Zakharoff has: Little crested wild duck. (*Anas clangula*).

147. Sona Urdak. سونا اور دیک

The Mallard.
Anas boschas.
Manchu: Borjin niyehe.
Chinese: P'U YA [p'u = rushes].

The "Mirror" says: This bird is reared in captivity, and resembles the green domestic duck.

P. de C. gives *Sona-borjin* as the name of a duck. The "Sanglakh" says, *sona* is the drake and *borčin* the duck. It is a curious coincidence that here we have "sona" in the Turki and "borjin" in the Manchu. In China it is quite a common practice to call a certain variety of bird by the combined names of the female and the male. Compare No. 155.

148. Kičik Urdak. كيچيک اور دیک

Another name for No. 147.
Manchu: Tarmin niyehe.
Chinese: P'U YA.

149. Quba Urdak. قوبا اوردیک

The Shoveller.
Spatula clypeata.
Manchu: Kaltara niyehe.
Chinese: MA YA.

The "Sanglakh" says *qúba* is a Kalmak word for a breastplate. The Turki name thus offers an interesting similarity to the Latin name.

The "Mirror" says: A duck resembling the *borjin niyehe* (No. 147). It is "Kaltara" coloured. [*Kaltara* literally means a red horse with white breast.]

150. Petek Urdak. پتک اور دیک

A species of duck.
Manchu: Yargičan niyehe [Z. A diving Duck: Russ. *Nïrok*].
Chinese: P'I HU LU.

The "Mirror" says: This is a small wild duck resembling the *borjin niyehe* (No. 147).

I have not been able to trace the Turki word *petek*: but there is a word curiously like it in Ottoman Turkish for the Shoveller Duck, *Spatula clypeata*, namely, پاتقه *patqa*.

151. Sukhsur or Suqsur. سوخسور

The Pintail Duck.
Dafila acuta.
Manchu: Borboki niyehe.
Chinese: NI KO TA.

The "Mirror" says: A small wild duck resembling No. 150, with delicate white spots on the wings. It cries out when flying.

Scully (I. 962): *Dafila acuta*, Pintail Duck, "cha sughsu aurdak."

The "Sanglakh" says: *Suqsur* is the male of the duck, and is synonymous with *sona*.

152. Qizghinj Karrak Urdak. قیز غینج کرّک اوردیک

Purple-headed Duck.
Manchu: Dudu niyehe.
Chinese: TZŬ T'OU YA.

The word *dudu* in Manchu means a turtle-dove.

The "Mirror" says: Purple head, broad beak, resembles the *borboki niyehe* (No. 151) in the body.

153. Jar Karrak Urdak. جار کرّك اوردیک

A mottled Duck.
Manchu: Alhačan niyehe.
Chinese: LO WÊN YA.

The "Mirror" says: Resembles No. 152, but has variegated plumage.

154. Čapar Karrak Urdak. چقار کرّک اوردیک

A mottled duck.
Manchu: Bulhačan niyehe.
Chinese: WÊN HAN YA.

The "Mirror" says: Resembles the *alhačan niyehe* (No. 153). The plumage is variegated.

GROUP VIII.

155. Qušmaq Urdak. قوشماق اوردیک

The Mandarin Duck.
Aix galericulata.
Manchu: Ijifun niyehe.
Chinese: YÜAN YANG.

The "Mirror" says: Purple head, white eyebrows, has a crest. The male and female are inseparable.

The Chinese words *yüan* and *yang* stand for male and female Mandarin duck respectively, and they are used as emblems of conjugal fidelity.

A description of the *Yüan yang* is given by Huc, see *Voyages*, Vol. I, p. 243.

156. Tutuš Urdak. تو توش اوردیک

Another name for the Mandarin Duck.
Manchu: Irgeče niyehe.
Chinese: CH'I CH'IH.

The "Mirror" says: Another name for the *ijifun niyehe* (No. 155).

Giles says, *ch'i* is a bird with variegated plumage, found in marshes, whose high tail is sometimes likened to a rudder.

157. Ḥang Ghirta. حانک غرت

The Brahminy Duck.
Casarca rutila.
Manchu: Lama niyehe.
Chinese: T'U YÜAN YANG.

The "Mirror" says: This bird resembles the *ijifun niyehe* (No. 155), but is of a yellowish colour.

Scully (S. F. 954): *Hangghut* pronounced *Hangat* = Brahminy Duck, *Casarca rutila.*

This Turki name is found recorded in many forms, such as *Angit*, *Anqit*, *Hangat* and *Alqit*.

158. Sarigh Urdak. سریغ اوردیک

Yellow Duck.
Manchu: Anggir niyehe [Z. Russian *Turpan* = *Anas nigra*].
Chinese: HUANG YA.

The "Mirror" says: This is a large yellow duck.

159. Kičik Quyruq Urdak. کیچیک قو یروق اوردیک

The Short-tailed Duck.
Manchu: Sočili niyehe.
Chinese: HSIAO WEI YA.

The "Mirror" says: Forked tail; body has white markings.

160. Yeken Urdak. یکان اوردوک

? *Anas querquedula.*
Manchu: Ija niyehe [Z. Mountain duck (*Anas querquedula*)].
Chinese: SHUI HU LU.

The "Mirror" says: Of the nature of the *sočili niyehe* (No. 159). Very small, and has very good tasting flesh.

161. Marg Urdak.

Another name for No. 160.
Manchu: Niojan niyehe.
Chinese: Same as the above.

162. Baliqči Urdak. بليق چى اورديک

The Fisherman Duck.
Manchu: Kanggô niyehe.
Chinese: YÜ YA.

The "Mirror" says: Somewhat larger than the *borjin niyehe* (No. 147) with a pointed beak. Eats fish.

163. Qara Payča Urdak. قرا فايچه اورديک

Black variegated duck.
Manchu: Jukjuhu niyehe.
Chinese: HEI CHIAO YA.

The "Mirror" says: Body black with variegated plumage. It is a very skilful diver, and resembles the *čikiri niyehe* (No. 165).

164. Qulang Sa Urdak. قولانک سا اورديک

Manchu: Čunggur niyehe.
Chinese: YU HU LU.

The "Mirror" says: Very small duck with curved beak. It feeds on fish, and therefore the flesh is not good to eat.

Giles says: *Yu hu lu* is a kind of cricket which sings during the winter in stoves.

165. Baliq-güz Urdak. بليق كوز اورديک

The Eastern White-eyed Pochard [*lit.* the fish-eyed duck].
Nyroca baeri.
Manchu: Čikiri niyehe.
Chinese: YÜ YEN YA [*lit.*, jade-eyed duck].

The "Mirror" says: This duck resembles the *dudu niyehe* (No. 152). It is called *čikiri* because its eyes and beak are white-grey, like the eyes of a wall-eyed horse or dog. [See note on No. 53].

166. Ala Mač Urdak. آلا ماچ اورديک

Variegated duck.
Manchu: Alha niyehe.
Chinese: HUA YA.

The "Mirror" says: Variegated duck, resembling the *dudu niyehe* (No. 152).

167. Ala Sarighinj Urdak. آلا سارغينج اورديک

The Eastern Grey Duck.
Anas zonorhyncha.
Manchu: Alhari niyehe.
Chinese: CHIEN HUA YA.

The "Mirror" says: Ash-coloured duck, with red plumage and small feet.

168. Baliq-gha Amraq Urdak. بليق غه امراق اورديک

A diver.

Manchu: Aka niyehe.

Chinese: LO HO.

The "Mirror" says: Resembles the *kanggô niyehe* (No. 162). Has a curved beak; eats fish. Its flesh is consequently unpleasant to the taste.

The Turki name means "a duck resembling a fish."

169. Hurluq Urdak. هور لوق اورديک

The Coot.

Fulica atra.

Manchu: Karan kalja [Z. Russian, *lisukha*, a coot].

Chinese: KU TING.

The "Mirror" says: Resembles a crow; body black, nose and beak white.

170. Yašil Šatuti. ياشيل شاطوطي

A green parrot.

Manchu: Yengguhe.

Chinese: YING WU.

The "Mirror" says: A green parrot with a beak like that of the vulture. Can be taught to talk.

The common Persian word for a parrot is *ṭuṭi* طوطي. The present list never uses the word *ṭuṭi* alone, but always speaks of *Shá tuti*, which is probably a corruption of *Sháh ṭuṭi* شاه طوطي, or "King Parrot," the term *sháh* being applied out of respect, just as the falcon is called *Sháh báz.*

Only in this place is *tuti* spelled with the correct "ṭ." Pavet de Courteille, in his Dictionary s. v. *bilik,* p. 191, quotes the following line:—

بيليک شاه ايلا سا حيوان نينک آتين * نی تانک گر کيمسا تاپسا شاه ذاتين

"Since the king knows the names of the animals, what wonder if one find among them a kingly nature."

P. de Courteille says this is an allusion to the name given to certain birds; for example, a parrot which talks very well is called شاه طوطي (*sháh ṭuṭi*).

171. Sirmurgh Šatuti. سيرمرغ شاتوتي

The Phœnix Parrot.

Manchu: Garudangga yengguhe.

Chinese: FÊNG HUANG YING WU.

The "Mirror" says: Has a long body, measures three feet. Resembles the phœnix, and is of five colours.

172. Khušaliq Šatuti. خوشاليق شاتوتي

The Parrot of Good Fortune.
Manchu: Sebjengge yengguhe.
Chinese: SHIH LO NIAO.

The Turki here, as elsewhere, writes *khušali]* خوشاليق, for *khušḥal liq* خوش حااليق.

The "Mirror" says: Another name for the *garudangga yengguhe* (171).

173. Šatuti. شاتوتي

The Parrot.
Manchu: Yenggehe.
Chinese: YING KO.

The "Mirror" says: Resembles the *yengguhe* (No. 170); beak small; of different colours.

For explanation of the Turki *Šatuti*, see No. 170.

174. Sarigh Ṣopia. سريغ صوفيا

A yellow parrot.
Manchu: Suwayan yenggetu.
Chinese: HUANG TING HSIANG NIAO.

The "Mirror" says: Smallish parrot, with head, back and wings all green, neck and breast-bone yellow.

The word *sopia*, according to Scully (S. F. 470) and Dutreuil de Rhins, means the Oriole, *Oriolus kundoo*, or *Oriolus galbula*. But in our list I think it must mean a species of parrot. The Chinese *ting hsiang* = cloves!

175. Yašil Ṣopia. ياشيل صوفيا

A green parrot.
Manchu: Niowanggiyan yenggetu.
Chinese: LÜ TING HSIANG NIAO.

The "Mirror" says: Resembling the yellow parrot, but larger. Head, breast-bone, back and wings all green. Yellow markings at the base of the wings.

176. Máda Ṣopia. ماده صوفيا

A hen-parrot.
Manchu: Yenghuhe.
Chinese: MU HOU.

The "Mirror" says: This is the female of the *yengguhe* (No. 170).

GROUP IX.

177. Čikdači. چيكدەچي

Chinese Mynah.
Acridotheres cristatellus.
Manchu: Bangguhe.
Chinese: PA KO [*lit.* the eight brothers].

Giles gives *yen* (swallow) *pa ko erh* = *Sturnus cineraceus*

The "Mirror" says: Black body, green beak, sometimes crested. White wing feathers, white markings on tail, yellow legs. Can be taught to talk.

Zakharoff says: This bird has a crest, but not the power of speech; though it belongs to a class of birds *without* crests, but possessing the power of talking.

The Chinese *pa ko* means literally eight brothers, which reminds one of the well-known name, seven sisters or seven brothers (*sath bhai*), given to Babblers in India.

Eha, in "Tribes on my Frontier," says: "Here (Bombay) they are brothers, and in Bengal they are sisters; but everywhere, like Wordsworth's opinionative child, they are seven." Eha, however, seems to have overlooked the *Chinese* variety.

Scully (S. F. 365) gives a very similar name "jigda chuk" for *Planesticus atrogularis*, Temm. He says: "It feeds chiefly on *Eleagnus* berries called *jigda* in Turki, and commonly known as 'Trebizond dates,' hence its name *Jigda chuk*, i.e., 'jigda-eater.'"

Redhouse says the Turkish چیكده (pron. in Ottoman *chiyde*) = *Zizyphus vulgaris*, the jujube.

Dutreuil de Rhins identifies *čigdači* with *Turdus fuscatus*.

178. Zákarči. زاكرچي

Another name for the Chinese Mynah.
Manchu: Kiongguhe.
Chinese: CH'Ü YÜ [Giles, *Acridotheres cristatellus*].

179. Aqiš Čikdači. آقيش چيكده چي

The Chough.
Pyrrhocorax graculus.
Manchu: Cinjiri [Z. Russian *Drozd*].
Chinese: LIAO KO [Giles, the blue grackle].

The "Mirror" says: Colouration violet; red beak, parting on the top of the head. A skilful singer, with a very clear voice.

180. Saghizghan. ساغيز غان

The Magpie.
Pica pica (B. S. 35), *P. bactriana* (Scully, S. F., 668 *bis*).
Manchu: Saksaha.
Chinese: HSI CH'IAO [Giles, magpie].

The "Mirror" says: Resembles the crow. Body and wings half white. At the end of the winter months it makes its nest.

181. Khabarči Saghizghan. خبر چی ساغیزغان

A species of magpie.
Manchu: Šengge saksaha.
Chinese: LING CH'IAO.

The "Mirror" says: Talking magpie, which, according to the Chinese, heralds the advent of a great man.

Zakharoff adds: "for example, the founder of a dynasty," thus reminding one of the king-making qualities attributed by the Persians to the *humá* bird.

Turki: *khabarči* = news-bringer.
Manchu: *šengge* = divine.
Chinese: *ling*, applied to animals, means intelligent.

182. Aqiš Saghizghan. آقیش ساغیز غان

The White Magpie.
Manchu: Šahôn saksaha.
Chinese: PAI HSI CH'IAO.

The "Mirror" says: Like the *Saksaha* but bigger, with rather short tail. On the body mixed white and grey feathers.

183. Tagh Saghizghan. تاغ ساغیز غان

The hill magpie.
Manchu: Alin-i saksaha.
Chinese: SHAN HSI CH'IAO.

The "Mirror" says: Like the ordinary magpie, but somewhat smaller. Black and white markings on the head, long tail; makes its nest in mountain forests.

184. Say Saghizghan. سای ساغیز غان

A species of Magpie.
Manchu: Niyo saksaha.
Chinese: SHUI HSI CH'IAO.

The "Mirror" says: Black, with long beak, white head and short tail. Very tall. Found on sand-banks and dunes. Fish-eater.

The Turki word *say* means "a river which is dry in summer and a torrent in winter"; but here it seems to be a translation of the Manchu *niyo* which means "a marsh."

185. Qizghiš Saghizghan. قیزغیش ساغیز غان

A Paradise Fly-catcher (female).
Tchitrea paradisi.
Manchu: Baibula.
Chinese: LIEN CH'IAO [Giles, *Tchitrea incei*, Gould].

The "Mirror" says: Resembles the magpie. Smoke-coloured, with long tail.

The Turki epithet *qizghiš*, reddish or russet, would only apply to the female.

186. Uzun Quyruq Aq Saghizghan. اوزون قویروق آق ساغیزغان

Paradise Fly-catcher (male).
Tchitrea paradisi.

Manchu: Golmin unčehengge šanyan baibula.
Chinese: T'O PAI LIEN.

The "Mirror" says: Resembles the *baibula* (No. 185), but with a longer tail.

The Chinese have probably mistaken the male and female of this bird for two different species. (See Gould, Vol. II, Plate 18).

187. Qargha. قارغا

The Crow.
Manchu: Gaha.
Chinese: WU YA or U YA.

The "Mirror" says: Body all black, broad beak.

188. Qung Qargha. قونگ قارغا

A species of crow.
Manchu: Holon gaha.
Chinese: TZŬ YA.

The "Mirror" says: A crow which is found round about the districts of the Great Wall.

P. de Courteille says *Qung* = corbeau.

189. Ala Qargha. آلا قارغا

The Variegated Crow.
Corvus cornix, Lin.
Manchu: Ayan gaha.
Chinese: HUA PU YA.

The "Mirror" says: A white-necked crow. Body large.

Scully, S. F., 659 *bis.*—*Corvus cornix.*

The "Sanglakh" says: *Āla qargha* is the equivalent of the Persian *Kulagh-i-kabud* کلاغ کبود and the Arabic *'ukka* عکه, which usually stand for the common Indian magpie, *Dendrocitta rufa.*

190. Aq Qargha. آق قارغا

The White Crow.
Manchu: Šanyan gaha.
Chinese: PAI YA.

The "Mirror" says: A large crow, all white; smallish head, oblong shaped. Light-red beak and feet.

191. Tokhanak. تخانک

Jackdaw.
Coleus monedula.
Manchu: Turaki [Z. Russian *Grach* = a rook].
Chinese: YÜAN NIAO.

The "Mirror" says: A crow with small body and beak.

Scully, S. F., 665, gives *Tukhunák qargha*, Jackdaw—*Coleus monedula.*

192. Kök Qargha. کوک قارغا

The European Roller.
Coracias garrula. [B.S. 259].
Manchu: Karaki [Z. Russian *Grach* = a rook].
Chinese: CH'ING YA.

The "Mirror" says: Smallish body, beak and tail black.

193. Qara Qargha. قرا قارغا

The White-necked or Parson Crow.
Corvus culminatus.
Manchu: Tanggôha.
Chinese: HAN YA.

The "Mirror" says: Smaller than the ordinary crow. White-necked.

Scully, S. F., 660. *Corvus culminatus.*

194. Kaftar. کفطر (*sic*).

The Pigeon.
Manchu: Kuwečihe.
Chinese: KO TZŬ [Giles, domestic pigeon].

The "Mirror" says: Resembles the *dudu* (No. 196) (turtle-dove); of all colours; reared in captivity.

Kaftar is another form of the Persian word *kabutar* [Pehlevi, *kapōtar*; Afghan, *kautar*].

195. Pay Paqliq Kaftar. پای فاقلیق کفطر

The Downy-legged Pigeon.
Manchu: Nunggari fathangga kuwečihe.
Chinese: MAO CHIAO KO.

The "Mirror" says: Head, back and tail black; white wings, downy legs.

196. Tuzlagha. توزلاغا

The Wild Pigeon.
Columba rupicola, Pall.
Manchu: Dudu [Z. Russian *Gorlitsa* = *Columba turtur*].
Chinese: PAN CH'IAO.

The "Mirror" says: Resembles the wild pigeon.

Zakharoff adds: Found in a wild state in fields and flat places generally.

197. Yašil Yawa Kaptar. یاشیل یبا کفطر

The Green Wild Pigeon.
Manchu: Ilhuru dudu.
Chinese: LU PAN.

The "Mirror" says: Resembles the *Kekuhe* (No. 198). Head black, body green, breast brown. Has downy feathers on the back-bone.

198. Khupup. خوفوف

The Hoopoe.
Upupa epops, Lin.
Manchu: Kekuhe.
Chinese: K'o KU.

The "Mirror" says: Resembles the *Silmen* (No. 77) (sparrow-hawk). Blackish colouration.

199. Qara Kakkuk. قرا كاك كوك

The Black Cuckoo.
Cuculus canorus [B. S. 253].
Manchu: Sahaliyan kekuhe.
Chinese: HEI CH'IU.

The "Mirror" says: Head and breast blackish; tail and wings white; legs short; on the foot of the male there are two toes in front.

200. Torolgha. تورولغا

Turtle-dove.
Turtur auritus [B. S. 270].
Manchu: Saksari kekuhe.
Chinese: CH'IAO CH'IU.

The "Mirror" says: This dove resembles the mountain magpie (No. 183) but is smaller.

201. Pakhmayghan Pakhtak. قاخمايغان قاختک

A species of dove.
Manchu: Kekutu.
Chinese: TZ'Ŭ MAO YING. [Wrongly read in Index as LA MAO YING.]

The "Mirror" says: In form like the *kekuhe* (No. 198), wings and tail black. The rest of the plumage coffee-brown, streaked in lines.

Scully says *Pakhtak* is the Turki name for the *Turtur stoliczkæ*.

I have not been able to trace the epithet *pakhmayghan*.

GROUP X.

202. Bulutči Janwar. بولوت چى جانوار

"The Cloud Bird." Possibly a species of lark, *e.g.*, *Alauda arvensis*.
Manchu: Tugitu.
Chinese: P'ING HSIAO.

The "Mirror" says: This bird is found in the wild districts of Tsang-yü. In nature it resembles the sparrow. It makes its nest in sand dunes.

Turki: *Bulut* = a cloud. Manchu: *Tugi* = a cloud. Chinese: *Hsiao* = the sky.

203. Azčaq. آز چاق

"The Strayed Bird" [" *L'oiseau égaré* "].
Manchu: Šajingga gasha [*lit.* the edict-giving bird].
Chinese: Fo NIAO [*lit.* The Buddha Bird].

The "Mirror" says: Head, beak, neck and back all black. Round the wings is a coffee-brown border. When it sings the words *mi t'u* are heard.

For *mi t'u*, we may possibly read the characters 7,835 and 12,106 in Giles, which would mean "to have lost the road."

In support of this interpretation we have the Turki word *ázmaq*, "to lose the way."

204. Toyton. توی‌تون

The "Toyton" Bird.
A species of cuckoo.
Manchu: Toiton.
Chinese: PU KU NIAO [Giles, *Cuculus canorus*].

The "Mirror" says: Found in mountain woods. It sings at night, and its cry sounds like the word "Toiton."

Zakharoff adds: This bird is such an assiduous hunter that the word *toiton* is metaphorically applied to man in the sense of shrewd, adroit, cunning, etc.

The Turki name is merely a transcription of the onomatopæic Manchu name.

205. Kakkuk Janwar. کاک‌کوک جانوار

A kind of cuckoo.
Manchu: Gugun gasha.
Chinese: KUO KUNG NIAO ["Royal Duke Bird"].

The "Mirror" says: Found in the mountain caves in the Fu-kien province. Head shiny black, green feathers on the wings, tail bluish, breast and feet red.

206. Hur Pigan. هور فیگان

Manchu: Čunggai [Z. Russian *Kulik* = woodcock].
Chinese: SHUI HUA KUAN.

The "Mirror" says: Neck red, beak black, on the head long feathers, like a crest. When it sees men it cries out, and the feathers on its head bristle up. The feet resemble those of a fowl.

207. Kökča Janwar. کوکچه جانوار

The Blue Crow.
Coracias garrula.
Manchu: Niowargi gasha [Z. *Coracias garrula*].
Chinese: TS'UI YÜN NIAO.

The "Mirror" says: Head and beak red; body all green; handsome shining green plumage.

See also No. 192.

208. Mihakči Janwar. مهکچی جانوار

The Shrike.
? *Lanius major.*
Manchu: Hionghioi gasha.
Chinese: Chüeh [Giles, *Lanius major*].

The "Mirror" says: Sings much in the summer, but rarely in the winter. When it sings in the summer, its note indicates the time for spinning to begin.

The Turki *miḥakči* seems to be derived from the Arabic *miḥakk* (pronounced in Ottoman Turkish *meḥekk* and *meheng*) which means a touchstone. But one would have expected here some name connected with a spindle or spinning.

209. Qičqirghaq Janwar. قیچقرغاق جانوار

A Cuckoo [*lit.* the bird which cries out].
Manchu: Hodan gasha [transcription of the Chinese].
Chinese: Ho tan.

The "Mirror" says: This bird in nature resembles the *Čoko* (fowl); it sings unceasingly, day and night, up to the middle of the winter months.

Giles has: *Ho-tan* = a kind of nightingale which is said to sing until the dawn comes; the word *tan* here being the Chinese character for dawn *plus* the Radical 196 for larger birds. See also No. 308.

210. Awazliq Janwar. آوازلیق جانوار

A singing bird. Possibly The Persian Nightingale, *Daulias golzi.*
Manchu: Jilgangga gasha [*lit.* singing bird].
Chinese: Wang kang ko.

The "Mirror" says: Sings at night, but has never been seen by anyone.

211. Munguzluq Janwar. مونک اوزلوق (*sic*) جانوار

Manchu: Senggelengge gasha.
Chinese: Nu k'o ya k'o [perhaps a foreign word].

The "Mirror" says: Head black, beak large, coffee-brown plumage. On the head is a bone which looks like a crest.

212. Üsma Janwar. اوسما جانوار

A species of Magpie.
Manchu: Giyen gasha [Z. Russian *Sinaya soroka*].
Chinese: Tien hua.

The "Mirror" has: Resembles the *saksaha* (No. 180) (magpie). Tip of the beak slightly bent, head and tail feathers indigo blue. It imitates the voices of all other birds.

The Chinese *tien-hua* means indigo blossom.

213. Süseni Janwar. سوسه‌نی *(sic)* جانوار

Manchu: Fulaburu gasha.

Chinese: SHIH CH'ING.

The "Mirror" says: Beak black, with curved tip. The tips of the wings are violet.

214. Targhil Janwar. تارغیل جانوار

Manchu: Kuringge gasha.

Chinese: WU PAN CH'UNG.

The "Mirror" says: Head black, beak curved, markings all over the body.

215. Jar Janwar. جار جانوار

Manchu: Hôngsitu gasha.

Chinese: TI PÊN NIU.

The "Mirror" says: Another name for No. 214.

216. Kol. کول

Manchu: Laidakô.

Chinese: TA KU NIAO.

The "Mirror" says: Head, wings, tail, all black; breast white. Found in marshy places.

Kol or *gol* in Persian means an owl.

217. Seḥer-Khíz. سحر خیز

"The Early-Riser."

Manchu: Kôwaha [Z. Russian *Kulik* = woodcock].

Chinese: YEH MING NIAO.

The "Mirror" says: Small beak, small body. Cries out at night.

Zakharoff says: Small marsh woodcock, with long legs. Cries out at night.

218. Sürmeči. سورمه چی

? The Jay.

? *Garrulus glandarius.*

Manchu: Isha [Z. Russian *Soya* = The Jay].

Chinese: SUNG YA.

Giles has *sung ya* = a mynah.

The "Mirror" says: Resembles the *baibula* (No. 185). Body somewhat small; tail, short and flecked. Very gluttonous bird.

219. Tuqačak. توقاچاق

Manchu: Kataha fadu.

Chinese: SHAO SHAN NIAO.

The "Mirror" says: Name of a small bird which, in singing, makes a sound resembling the words "Kataha fadu."

220. Tam Kütlej. تام كوتلاج

Manchu: Galman hereku [*lit.* a fly-catcher].
Chinese: T'IEH SHU P'I.

The "Mirror" says: Reddish eyes, long wings. Found in forests. Feeds on flies whilst flying.

Zakharoff says: Name of a bird resembling the *Teterev* (grouse).

SECTION II.

SMALL BIRDS.

GROUP I.

221. Qučqač. قوچقاچ

A general name for small birds.
Manchu: Čečike.
Chinese: CH'IAO.

In H. and H., p. 210, it is stated that *qučqač* is specially applied by the Kirghiz to Guldenstadt's Redstart *Rubicilla erythrogastra*.

222. Tinčliq Qučqač. تينچ ليق قوچقاچ

The "Lucky" Bird.
Manchu: Taifintu čečike.
Chinese: T'AI P'ING CH'IAO [*lit.* the peaceful bird].

The "Mirror" says: Crested head, beak slightly curved. Body whitish in colour, tail black, with gold tip.

223. Sarghinčliq Qučqač. سارغينچ ليق قوچقاچ

Manchu: Suwafintu čečike.
Chinese: SHIH ERH HUANG.

The "Mirror" says: Resembling the above. On the wings are white and yellow feathers in even rows.

224. Qirghinčliq Qučqač. قيرغينچ ليق قوچقاچ

Manchu: Fulfintu čečike.
Chinese: SHIH ERH HUNG.

The "Mirror" says: Plumage on the body like the *taifintu čečike* (No. 222). Red and white feathers lengthwise in rows.

225. Tumšuqliq Qučqač. تومشوقلیق قوچقاچ

Manchu: I n d a h ô n č e č i k e [*lit.* dog bird].

Chinese: TAI SHÊNG [Giles, the hoopoe, *Upupa epops*].

The "Mirror" says: Long beak, colouration mixed; crest on the head.

226. Uru-til Qučqač. اوروتیل قوچقاچ

Manchu: K ô b u l i n i l e n g k u č e č i k e [Z. A black starling].

Chinese: FAN SHÊ.

The "Mirror" says: Yellow beak, body uniformly black, red feet.

Zakharoff adds: Imitates a man's voice.

The Turki *uru til* is perhaps from *uwurmak* = "to turn over," and *til* "the tongue"; corresponding to the Chinese *fan-shê*. The name may have reference to the facility possessed by the bird for imitation.

227. Čuqughaq Qučqač. چوقوغاق قوچقاچ

A species of woodpecker.

Manchu: F i y o r h o n.

Chinese: SHAN CHO MU.

The "Mirror" says: Like the *indahón čečike* (No. 225) but without a crest. It searches in trees for worms and insects, and pecks the wood. Black, green, and various colours.

The Turki *Čuqumaq* = to peck.

228. Qizil Qašqaliq Čuqughaq Qučqač. قیزیل قاشقالیق چوقوغاق قوچقاچ

The Great Red-crowned Woodpecker.

Manchu: F u l g i y a n t o s i n g g a f i y o r h o n.

Chinese: CHU TING TA CHO MU.

The "Mirror" says: Large bird, in measurement the size of the *gaha* (crow). Body uniformly black, but inside feathers red.

229. Ala Čuqughaq Qučqač. آلا چوقوغاق قوچقاچ

The Variegated Woodpecker.

Manchu: Y o l o k t o.

Chinese: HUA CHO MU.

The "Mirror" says: The name for the variegated woodpecker.

230. Quqačaq. قوقاچاق

A species of woodpecker.

Manchu: T o r h o n.

Chinese: PÊN TA MU.

The "Mirror" has: A *Fiyorhon* (woodpecker) which pecks away at the trees to find insects, which it eats.

231. Qara Baš Hupup. قرا باش هفوف

The Black Woodpecker.
Manchu: Kurehu.
Chinese: HEI T'OU CHO MU.

The "Mirror" says: The black *fiyorhon* is called *kurehu*.

232. Aq Baš Quqačak. اق باش قوقاچاق

The White-necked Woodpecker.
Manchu: Čakôlu kurehu.
Chinese: PAI T'OU CHO MU.

The "Mirror" says: The white-necked *kurehu* (No. 231).

The Turki and Chinese names mean literally "white *headed* woodpecker."

233. Purčaqči Qučqač. نورچاقچی قوچقاچ

The Common Finch.
Manchu: Turi čečike.
Chinese: WU T'UNG.

Giles says: *Wu-t'ung* is the name of a tree upon which alone the phœnix is said to alight.
The "Mirror" has: Body grey-coloured, head and wing feathers black; broad yellow beak.

In Turkish *burčáq* is the name of the common vetch, *Vicia sativa*.

234. Gil-rang Purčaqči. کل رانک فور چاقچی

The Grey Finch.
Manchu: On čečike [Z. Grey Woodcock].
Chinese: HUI ERH.

The "Mirror" has: Resembling the *indahôn čečike* (No. 225). Body small, grey or ash-coloured.

235. Qaramtil Purčaqči. قرامتیل فورچاقچی

The Hawfinch.
Manchu: Yačin ôn čečike.
Chinese: TSAO ERH.

The "Mirror" has: Resembles the preceding. Large; head and tips of the wings white.

236. Qargha Qučqač. قارغا قوچقاچ

The Drongo or King-crow.
Dicrurus ater.
Manchu: Gaha čečike.
Chinese: LI CHI [Giles, The black Drongo, *Dicrurus cathæcus*].

The "Mirror" says: A very small bird resembling the crow. Uniformly black. Sings at dawn.

237. Sayraghuč Qučqač. سارى را غوچ قوچقاچ

The Chinese Oriole.
Oriolus chinensis.
Manchu: Gôlin čečike [Z. A Siskin].
Chinese: HUANG LI [Giles, Oriole].

The "Mirror" says: Gold coloured, wing feathers black. The male and female always fly together, and sing up to the end of autumn.

This bird is worn in China as the badge of honour by wives of civil officials of the 10th rank.

238. Bála Sayraghuč Qučqač. بلا سارى راغوچ قوچقاچ usually written بالا

The young of the above.
Manchu: Deberen gôlin čečike.
Chinese: YING CH'U.

The "Mirror" says: Beak reddish, pale yellow plumage without markings.

239. Ghuralay. غورا لاى

A Shrike.
Lanius homeyeri [B.S. 138].
Manchu: Giyahôn čečike.
Chinese: YING PU LA.

The "Mirror" says: Body and claws of a falcon. The tip of the beak, which it uses to catch small birds, is shaped like a fish-hook.

240. Alaman Ghuralay. آلمان غور الاى

A species of shrike.
? *Lanius collurio.*
Manchu: Mergen čečike.
Chinese: HAN LU [Giles, Butcher-bird].

The "Mirror" says: Resembles the *giyahon čečike* (No. 239). Is found in northern climes.

241. Čipar Ghuralay. چيغار (*sic*) غورالاي

Red-backed Shrike.
Manchu: Ilhuru giyahôn čečike [Z. *Lanius collurio*].
Chinese: CHIN PEI PU LA.

The "Mirror" says: Resembles No. 240. Head and neck ash-coloured, plumage on back reddish-gold. Found in southern districts.

242. Yamghurči. يامغورچي

The Sanderling
Calidris arenaria (B. S. 325).
Manchu: Čuiken [Z. Russian *Kulik*].
Chinese: SHUI WU NIAO.

The "Mirror" says: Resembles the *Čoočiyali* (No. 246); but is somewhat larger. Its cry announces rain.

Scully says: *Yamghurči* is a general name for waders.

243. Čul köktalgha. چول کوک تالغا

A species of warbler.
? *Sylvia nisoria*.
Manchu: Kokoli.
Chinese: YU KUAN ERH.

The "Mirror" says: White-tailed bird resembling the *yaksargan* (No. 244).

244. Köktalgha. کوک تالغا

The Tree Warbler.
Phyllopneuste rama (B.S. 147).
Manchu: Yaksargan.
Chinese: TA SHUI CHA TZŬ.

The "Mirror" says: Resembles the *Čoočiyali* (No. 246). Beak long, legs short, plumage light brown, tail white.

245. Yawa Köktalgha. یبا کوک تالغا

A species of warbler.
Manchu: Ihan yaksargan.
Chinese: SHU CHA TZŬ.

The "Mirror" says: Bigger than the *yaksargan* (No. 244), but resembling it very strongly. Found in thick damp jungles.

246. Uzun Put Köktalgha. اوزون پت کوک تالغا

A species of warbler [*lit.* long-legged].
Manchu: Čoočiyali.
Chinese: SHA LIU TZŬ.

The "Mirror" says: Resembles the *yaksargan* (No. 244). Short tail, long beak, and long legs.

GROUP II.

247. Budana (or Budina). بدنه

The Quail.
Coturnix communis or *C. dactylisonans*.
Manchu: Mušu.
Chinese: AN CH'UN.

The "Mirror" says: This bird's tail has no tip; plumage light brown.

This bird is worn in China as the badge of Assistant Magistrates.

The spelling of the "Turki" name in the MS. is peculiar, but this Persian word for a quail takes many forms, both in writing and in speech. Scully writes *baidina.* The method of writing adopted here would suggest the pronunciation *bédéné.*

The author of the *Sanglakh* says the correct reading is *budana.* Another word for a quail is *baldirčin,* which is a Turki word much used in Persia. Other names are *Semmāna* (سمّانه) and *Salwa* سلوی.

248. Dükür-yoq Budina. دکور یوق بدەنە

A species of quail (spurless).
Manchu: Ihan mušu.
Chinese: Ju [Giles: "A kind of quail said to be a transformed mole"].

The "Mirror" says: Somewhat smaller than the preceding. It has no hinder toes.

249. Uzun Tirmaq Budina. اوزون ترماق بدەنە

A species of quail (long-toed).
Manchu: Niyo mušu.
Chinese: Shui an.

The "Mirror" says: Body resembles that of the *mušu* (No. 247), three long toes in the front and a small spur.

250. Erkek. ارکک

The Male Quail.
Manchu: Gimšu.
Chinese: Chieh [Giles: "A cowardly quail that will not fight"].

251. Tiši. تیشی

The Female Quail.
Manchu: Bimšu.
Chinese: Pi.

The "Mirror" says: The female of the *mušu* (quail) is called *bimšu.*

252. Čurpa. چورپه

The young of the quail.
Manchu: Šurun.
Chinese: Wên.

The "Mirror" says: The young of the quail are called *šurun.*
The "Sanglakh" says: *Čurpa* is the name for the young of pheasants.

253. Bulbul. بلبل

The Grey Thrush.
Leucodopteron sinensis.
Manchu: Yadali čečike.
Chinese: Hua mei [Giles: the grey thrush].

David, adopting the Chinese name, calls this bird *L. hoamy.*

The "Mirror" says: Long, as it were pencilled, eyebrows; colouration yellowish grey, with small spots. It is a strong fighter and has a clear voice.

Zakharoff calls this bird a Chinese nightingale.

The Japanese *hojiro* is represented by the same Chinese characters, and means the Japanese Meadow Bunting.

254. Tagh Bulbul. تاغ بلبل

Mountain Thrush.
Manchu: Alin yadali čečike.
Chinese: SHAN HUA MEI.

The "Mirror" says: Found in mountain caves. Long tail, whitish yellow eyebrows. Sings cleverly, but not so well as the *yadali čečike* (No. 253).

255. Yawa Bulbul. يبا بلبل

The "Stone" Thrush.
Manchu: Wehe yadali čečike.
Chinese: SHIH HUA MEI.

The "Mirror" says: Head and body blackish, sometimes green. The eyebrows are somewhat smaller than those of the *yadali čečike* (No. 253). Sings beautifully.

256. Aq Qaš Bulbul. آق قاش بلبل

White-browed Thrush.
Manchu: Šadali čečike.
Chinese: PAI MEI.

The "Mirror" has: The name for the white eye-browed *wehe yadali čečike* (No. 255).

257. Aqiš Bulbul. آقيش بلبل

Manchu: Yentu čečike.
Chinese: PAI TAO MEI.

The "Mirror" says: Eyes with reddish-black pupils; blackish beak, white eyebrows, variegated wings, and yellow legs.

258. Sarghinč Bulbul. سارغينچ بلبل

Manchu: Suwayan faitangga čečike.
Chinese: HUANG TAO MEI.

The "Mirror" says Resembles the *fiyasha čečike* (sparrow) (No. 339). Beak and wings black; yellow eyebrows, reddish legs.

259. Narinji Bulbul. نارينجى بلبل

Manchu: Sontu čečike.
Chinese: TAN HUANG TAO MEI.

The "Mirror" says: Resembles No. 258. Rather large body, yellowish eyebrows, long upper feathers on the tail, yellow legs.

260. Biš Yolloq. بيش يول لوق

Manchu: Jingjara [Z. Russian *Lyesnoi vorobei* = wood-sparrow].
Chinese: WU TAO MEI.

The Chinese *wu tao mei* means literally "five-striped eyebrow."

The "Mirror" has: Resembles the *fiyasha čečike* (No. 339). From the beak up to the head extend five black stripes, looking like eyebrows; the female does not possess these.

The Turki has the appearance of a doggerel translation of the Chinese. *Tao*, in this and the three preceding words, evidently means "streak" or "stripe," like the Manchu *justan*. The Turki *yol*, "a road," is here used in the same sense.

261. Ghaz Turghay. غاز تور غاى

A lark.
Manchu: Haihôna.
Chinese: PAI LING.

The "Mirror" says: Larger than the *wenderhen* (No. 262), reddish beak, black breast; varied song.

Zakharoff calls this the Pyrennean lark (*Alauda calandra*).

262. Torghay. تور غاى

A species of lark.
Manchu: Wenderhen.
Chinese: O LAN. [The Manchu transcription indicates the pronunciation *o*.]

The "Mirror" says: Resembles the *Saman čečike* (No. 264), but has no crest.

263. Gilrang Turghay. كل رانك تورغاى

A lark.
Manchu: Suhun wenderhen.
Chinese: HUI SHÊ O LAN.

The "Mirror" says: Resembles the *Saman čečike*. Beak whitish, eyes black, body deep coffee-brown, legs white.

264. Püpeklik Torghay. فوفك ليك تورغاى

The Crested Lark.
Alauda cristata, Linn.
Manchu: Saman čečike.
Chinese: FÊNG T'OU O-LAN [*lit.* phœnix-headed lark].

The "Mirror" says: Resembles the *wenderhen* (No. 262). On the head is a crest. Its song is varied.

265. Qarloghač. قار وغاچ

The Common Swallow.
Hirundo rustica.
Manchu: Čibin.
Chinese: TZŬ YEN [*lit.* the purple swallow].

The "Mirror" says: Has a black body and bifurcated tail. Appears in China in the middle of spring, and migrates in the middle of the autumn.

The Turki word for a swallow takes a great variety of forms, amongst which the following may be noted:—قارلواچ قرلانغچ and قارلانغوچ

Amyot, Vol. II, p. 448, defines *čibin* as: "Nom d'une espece d'oie qui a sur la queue quelques taches rouges"!

Scully gives *üi qarloghač*, "a house-swallow," for *Hirundo rustica*.

266. Quyran Qarloghač. قویران قارلوغاچ

The Crag Martin.
Cotile rupestris.
Manchu: Hada čibin [Z. *Hirundo riparia*].
Chinese: SHIH YEN.

The "Mirror" says: Has a long grey tail; somewhat larger than the common *čibin*. Makes its nest under the eaves of houses and on rocky prominences.

A Chinese saying, *shih yen fei* = "the stone-martins are on the wing," is an indication of coming rain.

267. Qalmaq Qarloghač. قالماق قارلوغاچ

The Kalmuk or Mongolian Swallow.
Manchu: Monggo čibin.
Chinese: HU YEN.

The "Mirror" says: Somewhat smaller than the all-black swallow. Found on the borders of Mongolia.

The Chinese *hu* means Mongolian. The Turki definition of *Kalmuk* is more precise.

268. Uwwači Qarloghač. اوواچی قارلوغاچ

A sacred swallow.
Manchu: Boihoju čibin.
Chinese: SHÊ YEN.

The "Mirror" says: Swallow with red eyeballs, black beak, blackish feet, white wings with small spots. Appears in China on the 5th day from the beginning of winter ("the day of the bringing of the sacrifices of two lands").

The Turki *uwwa* means a "bird's nest," and must not be confounded with *üi*, "a house," see No. 265.

269. Qum Uwwa Qarloghač. قوم اووا قارلوغاچ

The Sand Martin.
Cotile riparia, Linn.
Manchu: Yonggan čibin.
Chinese: SHA YEN.

The "Mirror" says: A swallow making its nest in the sand on the sea-shore.

The Turki implies a swallow whose nest is made either of sand or in the sand (*qum*).

270. Čighirčiq Qarloghač. چغير چيق قارلوغاچ

The Hibernating Swallow.
Manchu: Butuha čibin.
Chinese: CHIH YEN.

The "Mirror" says: This swallow, at the time of moulting (the autumn), hides itself in the hollows of trees, on sea islands, and in lonely places.

271. Čighirčiq. چغير چيق

The Northern Swallow.
Manchu: Biyara.
Chinese: SAI YEN.

The "Mirror" says: Found in Mongolia and in cold countries generally. Somewhat like the common swallow, but much bigger.

GROUP III.

272. Lay Uwwa Qarloghač. لاي اووا قارلوغاچ

The House Swallow.
Manchu: Gôldargan.
Chinese: YÜEH YEN.

The "Mirror" says: Resembles a swallow. Red tips to the wings; builds a long-shaped nest of dirt.

The Turki implies the swallow whose nest is made of mud (*lay*).

273. Sarigh Ala Qarloghač. سريغ آلا قارلوغاچ

The Yellow Swallow.
Manchu: Aijirgan.
Chinese: CHIN YEN.

The "Mirror" says: The yellow-bodied swallow is called *aijirgan*.

274. Jijirghan Qarloghač. جي جيرغان قارلوغاچ

A general name for sand-martins.
Manchu: Jijirgan.
Chinese: YI [Giles: House-martin].

The "Mirror" says: This name is given to all swallows which make their nests on the sandy banks of rivers.

The Turki is an imitation of the Manchu.

275. Yilan Qarloghač. ييلان قارلوغاچ

A species of house-swallow.
Manchu: Kelterhen.
Chinese: SHÊ YEN.

The "Mirror" says: Bigger than the *gôldargan* (No. 272). Short beak, body uniformly black, breast-bone white with black markings. Builds a long-shaped nest under the cornices of houses.

The Turki and the Chinese names both mean "snake-swallow," perhaps referring to this swallow's diet!

276. Qarloghač Qučqač. قارلوغاچ قوچقاچ

? The Brambling.
Fringilla montefringilla.
Manchu: Čibirgan.
Chinese: YEN CH'IAO.

The "Mirror" says: Head and back reddish colour speckled with black. The yellowish chin resembles the swallow's chin.

277. Tagh Qarloghač Qučqač. تاغ قارلوغاچ قوچقاچ

? Crag Martin.
Cotile rupestris (Scop.).
Manchu: Alin čibirgan.
Chinese: SHAN HUO YEN.

The "Mirror" says: Beak black, head, neck, feet and breast feathers black, with small white markings. Tail mouse-coloured, with yellow tip.

278. Zangkar Qučqač. زانككار قوچقاچ

The Kingfisher.
Alcedo ispida or *Ceryle rudis*, Linn.
Manchu: Ulgiyan čečike [Z. *Coracias garrula*].
Chinese: TS'UI NIAO.

The "Mirror" says: Colouration green, beak long, tail short.

279. Kök Zangkar Qučqač. كوك زانككار قوچقاچ

The Turquoise Kingfisher.
Halcyon smyrnensis.
Manchu: Lamun ulgiyan čečike.
Chinese: TS'UI YÜ [Giles: *Halcyon smyrnensis*].

The "Mirror" says: Like No. 278. Its plumage is greenish-blue.

280. Qizil Qučqač. قيزيل قوچقاچ

? The Crimson Kingfisher.
Manchu: Hailun čečike [Z.: Russian, *Krasnŭi simorodok* = red kingfisher].
Chinese: FEI NIAO [Giles: The cock-kingfisher].

The "Mirror" says: Like No. 278, but with red plumage.

281. Yašil-raq Qučqač. ياشيل راق قوچقاچ

The Green Kingfisher.
Manchu: Niowari čečike.
Chinese: LU NIAO.

The "Mirror" says: Eyeballs black, cheeks yellow, head, neck and back feathers have broad green bands.

282. Čipar Qučqač. چيپار قوچقاچ

A kingfisher.
Manchu: Ilhuru.
Chinese: CHIN PEI.

The "Mirror" says: Eyeballs black, cheeks yellow, head, neck and back shining purple.

283. Marjan Qučqač. مرجان قوچقاچ

The Coral-bird.
Manchu: Šuru čečike [*lit.* the coral bird].
Chinese: SHAN HU NIAO [*lit.* red-coral bird].

The "Mirror" says: It has a crest on its head; the plumage of the body is black. The male has a long tail; the female a short one. It is a good singer and a strong fighter.

284. Tagh Marjan Qučqač. تاغ مرجان قوچقاچ

The Hill Coral-bird.
Manchu: Alin-i šuru čečike.
Chinese: SHAN HU.

The "Mirror" says: Resembles No. 283. A kind of large dove. On the cheeks are black and white markings.

285. Tagh Sarighliq Qučqač. تاغ سريغليق قوچقاچ

The Yellow Hill-bird.
Manchu: Alin-i suwayangga čečike.
Chinese: HUANG SHAN NIAO.

The "Mirror" says: Resembles the *yadali* (No. 253), but is larger. Head, back and tail are golden-yellow. It spreads its tail like the fingers of a hand.

286. Tagh Yašilliq Qučqač. تاغ ياشيلليق قوچقاچ

The Green Hill-Bird.
Manchu: Alin-i niowanggiyangga čečike.
Chinese: LU SHAN NIAO.

The "Mirror" says: Resembles the *kekuhe* (No. 198), but is larger. From the side of the eyes and the neck are two black stripes like eyebrows. Head and neck green, back blue, tail blackish.

287. Khabarči Qučqač. خبرچي قوچقاچ

"The News Bird."
Manchu: Mejin čečike.
Chinese: Hsin niao.

The "Mirror" says: It is smaller than the *saksaha* (No. 180) (magpie). Neck and back black; long bifurcated tail which flutters when the bird sings. The priests regard this as a good omen.

288. Khušalliq Qučqač. خوشاليق قوچقاچ

"The Lucky Bird."
Perhaps a magpie.
Manchu: Jurguntu čečike.
Chinese: Shuang hsi [*lit.* double joys].

The "Mirror" says: Beak black, variegated wings, black tail. It has two pure white feathers, like the white *saksaha* (or magpie).

289. Khuš Wakhtliq Qučqač. خوش اوخت‌ليق قوچقاچ

"The Good Luck Bird."
Manchu: Sabirgan čečike.
Chinese: Chi hsiang niao [*lit.* the auspicious bird].

The "Mirror" says: Body small, head all black, chin white, neck and back black, with singular markings looking like fishes' scales. In between the "scales" are flecks of white hair. This bird is regarded as very beautiful.

290. Khurramliq Qučqač. خرمليق قوچقاچ

"The Happy Bird."
Manchu: Sabingga čečike.
Chinese: Shui hung niao [*lit.* good luck red bird].

The "Mirror" says: Beak red, broad and strong. Body blackish. Male and female always inseparable.

GROUP IV.

291. Čirlaq Qučqač. چيرلاق قوچقاچ

A grasshopper warbler.
Locustella nævia.
Manchu: Karka čečike.
Chinese: Shui cha tzŭ [*lit.* water warbler].

The "Mirror" says: Resembles the *giyahôn čečike* (No. 239, the shrike). Beak long. It is found amongst the reeds; and brings up the young of the cuckoo.

There is a word *čirliq*, according to the "Sanglakh" (synonymous with *čırjirek*), in Turki which means a "cricket," or "grasshopper," and it is possible this bird may have been named thereafter, as in the case of the European variety *Locustella nævia*, Bodd.

292. Čarkhči Qučqač. چرخچی قوچقاچ

The Reed Warbler.
Acrocephalus streperus.
Manchu: Urka čečike.
Chinese: WEI CHA TZŬ [*lit.* reed warbler].

This is apparently another name for No. 291.

Bowdler Sharpe (B.S. 184) gives *caghči* as the Turki name for the Indian Blue-throat *Cyanecula cærulecula.* But I think this is a mistake for *čarkhči*, as Scully says the bird is so named because it makes a noise resemling the whirr of a spinning wheel (*čarkh*).

293. Šakhsanaghač Qučqač. شاخسناغوچ قوچقاچ

The Tailor Bird.
Manchu: Darha čečike [Z. tailor-bird].
Chinese: LU WEI NIAO.

The "Mirror" says: Resembles the *fenihe čečike* (No. 358). It builds a nest, which looks as if it were made of felt, with a narrow opening. Women, in order to recover their health after child-birth, burn this nest and dissolve the ashes in wine, which they then drink.

294. Šakhči Qučqač. شاخچی قوچقاچ

Another name for No. 293 (above).
Manchu: Jirha čečike.
Chinese: CHIAO LIAO [Giles: tailor-bird or wren].

Hepburn's Japanese-English Dictionary says *Nuso sazai*, which is written in Chinese characters *chiao liao*, means a "wren."

295. Hawadar Qučqač. هوادار قوچقاچ

"The Love Bird."
Manchu: Tomika čečike.
Chinese: T'AO CH'UNG [Giles: wren].

The "Mirror" says: the young of *jirha čečike* (No. 294) are called *tomika čečike.*

296. Zarrawar Qučqač. زره وار قوچقاچ

Manchu: Torho čečike.
Chinese: T'AO CH'IAO.

Another name for No. 295.

297. Máda Šakhči Qučqač. ماده شاخچی قوچقاچ

The hen of the Tailor-Bird.
Manchu: Aimika čečike.
Chinese: AI [Giles: the hen of the tailor-bird].

298. Tormačuq Qučqač. تورماچوق قوچقاچ

A Finch ?
Manchu: Darhôwan čečike [Z.: Russian, *Trostyaika* = Reed-warbler].
Chinese: Ti niao.

The "Mirror" says: It is smaller than the *baibula* (No. 185). It has a long double tail. It builds its nest amongst the reeds.

Perhaps the same as *Tumučuq* in Scully, S.F., 732, *bis* A, *Erythrospiza obsoleta*.

299. Uštur Qučqač. اوشتور قوچقاچ

The Little Camel-Bird.
Manchu: Temen čečike.
Chinese: Shui lo t'o [*lit.* water camel-bird].

The "Mirror" says: Beak long, back yellow, delicate markings on the head. Under the gizzard it has long hanging feathers like a hanging lip. Its neck is bent forward like a camel's.

300. Ala Par Janwar. آلا فر جانوار

Pied Wagtail.
Motacilla luzoniensis or *M. lugubris*.
Manchu: Inggali
Chinese: Chi ling [Giles: pied wagtail].

The "Mirror" says: Colouration grey, neck black, breast white, when it walks it wags its tail.

301. Ala Par Lamaj Janwar. آلافر لماج جانوار

A species of wagtail.
Manchu: Yanggali.
Chinese: Lu pu hua [*lit.* the turnip-flower].

The "Mirror" says: Resembles No. 300 in form, but in size is like the *wenderhen* (lark) (No. 262) family. Body feathers yellow, with black and white markings.

302. Yonjiliq Janwar. يونجي‌ليق جانوار

A species of sparrow.
Manchu: Sišargan.
Chinese: Ma ch'iao [Giles: sparrow].

The "Mirror" says: Resembles the *fiyabko* (No. 354). Breast brownish; on its face are blackish markings. These birds fly in flocks.

The Turki *yonja* = clover. *Yonjaliq* = pasture field.

303. Qizil Yonjiliq Janwar. قيزيل يونجي‌ليق جانوار

The Red Mountain Sparrow.
Manchu: Fulgiyan sišargan.
Chinese: K'ao shan hung.

The "Mirror" says: It has red feathers, with black markings.

304. Qizil Baš Janwar. قیزیل‌باش جانوار

The Red-headed Linnet.
Manchu: Čalihôn [Z.: Russian, *Chechetka*, *Fringilla linaria*].
Chinese: CHU TING HUNG.

The "Mirror" says: Back light brown, head red.

305. Baqam Janwar. بقّم جانوار

The Dark Red Linnet.
Manchu: Šušu čalihôn [Z.: Russian, *Malinovka*, *Motacilla Salicaria*].
Chinese: SHU SHU NIAO.

The "Mirror" says: Its plumage is all red. It is larger than the lark (*wenderhen*).

The Manchu word *šušu* = violet or dark red.

306. Sarigh Güz Janwar. سریغ کوز جانوار

A species of Finch.
Manchu: Aisuri.
Chinese: CHIN YEN.

The "Mirror" says: Eyes yellow, eyeballs black, like the lark (*wenderhen*, No. 262); tail short, body uniformly black, neck white. It has no hinder toes so it can not perch on trees.

307. Zar Qanat Qučqač. زر قنات قوچقاچ

The Gold-Finch.
Manchu: Aisha čečike [Z.: Russian, *Shtshegól*. *Fringilla carduelis*].
Chinese: CHIN CH'IH [Giles: *Chlorospiza spinus*].

The "Mirror" says: Resembles in nature the yellow shrike (*suwayan giyahôn*). Back red, wings black; but having in the centre a row of yellow feathers looking like shining gold.

308. Sarigh Qučqač. سریغ قوچقاچ

A yellow nightingale.
Manchu: Hôwangdana [a transliteration of the Chinese name].
Chinese: HUANG TAN.

The "Mirror" says: Back brown, breast yellow. It migrates in the summer.

For explanation of the Chinese word *tan*, see No. 209.

309. Nim Rang Qučqač. نیم رنک قوچقاچ

Manchu: Hongko čečike.
Chinese: SHIH HUANG.

The "Mirror" says: It is somewhat smaller than the *honggon čečike* (No. 310). Breast yellow, back blackish; it sings like a lark.

310. Qongrogholoq Qučqač. قونک روغولوق قوچقاچ

The Brass-Bell Bird.
Manchu: Honggono čečike.
Chinese: T'UNG LING [*lit.* a brass-bell].

The "Mirror" says: It is somewhat bigger than the *tomika čečike* (No. 295). Body speckled. When it sings its voice is like a brass-bell, being very flexible and clear.

Radloff gives *qongaraq* and *qongrū* as Turki words for a bell.

311. Jirqiraq Qučqač. جیرقیراق قوچقاچ

The Golden-Bell Bird.
Manchu: Honggon čečike.
Chinese: CHIN LING [*lit.* a gold-bell].

The "Mirror" says: Smaller than the *gôlin čečike* (No. 237). When it sings its voice sounds like a bell.

The Turki *Jirqiraq* is apparently another form of the Ottoman word for a "bell," which has several recognised forms: *činghiraq*, *činghirdaq*.

GROUP V.

312. Erte Yazdaqi Qučqač. ارته یازداقی قوچقاچ

The Spring Bird.
Manchu: Niyengniyeltu čečike.
Chinese: CH'ANG CH'UN HUA NIAO.

The "Mirror" says: Head and neck uniformly white, wings and tail black. Strong clear voice. Appears in the spring and sings unceasingly all through that season.

313. Bahardaqi Qučqač. بهارداقی قوچقاچ

The Spring Bird.
Manchu: Tuniyeltu čečike.
Chinese: WAN CH'UN NIAO.

The "Mirror" says: Another name for the above.

314. Junubi Qučqač. جنوبی قوچقاچ

The Southern Bird.
Manchu: Jukidun [Z.: Russian, *Byelaya kuropatka* = white partridge].
Chinese: CHO KU [Giles: the common partridge].

The "Mirror" says: The body of this bird is white with black markings like those of the young pheasant. It always migrates to the south.

315. Tagh Junubi Qučqač. تاغ جنوبی قوچقاچ

The Mountain Partridge.
Manchu: Alin-i jukidun.
Chinese: SHAN CHO.

The "Mirror" says: Resembles the Magpie. Legs and beak red; plumage dark green; tail long and large; black at the root and white at the extremity; on it are two upper feathers, very long, ash-coloured with reddish tips.

316. Mihruban Qučqač. مهروبان قوچقاچ

A Love Bird.
Manchu: Kidun čečike.
Chinese: HSIANG SSŬ NIAO [Giles: "love-bird"].

The "Mirror" says: It is mouse-coloured; neck short. It has a penetrating voice. The male and the female are not easily separated.

The Turki مهروبان is probably a mistake for مهربان .

317. Kötki Qučqač. كوتكى قوچقاچ

A Love-Bird.
Manchu: Ekidun čečike.
Chinese: LÜ FÊNG CH'IU.

Zakharoff says: This bird is smaller than the sparrow, and has a short neck. The male and female are inseparable.

318. Ala Boynaq Qučqač. آلا بويناق قوچقاچ

The Chinese Tit.
Parus minor, Temm.
Manchu: Simari čečike [Z.: *Parus minor*].
Chinese: TZŬ KUEI [Giles: a name for the cuckoo].

The "Mirror" says: On the head and neck are black markings. The cheeks are white, the wings and tail blue; the wings have white tips. Sings all night up to daybreak, until the blood drops from its mouth.

319. Ala Qanat Qučqač. آلا قنات قوچقاچ

Manchu: Tinggu čečike.
Chinese: T'I HU NIAO.

The "Mirror" says: Body blackish; delicate white spots on the back and wings.

Pétillon says: *T'i-hou t'i-hou*, onomatopée dont on a fait le nom d'un oiseau. Et j'entends l'oiseau du printemps qui m'invite à porter mon pot à vin. *Allusions Littéraires*, p. 69.

The Chinese *t'i hu* here means "bring the kettle."

320. Hudhud. هد هد

The Hoopoe.
Manchu: Sončoho čečike [Z.: Russian, *Udod* = *Upupa epops*].
Chinese: SAN HO SHANG.

The "Mirror" says: Beak long, head black; on the head longish black feathers like a pigtail (*sončoho*).

321. Qayči Tumšuq Qučqač. قایچی تومشوق قوچقاچ

Crossbill.

Loxia curvirostra.

Manchu: Hiyahali čečike [Z.: Russian, *Klest*].

Chinese: CHIAO TSUI.

The "Mirror" says: This bird's bill is crooked. The chin of the male is curved to the left, that of the female to the right.

322. Čaplašadqaq Qučqač. چاپلاشدقاق قوچقاچ

A love-bird.

Manchu: Sukiyari čečike.

Chinese: TAO KUA NIAO [Giles: *Loricula*, the love-bird of Formosa].

The "Mirror" says: The pupils of the eyes are white, the beak reddish, with hooked tip. Colouration light-green, feet blackish. Hangs from the branches of trees by its feet and beak, and swings round and round whilst singing.

323. Tutušqaq Janwar. توتوشقاق جانوار

A species of love-bird.

Manchu: Garukiyari.

Chinese: LU MAO YAO FÊNG.

The "Mirror" says: Somewhat larger than the *Sukiyari čečike* (No. 322). Outer feathers green, inner feathers yellow. It hangs upside down from the branches of fruit trees, and swings about.

324. Müki Tumšuq Qučqač. موکی تومشوق قوچقاچ

Manchu: Enggetu čečike.

Chinese: KO PA TSUI.

The "Mirror" says: Reddish eyes, blackish beak. Black and white mixed feathers on the head, back and tail.

325. Jöki Tumšuq Qučqač. جوکی تومشوق قوچقاچ

A woodpecker.

Manchu: Čolkon čečike.

Chinese: CH'ANG CHO NIAO.

The "Mirror" says: Back black, long beak.

Zakharoff says: Woodpecker (Russian, *Dyatel*) which has a long beak and feeds on cedar nuts.

326. Kök Tamghaq Janwar. کوک تامغاق جانوار

Dove-coloured mocking-bird.

Manchu: Lamuke.

Chinese: LAN TIEN K'O [*lit.* indigo-coloured chin].

The "Mirror" says: In size like the *fiyasha čečike* (No. 339) (sparrow). On the chin are blue feathers.

Zakharoff has: Dove-coloured mocking-bird.

327. Qara Tamghaq Janwar. قرا تامغاق جانوار

Black mocking-bird.
Manchu: Yačike.
Chinese: Hei tien k'o.

The "Mirror" says: Has black feathers on the chin.

328. Qiz Tamghaq Janwar. قيز (*sic.*) تامغاق جانوار

Red mocking-bird.
Manchu: Fulgike.
Chinese: Hung tien k'o.

The "Mirror" has: This bird has red feathers on the chin.

329. Áqiš Tamghaq Janwar. آقيش تامغاق جانوار

White mocking-bird.
Manchu: Šeyeke.
Chinese: Pai tien k'o.

The "Mirror" says: Has white feathers on the chin.

330. Áq Baš Qučqač. آق باش قوچقاچ

? A white-headed bulbul.
Manchu: Čakôlutu čečike.
Chinese: Pai t'ou wêng.

The "Mirror" says: At the back of the head are white feathers with black markings.

331. Ála Baš Qučqač. آلا باش قوچقاچ

A variety of bulbul.
Pycnonotus sp.
Manchu: Čakôlu čečike.
Chinese: Pai t'ou lang [*Pycnonotus occipitalis*].

The "Mirror" says: The beak is black, the head and neck white.

332. Burma buyun Qučqač. بورما بو يون قوچقاچ

Manchu: Meihe čečike.
Chinese: Shê t'ou niao. [The Chinese means *lit.* snake-headed bird].

The "Mirror" says: This bird has a snake-like neck and a long tongue.

In Turki *burmaq* = to twist or bend.

333. Yulbars baš Qučqač. يولبارس باش قوچقاچ

A Wood-sparrow.

Manchu: Bunjiha [Z: Russian *Lyesnoï vorobeï*, wood-sparrow].

Chinese: Hu t'ou ch'iao [*lit.* tiger-headed bird].

The "Mirror" says: Resembles the *fiyasha čečike* (No. 339). The body is small, but the head and eyes are large.

334. Qapáq baš Qučqač. قفاق باش قوچقاچ

Manchu: Holtu čečike.

Chinese: Hu lu t'ou [*lit.* pumpkin-headed].

The "Mirror" says: On the head are white feathers so arranged that they give the impression of the sections of a pumpkin.

The Manchu appears to be a transcription of the Chinese.

The Turki appears to be a translation of the Chinese. *Qapáq* = a pumpkin.

335. Feryadči Qučqač. فریاد چی قوچقاچ

Manchu: Intu čečike.

Chinese: Yao ku.

The "Mirror" says: Head and body reddish; somewhat larger than the *Suiha čečike* (No. 357). Sings unceasingly.

336. Ding-ding Qučqač. دینک دینک قوچقاچ

A species of wagtail.

Manchu: Tukiyeri čečike.

Chinese: Yao t'un ch'iao.

The "Mirorr" says: Over the eyelids are long ash-coloured feathers looking like eyebrows; short tail; always struts when walking.

This name bears a curious resemblance to the *jing jing* (Bearded Reedling, *Panurus biarmicus*) of Bowdler Sharpe's List.

337. Timur-tirmaq Qučqač. تمور تیرماق قوچقاچ

Manchu: Ukan čečike.

Chinese: T'ieh chiao [*lit.* Iron-foot].

The "Mirror" says: Resembles the *fiyasha čečike* (No. 339). Head blue, white feathers on the borders of the tail. Appears in spring.

The Turki name is apparently a translation of the Chinese.

338. Deir-deir Qučqač. دَیْر دَیْر قوچقاچ

Manchu: Derdu čečike.

Chinese: Tou-tou ch'iao.

The "Mirror" says: Resembles the *Kiongguhe* (No. 178) in nature. At the beginning of the beak there are black downy feathers. When it sings its cry sounds like the words *der-du*.

GROUP VI.

339. Ꭿq Qučqač. آق قوچقاچ

The house-sparrow.

Passer domesticus.

Manchu: Fiyasha čečike.

Chinese: CHIA CH'IAO.

The "Mirror" says: This bird builds its nest under the eaves of houses.

340. Mihman Qučqač. مهمان قوچقاچ

A sparrow.

Manchu: Antarhan čečike.

Chinese: PIN CH'IAO [G. *Passer montanus*].

The "Mirror" says: A sparrow which also nests under the eaves of houses.

341. Danlaghaq Qučqač. دان لاغاق قوچقاچ

The "shop" sparrow.

Manchu: Jeleme čečike.

Chinese: T'OU TS'ANG [Chinese *t'ou* = to pilfer].

The "Mirror" says: Resembles the *fiyasha čečike* (No. 339). Ash-coloured, with black markings. This bird steals rice, etc., from shops and cupboards

342. Sopičaq. سوپی چاق

Manchu: Yadan čečike.

Chinese: WU KÊNG MING.

The "Mirror" says: Resembling the *fiyabko* (354). Colouration coffee-brown.

The Turki bird name most resembling this is *Sopia* for which see No. 174.

343. Ꭿla Ča Qučqač. آلا چا قوچقاچ

A species of Bunting.

? *Emberiza schœniclus.*

Manchu: Bederi čečike.

Chinese: HUA PAN.

The "Mirror" says: Beak long and broad; over the eyelids white feathery stripes; the plumage of the body, black and white mixed.

B.S. 82 gives *ča qučqač* = *Emberiza shœniclus.*

344. Qara Ꭿla Qučqač. قرا آلا قوچقاچ

Manchu: Sahaltu čečike.

Chinese: PAI HUA CH'IAO.

The "Mirror" says: Larger than the *fiyasha čečike* (No. 339). Head black, neck white, feathers on the back dark yellow, with white markings.

345. Tagh Ala Qučqač تاغ آلا قوچقاچ

Manchu: Alhatu čečike.
Chinese: SHAN HUA CH'IAO.

The "Mirror" says: This bird has black and white variegated feathers [Z. says: This bird is used as a dedication by the Priests].

346. Bederlik Qučqač. بدرلیک قوچقاچ

Manchu: Marutu čečike.
Chinese: YÜ LIN CH'IAO [Chinese *yü-lin* = fishes' scales].

The "Mirror" says: The plumage of the body is black and white, the markings having the appearance of fishes' scales.

347. Tagh Qučqač. تاغ قوچقاچ

Mountain-sparrow.
Manchu: Alin-i čečike.
Chinese: SHAN CH'IAO.

The "Mirror" says: The colouration is slightly different to that of the *fiyasha čečike* (No. 339). This bird makes its nest in mountain crevices

348. Qara Čapar Qučqač. قرا چفار قوچقاچ

Manchu: Sunggali čečike.
Chinese: SUNG HUA [*lit.* pine-tree flowers].

The "Mirror" says: Body black with white spots. Strong voice.

349. Quruqči Qučqač. قوروق چی قوچقاچ

The Nut-cracker.
Nucifraga coryocatactes Linn.
Manchu: Ongguro čečike. [Z: Russian, *Kedrovka*].
Chinese: HU SUNG NIAO (*lit.* the pine-protecting bird).

The "Mirror" says: This bird feeds on hazel-nuts in the woods. When the sable and other animals climb the pine-trees for nuts, this bird gives a cry of fright.

350. Khán lik Qučqač. خان لیک قوچقاچ

A species of Linnet.
? *Fringilla cannabina.*
Manchu: Sišari čečike [Z: Russian, *Konoplyanka*].
Chinese: MA YEH CH'IAO.

The "Mirror" says: Beak reddish yellow; on the cheeks curly white feathers. The tail feathers are reddish and sometimes white.

351. Jár qiraghaq. جار قی راغاق

A species of Lark.
Alauda sp.

Manchu : Guwenderhen [Z : Russian, *Polevoï javǒronok*].
Chinese : SHAO T'IEN CH'IAO.

The "Mirror" says : Resembling the *Čibirgan* (No. 276) in nature. In colouration it resembles the quail. At daybreak this bird comes out of the thick grass, and soars up into the clouds.

352. Jibildaghaq. جيبيلدا غاق

Field-lark.
Alauda sp.
Manchu : Jorgirhen. [Z : Russian, *Polevoï ǰavoronok*].
Chinese : CHIAO T'IEN TZŬ.

The "Mirror" says : This lark sings (twitters) at sunrise, hence its name *jorgirhen*. The Manchu verb *jorgimbi* = to twitter.

353. Watil da ghaq. وتيل دا غاق

A species of lark.
Alauda sp.
Manchu : Mulderhen.
Chinese : T'IEN LIU.

The "Mirror" says : A lark with plumage like that of the female quail.

354. Čili. چيلى

? The Siberian Fieldfare.
Turdus ruficollis.
Manchu : Fiyabkô.
Chinese : CH'UAN TSAO CHI [Giles : *Turdus ruficollis*, Siberian Fieldfare].

The "Mirror" says : Coloration light brown. Appears in the summer.

355. Ayis Qirma Qučqač. ايىس قيرما قوچقاچ

A species of Tit.
Manchu : Ija čečike.
Chinese : TZŬ-TZŬ HEI.

The "Mirror" says : Green in colour. Somewhat larger than the *jinjiba čečike* (359).

356. Qipač Qučqač. قيفاچ قوچقاچ

Manchu : Čuseri čečike.
Chinese : CHU YEH CH'IAO.

The "Mirror" says : The feathers on the body are ash-coloured. Over the eyelids are light yellow feathers like eyebrows. Legs very red.

357 Daghlaghu. داغلا غو

Manchu : Suiha čečike.
Chinese : AI PAO [Chinese *pao* = panther].

The "Mirror" says: Back light brown, breast blackish.
Zakharoff adds: Breastbone yellowish grey, breast white like a leopard's.

358. Tukhmakči. توخمک چی

Manchu: Fenehe čečike.
Chinese: HUAI CH'UAN.

The "Mirror" says: Plumage resembles that of the *fiyabkô* (354). Very small bird.

359. Ala güz. آلا کوز

? A Wren.
Manchu: Jinjiba.
Chinese: FÊN YEN.

The "Mirror" says: Colouration green, body very small.
Zakharoff: Russian *Pyentra* [*Sylvia trochilus*].

360. Qighač Janwar. قی غاچ جانوار

? A Linnet.
? *Fringilla cannabina.*
Manchu: Fodoba.
Chinese: LIU YEH CH'IAO [*lit.* the willow-leaf bird].

The "Mirror" says: Colouration green, like the green of the Willow tree.

According to the "Sanglakh" *qiqač* is a word peculiar to the Turks of Persia and means "crooked."

INDEX OF TURKI BIRD NAMES.

INDEX TO LATIN NAMES.

CHINESE INDEX

Note. The numbers in the Index refer to the numbers in the List.

Memoirs of the Asiatic Society of Bengal.

1905—1906.

I. *On certain Tibetan Scrolls and Images lately brought from Gyantse.—By* PROF. SATIS CHANDRA VIDYĀBHŪṢAṆA, M.A., M.R.A.S. (Price Re. 1-8; or 2*s.* 3*d.*)

II. *Sal-Ammoniac: a Study in Primitive Chemistry.—By* H. E. STAPLETON, B.A., B.Sc. (Price Re. 1; or 1*s.* 6*d.*)

III. *The Similarity of the Tibetan to the Kashgar-Brahmi Alphabet.—By* The REV. A. H. FRANCKE. (Price Rs. 2; or 2*s.* 10*d.*)

IV. *Alchemical Equipment in the Eleventh Century, A.D.—By* H. E. STAPLETON and R. F. AZO. (Price Re. 1-8; or 2*s.* 3*d.*)

V. *Malaysian Barnacles in the Indian Museum, with a list of the Indian Pedunculata.—By* N. ANNANDALE, B.A., D.Sc. (Price Re. 1-8; or 2*s.* 3*d.*)

VI. *Ashrafpur Copper-plate Grants of Devakhadga.—By* GANGA MOHAN LASKAR, M.A. (Price Annas 8; or 10*d.*)

VII. *Festivals and Folklore of Gilgit.—By* GHULAM MUHAMMAD. (Price Rs. 2; or 2*s.* 10*d.*)

VIII. *Notes on the Bhotias of Almora and British Garhwal.—By* C. A. SHERRING, M.A., F.R.G.S., I.C.S. (Price Re. 1-5; or 2*s.*)

IX. *Religion and Customs of the Uraons.—By* the late REV. FATHER DEHON, S.J. (Price Rs. 2; or 2*s.* 10*d.*)

X. *Notes on the Fauna of a Desert Tract in Southern India* (Herpetology and Entomology).—*By* N. ANNANDALE, D.Sc., C.M.Z.S., with a list of Mammals by R. C. WROUGHTON, F.E.S. (Price Rs. 2; or 2*s.* 10*d.*)

XI. *Amulets as Agents in the Prevention of Disease in Bengal.*—Compiled in the Office of the Superintendent of Ethnography, Bengal. (Price Annas 12; or 1*s.* 2*d.*)

XII. *Earth-Eating and the Earth-Eating Habit in India.—By* D. HOOPER and H. H. MANN. (Price Re. 1; or 1*s.* 6*d.*)

XIII. *On a Cup-Mark Inscription in the Chumbi Valley.—By* E. H. C. WALSH, I.C.S. (Price Re. 1; or 1*s.* 6*d.*)

XIV. *A Descriptive List of the Sea-Snakes* (Hydrophiidæ) *in the Indian Museum, Calcutta.—By* CAPTAIN F. WALL, I.M.S., C.M.Z.S. (Price Re. 1; or 1*s.* 6*d.*)

XV. *Common Saws and Proverbs collected, chiefly from Dervishes, in Southern Persia.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Re. 1; or 1*s.* 6*d.*)

XVI. *The Common Hydra of Bengal: its Systematic Position and Life History.—By* N. ANNANDALE, B.A., D.Sc., C.M.Z.S. (Price Re. 1; or 1*s.* 6*d.*)

XVII. *Animals in the Inscriptions of Piyadasi.—By* MONMOHAN CHAKRAVARTI, M.A. (Price Annas 12; or 1*s.* 2*d.*)

XVIII. *Some current Persian Tales told by Professional Story-Tellers.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Re. 1; or 1*s.* 6*d.*)

XIX. *The Dards at Khalatse in Western Tibet.—By* REV. A. H. FRANCKE. (Price Re. 1-6; or 2*s.*)

Supplement, Miscellanea Ethnographica. Part I. 1. *The Blow-Gun in Southern India* 2. *Miscellaneous objects from the Rámanád subdivision of the Madura district* 3. *Indian Weighing-beams.—By* N. ANNANDALE, D.Sc. (Price Re. 1.)

Supplement, Miscellanea Ethnographica. Part II. 1. *Some Malayan Weapons—By* N. ANNANDALE. 2. *Plan of a Persian Gentleman's House.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Annas 8; or 10*d.*)

Memoirs of the Asiatic Society of Bengal.

Vol. II.

MEMOIRS

OF THE

ASIATIC SOCIETY OF BENGAL

VOL. II, No. 10, pp. 841—846.

NOTES ON SOME MONUMENTS IN AFGHANISTAN.

BY

H. H. HAYDEN, *Geological Survey of India.*

CALCUTTA:

PRINTED AT THE BAPTIST MISSION PRESS, AND PUBLISHED BY

THE ASIATIC SOCIETY, 57, PARK STREET.

1910.

Price Re. 1 ; *or* 1*s.* 6*d.*

18-1-10.

Notes on some Monuments in Afghanistan.

By H. H. HAYDEN, *Geological Survey of India.*

THE MUNÁRS NEAR KABUL.

Masson's detailed researches on the subject of the Afghan topes, published in Wilson's "*Ariana Antiqua*" (1841), leave little for subsequent travellers to add. This, indeed, is fortunate, since the state of preservation of the topes and other monuments both about Jalalabad and at Yakhdara near Kabul is now very inferior to what it was in Masson's day. A few, however, still survive, and, of these, the most striking are the two columns known as the *Munár-i-Chakri* and *Munár-i-Surkh.*

The *Munár-i-Chakri* (Plate xi) is one of the most conspicuous landmarks in the neighbourhood of Kabul. It stands on the Kotal-i-Munár, a pass over the high ridge crossed by the short cut from Kabul to Khurd Kabul and at about eight miles to the south-east of the former place. It has already been described by Masson,[1] but the figure given by him does not give a very accurate idea of the upper part of the column. His drawing, however, shows the curious bulge on the north-western side of the pillar; this is very marked in the original, and is quite noticeable in the photograph now reproduced. This bulge is due to the fact that the upper part of the column leans over to the south-east, a defect which probably dates from the time of its construction, as there is no evidence of recent displacement. The height of the column is about 105 feet; this estimate is based on the height of a stick, 5 ft. long, placed against the tower and photographed with it; it consequently only gives an approximation to the true height, which is probably somewhat greater.

A fact which appears to have escaped Mr. Masson's attention is the considerable use of timber in the construction of this Munár. Ends of wooden beams can be clearly seen at the first projecting course, and other beams have been used, though more sparingly, in the main mass of the masonry.

A regrettable feature will be noticed in the illustration now published: this is the dilapidated condition of the square base on which the pillar stands. Owing to the effects of the weather, the western side of the pedestal is becoming gradually undermined, and unless steps are taken before long to repair this damage, the Munár must inevitably fall.

The illustration now published is a reproduction of a photograph taken on December 5th, 1907, by Mr. W. Donovan, of the Oriental Telephone and Electric Company, Electrical Engineer to the Amir of Afghanistan.

---

[1] H. H. Wilson: *Ariana Antiqua*, p. 114, and pl. ix (1841).

The Munár-i-Surkh has already been described by Masson, and I only mention it here in order to correct an obvious slip to be found on page 56 of Fergusson's *History of Indian and Eastern Architecture* (1876) and which evidently escaped the author's notice. In his description of the Munárs near Kabul, Fergusson refers to them as the Chakri Munár and the Surkh Munár, and publishes a woodcut purporting to illustrate the latter and said to be taken "from a drawing by Mr. Masson in Wilson's 'Ariana Antiqua'". Masson states in his description of the Munár-i-Surkh (*op. cit.*, p. 114), that "its upper parts have fallen beneath the injuries of time": when Masson saw it, it was evidently in the same dilapidated state as at the time of my recent visit; only a portion—probably representing about two-thirds of the original structure—is still standing; this consists of a plain cylindrical column capped by a projecting course similar to that seen at rather less than two-thirds of its height in the illustration now published of the Munár-i-Chakri. On the other hand, Fergusson's woodcut represents a pillar in a very good state of preservation, and also resembles closely the Munár-i-Chakri. In his reference to his woodcut, "Munár-i-Surkh" is evidently, therefore, merely a slip for "Munár-i-Chakri." Curiously enough, however, his woodcut differs considerably from the illustration given by Masson on Plate ix of *Ariana Antiqua*, from which it purports to be taken.[1] It is clearly not a copy of Masson's figure, yet a comparison of both with the photograph now published shows the Fergusson's woodcut is the more accurate of the two!

Buddhist Carvings at Bámián.

The Bámián caves and carvings have been described by many writers, beginning with Hiuen Tsiang, who visited the valley nearly thirteen hundred years ago (between A.D. 629 and 645). Notes on them have also been published at various times in this Society's journal; *viz.*, by Burnes in 1833 (vol. ii, 561), and by Masson in 1836 (vol. v, 707). Subsequently in 1839, Bámián was visited by Dr. W. Griffith (Posthumous Papers: Journals of Travels in Assam, &c., edited by J. McClelland (1847), p. 389). Both he and Burnes give illustrations of the principal figures; these were drawn from rough sketches and with the exception of a photograph of one of the figures taken by Mr. A. Collins and reproduced in Dr. J. A. Gray's "My Residence at the Court of the Amir" (1895), p. 144, no photographs have, I believe, been published.

There are at present altogether five statues in Bámián, three of which are in the main valley at Taibut. Plate xii gives a general view of the cliffs of Tertiary conglomerate on the left side of the valley and shows the two chief niches, one at either end, and two smaller niches between them. Only one of the latter contains a statue and that has suffered, like the two principal figures, from systematic mutilation as well as from the effects of cannon-balls fired at it by Mahommedan invaders.

A fourth statue (Plate xiii) is seen in the cliffs on the right bank of the Chapdara, a stream which joins the Bámián river on its right bank about two miles below Taibut.

---

1 Only two copies of this work were accessible to me in Calcutta—one in the Imperial Library, and the other in the Library of the Asiatic Society of Bengal; but the illustrations were probably the same throughout the edition.

The fifth statue, which is the recumbent one and which I had not an opportunity of seeing, is at Azhdahár on the right side of the Bámián valley above Taibut.

Plate xii shows the numerous caves in the cliffs at Bámián; some of these are now used as barracks, others are occupied by the local peasants, whilst many are empty. Similar caves are to be seen in many of the smaller valleys in the neighbourhood.

Hiuen Tsiang describes the statues as being of great beauty; the largest, he says, was 140 or 150 feet in height, whilst "its golden hues sparkle on every side and its precious ornaments dazzle the eyes by their brightness."[1] It is difficult, however, to identify them from his description of their situations, but the two large ones, to which he refers as statues of Ṣakya Muni, are presumably those in the principal niches illustrated on Plate xii, while the recumbent figure, that he describes as being in a monastery to the east of Bámián, may be that at Azhdahár, "east" having been accidentally used instead of "west." At the time of his visit they were all evidently in an excellent state of preservation, since Buddhism then prevailed throughout the whole of Afghanistan, and a consideration of the extreme smallness of the remnants now left of the many statues, monasteries, stupas and viháras described by him leaves one appalled at the barbarism displayed in their ruthless destruction by subsequent conquerors.

The illustration now published (Plate xiv) is from a photograph of the largest figure, which stands in the niche seen at the left side of Plate xii. That published by Dr. Gray is from a photograph of the figure in the niche at the opposite end of the same plate. The sizes given for the largest of the figures vary considerably, ranging from 120 feet (Burnes) through 135 feet (Griffith) and 140 to 150 feet (Hiuen Tsiang) to 173 feet (Gray). Unfortunately I had not an opportunity of taking measurements, but I should be inclined to accept Dr. Gray's figure, *viz.* 173 feet. The heights given by the older Mahomedan historians are evidently only approximate.

Burnes, when he visited Bámián, was told the same fable with regard to these carvings as is repeated at the present day; according to this, they represent, the largest one a male, the next a female, wife of the large one, and the smallest, which is in a niche between the two large ones, their child. Both Burnes and Masson failed to realize the true nature of these carvings, but Griffith, probably as a result of his travels in Burma and Bhutan, at once recognised them as of Buddhist origin.

The frescoes above the heads of the two principal figures are now much dilapidated; those over the smaller statue appeared to be better preserved and are in parts extraordinarily fresh and bright; they appear to have been not unlike the frescoes found in Buddhist temples in Tibet at the present day. The only subject that I was able to recognise was a well-preserved painting of the Garuda bird.

All the statues are carved out of the solid cliffs of Tertiary conglomerate, which consists of small pebbles embedded in a fairly hard matrix of sandy clay.

---

[1] S. Beal: Si-yu-ki: *Buddhist Records of the Western World*, i, 51 (1885).

Cup-marks in Bámián.

On the descent from the Ak Rabát Kotal to Bámián, and at about one-and-a-half mile below the top of the pass, two large blocks of limestone have rolled down from the small scarp above the road, and lie at the side of the footpath. Both of these are covered with cup-marks on the side next the path. On the top of each block is a heap of pebbles and several of the cups contain small stones. Many of the marks are quite fresh and show signs of recent excavation. It is, therefore, clear that the present Mahommedan inhabitants still continue to hollow them out as they pass by.

The question of the origin of cup-marks has been dealt with at some length by Mr. E. H. Walsh, I.C.S., in a Memoir published by this Society [vol. i, 271 (1907)]. My observations throw no further light on the matter. The people of Bámián have apparently no idea of the meaning or origin of the marks, and, when asked, merely say that the place is a "ziarat" and that a holy man presumably died on this spot. When he died or who he was they do not know, and there is no trace of anything resembling a grave.

Plate xv shows old cups below and freshly-cut ones, with pebbles in them, above. The other block, on the left-hand side of the picture, is covered with more numerous and much finer cup-marks, but when I saw it, I had unfortunately used my last film and was unable to photograph it.

It is interesting to find customs of this kind surviving in a Mahommedan community so strictly orthodox as that of Afghanistan, but this is by no means the only instance of the kind. Throughout the hill-country of Bámián and Saighán it is quite usual to find the hill-tops and passes crowned by cairns in which one is tempted to see a survival of the Buddhist "lá-dse" (ལ་རྫས) of Tibet. The cairns may be heaps of stones on which are planted sticks with white flags attached, or they may be built-up piles of horns of ibex and wild sheep. None of these, so far as I could ascertain, have any historical legend attached to them, although they are classed under the comprehensive term "ziarat." They are in just the places in which in Tibet one would confidently expect to find a "lá-dse" erected in honour of such local deities as inhabit passes and mountain-tops. As in Tibet, too, solitary trees beside the mountain-streams are hung with flags and their branches adorned with horns, and although more rigid enquiries than I was able to make might elicit a story of some legendary saint, it is difficult to avoid the conclusion that the devout Mahommedan, who strokes his beard as he passes by, is unwittingly doing homage to the tutelary deity whose simple shrine has survived the iconoclasm that destroyed the more pretentious monuments erected to the founder of Buddhism and defaced the magnificent carvings in the valley of Bámián.

Bábar's tomb at Kabul.

On the western flanks of Sher Darwáza lies the Bágh-i-Bábar, perhaps the most beautiful garden in all Afghanistan. Here are the chenar trees under which Bábar is said to have sat, the marble water-channels and the basin that he filled with wine, and here too are masses of the purple *árghawán*, the flowering shrub in which he took such a keen delight. On a terrace on the hill-side, at the upper end of the garden, and overlooking the scene of many a joyous carouse, stands Bábar's grave, and lower down is a small mosque erected to his memory.

Both mosque and tomb are of white marble from Maidán. The main portion of the mosque (Plate xvi) is of great beauty, but it is enclosed by an untidy railing of rusty iron rods, and is characteristically disfigured by a sloping roof made from old kerosene-oil tins and painted a brilliant blue.

The tomb (Plate xvii) also suffers from its immediate surroundings, planted as it is in the middle of an untidy, flagged courtyard and with a common white-washed *chirágh-dán* for background ; the site, however, with the garden immediately below it and, in the distance, the snow-capped heights of Paghmán, is no doubt just the one that Bábar would have chosen.

The inscription on the tombstone has been read under the superintendence of Dr. E. D. Ross, to whom I am indebted for the following note :—

"The Emperor Babar, after a life of continuous excitement, vicissitude and adventure such as has fallen to the lot of only a few of the great heroes of history, died in Agra on the 6th of Jumāda I, 937 (December 20th, 1530).[1] He was, according to local tradition, temporarily buried in the Rāmbāgh on the left side of the river, about two miles above the present Railway bridge.[2] According to Ferishta he expressed in his will a desire to be buried in Kabul. His body was, however, left in Agra till after the battle of Kanauj in 945 (1538) when Humayun and his family were driven out of India, and Babar's widow, Bika Begum, performed the pious duty of removing her late husband's body to Kabul.

"Babar's tomb is still to be seen in Kabul; Plate xvii shows his tombstone bearing an inscription, and Plate xvi the mausoleum erected to his memory. It will be seen that these monuments bear a very modern appearance, especially the latter. With the aid of a glass the inscription on the tomb has been read, and is now printed, I believe, for the first time. Ferishta says that Babar was buried near a place called Qadam Rasul.

"The inscription runs as follows :—

بادشاهي كز جبينش تافتي نور اله * آن ظهير الدين محمد بود بابر بادشاه

با شكوه و دولت و اقبال و عدل و داد و دين * داشت از توفيق و فيض و فتح و فيروزي سپاه

عالم اجسام را بگرفت و شد روشن روان * بهر فتح عالم ارواح چون نور نگاه

شد چو فردوسش مكان رضوان ز من تاريخ جست * گفتمش فردوس دايم جاى بابر بادشاه

Translation :—

'A king from whose brow shone the light of God

'Was Zahiruddin Muhammad Babar Padishah.

'With splendour, wealth, good fortune, justice, probity, and faith

---

[1] According to Ferishta, he died on the 5th of this month.

[2] See Beveridge. Translation of Akbar Nama, Vol. I, Errata, p. xi.

'He commanded a force composed of Divine Bounty, Grace, Victory, and Triumph.

'He seized the world of bodies and became bright souled

'For the conquest of the world of souls he became like the light of the Eyes,

'When Paradise became his dwelling, *Rizwán* (the doorkeeper of heaven) demanded of me a chronogram.

'I replied: Paradise is for ever the abode of Babar Padishah.'

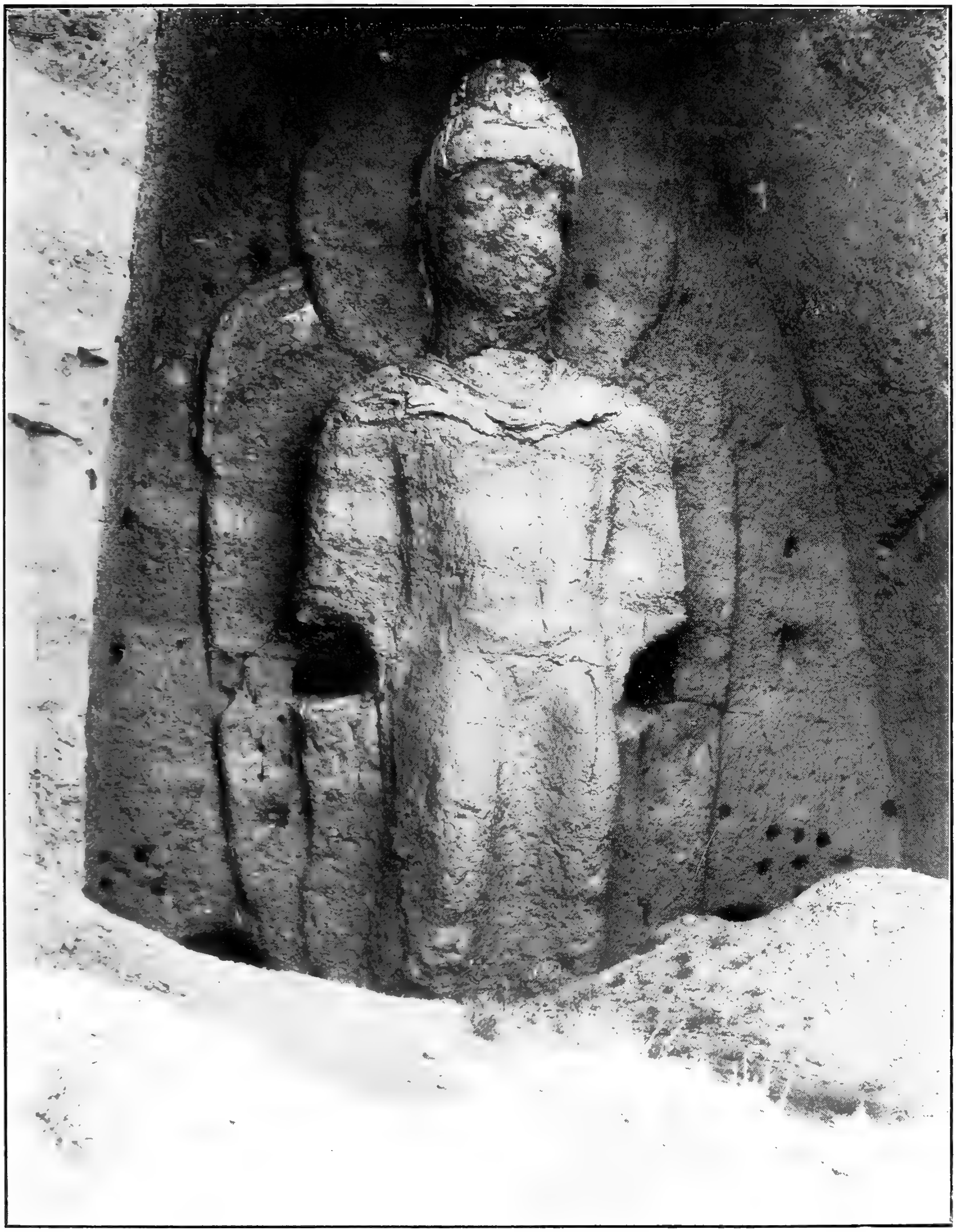
The words *Firdaws dá'im jái-Bábar Pádisháh* give the date A.H. 937.''

W. Donovan, photo.

CHAKRI MUNAR: from the S. S. W.

Engraved and Printed by THE CALCUTTA PHOTOTYPE C

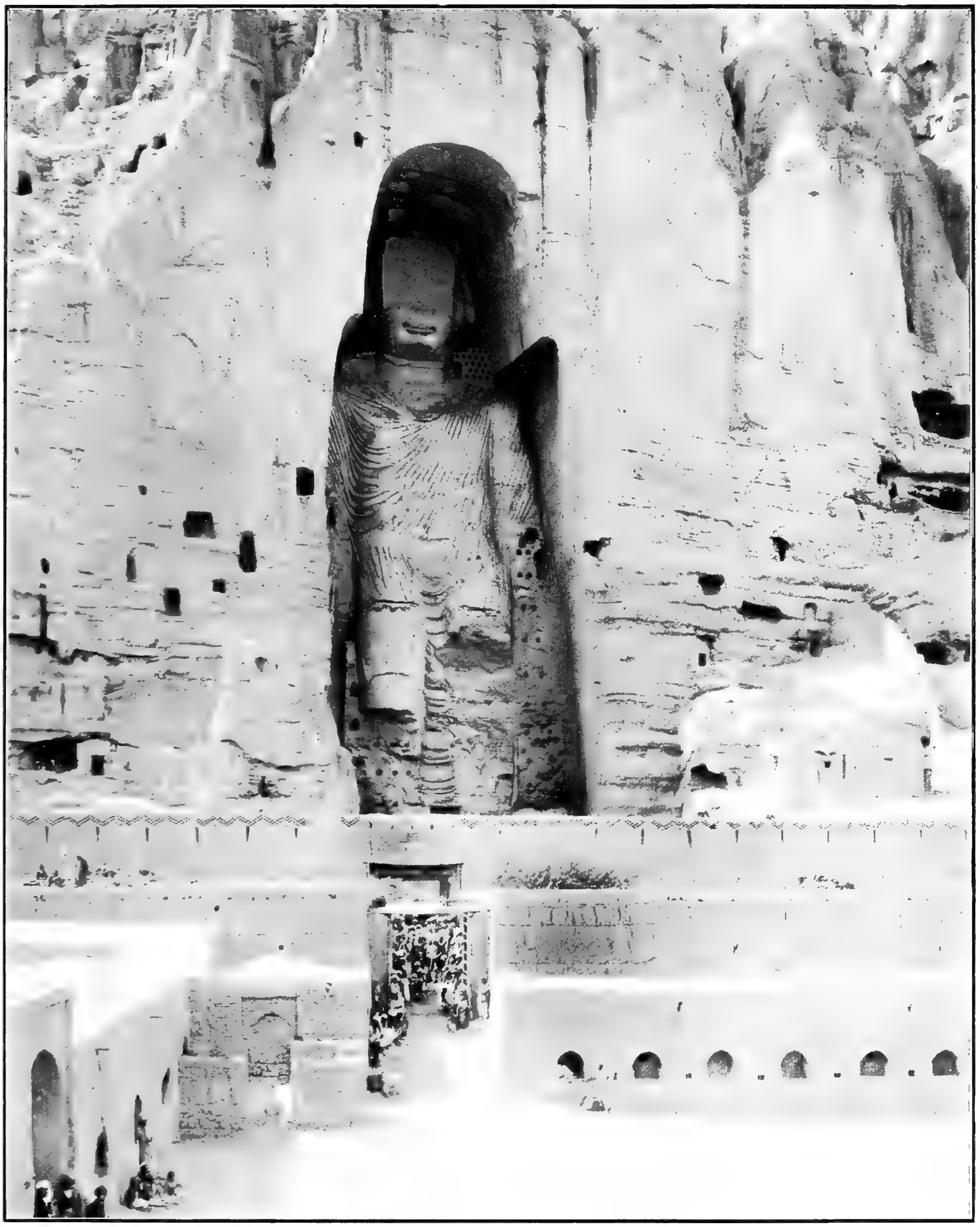
BAMIAN FROM THE SOUTH: showing the cave dwellings and niches containing rock carvings. The niche slightly to the left of the centre of the plate is empty.



H. H. Hayden, photo.

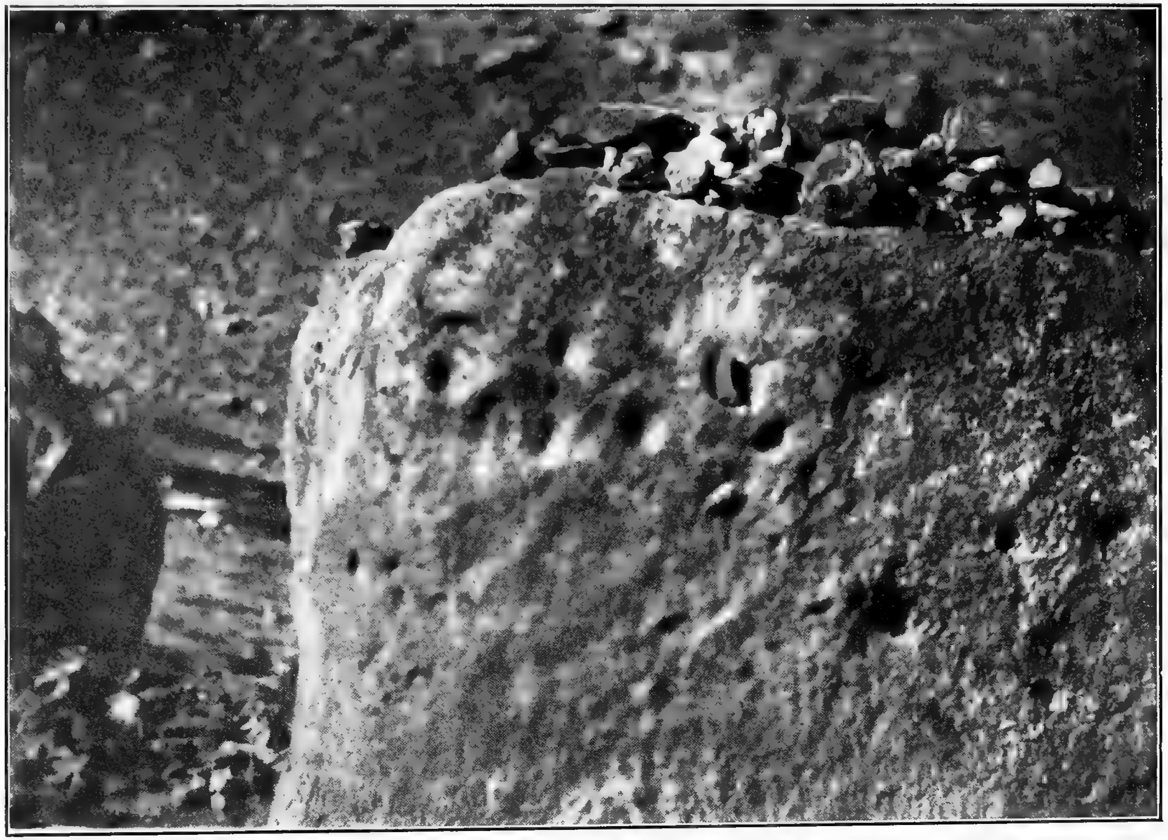
CARVED FIGURE IN CLIFFS on right side of Chapdara.

Engraved and Printed by THE CALCUTTA PHOTOTYPE Co.



H. H. Hayden, photo.

FIGURE IN NICHE (1), seen on left-hand side of Plate XII.



H. H. Hayden, photo.

CUP-MARKS ON LIMESTONE BLOCK about 1½ mile below Ak Rabát Kotal on road to Bamían.

Engraved and Printed by THE CALCUTTA PHOTOTYPE CO.

H. H. Hayden, photo.

MOSQUE IN BAGH-I-BABAR, KABUL.

BABAR'S TOMB IN BAGH-I-BABAR, KABUL.

THE CALCUTTA PHOTOTYPE Co.

Memoirs of the Asiatic Society of Bengal.

1905—1906.

I. *On certain Tibetan Scrolls and Images lately brought from Gyantse.—By* PROF. SATIS CHANDRA VIDYĀBHŪṢAṆA, M.A., M.R.A.S. (Price Re. 1-8; or 2*s.* 3*d.*)

II. *Sal-Ammoniac: a Study in Primitive Chemistry.—By* H. E. STAPLETON, B.A., B.Sc. (Price Re. 1; or 1*s.* 6*d.*)

III. *The Similarity of the Tibetan to the Kashgar-Brahmi Alphabet.—By* The REV. A. H. FRANCKE. (Price Rs. 2; or 2*s.* 10*d.*)

IV. *Alchemical Equipment in the Eleventh Century, A.D.—By* H. E. STAPLETON and R. F. AZO. (Price Re. 1-8; or 2*s.* 3*d.*)

V. *Malaysian Barnacles in the Indian Museum, with a list of the Indian Pedunculata.—By* N. ANNANDALE, B.A., D.Sc. (Price Re. 1-8; or 2*s.* 3*d.*)

VI. *Ashrafpur Copper-plate Grants of Devakhaḍga.—By* GANGA MOHAN LASKAR, M.A. (Price Annas 8; or 10*d.*)

VII. *Festivals and Folklore of Gilgit.—By* GHULAM MUHAMMAD. (Price Rs. 2; or 2*s.* 10*d.*)

VIII. *Notes on the Bhotias of Almora and British Garhwal.—By* C. A. SHERRING, M.A., F.R.G.S., I.C.S. (Price Re. 1-5; or 2*s.*)

IX. *Religion and Customs of the Uraons.—By* the late REV. FATHER DEHON, S.J. (Price Rs. 2; or 2*s.* 10*d.*)

X. *Notes on the Fauna of a Desert Tract in Southern India* (Herpetology and Entomology).—*By* N. ANNANDALE, D.Sc., C.M.Z.S., with a list of Mammals by R. C. WROUGHTON, F.E.S. (Price Rs. 2; or 2*s.* 10*d.*)

XI. *Amulets as Agents in the Prevention of Disease in Bengal.*—Compiled in the Office of the Superintendent of Ethnography, Bengal. (Price Annas 12; or 1*s.* 2*d.*)

XII. *Earth-Eating and the Earth-Eating Habit in India.—By* D. HOOPER and H. H. MANN. (Price Re. 1; or 1*s.* 6*d.*)

XIII. *On a Cup-Mark Inscription in the Chumbi Valley.—By* E. H. C. WALSH, I.C.S. (Price Re. 1; or 1*s.* 6*d.*)

XIV. *A Descriptive List of the Sea-Snakes* (Hydrophiidæ) *in the Indian Museum, Calcutta.—By* CAPTAIN F. WALL, I.M.S., C.M.Z.S. (Price Re. 1; or 1*s.* 6*d.*)

XV. *Common Saws and Proverbs collected, chiefly from Dervishes, in Southern Persia.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Re. 1; or 1*s.* 6*d.*)

XVI. *The Common Hydra of Bengal: its Systematic Position and Life History.—By* N. ANNANDALE, B.A., D.Sc., C.M.Z.S. (Price Re. 1; or 1*s.* 6*d.*)

XVII. *Animals in the Inscriptions of Piyadasi.—By* MONMOHAN CHAKRAVARTI, M.A. (Price Annas 12; or 1*s.* 2*d.*)

XVIII. *Some current Persian Tales told by Professional Story-Tellers.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Re. 1; or 1*s.* 6*d.*)

XIX. *The Dards at Khalatse in Western Tibet.—By* REV. A. H. FRANCKE. (Price Re. 1-6; or 2*s.*)

Supplement, Miscellanea Ethnographica. Part I. 1. *The Blow-Gun in Southern India* 2. *Miscellaneous objects from the Rámanád subdivision of the Madura district* 3. *Indian Weighing-beams.—By* N. ANNANDALE, D.Sc. (Price Re. 1.)

Supplement, Miscellanea Ethnographica. Part II. 1. *Some Malayan Weapons—By* N. ANNANDALE. 2. *Plan of a Persian Gentleman's House.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Annas 8; or 10*d.*)

Memoirs of the Asiatic Society of Bengal.

Vol. II.

I. *Cirrhipèdes operculés de l'Indian Museum de Calcutta.—Par* M. A. GRUVEL. (Price Rs. 2; or 2*s.* 10*d.*)

II. *The Coinage of Tibet.—By* E. H. C. WALSH. (Price Re. 1; or 1*s.* 6*d.*).

III. *The Exact Determination of the Fastness of the more Common Indigenous Dyes of Bengal, and comparison with typical synthetic Dye-stuffs. Part I. Dyeing on Cotton.—By* E. R. WATSON. (Price Re. 1; or 1*s.* 6*d.*)

IV. *The Saorias of the Rajmahal Hills.—By* R. B. BAINBRIDGE. (Price Rs. 2; or 2*s.* 10*d.*)

V. *Mundari Poetry, Music and Dances.—By* REV. FR. J. HOFFMANN, S.J. (Price Re. 1; or 1*s.* 6*d.*)

VI. *Tarīkh-i-Nuṣratjangi.—By* HARINATH DE. (Price Re. 1; or 1*s.* 6*d.*)

VII. *The Exact Determination of the Fastness of the more Common Indigenous Dyes of Bengal, and comparison with typical Synthetic Dye-stuffs. Part II. Dyeing on Silk.—By* E. R. WATSON. (Price Annas 12; or 1*s.* 2*d.*)

VIII. *Monograph on Sea Snakes.—By* MAJOR F. WALL, I.M.S. (Price Rs. 5; or 7*s.*)

IX. *A Polyglot List of Birds in Turki, Manchu and Chinese.—By* E. DENISON ROSS, PH.D. (Price Rs. 4; or 6*s.*)

X. *Notes on some Monuments in Afghanistan.—By* H. H. HAYDEN. (Price Re. 1; or 1*s.* 6*d.*)

On the Correlations of Areas of Matured Crops and the Rainfall, and certain allied problems in Agriculture and Meteorolgy.—By S. M. JACOB, I.C.S. (In the press.)

Ramacarita by Sandhyakara Nandi.—Edited by MAHAMAHOPADHYAYA HARAPRASAD SHASTRI, M.A. (In the press.)

The Wakf of Movables.—By DR. ABDULLAH AL-MAMUN SUHRAWARDY, M.A., *Barrister-at-Law.* (In the press.)

MEMOIRS

OF THE

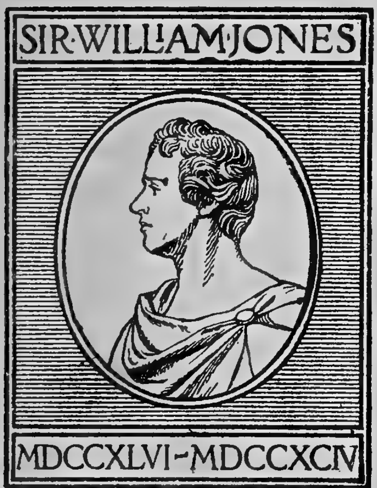
ASIATIC SOCIETY OF BENGAL

VOL. II, No. 11, pp. 347—429.

ON THE CORRELATIONS OF AREAS OF MATURED CROPS AND THE RAINFALL.

BY

S. M. JACOB, I.C.S.



CALCUTTA:
PRINTED AT THE BAPTIST MISSION PRESS, AND PUBLISHED BY
THE ASIATIC SOCIETY, 57, PARK STREET.
1910.

Price Rs. 2-8 ; or 3s. 10d.

18-3-10.

On the Correlations of Areas of Matured Crop and the Rainfall, and certain allied Problems in Agriculture and Meteorology.

(A preliminary enquiry).

By S. M. JACOB, I.C.S.

CONTENTS.

INTRODUCTION.

This paper is divided into three parts, as follows:—

Part I deals with the interdependence of the crop and the rainfall which enables it to come to maturity. This dependence is, of course, the most elementary fact in Agriculture. Of the different ways in which this relationship might be expressed quantitatively, that provided by Galton's correlation function appears to be the most effective for approaching the problems which arise when the relationship is to be expressed numerically.

In this paper the correlation coefficient 'r' has been calculated for a number of cases, the correlated variables, so far as the main purpose of the paper is concerned, being the total rainfall in certain groups of months and the total harvested area in chosen localities for the harvests which mature subsequently to these months.

The results obtained seem to be of some interest and of practical importance. For the autumn harvest the correlation coefficient has a value of about ·4 to ·5, and for the spring harvest, from ·6 to ·8.

Even the high probable errors of these coefficients do not rob them of their significance.

Other fundamental constants of the modern theory of statistics, *e.g.*, the "coefficient of variation," "standard deviation" are calculated in a number of cases, and in the light of this theory it may be said that a knowledge of these constants is essential to a proper description of the chief facts of Agriculture and Meteorology.

So far as the author is aware these constants have not been previously calculated for India, except for certain rainfall *data* by Blanford, who has given the 'probable deviations' in certain cases.[1]

Apart from the fact that the *data* of this paper differ from those considered by Blanford, the special object has been to find equations which will predict within certain limits of error the amount of a crop from the rainfall on which it depends. These equations are the well-known regression equations, and in forming them the author believes that at any rate a first approximation to scientific prediction is attained.

In each case diagrams are given from which the probable extent of a crop can be found from the antecedent rainfall for the localities considered.

In this part of the paper there is also a theoretical discussion of the way in which the regression equations are modified by errors of measurement such as certainly occur for agricultural statistics and to a less extent in rainfall *data*.

Part II.—Here the distribution of rainfall, a fundamental problem both for agriculture and meteorology is considered by the method of curve fitting developed by Prof. Karl Pearson. The 'Gaussian' and 'normal' curve

$$y = y_0 \, e^{-\frac{x^2}{2\sigma^2}}$$

and the skew curve

$$y = y_0 \left(1 + \frac{x}{a}\right)^p . e^{-\frac{p}{a}x}$$

1 Since this paper was written, Dr. Gilbert T. Walker, F.R.S., Director-General of Observatories in India, has very kindly shown me his calculations in manuscript of a very large number of coefficients of correlations of rainfall and pressure and other meteorological variables, which he has made the basis of a wide-reaching treatment of the problem of monsoon prediction.—S. M. J. 14-8-09.

are fitted to the *data* by the 'method of moments', and the results are exhibited graphically. This discussion forms a connecting link between the problems of Part I and that of

Part III, in which the change of a rainfall from year to year is considered. It is shown that if we take the deviations of rainfall from its mean value for the two periods April—September, October—March, and form their product for each period of 12 months, we get a series of points which are found to indicate a marked oscillatory change, which can be roughly described by the help of harmonic $\frac{\text{sine}}{\text{cosine}}$ curves where periods are about 19 years and some simple ratio of this period. The oscillation of 19 years periods appears to be sufficiently characteristic in certain cases, though in others it may perhaps be marked by oscillations of different period and amplitude.

The matter is one which demands a thorough harmonic analysis, but it seems that some light may be thrown in this way on the nature of the saecular changes in climatic conditions; though it is possible that random sampling may explain away all the variations. The subject is still one for speculation; but apart from that, certain definite facts are established, and they may perhaps be suggestive of future paths of enquiry. Since the paper was written the following results for the total unirrigated harvests of Sialkot, Zafarwal and Daska Tahsils have been obtained, and a table is annexed showing what the predicted value of these areas was as calculated from the appropriate regression equations:—

	Sialkot.	*Zafarwal.*	*Daska.*
Prediction based on April—August rainfall ..	$56{,}200 \pm 7000$	$52{,}000 \pm 6200$	......
Prediction based on April—September rainfall ..	$59{,}963 \pm 6718$	$54{,}376 \pm 6068$	$26{,}656 \pm 5089$
Actual measured area in acres	61,333	55,534	35,807

The predictions for Sialkot and Zafarwal based on April—September rainfall are only about 2 % in error, which is certainly smaller than the error of measurement itself.

For Daska the error is large. Such an error might indeed be attributed to a defect in the process applied, but I had long since remarked (*v.* p. 355) that the Daska statistics seemed to require correction. As, however, the Daska Tahsil regression equations had been calculated it was thought well to give the predicted area of matured crop, even although it differed from the value given by official measurement. It would be completely unscientific to conceal a discrepancy of this kind.

The object of this paper is to investigate to a first approximation only the interdependence and correlations which subsist between certain of the fundamental data in the statistics of Agriculture and Meteorology.

This will be attempted with the help of the modern methods of treatment which originating with Bravais and Quetelet owe their greatest development to the work of Francis Galton and Karl Pearson.

The application of these methods has not, so far as the author is aware, been previously made to the data considered in this paper, or indeed to any similar data,[1] so that it is hoped that, in spite of the fact that the statistics discussed are far from being as complete or wide-reaching as is desirable, some at least of the results obtained will be of value if only for purposes of comparison when fuller treatment becomes possible. In any case, too, an advance will have been made by indicating what are the more favourable lines on which to approach those problems whose practical solutions appear to be of high utility.

Some familiarity with the more elementary parts of the modern theory of statistics has to be assumed for an understanding of the procedure to be adopted in this paper, as it would unduly lengthen the argument to enter into a mathematical explanation of all the processes employed, and such an explanation might well be regarded as impertinent by those conversant with their use.

At same time it is believed that even without a grasp of the 'exact' meaning of such terms as 'correlation', 'standard deviation', 'probable error' and the like, the reader may at least be able to obtain a qualitative idea of the nature of the results reached, although the sooner such qualitative notions are replaced by definite quantitative ones, the more hope there will be that statistical problems will receive adequate statistical treatment.

Similarly, the characteristic agricultural and metereological conditions which prevail in India will be assumed to be known at any rate in outline. The different modes of agriculture and the variations of climatic influence are of extreme importance in their effect on the resultant harvest, but into these it is not proposed to enter in detail as the statistics dealt with apply (except in the case of certain rainfall data) only to a very limited area in the Panjab.

It will be time to discuss the effect of special differences in agricultural operations and physical circumstance when the applications of the present methods has been made to many diverse and widely-separated tracts. Until such time it will not be wise to try to generalise the formulæ so as to make them applicable to other places than those for which they are calculated.

It is, however, quite certain that such generalisation is possible, but it must, of course, be reached very gradually and by considering one by one all the contributory causes.

---

[1] I have since been informed by Mr. G. Udny Yule, Honorary Secretary of the Royal Statistical Society, that the similar problem for English crops has been treated by R. H. Hooker in the Journal of the Royal Statistical Society for 1907. Mr. Yule has kindly promised to send me a copy of this paper, but unfortunately I have not yet received it.

PART I.

THE CORRELATION OF THE MATURED AREAS OF CROPS AND THE RAINFALL.

1. The data considered in this part of the paper refer on the one hand to the total areas of crops which come to maturity and contain an 'average' amount of grain, and straw, variously spoken of as 'cropped,' 'matured' or 'harvested' areas; and on the other to the rainfall recorded at or near the places where the crops in question have grown.

The accuracy of the latter or rainfall data may for the most part be assumed to be fair, and where the guages are directly under the supervision of the Meterological Department, to be good. In cases where the rainfall is measured by the district authorities an accuracy of more than 1 or 2 per cent. is hardly to be expected,[1] though, on the whole, the records even here are at any rate approximately correct.

In respect of the matured areas of crops the data are less satisfactory. In the Punjab these data are based on a rough estimate of the relative amount of the grain and straw-bearing crop in each field examined by a local official, and compared mentally with what he believes to be a normal outturn for the particular locality and the class of crop. In many cases, too, it is to be feared that the estimate is made without seeing the field, merely from hearsay and by a judgment of the probabilities of the case. The area of each field is quite accurately known, and it is only in this mental comparison of the produce of a unit of area for the harvest considered with the 'average' or 'normal' produce of a unit of area that serious errors arise. The 'average' or 'normal' is solely the estimating official's conception of what a 'normal' harvest should be. Though, of course, persons of long experience will agree to some extent in their conception of the 'normal' or 'average' harvest, yet, so far as I know, it has never been quantitatively defined. Whether the total yield should be measured by weight or by volume, what proportions of grain, chaff and straw it should contain, what percentage of moisture should be deducted, and so forth are all questions which would have to be answered if an accurate standard is to be set up; and the need for some such standard appears to be very great.

Yet, in spite of indefiniteness in these respects a certain tradition as to what constitutes an average crop, made more precise by experiments on the yield of certain crops, exists, and as a unit of measurement is not quite the inadequate instrument that it might appear to be at first sight.

When the ratio of the actual yield to the assumed average has been determined, to be, for instance three-quarters, then a field of an area of 1 acre of this kind of crop

---

[1] I have found a guage which should have had an opening of a circular shape and 5″ in diameter, to have an opening approximately elliptical with axes of 5″·10 and 4″·96. This alone, apart from inaccurate measurement, would introduce an error of over 1%.

is entered in the Government papers as three-quarters of an acre of matured crop.

It is the areas of the crops so estimated, which form the closest measure of the real outturn at present obtainable, with which we are here concerned.

The accuracy of these estimates is, as will be seen from the above, very limited: errors of 5, 10 or even, 15 % are by no means improbable and greater ones are possible.

The most serious errors will arise from a want of constancy in the 'personal equation' of the estimator from harvest to harvest, and to a less extent in passing from field to field: and even if the 'personal equation' were constant for a single individual, discrepancies would arise wherever one estimating official was substituted for another owing to their 'relative personal equation.' It is of the utmost importance then, if the data are to be relied on as approximately accurate, that the 'personal equation' should be as nearly as possible constant, and the 'relative personal equation' small.[1] In practice I think these conditions hold good to a certain extent. The estimating official has usually been born and reared in an agricultural community which has a very shrewd insight into the quantity and quality of its means of subsistence, and, unless deliberately falsified, the official's estimate must have a real significance.

Taking, then, the data so obtained, and going back as far as is possible,[2] in this part of the paper the standard deviations, coefficients of variation and correlation of rainfall and harvested areas will be examined for each of the two chief harvests and for the months preceding them during which the rainfall has a determining effect on them.

If, as will prove to be the case, a substantial correlation is found to exist between the amount of the matured crop in any harvest and the rainfall in the selected period preceding, then the regression or prediction equations can be formed from which it will be possible to forecast within stated limits of error the probable extent of the matured crop for the locality for which the equations have been calculated, whenever the amount of rainfall in the months preceding that harvest is given.[3]

---

1 I have tested the 'relative personal equation' of myself and another person over a considerable area, the estimates being made quite independently and at different times. The agreement was on the whole within 3% and rarely exceeded 6 or 7% of the total area.

2 Unfortunately only 20 years' statistics have been available in the majority of instances.

3 The prediction cannot, of course, be absolute for any individual harvest, since unless the correlation of cropped area with the variable used for prediction be unity, the cropped area will not be the same even for the same rainfall. What is predicted by the regression equations is the mean value of the various cropped areas which occur for a particular amount of rainfall. The value of any particular cropped area will vary about that mean in a way expressible, if the correlation be 'normal,' in terms of the standard deviation of the crop and the coefficient of correlation.

As a matter of fact in this paper it will be assumed that the correlation is 'normal' throughout. For the purpose of calculating the probable errors of the constants this assumption will be near enough to the truth; but, should it prove to be the case, as seems likely *à priori*, that the correlation is not only not 'normal' but not even 'linear', then the regression equations would need modification when applied to extreme cases. Paucity of data do not justify the consideration of this problem just at present, and it is not contended that the present investigation will lead to more than a first approximation.

Conformably, the coefficient used throughout is Galton's function 'r', which it is perhaps necessary to define here.

Let (x_1, y_1) (x_2, y_2) (x_3, y_3) .... $(x_n\ y_n)$ ... be a system of pairs of associated variables, let $\bar{x}$, $\bar{y}$ be the mean

In this paper the crops considered are those which are known technically as 'unirrigated,'[1] that is, they do not ordinarily receive any water except that which falls on them directly in the form of rain. No doubt crops which receive water from other sources, such as canals, wells, or by spill,[2] from torrent or river, depend, too, very largely on the water which reaches them directly in the form of rain, and in any case they will in general depend ultimately on the rainfall which falls within a certain distance; it might therefore be reasonably anticipated that the amount of such crops would show a correlation with the local rainfall, but the correlation will probably be smaller than that for the class of crops dealt with here, and its determination will be left to a future date.

It would be highly desirable that every different kind of crop should be treated separately. In the present instance the large probable errors to which most of the constants are subject make it open to question whether the differences in the coefficients of correlation and regression would be large enough to be significant. Though, undoubtedly, this is of importance, it is not proposed to consider here the constant special to each class of crop. This point must be noted when applying the regression equations for purposes of prediction to any particular group of unirrigated crops, since, should the group taken consist of different classes of crops from those whose regression equations are given, or consist even of the same staple crops in different proportions, it is obvious that the results obtained would be greatly diminished in accuracy should the differences in the constants mentioned above be really significant.

Again, caution must be used in attempting to apply the equations based on the special circumstances of one locality (not only in respect of the nature of its crops) to a locality of completely distinct physical and climatic conditions. Thus, to take an important case, it would clearly be unjustifiable to assume that the equations would remain unmodified if they were determined for a locality in which the distribution of rainfall differed greatly from that which is characteristic of the localities discussed, even although the total mean rainfalls might be the same.

§ 2. The general process adopted in dealing with the statistics of rainfall and crop is as follows:

Let C denote the known matured area of crop in any village, group of villages, or other arbitrarily chosen area for a given harvest. Let R denote the total rainfall during a given period measured at any selected point, preferably as near as may

---

values of the x's and y's respectively, so that if N be the total number of associations $N\bar{x} = \Sigma(x_r)$, $N\bar{y} = \Sigma(y_r)$ where Σ denotes a summation for every value of x and y respectively, then the 'standard deviation' of the x – variable which is usually denoted by σ_x is given by $N\sigma_x^2 = \Sigma(x_n - \bar{x})^2$. A similar expression holds for the y– variable. Then if we write $NI = \Sigma(x_n - \bar{x})(y_n - \bar{y})$, where the summation is for every associated pair of x's and y's, the correlation coefficient is given by $r = \frac{I}{\sigma_x \sigma_y}$.

The standard deviation is readily seen to be a quantity of the same quantity as the 'radius of gyration' of dynamics or the R.M.S. of the electrician. The quantity I corresponds to the dynamical 'product moment' divided by the mass.

1 A poor equivalent for the Urdu word 'barȁni' or rainland crops.

2 These are also frequently classed as 'unirrigated,' but they have been excluded from this investigation, as they are quite differently circumstanced.

be to the 'centroid' of the area mentioned. Let $\bar{C}$, $\bar{R}$ denote the mean values $\bar{R}$, and σ_C, σ_R the standard devations of C and R respectively. Let r denote their correlation.

Then the equation determining the probable value of the matured crop in the given area, based on the total amount of rainfall assumed known, is

$$C-\bar{C}=\frac{\sigma_C}{\sigma_R}\,r\,(R-\bar{R})\;.\;.\;.\;.\;.\;.\;.\quad(1)$$

This is known as the regression equation of C on R, or, as we shall call it, of crop on rain, and the quantity $\frac{\sigma_C}{\sigma_R}\,r$ is known as the regression coefficient.

This is the fundamental equation of linear regression for predicting the value of one variable from a knowledge of the value of a second variable, when the means, standard deviations, and coefficients of correlation of both variables are given.

Similarly, the regression equation of R on C or of rain on crop is

$$R-\bar{R}=\frac{\sigma_R}{\sigma_C}\,r\,(C-\bar{C})\;.\;.\;.\;.\;.\;.\;.\quad(2)$$

which is clearly a different equation from (1) above.

In the present application, the latter equation (2) will not in general be of much use as it will give us a means of finding out how much rain has probably fallen when the extent of the crop dependent on it is known. But for the most part this information will be valueless, as the amount of rainfall is already known. An occasion for its use would occur where the record of rainfall for some past period had been lost, and we wished to reconstruct its probable value from the known amount of crop which succeeded that period.

The values of C and R determined by equations (1) and (2) respectively are the most probable subject to the limitations of our statistics. If these statistics extend over a period of 'n' years, and if we are justified in assuming that the amounts and distributions of the rainfall and other circumstances social and economic, which have an influence on agriculture, form a typical or 'random' sample of their values in the neighbouring years, then with the already noted limitation as to the nature of the correlation, the probable errors in the prediction of the 'regression value' of C, say, is $\dfrac{\cdot 67449\,\sigma_C\sqrt{1-r^2}}{\sqrt{n}}$ . . . . . . (3).

About the 'regression value' of C so determined the actual values of C will be scattered, and if the whole distribution be normal, the standard deviation of the distribution or the measure of the scattering about the true regression point is $\sigma_C\sqrt{1-r^2}$. Hence as already remarked an absolutely definite value of C cannot (except in the case of perfect correlation) be determined, and when the amount of crop or other variable is calculated from the regression equation, not only is the ordinate of the regression line in error to an extent given by its probable error of equation (3), but also no anticipation of the distance of C in excess and defect of the ordinate can be made except by the statement of a probability, the prediction becoming closer as σ_C is reduced or as r approaches unity.

This point will be further discussed at a later stage.

§ 3. It is now possible to consider the application of the theory to the statistics chosen. The greater part of those in this part relate to the Sialkot District in the Punjab, and these are taken first of all.

Diagram I gives a map of the District with its 5 Tahsils—Sialkot, Zafarwal, Raya, Pasrur and Daska.

In each of these Tahsils 30 villages were chosen with especial reference to their containing a large amount of unirrigated crop. It was found, however, that the statistics for the 30 villages selected for the Daska Tahsil exhibited such a large progressive increase in the amount of the matured crop, that it was evident that either the villages in question had started additional cultivation on unirrigated lands during the period under consideration, which fact would to some extent invalidate the regression equations unless special modifications were introduced,[1] or that the statistics themselves were seriously at fault. In either case the coefficients found would be of little use and they were not evaluated.

Lists of the villages chosen and the figures for the cropped areas of the two harvests on unirrigated land will be found in the Appendix.

The Diagram I shows the position of each of the villages in the 4 Tahsils: Sialkot, Zafarwal, Raya and Pasrur.

From inspection of the map the mean distances of the villages in each Tahsil from the Tahsil town, that is from the point at which the rainfall is measured, were found to be as follows :—

Sialkot	..	..	..	$5\frac{1}{2}$ miles.
Zafarwal	..	..	..	9 ,,
Pasrur	..	..	..	$2\frac{1}{2}$,,
Raya	..	..	..	15 ,,

These distances are intended to represent roughly not the distances of the 'centroids' of the areas, but their mean scalar distance from the Tahsil Town. Except in the case of Raya, where the villages all lie within bearings of N. and N. E. of Raya Town itself, the 'centroidal' or vectorial mean distances of the village areas will be considerably less than the above.

[1] The period is so short, that this would hardly be feasible. As a matter of fact the area sown is not constant for any of the villages, and a double regression equation based on both area cropped and area sown would probably give better results. It is intended to make this extension, or one equivalent to it, later on.

Now it is clear that we want as far as possible to correlate the amount of matured crop as nearly as may be with the actual rain which reaches the land on which the crop is grown, and the problem at once arises whether it would be desirable to interpolate, or rather to extrapolate, from the values of the rainfall at the Tahsil Towns, and so to obtain a measure of the rainfall over each of the areas in question. But the problem of determining the best interpolation and extrapolation formula is in itself a task of some magnitude, and simply to weight the rainfalls at the Tahsil Towns by their scalar mean or centroidal mean distances is not a process which can be confidently adopted until it is found to be justifiable.

Consequently, no attempt has been made to find the probable value of the rainfall over the selected areas, and the correlations of the matured area of crop have been made simply with the rainfall at the chief town of the Tahsil in which the villages are situated.

Some measure of the differences between the true mean rainfall over the areas chosen and the actual adopted value of the rainfall will be given by an examination of the differences in the rainfall where it has been measured, *viz.*, at Sialkot, Zafarwal, Raya, Pasrur and Daska.

The total rainfall for each year for the 6 months April to September, both inclusive, and for the 6 months October to March, both inclusive, have been formed for each Tahsil Town, and taking the rainfall at Sialkot as a standard, the differences between the rainfall there and the four other Tahsil Towns have been calculated. These differences were squared, their mean value taken, and then the square root of this mean value. The results are given in the table below :—

Table showing the root-mean-square of the differences between the rainfall in Sialkot Town and the places mentioned below for the years 1887-8 *to* 1906-7.

	Daska.	*Pasrur.*	*Zafarwal.*	*Raya.*
I. For the 6 months April to September ..	8″·10	7″·01	8″·87	7″·64
II. For the 6 months October to March ..	2″·42	1″·63	1″·88	2″·56

Now the standard deviations of the rainfall in each of these places is :—

I. For the 6 months April to September ..	8″·670	7″·043	9″·698	7″·465
II. For the 6 months October to March ..	3″·126	4″·300	4″·575	3″·350

Thus we see that the root-mean-square of the differences of rainfall as we pass from Sialkot to the four places mentioned is as large as the standard deviation in these places themselves in the case of the rainfall of April to September, and is quite comparable with it for the rainfall of October to March. That the ratio of the root-mean-square of the differences to the standard deviation is much larger for the summer than for the winter rains appears to indicate that a smaller error will be made in taking the rainfall measured at one point as a measure of the true rainfall at another neighbouring point in the latter case than in the former.

The four places above have been entered in the table in the order of their nearness to Sialkot, the direct distances from Sialkot being approximately, Daska 16 miles, Pasrur 18 miles, Zafarwal 28 miles, and Raya 36 miles.

It does not appear that within the limits of these distances that the root-mean-square of the differences varies much with the distance. No doubt it would diminish if the rainfall were measured at a near point to Sialkot, but its variation within the limits of 16 to 36 miles appears not to be sensible, at least so far as the above results go. The matter is interesting, but cannot be pursued further here.

So far, then, it might seem quite beside the mark to attempt to correlate the growth of crops in one neighbourhood with the rainfall at some point whose distance from that neighbourhood is of the order of the above distances. But the high correlations existing between the rainfall at the places named shows that the expectation of some such correlation is not an idle one.

The correlations between the rainfalls at the above places can be very simply deduced from the data above.

For let x_1, x_2 be the rainfalls at two points, and put $\Delta = x_1 - x_2$.

Then $\Delta^2 = x_1^2 - 2x_1x_2 + x_2^2$.

Whence by summation for each of the years in which the rainfall is measured,

$$\Sigma(\Delta^2) = \Sigma(x_1^2) - 2\Sigma(x_1x_2) + \Sigma(x_2^2)$$

and dividing by the number of years

$$\sigma^2_\Delta = \sigma_{x_1}^2 - 2\sigma_{x_1}\sigma_{x_2} r_{x_1x_2} + \sigma_{x_2}^2 + (\bar{x}_1 - \bar{x}_2)^2$$

where σ denotes the standard deviation, $\bar{x}$ the mean, and r the correlation between x_1, x_2.

$$\therefore\ r_{x_1x_2} = \frac{1}{2\sigma_{x_1}\sigma_{x_2}}\left\{\sigma_{x_1}^2 + \sigma_{x_2}^2 - \sigma^2_\Delta + (\bar{x}_1^2 - \bar{x}_2^2)\right\}.$$

$$= \frac{1}{2\sigma_{x_1}\sigma_{x_2}}\left\{\sigma^2_{x_1} + \sigma^2_{x_2} - \sigma^2_\Delta + \bar{\Delta}^2\right\} \text{ where } \bar{\Delta} = \bar{x}_1 - \bar{x}_2.$$

In the present instances we know σ_{x_1}, σ_{x_2}, σ_Δ, $\bar{\Delta}$ and the correlations follow at once. The correlations are with the Sialkot rainfall.

	Daska.	Pasrur.	Zafarwal.	Raya.
I. For the 6 months April to September ..	·7182 ± ·0731	·7076 ± ·0755	·5700 ± ·1018	·7195 ± ·0727
II. For the 6 months October to March ..	·9358 ± ·0188	·9756 ± ·0073	·9157 ± ·0244	·9086 ± ·0263

In spite of their large probable errors all these coefficients of correlation are significant, and all of them are large enough to make it likely that if a high correlation exist between the cropped area and the rainfall in one locality, there will at least be some correlation with the rainfall in an adjacent locality. Thus although considerable local variations of rainfall do occur there are some grounds for thinking that the value of the correlation of the crop in one place with the rainfall in some near place will at any rate approximate to the true correlation with the rainfall in the place where the crop is grown. The nearer one can get to an estimate of the true mean rainfall affecting a certain area, the higher one would expect the correlation with the crop grown on that area to be, so that even without extending the present method by altering the periods for which the rainfall is taken, or by forming multiple regression equations, the limit of accuracy of prediction is not set by the correlations reached in this paper.

For the purpose of discussing the effect of the rainfall in the two chief harvests, Kharif (autumn harvest) and Rabi (spring harvest) which occur in the Punjab, it seemed simplest and to a fair extent to be justified by agricultural conditions, to divide the year into two nearly equal divisions comprising respectively the six months of April to September and of October to March, to find the total rainfall in each of these periods and to correlate it with the amount of matured crop in the harvests which ripen towards the close of these periods. These roughly represent too the division of the year meteorologically into the two groups of the South-West Monsoon and the winter rains of the Panjab.

The notation adopted is as follows :—

$\overline{R}_{\kappa}$ = the mean of the total rainfall for the six months April to September, both inclusive, for the years 1887—1906, measured in inches.

σ_R = the standard deviation of the above rainfall.

v_R = the coefficient of variation of the rainfall.

$\overline{C}_{\kappa}$ = the mean area of matured crops measured in acres for the kharif (autumn) harvest.

σ_C = the standard deviation of the above area of matured crops.

v_C = the coefficient of variation of the above areas of matured crop.

r_{κ} = the correlation of the matured area of crops and the rainfall as defined above.

ϕ_κ = the regression coefficient for the regression of crop on rain divided by the mean area of the matured crop, *viz.* $\frac{\sigma_C}{\sigma_R} \cdot \frac{r_\kappa}{\bar{C}_\kappa}$.

The same symbols are used for the corresponding quantities for the Rabi (spring) harvest, except that the suffix 'ρ' is substituted for 'κ' wherever the latter occurs, and the period to which the rainfall data apply being from October to March, both inclusive.

The following tables give the values of these coefficients for the 30 villages selected in each of the 4 Tahsils: Raya, Pasrur, Sialkot and Zafarwal.

For the calculation of the coefficients for the rainfall the figures have been taken to the nearest $\frac{1}{10}''$, and for the areas of the crops to the nearest 10 acres.

Table I—Kharif (Autumn) harvest.

Place.	$\bar{R}_\kappa$	σ_R	v_R	$\bar{C}_\kappa$	σ_C	v_C	r_κ	ϕ_κ
Raya ..	19·71 ± 1·13	7·465 ± ·80	37·88	2964 ± 130	863 ± 92	29·10	·4608 ± ·119	·018
Pasrur ..	21·13 ± 1·06	7·043 ± ·75	33·32	4290 ± 182	1209 ± 129	28·18	·2967 ± ·137	·015
Sialkot ..	24·01 ± 1·36	8·979 ± ·96	37·41	4576 ± 156	1036 ± 110	22·64	·4639 ± ·118	·012
Zafarwal ..	25·80 ± 1·45	9·698 ± 1·03	37·58	4030 ± 112	743 ± 79	18·44	·4402 ± ·122	·0084

Table II—Rabi (Spring) harvest.

Place.	$\bar{R}_\rho$	σ_R	v_R	$\bar{C}_\rho$	σ_C	v_C	r_ρ	ϕ_ρ
Raya ..	5·49 ± ·51	3·35 ± ·36	61·00	5025 ± 291	1929 ± 206	38·42	·5885 ± ·097	·068
Pasrur ..	6·90 ± ·66	4·30 ± ·46	63·12	6900 ± 394	2613 ± 279	37·88	·4613 ± ·119	·040
Sialkot ..	7·30 ± ·63	4·18 ± ·45	57·29	3208 ± 264	1754 ± 187	54·67	·7335 ± ·070	·096
Zafarwal ..	7·73 ± ·69	4·57 ± ·49	59·18	4860 ± 229	2151 ± 219	44·26	·7207 ± ·072	·070

The places considered are entered in each table in ascending order of their mean rainfalls.

Before dealing with the correlations and regressions of each place separately, some general remarks on the facts brought to light by the tables will be made.

Thus it is remarkable that the coefficients of variation for both rainfall and crop are considerably smaller for the kharif harvest than they are for the Rabi, and that the crop is in both harvests less variable than the rainfall on which it depends. The coefficient of variation of the rainfall of April to September might be put roughly at about 37, and for the months October to March at about 60, the divergences from these values being well within the limits of the probable errors. The average coefficients of variation for the Kharif and Rabi crops respectively are roughly 25 and 44.

Turning to the coefficients of correlation the relative smallness of the kharif coefficient as compared with that for the Rabi is a very important fact. The values seem fairly consistent, except that for Pasrur they are in both cases far lower than for the remaining Tahsils. This occurrence is repeated for the kharif harvest when dealing with the unirrigated areas in the whole of each Tahsil (*v.* § 4 *seq.*), where the coefficient of correlation for Pasrur is so small that it is exceeded by its probable error. I am not aware of any exceptional circumstances in this Tahsil which would account for this lowness, and it is not necessary to do more than to point to the probable errors of the coefficients, and the great reduction in the values of the coefficients produced by inaccurate measurements. This latter question will be considered more fully later on, as it has a bearing on statistical treatment where there is some uncertainty in the data.

However, the coefficients of correlation for the Rabi harvest are decidedly larger than those for the kharif, and at first sight this result would appear to be contrary to expectation, as it was well-known that rain falling at the close of the period April to September has, as a rule, a beneficial effect on the succeeding Rabi, whereas the influence of the rain which falls from October to March is generally disregarded as a factor influencing the kharif crop. In excluding the rainfall at the end of the period April to September in forming the variable with which to correlate the Rabi harvest, it might have been anticipated that a serious diminution in the correlation would result. As a matter of fact, as will be shown later, this actually is the case; but the correlation of the Rabi crop with the total rainfall of September to March is so high, that even when reduced by excluding the September rainfall from computation it still remains higher than the correlation of the kharif crop.

This difference in the coefficients of correlation appears to be significant, but at the present stage it is a somewhat difficult matter to explain it. Without attempting to give a complete explanation certain considerations will be adduced which will show in what way the coefficient of correlation can be altered, some of which may partially account for the above-noted difference.

In the first place neither the crops nor the proportions of the principal crops are the same for the two harvests. Rice, maize and jowár (Indian Millet) are the chief crops of the autumn; and wheat, barley, gram of the spring harvest; but whereas wheat is, as a rule, more than half the total spring crop, jowár the largest of the autumn crops rarely forms more than one quarter of the total harvest.

Secondly, there is the important matter of the distribution of the rainfall. Clearly if we correlate the amount of crop and the *total* rainfall, then whenever the distribution of the rainfall varies, the correlation will be diminished.

This is an obvious deduction from the well-known fact that the same quantity of rain will have a completely different effect on the harvest according as it its distribution is beneficial or adverse.

The question, therefore, which arises is—' Is the type distribution of the rainfall the same for the two periods April—September and October—March ?' By type here I mean simply the average distribution and the deviations therefrom. Though the enquiry will need great extension yet some grounds for answering this question in the negative is given in Part II of this paper, where it appears that in a certain instance the skewness of the distribution has opposite signs in the two cases.

Again, is the high value of r_ρ as it were factitious, since the Rabi harvest is largely dependent on the rainfall of April—September, which for the 20 years considered is correlated with the rainfall of the succeeding October to March ? But calculated for longer periods this correlation of the rainfall in the two periods becomes insignificant (*v.* Part III), so that may be r_ρ too would be reduced if found from a greater range of values. Finally, in the case of the Kharif harvest are we not correlating the crop with a rainfall more widely differing from the true mean rainfall than is the case for the Rabi harvest, as seems probable from inspection of the correlations of local rainfall ?

I put these questions to show what points have to be considered before any deduction can be made from the differing values of the coefficient of correlation for the two harvests. At present I must leave them unanswered.

As to the function for which the value ϕ has been adopted, it appears to be desirable to tabulate it, but it cannot be fully discussed till it has been evaluated for a number of cases.

Since the regression equation of crop on rain is

$$C - \bar{C} = \frac{\sigma_C}{\sigma_R} r (R - \bar{R})$$

we have

$$\frac{C - \bar{C}}{\bar{C}} = \phi (R - \bar{R}).$$

Thus ϕ is the ratio which the excess of the probable crop obtained from a rainfall one unit above the average, over the average crop bears to the average crop. So that if, for instance, the average crop is 1 acre, ϕ represents the added or diminished acreage due to every inch above or below the average rainfall.

Thus for the 120 villages considered here, whilst one inch of rain above the average in the months April to September increases the probable Kharif crop by about $\frac{1}{77}$th, the Rabi crop may be expected to have about $\frac{1}{15}$th added to its mean crop by each additional inch of rain in the months October to March : or from this point of view an inch of rain in October to March has about five times the crop-producing value of an inch of rain in the months April to September.

Taking each of the Tahsils separately the distribution of rain and crop will be shown by diagrams which will also exhibit the regression lines.

(*i*) *Raya.* The 30 villages chosen all lie in the Darp Assessment Circle.

(*a*) Kharif.

The regression equations are :—

For the regression of crop on rain

$$C_K = 53{\cdot}251\ R_K + 1914{\cdot}4$$

and for the regression of rain on crop

$$C_K = 250{\cdot}74\ R_K - 1978{\cdot}1.$$

Figure 1 shows the distribution of crop and rainfall, the ordinates of the point marked with small closed curves giving the crop and the abscissæ of these points the rainfall corresponding, according to the scale given in the diagram.

The probable error of a prediction of the mean value of the crop given by a certain rainfall is 115 acres.

It will be convenient to call this probable error E_c.

(*b*) Rabi.

The regression equations are :-

For crop on rain

$$C_\rho = 339{\cdot}07\ R_\rho + 3164$$

For rain on crop

$$C_\rho = 979{\cdot}02\ R_\rho - 349{\cdot}3.$$

The value of $E_c = \pm 235.$

The distribution and the regression lines are shown in Figure 2.

(*ii*) *Pasrur.* The 30 villages are all in the Pasrur Assessment Circle.

(*a*) Kharif.

The regression equations are :—

For crop on rain

$$C_K = 56{\cdot}935\ R_K + 3213{\cdot}5.$$

For rain on crop

$$C_K = 578{\cdot}78\ R_K - 7942$$

and $E_c = \pm 174.$

The distribution and regression lines are exhibited in Figure 3.

(*b*) Rabi.

The regression equations are :—

For crop on rain

$$C_\rho = 276{\cdot}8\ R_\rho + 4990{\cdot}4.$$

For rain on crop

$$C_\rho = 1301\ R_\rho - 2076{\cdot}6$$

and $E_c = \pm 350.$

The distribution and regression lines are given in Figure 4.

The correlations for both harvests appear to be small.

It is true that their probable errors are large, and a value of ·4 for r_K would be within the range of probable values for all four Tahsils, though the difference between r_p for this Tahsil and for Sialkot and Zafarwal may possibly be significant.

In his Assessment Report Captain Dunlop-Smith says (p. 5) that in the Pasrur circle "the soil most frequently met with is 'bharari', a hard brittle loam incapable of retaining moisture, and thus requiring constant and heavy rain....The rainfall is not heavy, and the extent of crops failed from drought is sometimes formidable." It is possible, therefore, that the explanation of the low correlation is to be sought for in this statement.

(*iii*) *Sialkot.* One village is situated in the Charkhri circle, all the rest being in the Bharari.

(*a*) Kharif.

The regression equations are:—

For crop on rain

$$C_K = 53{\cdot}5\ R_K + 3291{\cdot}5$$

For rain on crop

$$C_K = 248{\cdot}7\ R_K - 1393{\cdot}5$$

$$E_c = \pm 156.$$

The following is roughly the percentage of the principal crops:—

Rice	5
Maize	11
Jowar	33
Cane	2
Cotton	7
Fodder	12
Others	30

(*b*) Rabi.

The regression equations are:—

For crop on rain

$$C_\rho = 307{\cdot}39\ R_\rho + 964{\cdot}6$$

For rain on crop

$$C_\rho = 571{\cdot}33\ R_\rho - 962{\cdot}2.$$

The proportions of the chief crops are:—

Wheat	48
Barley	27
Gram	23
Fodder	2
Others	10

Figure 6 shows the distribution of rain and crop and the regression lines.

(*iv*) *Zafarwal.* Of the 30 villages taken 14 are in the Jatátar circle, 7 in the Charwa, 4 in the Dosáhe, 3 in the Dokandi, and 2 in the Darp.

(*a*) Kharif.

The regression equations are:—

For crop on rain

$$C_K = 33{\cdot}73\ R_K + 3159{\cdot}7$$

For rain on crop

$$C_K = 174{\cdot}05\ R_K - 461{\cdot}5$$
$$E_c = \pm 101.$$

The principal crops are:—

Rice	12
Maize	16
Jowar	24
Cotton	4
Cane	7
Others	37

(*b*) Rabi.

The regression equations are :—

For crop on rain

$$C_\rho = 338{\cdot}9\ R_\rho + 2240{\cdot}4$$

For rain on crop

$$C_\rho = 652{\cdot}39\ R_\rho \mp 183$$

and $$E_c = \pm 225.$$

The crops are :—

Wheat	56
Barley	21
Gram	4
Others	19
	100

The distribution is shown in Figure 8.

§ 4. The correlations for the total unirrigated areas in 4 Tahsils.

We will now turn to the consideration of the correlation of rainfall and matured crop for the whole of the unirrigated areas in each of the Tahsils Daska, Pasrur, Sialkot and Zafarwal. The data for Tahsil Daska did not appear to be *primâ facie* abnormal in respect of the early part of the period, as was the case of the figures for the 30 selected villages, and its correlations though low, especially for the

Rabi harvest, cannot be rejected as incorrect without further examination. The figures for the Raya Tahsil for the matured crop could not be procured, for the years 1887-8, 1888-9 and 1889-90, and the loss of the 3 years out of 20 would so greatly increase the already large probable errors that it was not thought worth while to calculate the various coefficients.

The results for the four Tahsils are as follows:—

(*a*) Kharif harvest.

Tahsil.	$\overline{R}_K$	σ_R	v_R	$\overline{C}_K$	σ_C	v_C	r_K	ϕ_K
Daska ..	19·33 ± 1·31	8·670 ± ·92	44·84	19435 ± 1271	8426 ± 899	43·35	·4352 ± ·1222	·0213
Pasrur ..	21·13 ± 1·06	7·043 ± ·75	33·32	29225 ± 1353	8972 ± 957	30·70	·1121 ± ·1489	·0049
Sialkot ..	24·01 ± 1·36	8·979 ± ·96	37·41	50420 ± 1661	11016 ± 1175	21·85	·4693 ± ·1180	·0114
Zafarwal ..	25·80 ± 1·45	9·698 ± 1·03	37·58	47215 ± 1549	10272 ± 1095	21·76	·5174 ± ·1105	·0117

(*b*) Rabi harvest.

Tahsil. ..	$\overline{R}_\rho$	σ_R	v_R	$\overline{C}_\rho$	σ_C	v_C	r_ρ	ϕ_ρ
Daska ..	5·55 ± ·47	3·13 ± ·33	56·28	17575 ± 1956	12969 ± 1383	73·80	·4458 ± ·1221	·105
Pasrur ..	6·90 ± ·66	4·30 ± ·46	63·12	41090 ± 2717	18015 ± 1921	43·84	·5179 ± ·1102	·0521
Sialkot ..	7·30 ± ·63	4·18 ± ·45	57·29	52215 ± 2906	19265 ± 2055	36·90	·6309 ± ·0927	·0556
Zafarwal ..	7·73 ± ·69	4·57 ± ·49	59·18	55330 ± 3783	25083 ± 2675	45·33	·6532 ± ·0865	·0647

The notation and units are the same as before, the rainfall being measured in inches and the crop in acres.

As in the case of the 30 villages selected for each Tahsil, Pasrur again shows a very low correlation, so much so that in the case of the Kharif harvest this coefficient is even lower than its probable error. It seems fairly certain that in the case of this Tahsil some special circumstance must determine the exceptional values, and the Kharif coefficient of correlation would certainly seem to be a result of inaccurate statistics.

On the whole the selection of villages with a larger area devoted to 'unirrigated' cultivation appears to have raised the correlations slightly, and the difference between the Rabi coefficients for Sialkot and Zafarwal is fairly large, though, of course, no stress can at present be laid on these differences. By selecting the villages the average coefficient of correlation for the Kharif harvest for the 4 Tahsils taken in each case has been raised from ·36 to ·41 and for the Rabi harvest from ·56 to ·62; thus the accuracy of prediction for the harvest of a whole Tahsil by a single formula is, on the whole, somewhat less than that for the chosen villages, and this is perhaps due to the greater liability to mistakes in classing any particular crop where only a small proportion of that class of crop exists in any definite area, and especially for those villages which largely depend on well water a crop classed as unirrigated may have really received irrigation at critical times from wells, and yet still remain classed as unirrigated.

It appears probable, therefore, that as a rule the correlation coefficients in the selected villages, that is, in general, the higher values of the coefficients are more probably the true ones.

Taking each Tahsil separately, the regression equations and the diagrams showing the regression lines together with the distribution of rainfall and matured crop will now be given.

(*i*) *Tahsil Daska.*

(*a*) Kharif.

The regression equations are :—

For the regression of crop on rain

$$C_K = 413{\cdot}53\ R_K + 11439$$

For the regression of rain on crop

$$C_K = 2233{\cdot}2\ R_K - 23744.$$

The rainfall from April to September appears to have a high variability from year to year, and the coefficient of variation for the matured area of the crop is nearly twice that of Sialkot and Zafarwal, and consequently ρ_K is large.

It is probable that for this Tahsil the true mean rainfall over the unirrigated area differs somewhat widely from the value adopted, as, according to Captain Dunlop-Smith, the rainfall varies very greatly from place to place in this Tahsil. He gives the following approximate averages for the total yearly rainfall in each of the four assessment circles:—

Charkhri II	18″
Charkhri I	22″
Aik	27″
Bet Bela	30″

The Tahsil town of Daska at which the rainfall is taken for the purposes of this enquiry is situated in Charkhri I, and the mean annual value of the rainfall there is about 25″, which is just over the mean of the four rainfalls given above. At the same time, as by far the greater part of the unirrigated area of this Tahsil is situated in the Bet Bela assessment circle, the adopted values of the rainfall will probably be too small, in general, while the true mean values will vary from year to year in a different way from the adopted values. Consequently, the value of the correlation coefficient will be different from and most probably less than the value it would have if the true mean values of the rainfall had been ascertained. Figure 9 shows the distribution of rainfall and matured crop with the regression lines.

(*b*) Rabi.

The regression equations are:—

For crop on rain

$$C_p = 1849{\cdot}6\ R_p + 7301$$

For rain on crop

$$C_p = 9307{\cdot}1\ R_p - 34126.$$

Here again the variability of the crop is very great, and ϕ_p has a high value in consequence. The average rainfall being low, this is to be expected to a certain extent, but the differences between the values for this and the other Tahsils can hardly be explained altogether on this basis.

The distribution of rain and crop with the regression lines is shown in figure 10.

(*ii*) *Pasrur.*

(*a*) Kharif.

It is quite useless to give the regression equations for this Tahsil for the Kharif harvest, as the abnormally low value of the coefficient of correlation makes them worthless for the purposes of prediction, and they would merely mislead. Up to the present I have been unable to trace the source of the error, for such it undoubtedly is, which has produced this anomalous value, but I fear that either one or both of the statistical series for crop and rainfall are at fault, though other explanations considered while discussing the 30 selected villages in this Tahsil are not to be overlooked.

(*b*) Rabi.

The regression equations are:—

For the regression of crop on rain

$$C_p = 2142{\cdot}3\ R_p + 26308$$

For the regression of rain on crop

$$C_p = 7987{\cdot}3\ R_p - 14022.$$

The value of ϕ_p appears to be practically the same as for Sialkot and Zafarwal, and both r_p and ϕ_p are greater than they were for the 30 selected villages of this Tahsil, though the differences are scarcely significant.

From the data given by Captain Dunlop-Smith on p. 42 of the Assessment Report, and assuming approximately that the whole unirrigated cropped area of the Tahsil is distributed in the following proportions in the various circles, namely, Dokánde 11, Darp 8, Pasrur 21, Charkhri 4, the percentages of the principal Rabi crops in this Tahsil are roughly as follows:—

Wheat	64
Barley	15
Gram	7
Fodder	2
Others	12
Total ..	100

The diagram below gives the distribution of the rainfall from October to March against the matured crop, with the regression lines.

(*iii*) *Sialkot.*

(*a*) Kharif.

It seems probable that the data for this and Tahsil Zafarwal are the most reliable of any of the four Tahsils. There is certainly no physical difference, so far as I know, to account for the higher correlations, except perhaps higher rainfall, which in certain instances (*vide* p. 363 ante) will determine greater coefficients of correlation.

The regression equations are:—

For crop on rain

$$C_K = 575{\cdot}727\ R_K + 36600$$

For rain on crop

$$C_K = 2614{\cdot}3\ R_K - 12336.$$

The probable error $E_c = \pm 1467$

From the average of 5 years (1887—1891) the proportions of unirrigated matured crop in the five circles are as follows: Bharari 26, Niánda 10, Bet 4, Bajwat 4, Charkhri 4, and thus we find from the table on p. 48 of the Assessment Report the following percentages of matured crop in the unirrigated area of this Tahsil:—

Rice	6
Maize	13
Jowar	28
Cane	3
Cotton	8
Fodder	13
Others	29
Total ..	100

Thus the crops are very diverse, and the same correlation can, of course, only be predicated of another area where the rainfall, physical conditions and proportions of crop are the same as those here. This is an important point, for the correlations for each individual crop have almost certainly a particular value, which it is undoubtedly desirable to investigate. Until this is done the above limitations must be borne in mind.

The distribution of rainfall and crop are shown in the diagram below:—

(*b*) Rabi harvest.

The regression equations are:—

For crop on rain

$$C_\rho = 2904{\cdot}0\ R_\rho + 31001{\cdot}9$$

For rain on crop

$$C_\rho = 7296{\cdot}3\ R_\rho - 1085$$

The value of $E_c = \pm 2254.$

The proportions of unirrigated matured crop in the different circles is somewhat different from those of the Kharif harvest.

They are Bharari 23, Niánda 11, Bet 6, Bajwat 6, Charkhri 8, and the average of the 5 years 1887-8—1891-2 gives the following proportions of crop for the whole Tahsil.

Wheat	51
Barley	26
Gram	10
Fodder	2
Other crops	11
Total	100

The diagram showing the distribution of rainfall and crop with the regression lines is:—

(*iv*) *Zafarwal.*

(*a*) Kharif.

The regression equations are:—

For crop on rain

$$C_K = 548{\cdot}21\ R_K + 31{,}910$$

For rain on crop

$$C_K = 20464\ R_K + 2381$$

and the probable error $E_c = \pm 1325$.

The percentages of the principal crops are roughly:—Rice 11, Maize 16, Jowar 22, Sugarcane 4, Cotton 7, others 40.

The diagram shows the distribution and the regression lines:—

(*b*) Rabi.

The regression equations are:—

For crop on rain

$$C_\rho = 3581{\cdot}5\ R_\rho + 27645.$$

For rain on crop

$$C_\rho = 8392{\cdot}9\ R_\rho - 9547$$

and $E_c = \pm 2196.$

The percentages of the chief matured crops are:—

Wheat	57
Barley	20
Gram	3
Others	20

The distribution of rainfall and crop with the regression lines is shown in the Fig 15.

§5. Correlation of the matured crop with other than the six-monthly periods dealt with previously.

The beneficial effect of heavy rainfall in September on the Rabi harvest, and its frequently adverse influence on the Kharif crop, has already been referred to. It seemed desirable, therefore, to exclude it from computation in the rainfall correlated with the latter harvest and to include it in the period to be correlated with the former.

I have taken only the Tahsils Sialkot and Zafarwal which have the heaviest rainfall and whose correlations appeared to be probably the nearest to the truth.

The following results were found :—

Table showing the correlations of the Kharif matured area with the total rainfall from April to August, both inclusive, and of the Rabi matured area with the total rainfall from September to March, both inclusive, for unirrigated lands.

	Kharif.	*Rabi.*
Total unirrigated areas of Sialkot Tahsil ..	$\cdot 4161 \pm \cdot 125$	$\cdot 8281 \pm \cdot 047$
	$(\cdot 4693 \pm \cdot 118)$	$(\cdot 6309 \pm \cdot 093)$
Total unirrigated area of Zafarwal Tahsil ..	$\cdot 5045 \pm \cdot 112$	$\cdot 7215 \pm \cdot 074$
	$(\cdot 5174 \pm \cdot 110)$	$(\cdot 6532 \pm \cdot 086)$
Total unirrigated area of 30 selected villages in Zafarwal.	$\cdot 3939 \pm \cdot 127$	$\cdot 7550 \pm \cdot 065$
	$(\cdot 4402 \pm \cdot 122)$	$(\cdot 7207 \pm \cdot 072)$

For purposes of comparison the correlations for the rainfall taken in each of the six-monthly periods, April—September, October—March, are entered in round brackets below the corresponding correlations.

The results are of considerable interest, seeing that in spite of the large probable errors, they all tend to corroborate the existence of the effects noted. The increase in the Rabi coefficient is particularly marked, and the change in the Kharif coefficient though small is consistently a diminution.

It would, of course, be totally erroneous to argue from these figures to the effect that all rain in September, whatever its amount and distribution, is beneficial to both the autumn and to the spring crop. All that can be said is that rain, of the quantity and mode of distribution that occurred during the period 1887-8 to 1906-7, appears on the whole to have done some slight good to the former crop and considerable good to the latter.

As a matter of fact, though it is difficult to see how rainfall in September, unless absolutely overwhelming, could harm the Rabi harvest, the case of September rain causing harm to the Kharif crop is quite easy of conception. The above results show that the contradictory of this latter proposition is more generally true.

The following tables show the mean value of the rainfall, its variation, and the value of ϕ for the two Tahsils, Sialkot and Zafarwal (total unirrigated area):—

		$\bar{R}$	σ_R	ϕ
I. Kharif Harvest.				
Sialkot	Rainfall April to August	$20{\cdot}79 \pm 1{\cdot}22$	$8{\cdot}116 \pm {\cdot}87$	${\cdot}0112$
	,, April to September ..	$24{\cdot}01 \pm 1{\cdot}36$	$8{\cdot}979 \pm {\cdot}96$	${\cdot}0114$
Zafarwal	Rainfall April to August	$22{\cdot}94 \pm 1{\cdot}31$	$8{\cdot}713 \pm {\cdot}93$	${\cdot}0126$
	,, April to September ..	$25{\cdot}80 \pm 1{\cdot}45$	$9{\cdot}698 \pm 1{\cdot}03$	${\cdot}0117$
II. Rabi Harvest.				
Sialkot	Rainfall September to March ..	$10{\cdot}50 \pm {\cdot}92$	$6{\cdot}09 \pm {\cdot}65$	${\cdot}0501$
	,, October to March ..	$7{\cdot}30 \pm {\cdot}63$	$4{\cdot}18 \pm {\cdot}45$	${\cdot}0556$
Zafarwal	Rainfall September to March ..	$10{\cdot}43 \pm 1{\cdot}05$	$6{\cdot}96 \pm {\cdot}74$	${\cdot}0470$
	,, October to March	$7{\cdot}73 \pm {\cdot}69$	$4{\cdot}57 \pm {\cdot}49$	${\cdot}0647$

The regression equations giving the probable value of the crop in the two harvests from the known rainfall in the two periods, April to August (both inclusive), and September to March (both inclusive) are:—

(*i*) Total unirrigated area in Tahsil Sialkot.

(*α*) Kharif harvest.

For the regression of crop on rain

$$C = 564{\cdot}7\ R + 38676$$

For the regression of rain on crop

$$C = 3262{\cdot}1\ R - 17417$$

and $E_c = \pm 1518.$

(*β*) Rabi harvest.

For the regression of crop on rain

$$C = 2618{\cdot}4\ R + 24722$$

For the regression of rain on crop

$$C = 3818{\cdot}6\ R + 12119$$

and $E_c = \pm 1623.$

(*ii*) Total unirrigated area in Tahsil Zafarwal.

(*α*) Kharif harvest.

For the regression of crop on rain

$$C = 594{\cdot}7\ \mathrm{R} + 33569$$

For the regression of rain on crop

$$C = 2336{\cdot}5\ \mathrm{R} - 6397$$

and $E_c = \pm 1355.$

(β) Rabi harvest.

For the regression of crop on rain

$$C = 2600 \cdot 9\ \mathrm{R} + 28203$$

For the regression of rain on crop

$$C = 4996 \cdot 7\ \mathrm{R} + 3215.$$

$$E_c = \pm 2630.$$

I will content myself by giving the diagram showing the distribution of rain and crop for the Rabi harvest in Tahsil Sialkot only. This is shown below in Figure 16.

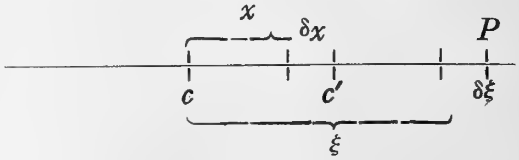
The diminution in the angle between the regression lines due to the high correlation is seen by a comparison with the previously-given diagrams for the Rabi harvest, although their point of intersection is not quite the same.

§ 6. The prediction of isolated values of cropped areas.

It has already been pointed out that in predicting the amount of crop from a knowledge of the rainfall, what is actually predicted is the amount of crop which is, if the regression be linear, the mean of the 'array' of values corresponding to the given value of the rainfall. Now the assumption has been made that the regression dealt with is to a first approximation both 'linear' and 'normal,' so that knowing the standard deviation of the whole series of observations and the correlation, namely, σ_C and r, the standard deviation of the 'array' corresponding to a particular value of the rainfall is $\sigma_C\sqrt{1-r^2}$. In other words, if we put $\lambda = \cdot 67449$ [1] then corresponding to a given rainfall the amount of crop will oscillate about the *true* mean, and have a probable excess or defect of $\lambda\,\sigma_C\sqrt{1-r^2}$. But we do not even know the true mean exactly. The mean found from any number 'n' of observations has itself a probable deviation from the true mean of $\dfrac{\lambda\,\sigma_C\sqrt{1-r^2}}{\sqrt{n}}$.

Where 'n' is at all large the error produced by an incorrect estimate of the mean is quite negligible as compared with the previous error, but theoretically, so long as 'n' is finite the latter error does not vanish, and in the present case it produces a certain practical error which has to be taken into account. It is desirable, therefore, to show how these probable errors are to be combined, so that the whole probable error in predicting a single isolated value of the crop (which is the practical desideratum) can be obtained.

Let c denote the *true* and c' the actually determined regression point. Then let the distribution of the c's about c be such that the frequency of c's contained in the interval x to $x+\delta x$ is $f(x)\ \delta x$, where x is the distance from c.



[1] λ is given by the equation $\int^{\lambda} {}^{-x^2} dx = \frac{\sqrt{\pi}}{4}$.

Further let P be the position of an individual value of a single observation, then the single observations are grouped about c with a frequency $F(\xi)\ \delta\xi$, say, and it is necessary to find the grouping of the P's about c'.

The frequency of a deviation X of p from c', where $X=\xi-x$, is clearly

$$=\frac{\delta X\int_{-\infty}^{+\infty} F(\xi)\,f(x)\,dx.}{\int_{-\infty}^{+\infty} f(x)\,dx.}$$

$$=\frac{\delta X\int_{-\infty}^{+\infty} F(X+x)\,f(x)\,dx.}{\int_{-\infty}^{+\infty} f(x)\,dx}$$

where X is a constant for the integration.

Suppose the distribution of the $c's'$ and of the individuals about c to be 'normal' and of the form

$$y=y_c\,e^{-\frac{x^2}{2\sigma_c^2}}\equiv f(x)$$

$$y=y_i\,e^{-\frac{x^2}{2\sigma_i^2}}\equiv F(x)$$

then the distribution of the individuals about c' is

$$\frac{y_c\,y_i\int_{-\infty}^{+\infty} e^{-\frac{(x+X)^2}{2\sigma_i^2}-\frac{x^2}{2\sigma_c^2}}\,dx}{y_c\int_{-\infty}^{+\infty} e^{-\frac{x^2}{2\sigma_c^2}}\,dx}$$

$$=\frac{y_c\,y_i\dfrac{\sqrt{2\pi}}{\sqrt{\dfrac{1}{\sigma_i^2}+\dfrac{1}{\sigma_c^2}}}e^{-\frac{X^2}{2(\sigma_c^2+\sigma_i^2)}}}{y_c\sqrt{2\pi}\,\sigma_c}$$

$$=y_i\,\frac{\sigma_i}{\sqrt{\sigma_i^2+\sigma_c^2}}\,e^{-\frac{X^2}{2(\sigma_c^2+\sigma_i^2)}}$$

Then the distribution is also normal and the standard deviation is given by $\sqrt{\sigma_i^2+\sigma_c^2}$, the well-known result for the errors of the sum or difference of two uncorrelated variables.

Thus the probable deviation in the grouping of individuals about the determined regression point is $\lambda\sqrt{\sigma_i^2+\sigma_c^2}$.

Now assuming as before that the whole distribution, and not only the 'array' distributions, is normal, we have $\sigma_i = \sigma\sqrt{1-r^2}$ and $\sigma_c = \frac{\sigma}{\sqrt{n}}\sqrt{1-r^2}$.

So that the whole probable error is $\lambda\sigma\sqrt{\frac{n+1}{n}(1-r^2)}$

As already noted, when n is large this tends simply to the value $\lambda\sigma\sqrt{1-r^2}$, but in the cases we are dealing with n is often as low as 20, and $\lambda\sqrt{1-r^2}$ has to be increased by about 1·0247 of its value, or roughly $\frac{41}{40}$.

Thus, with the previously adopted notation the probable error in the prediction of a crop of standard deviation σ_c is $E_c\sqrt{n+1}$.

As an example the rainfall in 1908 of April to August in Sialkot is 31″·3, so that using the regression equation for the Kharif harvest, we find the probable unirrigated crop to be 56,200 acres approximately with a probable error in excess or defect of about 7,000 acres.

Or, again, the April to August rainfall on 1908 at Zafarwal was 31″·0, which gives, on using the regression equation, a probable Kharif harvest of 52,000 acres for the whole of the Tahsil for unirrigated land, with a probable error of 6,200 acres.

Exactly the same process will apply to prediction based on any of the regression equations given in this paper, in every instance the given value of E_c being multiplied by 4·58 approximately to obtain the probable error of the prediction.

The probable errors may seem large, but it must be remembered that in approaching the subject for the first time many refinements have to be neglected as beyond the scope of pioneer work. Some of these have already been referred to.

Even so some advance has been made.[1]

§ 7. The effect of errors of measurement on the correlation coefficient.

It has already been pointed out that in treating the problems of the dependence of the matured areas of crop on the rainfall, we are using statistics which are subject to considerable errors which may be in part random and in part systematic. From the standpoint of the present investigation the inaccuracies in the rainfall data are small enough to be negligible, but this is not the case for the measurements of the cropped areas, and it becomes important to determine the effect which such errors would produce on the correlations.

---

[1] Since this paper was written I have seen in Dr. Shaw's British Association Address to Section A in 1908, that some 'interesting relations between the yield of barley and cool summers, and the yield of wheat and dry autumns' have been recently obtained, and this is being made the starting point by the Board of Agriculture for a 'general investigation of the relation between the weather and the crops which cannot fail to have *important practical bearings.*'

Note added 21·9-09.—I have now received Mr. Hooker's paper. Mr. Hooker is the Head of the Statistical Branch of the Board of Agriculture in England, and it is clearly his investigation that Dr. Shaw refers to.

The question is one of some difficulty.

Let x_m y_m be the co-ordinates of any character, as here of rainfall and crop respectively.

Let N_m be the total frequency of the occurrence of the character x_m, that is in a unit interval enclosing x_m. Here x_m, y_m are the true values of the characters. Suppose, then, that x_m (rainfall) is correctly measured, but that y_m (crop) is incorrectly measured as k_m y_m. It is reasonable to assume that in measurements of the cropped area, the error is proportional to the area measured, but that the multiplying factor has a random distribution, so that if y_m is constant the erroneously measured y_m's have the same mean value as y_m, but are 'normally' distributed about this mean.

Then the errors in measurement will alter the distribution of each array corresponding to a given x_m, but N_m will remain unaltered.

To make the process clearer consider first the case of perfect linear correlation.

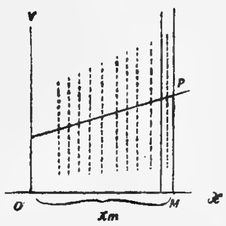


FIG. 17a.

Then let P be point on the regression line, and let x_m be its abscissa. Then the whole array is concentrated at P, thus there are N_m individuals with characters x_m $\bar{y}_m$ say at P. Now when the erroneous process of measurement of the kind supposed is applied to these N_m individuals, the $\bar{y}_m$ character will become distributed in an array about P with a standard deviation about P of $k\bar{y}_m$, P remaining the centroid of the array, and k is to be a constant for all the arrays. That is to say the new distribution, that is the distribution from which, in practice, the correlation and regression coefficients are estimated, becomes such that the regression remains linear but is not 'normal,' and the correlation is reduced below unity.

Put σ_{y_m} for the old standard deviation of the m^{th} array, which in this case is zero, and σ_{y_m}' for the new standard deviation, which is equal to $k\bar{y}_m$. Let σ_y be the old standard deviation for the whole system about an axis parallel to Ox and σ_y' the new standard deviation.

And let N be the total frequency. Then we have at once

$$N(\sigma_y'^2+\bar{y}^2)=\overset{m}{\underset{m=1}{S}}\left\{N_m(\bar{y}_m^2+\sigma_{y_m}'^2)\right\}$$

where S denotes a summation, and $\bar{y}$ is the ordinate of the centroid of the whole system.

$$=\overset{m}{\underset{m=1}{S}}\left\{N_m\,\bar{y}^2_m(1+k^2)\right\}$$

$$=(1+k^2).\quad N(\bar{y}^2+\sigma_y^2)$$

$$\text{Thus } \sigma_y'^2=\sigma_y^2+k^2(\bar{y}^2+\sigma_y^2).$$

Now let I, I′ denote the old and new product moments of the distribution about the axes o_x, o_y. Then, clearly, I = I′, and therefore the product moment about the centroid is unchanged. Hence if r' is the new (erroneous) coefficient of correlation

$$r' = \frac{r\sigma_y}{\sqrt{\sigma_y^2 + k^2(\bar{y}^2 + \sigma_y^2)}} = \frac{\sigma_y}{\sqrt{\sigma_y^2 + k^2(y^2 + \sigma_y^2)}}$$

since the original correlation was perfect.

This is sufficient to indicate the method, and we will now turn to the general case of a correlation less than unity.

The original correlation being assumed to be normal the standard deviation of each y array is $\sigma_y\sqrt{1 - r^2}$. Then the frequency of a character of deviation y_s from the mean of the array corresponding to x_m is given by

$$\frac{N_m}{\sigma_y\sqrt{2\pi(1-r^2)}} e^{-\frac{1}{2}\cdot\frac{y_s^2}{\sigma_y^2(1-r^2)}} \delta y_s = p_s \, \delta y_s,$$

say where δy_s is a small interval enclosing y_s.

Now owing to inaccurate measurement of the assumed type each character in the interval δy_s gets a different value, so that the whole group is distributed about the mean character y_s with a standard deviation $k\,(\bar{y}_m + y_s)$.

Thus the standard deviation of the whole array corresponding to x_m is altered to a value σ_{y_m}' where

$$N_m \sigma_{y_m}'^2 = \int_{-\infty}^{+\infty} p_s \, (y_s^2 + k^2(\bar{y}_m + y_s)^2 \, dy_s$$

$$= N_m \sigma_{y_m}^2 + \int_{-\infty}^{+\infty} \frac{k^2}{\sigma_{y_m}\sqrt{2\pi}} e^{-\frac{1}{2}\frac{y_s^2}{\sigma_{y_m}^2}} \{y_m + \bar{y}_s\}^2 dy_s$$

$$= N_m(\sigma_{y_m}^2 + k^2\bar{y}_m^2) + \frac{k^2}{\sigma_{y_m}\sqrt{2\pi}} \int_{-\infty}^{+\infty} e^{-\frac{1}{2}\frac{y_s^2}{\sigma_{y_m}^2}} (2\bar{y}_m y_s + y_s^2) \, dy_s.$$

Now the first part of the integral must clearly vanish, and we require to find only

$$\int_{-\infty}^{+\infty} e^{-\frac{1}{2}\frac{y_s^2}{\sigma_{y_m}^2}} y_s^2 \, dy_s = \int_{-\infty}^{+\infty} - \sigma_{y_m}^2 \, y_s \frac{d\left(e^{-\frac{1}{2}\frac{y_s^2}{\sigma_{y_m}^2}}\right)}{dy_s} dy_s$$

$$= \left[-\sigma_{y_m}^2 \, y_s \, e^{-\frac{1}{2}\frac{y_s^2}{\sigma_{y_m}^2}} \right]_{-\infty}^{+\infty} + \sigma_{y_m}^2 \int_{-\infty}^{+\infty} e^{-\frac{1}{2}\frac{y_s^2}{\sigma_{y_m}^2}} dy_s$$

$$= \sigma_{y_m}^2 . \; N_m \sqrt{2\pi} \; \sigma_{y_m}$$

$$= \sqrt{2\pi} \, N_m \, \sigma_{y_m}^3$$

Thus

$$\sigma_{y_m'}^2 = \sigma_{y_m}^2 + k^2(\bar{y}_m^2 + \sigma_{y_m}^2)$$

This gives the relative standard deviations of the array of the old and new systems in terms of each other.

To find the new standard deviations of the whole distribution

$$N(\sigma_y'^2 + \bar{y}^2) = \overset{m}{\underset{m=1}{S}} \left\{ N_m(\bar{y}_m^2 + \sigma_{y_m}'^2) \right\}$$

$$= \overset{m}{\underset{m=1}{S}} \left\{ N_m \left(\bar{y}_m^2 + \sigma_{y_m}^2 + k^2 \left(\bar{y}_m^2 + \sigma_{y_m}^2\right)\right) \right\}$$

$$= \overset{m}{\underset{m=1}{S}} \left\{ N_m(1 + k^2)(\bar{y}_m^2 + \sigma_{y_m}^2) \right\}$$

$$= N(\sigma_y^2 + \bar{y}^2)\ (1 + k^2)$$

$$\therefore\ \sigma_y'^2 = \sigma_y^2 + k^2(\sigma_y^2 + \bar{y}^2)$$

thus we have $r' = \dfrac{r\sigma_y}{\sqrt{\sigma_y^2 + k^2(\sigma_y^2 + \bar{y}^2)}}$

which is the same result as before for the case $r = 1$.

We may write it $r' = \dfrac{r}{\sqrt{1 + k^2(1 + \tau^2)}}$

where $\tau = \dfrac{\bar{y}}{\sigma_y} = \dfrac{100}{v}$, where v is the coefficient of variation of the whole group of y characters.

Again since $r'\sigma_y' = r\sigma_y$ and σ_x is unaltered, the regression coefficient of y on x is unaltered, and consequently so far as errors of this type are concerned the regression equation of y on x is unaffected. But the regression coefficient of x on y is now

$$\frac{\sigma_y'}{\sigma_x}\ \frac{1}{r'} = \frac{\sigma_y(1 + k^2(1 + \tau^2))}{\sigma_x\ r}$$

and the regression coefficient of x on y is increased by the factor $1 + k^2\ \ 1 + \tau^2)$

To express the value of the true coefficient of correlation in terms of the erroneously estimated values of r' and σ_y', we have

$$r = r'\{1 + k^2(1 + \tau^2)\}^{1/2}$$

$$\text{Now } \tau^2 = \frac{\bar{y}^2}{\sigma_y^2} = \frac{\bar{y}^2(1 + k^2(1 + \tau^2))}{\sigma_y'^2}$$

$$\therefore\ \tau^2\left(1 - \frac{k^2\bar{y}^2}{\sigma_y'^2}\right) = (1 + k^2)\,\frac{\bar{y}^2}{\sigma_y'^2}$$

$$\therefore \quad r^2 = \frac{(1+k^2)\overline{y}^2}{\sigma_y'^2 - k^2\overline{y}^2}$$

$$1 + r^2 = \frac{\sigma_y'^2 + \overline{y}^2}{\sigma_y'^2 - k^2\overline{y}^2} = \frac{\left(\frac{v'}{100}\right)^2 + 1}{\left(\frac{v'}{100}\right)^2 - k^2}$$

which gives

$$r = r'\left\{1 + k^2\left(\frac{\left(\frac{v'}{100}\right)^2 + 1}{\left(\frac{v'}{100}\right)^2 - k^2}\right)\right\}^{\frac{1}{2}}$$

where v' is the measured coefficient of variation

$$r = r'\left\{\frac{\left(\frac{v'}{100}\right)^2(1+k^2)}{\left(\frac{v'}{100}\right)^2 - k^2}\right\}^{\frac{1}{2}}$$

$$= r' \frac{v'}{100}\left\{\frac{1+k^2}{\left(\frac{v'}{100}\right)^2 - k^2}\right\}^{\frac{1}{2}}$$

This gives the true coefficient of correlation in terms of the measured values and the known 'standard' error k.

In the cases dealt with here, for the Kharif harvest v' has a typical value of 20, and for the Rabi harvest 40.

Now if we put $k = \frac{1}{8}$ this would be equivalent to saying that in the estimation of matured areas of crop the probable error was about 8·5 %.

This is perhaps somewhat larger than might be met with in practice, but I fear, it is a not very unreasonable value to adopt.

Accordingly, for the Kharif harvest $r' = 1{\cdot}35\, r$ approximately.

And for the Rabi harvest $r' = 1{\cdot}12\, r$ approimately.

Thus the coefficients of ·5 and ·7 would be increased to ·675 and ·784 respectively. Of course no stress can be laid on particular figures till we are in a position to say what the percentage error of measurement actually is, but they indicate the type of correction which would be applicable, and point to higher values of the correlation coefficient being obtained with increased accuracy of measurement. Further, the assumptions made here must be borne in mind. At best they can be only partial representations of truth, as it is very probable, for instance, that the actual errors made in measurement have a skew distribution.

§ 8. Tables for finding the value of 'E_c' and of the probable error of 'r' for the case of 20 observations.

In dealing with agricultural statistics in the Panjab we shall frequently find that a reliable series is only available for 20 years, or, that they fall into groups of 20. It is desirable to tabulate some of the probable errors which are wanted approximately.

Table showing the values of log $\sqrt{1-r^2}$, *and log* $\left(\frac{\cdot 67449}{\sqrt{20}}\sqrt{1-r^2}\right)$ *for values of 'r' ranging from* ·20 *to* ·81.

r	log $\sqrt{1-r^2}$	log E_c'	Δ_1	r	log $\sqrt{1-r^2}$	log E_c'	Δ_1	r	log $\sqrt{1-r^2}$	log E_c'	Δ_1
·20	$\bar{1}$.99114	$\bar{1}$·16960	93	·41	$\bar{1}$·96004	$\bar{1}$·13850	218	·62	$\bar{1}$·89465	$\bar{1}$·07311	445
·21	·99021	·16867	98	·42	·95786	·13632	225	·63	·89020	·06866	463
·22	·98923	·16769	103	·43	·95561	13407	233	·64	·88557	·06403	480
·23	·98820	·16666	108	·44	·95328	·13174	241	·65	·88077	·05923	497
·24	·98712	·16558	113	·45	·95087	·12933	250	·66	·87580	·05436	519
·25	·98599	·16445	119	·46	·94837	·12683	257	·67	·87061	·04907	538
·26	·98480	·16326	124	·47	·94580	·12426	267	·68	·86523	·04369	561
·27	·98356	·16202	129	·48	·94313	·12159	275	·69	·85962	·03808	584
·28	·98227	·16073	134	·49	·94038	·11884	285	·70	·85378	·03224	608
·29	·98093	·15939	141	·50	·93753	·11599	295	·71	·84770	·02616	636
·30	·97952	·15798	146	·51	·93458	·11304	304	·72	·84134	·01980	663
·31	97806	·15652	152	·52	·93154	·11000	314	·73	·83471	·01317	695
·32	·97654	·15500	158	·53	·92840	·10686	226	·74	·82776	·00622	727
·33	·97496	·15342	163	·54	·92514	·10360	337	·75	·82049	$\bar{2}$·99895	763
·34	·97333	·15179	171	·55	·92177	·10023	348	·76	·81286	$\bar{2}$·99132	801
·35	·97162	·15008	176	·56	·91829	·09675	361	·77	·80485	$\bar{2}$·98331	843
·36	·96986	·14832	183	·57	·91468	·09314	372	·78	·79642	$\bar{2}$·97488	888
·37	·96803	·14649	190	·58	·91096	·08942	387	·79	·78754	$\bar{2}$·96600	939
·38	·96613	·14459	196	·59	·90709	·08555	400	·80	·77815	$\bar{2}$·95661	994
·39	·96417	·14263	203	·60	·90309	·08155	415	·81	·76821	$\bar{2}$·94667	
·40	·96214	·14060	210	·61	·89894	·07740	429				

Table showing the values of the "probable error" of the coefficient of correlation 'r', together with its five-figure logarithms and their first differences for n = 20.

r	E_r	Δ_1	$\log E_r$	Δ_1	r	E_r	Δ_1	$\log E_r$	Δ_1	r	E_r	Δ_1	$\log E_r$	Δ_1
·20	·1448	6	$\bar{1}$·16073	186	·47	·1175	14	$\bar{1}$·07005	532	·74	·0682	22	$\bar{2}$·83398	1454
·21	·1442	7	·15887	196	·48	·1161	15	·06743	551	·75	·0660	23	·81944	1526
·22	·1435	7	·15691	205	·49	·1146	15	·05922	570	·76	·0637	23	·80418	1602
·23	·1428	7	·15486	216	·50	·1131	15	·05352	589	·77	·0614	23	·78816	1686
·24	·1421	7	·15270	227	·51	·1116	15	·04763	609	·78	·0591	24	·77130	1777
·25	·1414	8	·15043	237	·52	·1101	16	·04154	629	·79	·0567	24	·75353	1877
·26	·1406	8	·14806	247	·53	·1085	16	·03525	651	·80	·0543	24	·73476	1959
·27	·1398	8	·14559	259	·54	·1069	17	·02874	674	·81	·0519	25	·71517	2137
·28	·1390	9	·14300	269	·55	·1052	17	·02200	696	·82	·0494	25	·69380	2244
29	·1381	9	·14031	281	·56	·1035	17	·01504	721	·83	·0469	25	·67136	2396
·30	·1372	9	·13750	292	·57	·1018	17	·00783	746	·84	·0444	25	·64740	2568
·31	·1363	9	·13458	304	·58	·1001	17	·00037	773	·85	·0419	26	·62172	2762
·32	·1354	10	·13154	315	·59	·0984	18	$\bar{2}$·99264	800	·86	·0393	26	·59410	2986
·33	·1344	10	·12839	328	·60	·0966	19	·98464	829	·87	·0367	26	·56424	3244
·34	·1334	10	·12511	340	·61	·0947	19	·97635	859	·88	·0340	27	·53180	3549
·35	·1324	10	·12171	353	·62	·0928	19	·96776	891	·89	·0314	27	·49631	3910
36	·1313	11	·11818	366	·63	·0909	19	·95885	924	·90	·0287	28	·45721	4347
·37	·1302	11	·11452	379	·64	·0890	19	·94961	960	·91	·0259	28	·41374	4889
·38	·1291	11	·11070	395	·65	·0871	20	·94001	996	·92	·0232	28	·36485	5573
·39	·1279	12	·10680	407	·66	·0851	20	·93005	1036	·93	·0204	28	·30912	6471
·40	·1267	12	·10273	420	·67	·0831	20	·91969	1077	·94	·0176	29	·24441	7695
·41	·1255	13	·09853	435	·68	·0811	21	·90892	1121	·95	·0147	29	·16746	9468
42	·1242	13	·09418	451	·69	·0790	21	·89771	1168	·96	·0118	29	·07278	12273
43	·1229	13	·08967	466	·70	·0769	21	·88603	1218	·97	·0089	29	$\bar{3}$·95005	17389
·44	·1216	13	·08501	482	·71	·0748	22	·87385	1270	·98	·0060	30	·77616	29885
·45	·1203	14	·08019	498	·72	·0726	22	·86115	1328	·99	·0030	30	·47731	
·46	·1189	14	·07521	516	·73	·0704	22	·84787	1389	·00	0·000			

PART II.

THE MEAN DISTRIBUTION OF RAINFALL AS EXPRESSED BY CERTAIN TYPES OF FREQUENCY CURVES.

§ 9. The problem of the mean distribution of the rainfall throughout the year or other period is an important one, as when random variations have been eliminated, there results a certain type-curve which will be characteristic for the given locality and period.

The curves do not, of course, express the actually occurring rainfall during any given year, or other non-recurring cycle, as the ordinate representing the actual rainfall will have a series of maxima and minima. It seems probable, however, that if a sufficient number of recurring cycles are taken, their maxima and minma will not in general coincide, and that the resultant curve will have but a few maxima and minima, and be expressible by the help of the ordinary frequency curves of the types recently investigated. If this be the case, then a given frequency curve will represent the generic rainfall, from which the actual rainfall in any year will vary, but within certain limits, as a species might vary from its genus in the animal kingdom.

Further, the problem of the determination of the characteristic distribution of the rainfall, interesting as it is in itself, has a most important bearing on the nature and seasonal position of the crops which it affects.

Example 1st. The rainfall data of Zafarwal (District Sialkot) fitted with a normal or 'Gaussian' frequency curve.

The average rainfall in Zafarwal for the years 1887–1906 is as follows:—

Month.	*Rain $\frac{1}{10}$ inches.*
April	6
May	8
June	24
July	87
August	105
September	33
October	2

Let us suppose each of the frequencies collected at the median line of the month in which it occurs, and let us find the moments referred to the median line of July. Properly the unequal lengths of the months should be allowed for, but the error introduced is small.

The moments are $\nu'_1 = \cdot 449$, $\nu'_2 = 1\cdot 377$, $\nu'_3 = \cdot 653$, $\nu'_4 = 5\cdot 408$, and using Shephard's corrections $\mu'_1 = \cdot 449$, $\mu'_2 = 1\cdot 294$, $\mu'_3 = \cdot 541$, $\mu'_4 = 4\cdot 749$. Thus the mean is at a point $\cdot 449$ beyond the median point of July, a month being the base unit.

And the moments about the mean are :—

$$\mu_1 = 0$$
$$\mu_2 = 1{\cdot}092$$
$$\mu_3 = -1{\cdot}020$$
$$\mu_4 = 5{\cdot}220.$$

The Gaussian curve $y = \dfrac{N}{\sqrt{2\pi}\sigma} e^{-\frac{x^2}{2\sigma^2}}$ becomes $y = 101{\cdot}17\, e^{-{\cdot}458x^2}$

with a standard deviation $\sigma = 1{\cdot}045$.

The diagram shows this curve and the original data.

The mean and modal rainfall would have to occur together on July 30th, if this curve is to be an adequate representation.

One-fourth of the total rainfall will have fallen on an average by the 9th of July, and three-fourths by the 18th August; the former of these dates being roughly about the time of the so-called breaking of the south-west monsoon.

However, the diagram itself shows that a skew curve would probably be better suited to represent the facts.

2nd. The Gaussian curve will not fit the data of any frequency group within the limits of the errors of random sampling unless $\beta_2 - 3$ is sensibly zero, where $\beta_2 = \dfrac{\mu_4}{\mu_2{}^2}$.

In the case of the rainfall data of example 1st, we have $\beta_2 - 3 = 1{\cdot}38$ which is many times greater than its probable error ${\cdot}67449 \sqrt{\dfrac{24}{265}}$.

Let us fit, therefore, a curve of the type $y = y_0\left(1+\dfrac{x}{a}\right)^p e^{-\frac{p}{a}x}$, to the data, where

$$a = \frac{4\dfrac{\mu_2{}^3}{\mu_3{}^2} - 1}{2\dfrac{\mu_2}{\mu_3}}$$

$$p = 4\frac{\mu_2{}^3}{\mu_3{}^2} - 1$$

We find $p = 4{\cdot}006$, $a = -1{\cdot}871$, and the curve is

$$y = 110{\cdot}8\left(1 - \frac{x}{1{\cdot}871}\right)^{4{\cdot}006} e^{2{\cdot}141\,x}$$

where the distance between mean and mode is ${\cdot}467$, and the range ends at $2{\cdot}338$ from the mean, and $2{\cdot}787$ from the median line of July.

The time of mean rainfall is as before at the 30th July, but the modal or maximum rate of rainfall occurs about a fortnight later on the 13th August, the rate being then 11″·08 per mensem.

The effective ending of rainfall due to the south-west monsoon is about October 8th. The diagram below shows that a much better fit has been obtained.

3rd. The distribution of rainfall in Zafarwal (November—April). The rainfall in inches is (average of 1887-8—1906-7)—

November,	December,	January,	February,	March,	April.
·03	·68	2·69	1·85	1·62	·57

Multiplying by 1,000 and dividing by the number of days in the month (for February average number of days = 28·2) the following frequencies are obtained approximately—1, 22, 87, 66, 52, 19.

The moments about the mean are:—

$$\mu_1 = 0$$
$$\mu_2 = 1·132$$
$$\mu_3 = ·364$$
$$\mu_4 = 3·183.$$
$$\beta_2 = 2·19.$$

Thus $3 - \beta_2 = ·81$, which is 3 or 4 times its probable error.

Fitting the curve $y = y_0\left(1 + \frac{x}{a}\right)^p e^{-\frac{p}{a}x}$ we get

$$y = 91·4\left(1 + \frac{x}{7·04}\right)^{42·79} e^{-6·08x}$$

The mode is on the 2nd of February, and the mean on the 7th of February, thus the skewness is of opposite sign to that for the months April—October.

The curve is shown in diagram 19.

The modal rainfall for the summer rains precedes the modal rainfall for the winter by 173 days, but the points of mean rainfall are 192 days apart.

The sum of these two periods is 365, though, of course, the result being exactly a tropical year is somewhat fortuitous.

It is interesting to exhibit the two curves last obtained on the same scale, as they clearly show the distribution of rainfall throughout the year.

The two curves have their two steeper slopes facing each other.

Lastly I have taken the actual daily rainfall data for the 20 years 1887-8—1906-7, and found the mean rate of rainfall at intervals of 10 days, this rate being the mean of 20 days, so that in the frequency polygon shown in the diagram, the vertices of the polygon represent the mean rainfall for 10 days on either side of the vertex in question.

This, of course, will produce a flatter curve system than would otherwise be the case.

The curves obtained from the monthly data are superposed.

4th. Taking the average for the 20 years 1887-8—1996-7, and taking 20 day periods we have the following data :—

	Rain in $\frac{1}{10}$ths inches.
20th May—8th June	6
9th June—28th June	24
29th June—18th July	64
19th July—7th August	88
8th August—27th August	99
28th August—16th September	47
17th September—6th October	13
7th October—26th October	1

These give the average 'monthly' rates, that is, the amount of rain which would fall in one month, if the given rate for the 20 days were maintained throughout the month.

This scheme has been adopted because the monthly rainfall is the most frequently tabulated datum, and comparison becomes easy.

In order to fit the above with a skew curve of type $y = y_0 \left(1 + \frac{x}{a}\right)^p e^{-\frac{p}{a}x}$ we find the moments about the mean to be

$$\mu_0 = 0$$
$$\mu_2 = 1{\cdot}675$$
$$\mu_3 = -{\cdot}274$$
$$\mu_4 = 7{\cdot}504$$

We have $\beta_2 = 1{\cdot}6$, $\beta_2 - 3 = 1{\cdot}4$ with a probable error of ·18, so that the skewness is significant, and Gaussian curve will not sufficiently represent the data.

The equation of the curve is

$$y = 105{\cdot}66\left(1 - \frac{x}{20{\cdot}40}\right)^{249{\cdot}4} e^{12{\cdot}23x}.$$

The distance between mean and mode = ·392.

This gives a modal value for the 5th August.

The points of inflexion of this type of frequency curve are given by $x = \pm\frac{a}{\sqrt{p}}$, so that in this case the points of inflexion are 26 days on either side of the mode, that is, at the 11th July and the 1st September respectively.

If we remember that the south-west monsoon begins and ends with a certain abruptness, these dates will roughly determine the typical duration of the monsoon, though, of course, the limits may often be exceeded.

Figure 22 shows the curve in question.

PART III.

CORRELATIONS OF THE SEASONAL RAINFALLS.

§ 10. From the work done in Part I of the paper, it was easy to deduce the correlations of the total rainfall in April to September with the total for October to March. For the 20 years discussed the results were:—

Sialkot	·6061 ± ·095
Zafarwal	·4943 ± ·114
Raya	·4468 ± ·121
Pasrur	·3919 ± ·128

These correlations are from 3 to 6 times greater than their probable errors, and it was clearly a matter of high interest and importance to discover whether these correlations were really due to a definite relationship between the seasonal rainfalls or to the fact that the years dealt with constituted a special group. As a matter of fact it was found that, at any rate for the part of the Punjab dealt with, the 20 years 1887-8—1906-7 form a very special group, and can by no means be taken to represent the result of a random sampling from among all years.

For the purpose the data for 8 stations in the North-West of India were obtained from the Meteorological Department.[1]

The results which are given below very soon showed how completely the years 1887-8—1906-7 failed to be representative of the secular rainfall.

	$\bar{R}_\kappa$	σ_R	v_R	$\bar{R}_\rho$	σ_R	v_R	N	r
Peshawar ..	6·76	4·18	61·79	6·28	3·50	55·66	45	·0496
Shahpur ..	10·65	4·45	41·81	3·40	2·52	73·91	53	—·1514 ± ·093
Kohat ..	11·49	4·68	40·75	6·36	4·00	62·87	45	—·076
Lahore ..	15·63	6·35	40·64	3·76	2·23	59·16	45	·1895 ± ·097
Beawar ..	18·26	7·14	39·12	1·09	1·07	97·87	51	·0610
Ajmere ..	19·54	6·75	34·57	1·66	1·26	76·09	44	—·1665 ± ·099
Nagpur ..	41·23	10·11	24·52	4·00	2·78	69·62	53	·1874 ± ·09
Jubbulpore ..	49·36	13·59	27·54	3·93	3·37	85·87	62	·1240 ± ·084

[1] I am indebted to the courtesy of Mr. J. H. Field, Imperial Meteorologist, for the selection of the specially long series.

The notation is the same as that previously adopted, R_κ being the total mean-rainfall of April to September, both inclusive; and $\overline{R}_\rho$ of October to March, both inclusive; and r denotes the correlation of R_κ with the *following* R_ρ.

N denotes the number of years to which the data extend.

Of the 8 coefficients of correlation, 5 are positive, and 3 negative, and not one of them is but just over twice its probable error. It is doubtful if any one of them is gnificant.

If the diagrams given below, which show the product moment for each year, be examined, it becomes clear that for a few years a positive correlation is possible, but that on the whole the positive and negative moments alternate in such a way that no correlation results.

Thus the Lahore data exhibit a very striking alternation. From 1862 to 1876 the correlation is on the whole positive, for 1877 to 1889 it is markedly negative, and from 1890 to 1906 it is again positive.

Thus the reason for the high correlations given above for four stations in the Sialkot district is that the years for which the calculation was based included the last of the periods mentioned, and not the previous one. The inclusion of the first of the periods in the Lahore data has had the effect of making the correlation positive; but it would certainly seem that previous to 1860 a period of negative correlation had probably existed, the inclusion of which would cause all positive correlation to disappear. At any rate the results for the whole period 1862—1906 are suggestive of some such conclusion.

It is clear, therefore, that no linear equation of regression will suffice to predict the value of the rainfall in October to March from the given April to September rainfall preceding. Direct attack of this problem by this method does not apparently promise much success.

If, however, we take the system of points which give the value of the product moment, and plotting these as ordinates to the corresponding years as abscissæ, join the points for successive years, as has been done in the diagrams below, in certain cases there seems to be an alternation of the sign and magnitude of the product moment which is roughly simple harmonic.

This is a very wide field of speculation, and my investigations are not sufficiently extended either in time or space to enable the existence of periodic alternations to be definitely asserted.

In the case of three of the places taken—Pesháwár, Nagpore, and Jubbulpore—the alternations are such that no simple harmonic curves can be fitted to them by inspection. In the remaining five cases a sine curve, or, as in the case of Lahore, a double sine curve has been fitted to the data.

As neither the method of moments or of least squares has been adopted for the fitting, it is not possible to assert that the curves given will best represent the given points. To do this and to apply the proper tests for goodness of fit are problems which must be made the subjects for future enquiry.

The following are the constants for the sine curves chosen:—

The amplitude is measured in inches-squared, and the epoch represents the date at which the amplitude is a maximum. The period is the time of a half oscillation, that is from a maximum to a minimum.

	Amplitude.	*Period.*	*Epoch.*
Shahpur	5	19 years	1890 A.D.
Kohat (curve I)	10	19 ,,	1890 ,,
,, (curve II)	10	19 ,,	1895 ,,
Lahore (curve I)	10	13·5 ,,	1900 ,,
,, (curve II)	10	9 ,,	1893 ,,
Ajmere	10	19 ,,	1895 ,,
Beawar	2·5	19 ,,	1890 ,,

All these appear to be at any rate partial representations of the change in the value of the product moment.

In the case of Lahore a combination of the above two curves gives a better fit than either of them alone.

If y denote the product of the two deviations from the mean rainfall, the following are the equations which gives its value as a rough approximation for the places named.

Shahpur $$y = 5 \sin \left\{ \frac{\pi(t-1890)}{19} + \frac{\pi}{2} \right\}$$

Kohat $$y = 10 \sin \left\{ \frac{\pi(t-1890)}{19} + \frac{\pi}{2} \right\}$$

Lahore $$y = 10 \sin \left\{ \frac{2\pi(t-1900)}{27} + \frac{\pi}{2} \right\} + 10 \sin \left\{ \frac{\pi(t-1893)}{9} + \frac{\pi}{2} \right\}$$

Ajmere $$y = 10 \sin \left\{ \frac{\pi(t-1895)}{19} + \frac{\pi}{2} \right\}$$

Beawar $$y = 2{\cdot}5 \sin \left\{ \frac{\pi(t-1890)}{19} + \frac{\pi}{2} \right\}.$$

To predict the value of the rainfall of October to March from the known rainfall in the preceding six months, we determine the value of y from the above, and have

$$(R_\kappa - \overline{R}_\kappa)\ (R_\rho - \overline{R}_\rho) = y$$

whence

$$R_\rho = \overline{R}_\rho + \frac{y}{R_\kappa - \overline{R}_\kappa}$$

It is not contended that this will determine accurate values of the probable rainfall, but it would seem not impossible that it will give first approximations.[1]

The diagrams will now be understood without further comment.

Here this paper must be brought to a close.

It is hoped that the conclusions reached will not be applied without appreciation of the limitations to which they are subject.

In the future it is trusted that some of these limitations will be removed.

In conclusion, I wish to express my thanks to Miss G. M. McLaren for her kind help in Part III of this paper.

---

[1] The root-mean-square of the differences of the value of the product from the chosen harmonic curves is as follows, the units being inches-squared.

	R. M. S.	*S. D. of points about mean straight line.*
Kohat (curve 1)	12·9	14·6
Lahore ..	10·5	11·4
Ajmere ..	8·8	9·0
Beawar (curve 2)	5·8	6·6

The improvement in the fit is small, but definite. It is hoped that harmonic analysis may be usefully employed in getting better results.

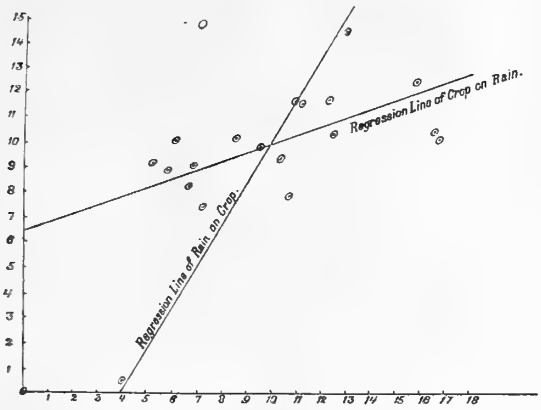


FIG. I.

Hor. Scale I divn. = 2″.
Ver. Scale I divn. = 300 acres.

Diagram showing the distribution of rain and crop for 30 villages in Tahsil Raya (Kharif harvest).

Eqns. of the regression lines are:—

(i) of crop on rain: $y = 1{\cdot}355x + 6{\cdot}381$.
(ii) of rain on crop: $y = 1{\cdot}672x - 6{\cdot}594$.

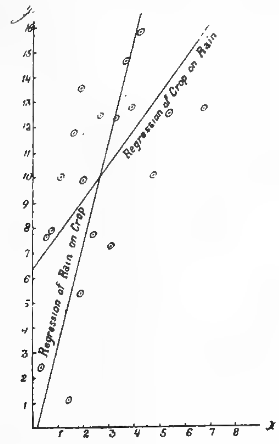


FIG. 2.

Hor. Scale I divn. = 2″.
Ver. Scale I divn. = 500 acres.

Diagram showing the distribution of rain and crop for 30 villages in Tahsil Raya (Rabi harvest), with the regression lines.

Eqns. of the regression lines are:—

(i) of crop on rain: $y = 1{\cdot}356x + 6{\cdot}328$.
(ii) of rain on crop: 699

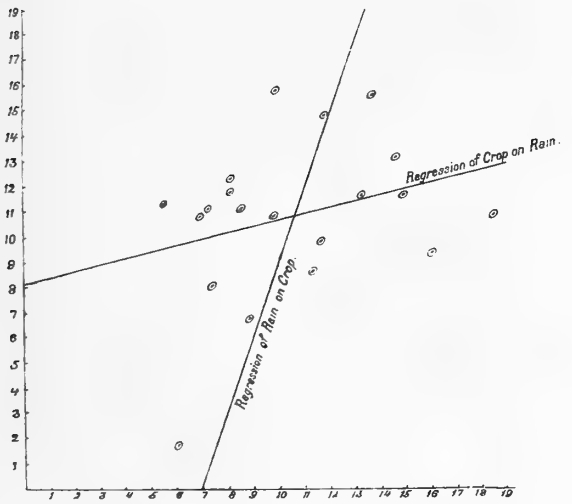


FIG. 3.

Hor. Scale I divn. = 2″.
Ver. Scale I divn. = 400 acres.

Distribution of rain and crop for 30 villages in Pasrur (Kharif harvest).

Eqns. of the regression lines are:—

(i) of crop on rain: $y = {\cdot}255x + 8{\cdot}053$.
(ii) of rain on crop: $y = 2{\cdot}894x - 19{\cdot}85$.

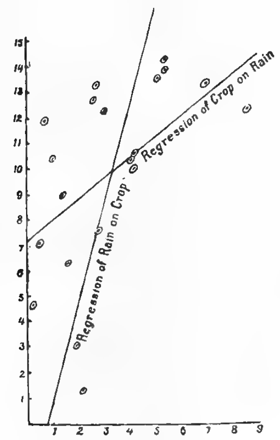


FIG. 4.

Hor. Scale I divn. = 2″.
Ver. Scale I divn. = 700 acres.

Distribution of rain and crop for 30 villages in Tahsil Pasrur (Rabi harvest).

Eqns. of the regression lines are:—

(i) of crop on rain: $y = {\cdot}791x + 7{\cdot}143$.
(ii) of rain on crop: $y = 3{\cdot}717x - 2{\cdot}967$.

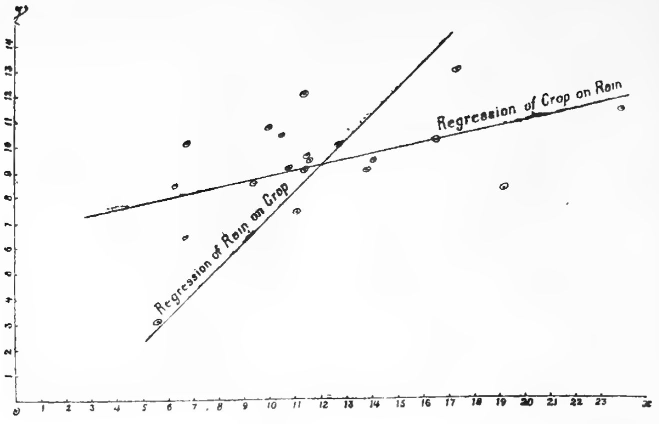


FIG. 5.

Hor. Scale 1 divn. = 2″.
Ver. Scale 1 divn. = 500 acres.

Diagram showing distribution of rain and crop of 30 villages in Tahsil Sialkot for the years 1887—1906 (Kharif harvest), with the regression lines.

Eqns. of the regression lines are:—

(*i*) For crop on rain: $y = \cdot 2141x + 6\cdot 583$.
(*ii*) For rain on crop: $y = \cdot 9949x - 2\cdot 787$.

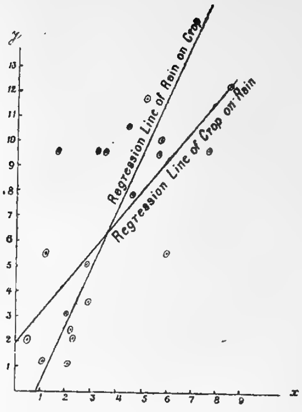


FIG. 6.

Hor. Scale 1 divn. = 2″.
Ver. Scale 1 divn. = 500 acres.

The distribution of rain and crop for 30 villages in Tahsil Sialkot (Rabi harvest).

Eqns. of the regression lines are:—

(*i*) for crop on rain: $y = 1\cdot 230x + 1\cdot 929$.
(*ii*) for rain on crop: $y = 2\cdot 285x - 1\cdot 924$.

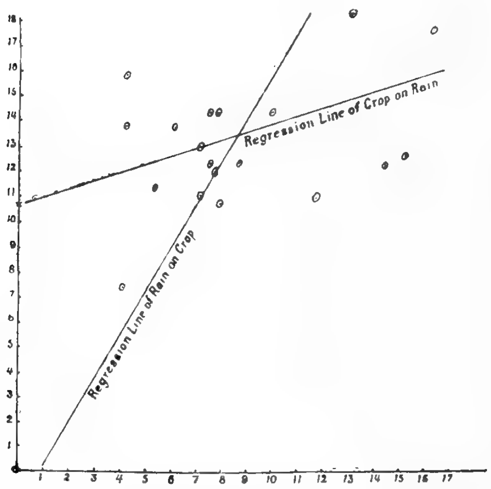


FIG. 7.

Hor. Scale 1 divn. = 3″.
Ver. Scale 1 divn. = 300 acres.

Distribution of rain and crop for 30 villages in Tahsil Zafarwal (Kharif harvest), with the regression lines.

Eqns. of the regression lines are:—

(*i*) of crop on rain: $y = \cdot 337x + 10\cdot 530$.
(*ii*) of rain on crop: $y = 1\cdot 740x - 1\cdot 538$.

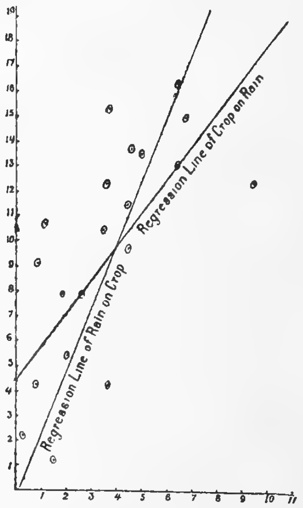


FIG. 8.

Hor. Scale 1 divn. = 2″.
Ver. Scale 1 divn = 500 acres.

Distribution of rain and crop for 30 villages in Tahsil Zafarwal (Rabi harvest), with the regression lines.

Eqns. of the regression lines are:—

(*i*) of crop on rain: $y = 1\cdot 356x + 4\cdot 481$.
(*ii*) of rain on crop: $y = 2\cdot 610x - \cdot 366$.

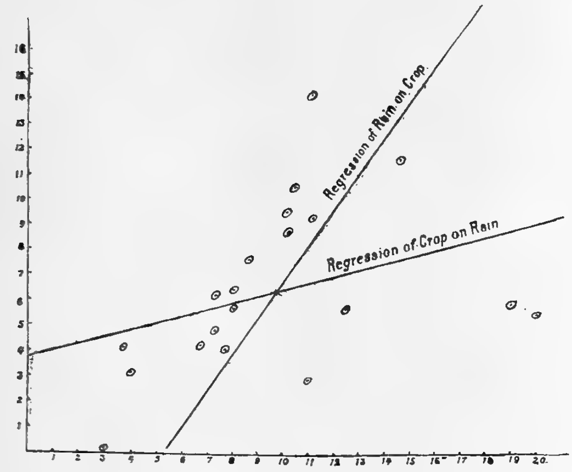


FIG 9.

Hor. Scale 1 divn.=6″.

Ver. Scale 1 divn. = 9000 acres.

Distribution of rain and crop for total harvest (Kharif) for Daska Tahsil, with rainfall April to September.

Eqns. of the regression lines: —

(*i*) crop on rain: $y = \cdot 2757x + 3 \cdot 813$.

(*ii*) Rain on crop: $y = 1 \cdot 489x - 7 \cdot 914$.

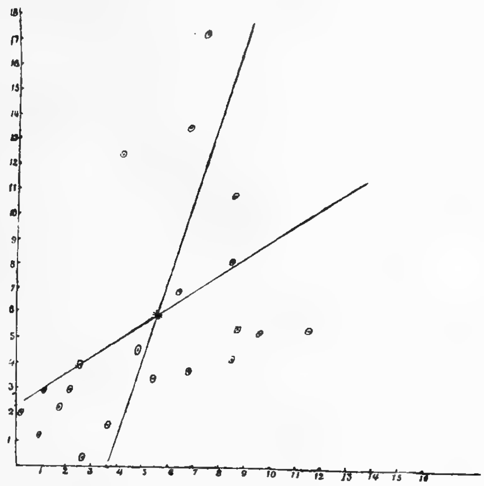


FIG. 10.

Hor. Scale 1 divn. = 1″

Ver. Scale 1 divn. = 3000 acres.

Distribution of rain and crop for the total Rabi harvest of Tahsil Daska unirrigated areas, with rainfall October to March.

Eqns. of regression lines are:—

(*i*) of crop on rain: $y = \cdot 616x + 2 \cdot 434$.

(*ii*) of rain on crop: $y = 3 \cdot 102x - 11 \cdot 375$.

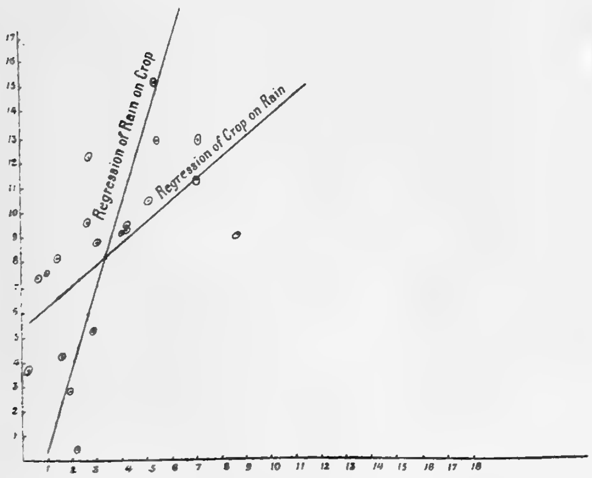


FIG. 11.

Hor. Scale 1 divn. = 2″.

Ver. Scale 1 divn. 5000 acres.

Distribution of rain and crop total for Rabi harvest unirrigated area of Tahsil Pasrur, with rainfall October to March.

Eqns. of the regression lines are :—

(*i*) Crop on rain: $y = \cdot 8569x + 5 \cdot 262$.

(*ii*) Rain on crop: $y = 3 \cdot 195x - 2 \cdot 804$.

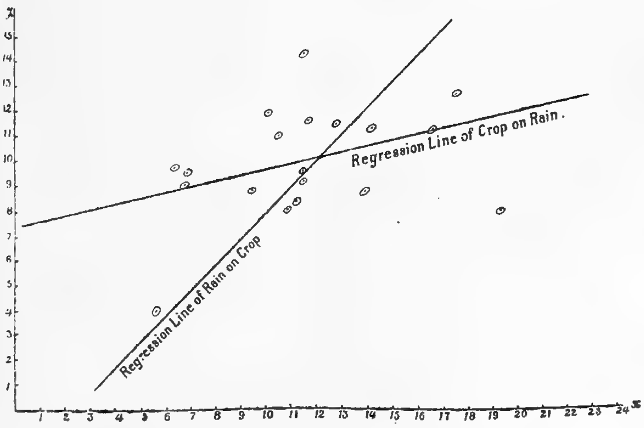


FIG 12.

Hor. Scale 1 divn. = 2″.

Ver. Scale 1 divn. = 5000 acres.

Diagram showing the distribution of rain and cropped area in the whole of Tahsil Sialkot from 1887—1906 for unirrigated lands.

Eqns. of the regression lines are:—

(*i*) of crop on rain: $y = \cdot 2303x + 7 \cdot 320$.

(*ii*) of rain on crop: $y = 1 \cdot 0457x - 2 \cdot 467$.

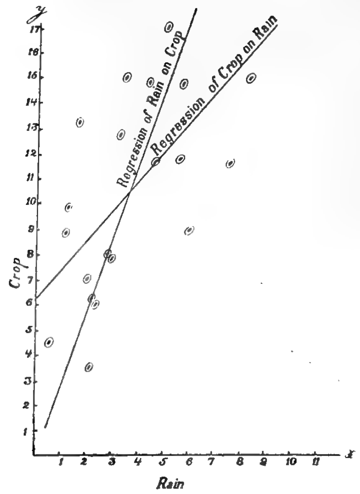


FIG. 13.

Hor. Scale 1 divn. = 2″.

Ver. Scale 1 divn. = 5000 acres.

Diagram showing the distribution of the total unirrigated mature and crop (Rabi harvest) and rainfall from 1887-8 to 1906-7, with the regression lines for Sialkot Tahsil.

Eqns. of the regression lines are:—

(*i*) of crop on rain: $y = 1{\cdot}161x + 6{\cdot}200$.

(*ii*) of rain on crop: $y = 2{\cdot}918x - 0{\cdot}217$.

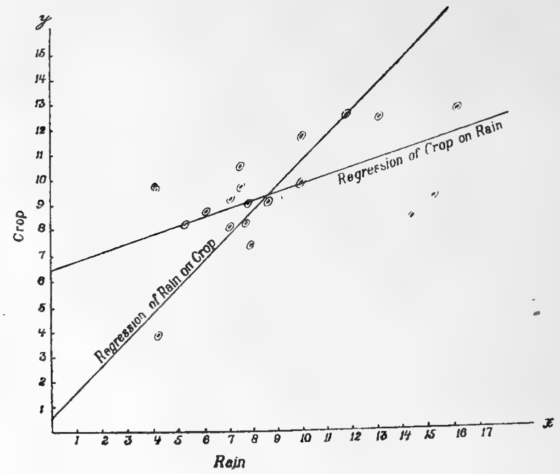


FIG. 14.

Hor. Scale 1 divn. = 3″.

Ver. Scale 1 divn. = 5000 acres.

Diagram showing the distribution of rain and crop for the whole of Tahsil Zafarwal (Kharif harvests, 1887—1906), with the regression lines.

Eqns. of the regression lines are:—

(*i*) crop on rain: $y = {\cdot}3289x + 6{\cdot}381$.

(*ii*) rain on crop: $y = 1{\cdot}228x - 0{\cdot}476$.

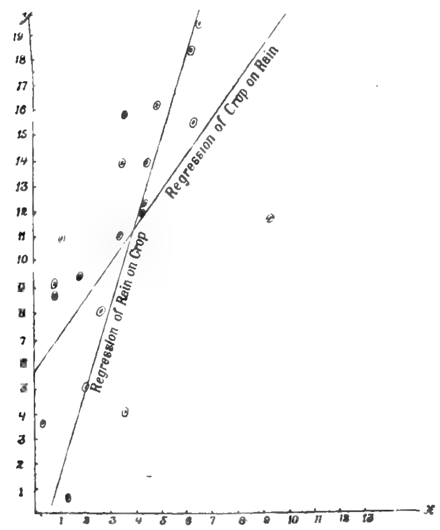


FIG. 15.

Hor. Scale 1 divn. = 2″.

Ver. Scale 1 divn. = 5000.

Diagram showing the distribution of rain and crop for the whole of Zafarwal Tahsil unirrigated areas in Rabi harvest from 1887-8 to 1906-7, with the regression lines.

Eqns. of the regression lines are:—

(*i*) crop on rain: $y = 1{\cdot}4326x + 5{\cdot}529$.

(*ii*) rain on crop: $y = 3{\cdot}357x - 1{\cdot}909$.

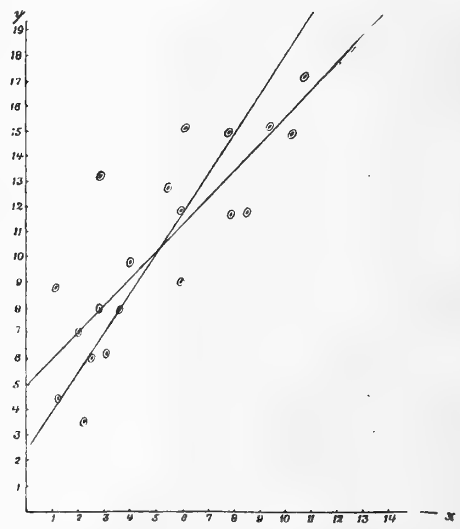


FIG. 16.

Hor. Scale 1 divn. = 2″.

Ver. Scale 1 divn. = 5000 acres.

Correlation of the matured area of crop in the whole of Sialkot Tahsil, Rabi harvest, with the total rainfall September to March for the year 1887-8 to 1906-7.

Eqns. of the regression lines are:—

(*i*) of crop on rain: $y = 1{\cdot}047x + 4{\cdot}944$.

(*ii*) of rain on crop: $y = 1{\cdot}527x + 2{\cdot}424$.

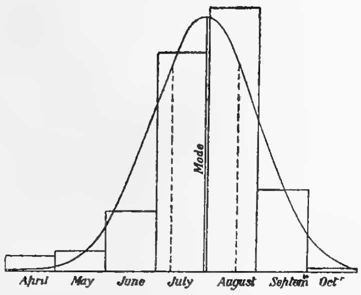


FIG. 17.

The fitting of a 'normal' (Gaussian) curve to the rainfall data of Zafarwal, District Sialkot, for the 20 years 1887—1906.

Ver. Scale 1 cm. = 3″.

Hor. Scale 2 cms. = 3 months.

Equation of curve—

$$y = 10\cdot 1{,}17 e^{-1145x^2}$$

where x and y are both measured in $\frac{1}{3}$rd cm. units.

The maximum (modal) rate of rainfall occurs at about July 30th.

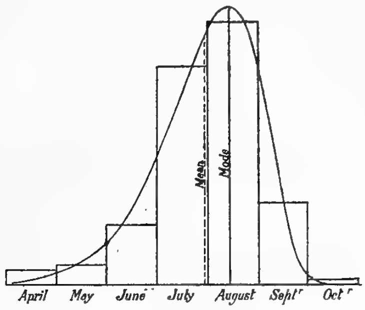


FIG. 18.

The Rainfall data of Zafarwal fitted with a skew curve—

$$y = 110\cdot 8\left(1 - \frac{x}{37\cdot 42}\right)^{4\cdot 006} e^{\cdot 10705x}$$

where x and y are both measured in $\frac{1}{3}$rd mms.

Ver. Scale 1 mm. = $\frac{3}{10}$″ h.m.

Hor. Scale 1 mm. = $\frac{3}{20}$th month.

Distance between mean and mode = 3·11 mms.

From mid point of July to end of range = 18·58 mms. = 2·787 mos.

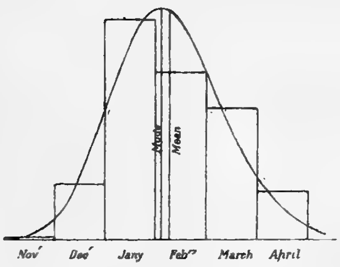


FIG. 19

Fitting of the Rainfall data of Zafarwal (Nov. to April) with a skew curve—

$$y = 9\cdot 14\left(1 + \frac{x}{14\cdot 08}\right)^{42\cdot 79} e^{-3\cdot 04x}$$

where x and y are both measured in $\frac{1}{3}$ cm.

Hor. Scale 1 cm. = 45·3 days.

Ver. Scale 1 cm. = $\frac{3}{100}$″ per diem.

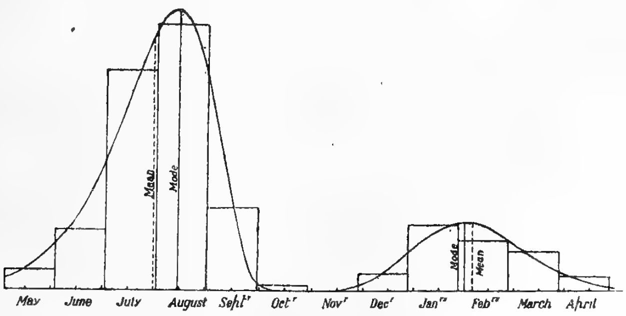


FIG. 20.

The two curves (Summer and Winter rains) on the same scale.

Equations of curves—

$$(i)\quad y = 11\cdot 0\left(1 - \frac{x}{3\cdot 742}\right)^{4\cdot 006} e^{+1\cdot 0705x}$$

$$(ii)\quad y = 2\cdot 742\left(1 + \frac{x}{14\cdot 08}\right)^{42\cdot 79} e^{-3\cdot 04x}$$

where x and y are measured in $\frac{1}{3}$ cms.

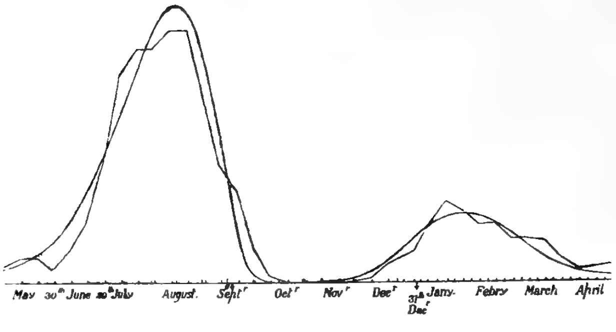


FIG. 21.

The curves obtained from the total monthly rainfall fitted to the polygon whose vertices represent the average rainfall for 10 days on either side of the vertex in question.

Ver. Scale 1 cm = 3″ per month.
Hor. Scale ·6575 cm. = 30 days.

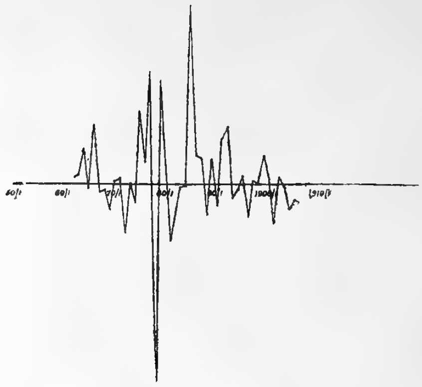


FIG. 22.

Product moment for Peshawar—

$r = {\cdot}049$.

Scale 1 mm. $= \frac{50}{100}{}''^2$

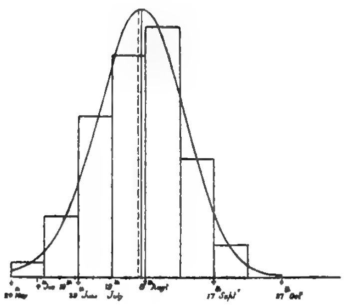


FIG. 23.

Rainfall in Sialkot (1887-8 to 1906-7) 20-day means for 20th May—27th Oct. fitted with a skew frequency curve—

$$y = 10{\cdot}57\left(1 - \frac{x}{27{\cdot}2}\right)^{249{\cdot}4} e^{9{\cdot}17x}$$

where x and y are measured in $\frac{1}{3}$ cms.

Hor. Scale 1cm. = 45 days.
Ver. Scale 1cm. = 3″ in 30 days.

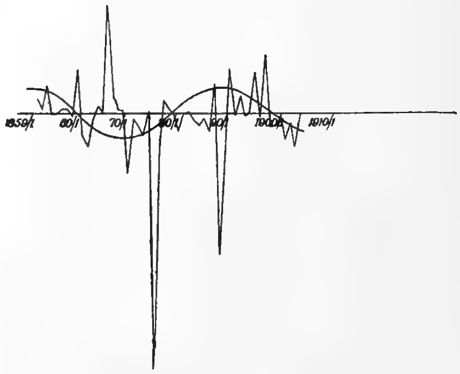


FIG. 24.

Product moment for Shahpur—

${\cdot}151 - {\cdot}093$.

Scale 1 mm. $= \frac{150}{100}{}''^2$

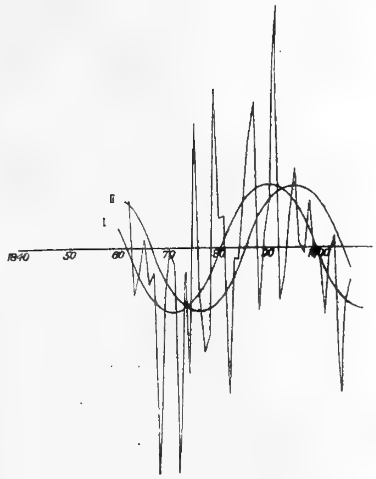


FIG. 25.

Product moments for Kohat (Kharif and succeeding Rabi)—

Ver. Scale 1 mm. $= \frac{120}{100}''^2$

$r = -\cdot 076$.

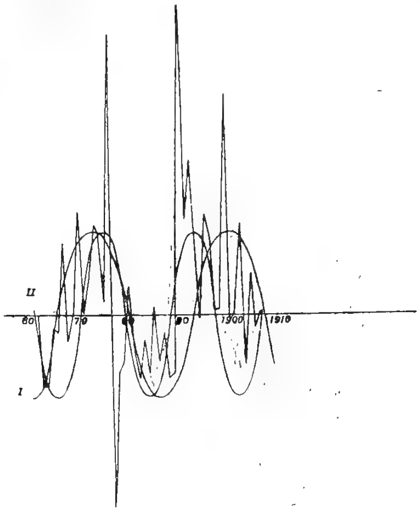


FIG. 26.

Product moment for Lahore—

$r = \cdot 189 \pm \cdot 097$.

Scale 1 mm $= \frac{90}{100}''^2$

With the curves—

$$y = 3 \sin \left\{ \frac{\pi(t - 1893)}{9} + \frac{\pi}{2} \right\}$$

$$y = 3 \sin \left\{ \frac{2\pi(y - 1900)}{27} + \frac{\pi}{2} \right\}$$

where t is the year A.D.

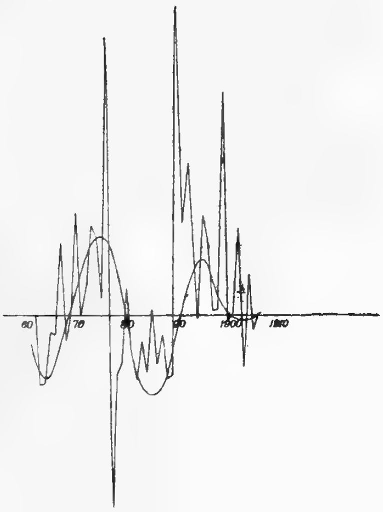


FIG. 27.

Product moment for Lahore—

$r = \cdot 189 \pm \cdot 097$.

Ver. Scale 1 mm $= \frac{90}{100}''^2$

The equation of the curve fitted is—

$$= \tfrac{3}{2} \left[\sin \left\{ \frac{\pi(t - 1893)}{9} + \frac{\pi}{2} \right\} + \sin \left\{ \frac{2\pi}{27}(t - 1900) + \frac{\pi}{2} \right\} \right]$$

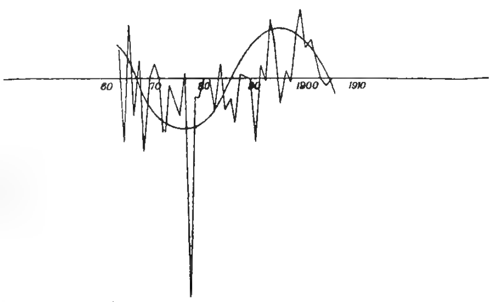


FIG. 28.

Product moment for Ajmere—

$r = \cdot -167 \pm \cdot 099$.

Scale 1 mm. $= \frac{150}{100}''^2$

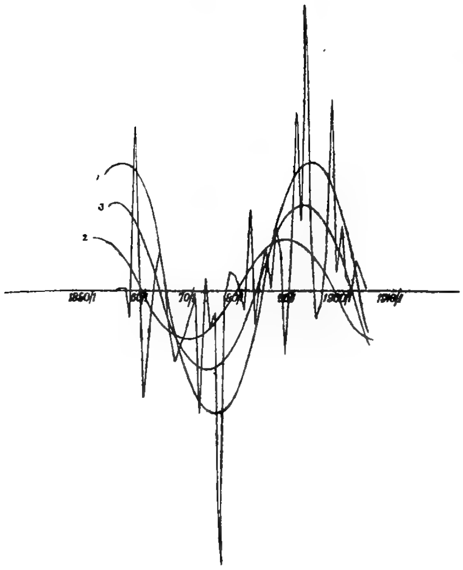


FIG. 29.

Product moment for Beawar—

Ver. Scale I mm. = $\frac{60}{100}$ (inches)^2

$r = \cdot 061$.

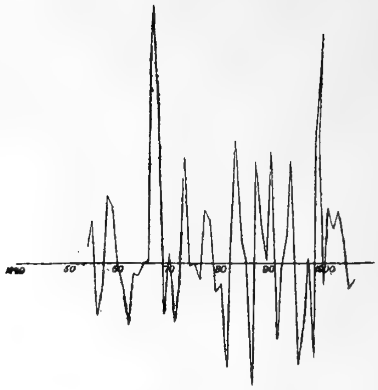


FIG. 30.

Product moments for Nagpur (Kharif and succeeding Rabi)—

Ver. Scale I mm. = (3 inch)^2

$r = \cdot 187 \pm \cdot 09$.

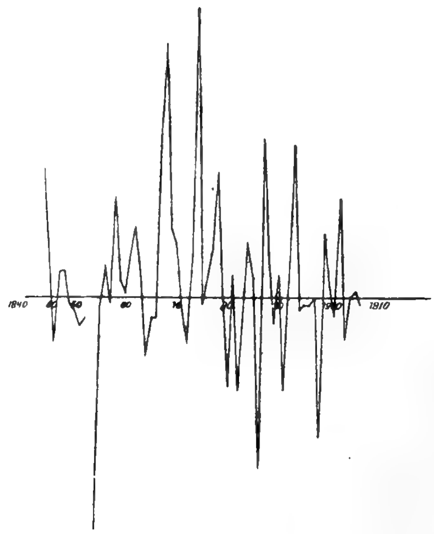


FIG. 31.

Product moment for Jubbulpore—

Scale I mm. = $3''^2$

$r = \cdot 124 \pm \cdot 084$.

PESHAWAR.

Rainfall. *Elevation* 1,110 *feet.*

	Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
		″	″	″	″	″	″	″	″	″	″	″	″	
	1853	0	1·88	3·63	0·88	0·13	0·06	4·50	3·00	0·63	0·88	0·38	0	9·20
10·66	1854	5·06	3·76	0·58	0·77	0·73	0·42	3·63	0·64	0·60	0	0·10	0	6·79
4·03	1855	0·60	0·80	2·53	1·67	0	0·45	3·60	0·46	0·83	0·20	0	0·02	7·01
1·83	1856	0	0·91	0·70	0·87	?	?	?	?	?	?	?	?	·87
	1857 to 1861					Not	on	record						
	1862	?	?	?	1·60	0	0·50	1·30	0·90	0	0	1·60	0	4·30
5·30	1863	2·50	0	1·20	0·30	0	0·10	2·10	3·00	0	0	0	1·30	5·50
3·20	1864	1·10	0	0·80	7·00	1·90	0·50	0	0·50	0·30	0	0	0·40	10·20
8·10	1865	1·70	2·90	3·10	1·90	0	0	0·70	2·10	1·10	0	0·50	3·20	5·80
9·60	1866	0·80	1·30	3·80	0·50	0·70	0	0	1·30	1·20	0	0	0	3·70
·90	1867	0	0·50	0·40	2·70	0·80	0	0	3·10	0	0	0	0·40	6·60
3·20	1868	0·30	0·20	2·30	3·60	0·40	0	0·50	0	1·00	0	0	3·40	5·50
8·30	1869	1·70	0·90	2·30	0·20	0	0·70	0	0·90	7·00	1·60	0	0	8·80
4·00	1870	1·10	0·20	1·10	0·20	0	0	0	3·60	0·80	0	0	0·40	4·60
5·90	1871	0·10	5·00	0·40	1·40	0	0·70	3·10	0	0	0	0	0·60	5·20
4·90	1872	1·50	0·70	2·10	2·20	1·70	0·10	2·70	5·10	0·40	0	0	0	12·20
4·30	1873	1·50	1·00	1·80	0·40	2·30	0·10	1·80	0·90	0·20	0	0	0	5·70
6·20	1874	4·80	0	1·40	0·60	0	0	2·40	5·40	0·50	0	0	0	8·90
4·70	1875	0	3·30	1·40	0	0·80	0	4·90	4·60	0·40	1·00	1·50	0·70	10·70
9·00	1876	2·20	0·80	2·80	1·20	0	0·50	2·10	2·80	0·30	1·00	1·60	0	6·90
9·76	1877	3·54	2·64	0·98	7·24	0·17	0·38	0	0	0·11	0·64	8·50	3·67	7·90
17·74	1878	1·99	2·77	0·17	3·86	3·76	0	2·07	11·34	0·13	0·23	0	0	21·16
3·42	1879	0	0·46	2·73	0·24	0·14	0·05	0·47	0·97	0·16	0	0·10	0·52	2·01
·99	1880	0	0·37	0	0·11	0·52	0·47	1·65	0	1·39	0	0	0·50	4·14
3·54	1881	0·35	0·49	2·20	4·89	0·03	3·85	0·12	2·18	0·97	0·76	0	0·06	12·04

PESHAWAR.—(Contd.)

Rainfall. *Elevation* 1,110 *feet.*

	Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	•
		″	″	″	″	″	″	″	″	″	″	″	″	
4·16	1882	1·46	0·14	1·74	2·16	0·11	0	3·30	0	2·40	0·14	0	0	7·97
3·75	1883	1·98	0·74	0·89	0·53	0·16	0·10	4·57	0·07	0·24	0.07	1·93	0·17	5·67
6·24	1884	3·28	0·95	1·84	0·88	0·56	0·15	1·11	1·20	1·78	0	0·11	0	5·68
7·51	1885	4·19	0·62	2·59	7·35	3·00	0·12	0·02	1·97	0	0·06	0·01	0·42	12·46
11·41	1886	4·01	1·16	5·75	1·33	1·55	0	1·50	0	0·20	0·09	0·22	0·48	4·58
1·96	1887	0·13	0·07	0·89	0·64	0·05	0	0·80	1·08	1·25	0·05	0	0·15	3·82
3·67	1888	0·66	1·31	1·50	0·33	0·11	0·20	0·86	1·42	0	0	2·14	0·17	2·92
8·10	1889	1·98	2·66	1·15	1·93	0·32	0	0·30	2·33	0	0	0	0·02	4·88
1·70	1890	0·50	0·23	0·95	1·89	0·20	0	1·47	1·94	0·02	0·19	4·02	2·33	5·52
15·27	1891	4·41	2·69	1·63	2·59	0·32	0·14	0·20	0·67	0·08	0·20	0·37	0	4·00
2·04	1892	0·19	0·23	1·05	0·03	0·50	0·42	3·68	17·75	0·07	0·12	0·12	0·37	22·45
6·72	1893	3·17	0·71	2·23	0·79	0·69	0·06	6·89	0·31	1·23	0	0	0·94	9·97
5·30	1894	1·96	0·94	1·46	2·55	0·79	0	1·74	0·41	0	0·12	0·03	0·44	5·49
9·08	1895	0·08	0·88	7·53	2·02	0·03	0·40	0	1·84	0·33	0·07	0·16	0	4·62
4·90	1896	0·98	2·44	1·25	0·26	0·50	0	0·35	0·10	0	0	1·06	0	1·21
7·49	1897	3·23	1·14	2·06	2·72	1·44	0·47	0·54	4·76	0·41	0	0	1·25	10·34
6·25	1898	0·05	2·60	2·35	0·42	1·37	0·05	4·22	0·40	1·41	0	0	0·40	7·87
6·15	1899	0	3·07	2·68	1·24	0·20	0·17	0·88	0·95	0	0·06	0	0·05	3·44
3·95	1900	1·57	1·37	0·90	1·99	2·36	0·07	0·19	1·34	0·71	0·05	0·09	0·89	6·66
7·37	1901	1·69	1·53	3·12	0·84	5·16	0·40	0·14	0·10	1·21	0·29	0	0·04	7·85
1·19	1902	0	0·12	0·74	0·65	0·10	0·52	0·78	0·05	0·57	0·54	0·05	0	2·67
5·72	1903	1·41	0	3·72	1·04	2·10	0·13	0·45	1·00	1·13	0	0·08	1·03	5·85
11·71	1904	3·30	0·03	7·27	0·94	0·34	0	0·83	1·14	1·06	0·47	0·07	0·19	4·31
9·13	1905	1·60	1·91	4·89	0·67	1·84	0	0·12	0·15	1·52	0	0	2·54	4·30
8·12	1906	0	4·34	1·24	0·91	0·47	0·09	0·57	1·46	0·63	0·39	0	1·46	4·13
8·00	1907	1·57	2·75	1·83	3·62	0·22	0·36	1·33	1·13	0	0	0	0	6·66

SHAHPUR.

Rainfall. *Elevation 647 feet.*

	Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
		″	″	″	″	″	″	″	″	″	″	″		
	1854	?	1·40	0·50	0	1·30	1·70	2·20	1·90	1·10	0	0·60	0	8·20
2·10	1855	1·50	?	?	?	0·10	0·70	6·50	2·90	2·80	0·10	0	0	13·00
3·50	1856	0·10	0·20	3·10	0·80	0·30	1·00	4·40	12·60	1·40	0	0	0	20·50
3·60	1857	2·00	1·60	0	1·80	0·30	0·60	4·30	4·60	1·20	0·40	0	0	12·80
2·90	1858	1·60	0·80	0·10	0·10	0	0·70	6·30	0·50	0·50	0	0	0·30	8·10
3·00	1859	0·90	0·80	1·00	1·30	0·40	1·00	1·50	2·10	1·00	0	0·10	0·40	7·30
2·70	1860	0·60	1·00	0·60	0	1·00	1·30	1·50	3·70	0·80	0	0	0	8·30
2·70	1861	1·20	0	1·50	0	0·50	0·30	4·00	6·00	0	0	0	2·00	10·80
5·00	1862	1·00	0	2·00	1·00	0	2·90	6·30	5·10	5·00	0·90	0·40	0	20·30
3·90	1863	1·60	0·10	0·90	0	0	2·10	7·00	4·10	0	0	0·10	0·50	13·20
1·30	1864	0·20	0·50	0	2·20	1·80	0·80	1·60	2·30	1·20	0	0	1·00	9·90
9·00	1865	2·10	3·30	2·60	0·10	0·10	0	3·30	4·40	2·00	0	0·10	1·40	9·90
4·50	1866	1·40	1·30	0·30	0·30	0	0·10	4·60	1·90	1·00	0	0	0	7·90
2·50	1867	0·40	0·60	1·50	1·10	1·40	0·50	1·50	4·50	1·30	0	0	0·10	10·30
3·10	1868	0	2·40	0·60	0	0	0·90	1·30	1·10	0·60	0	0	0	3·90
0·00	1869	0	0	0	0	0	0	1·60	1·60	1·00	0·10	0	0·20	4·20
2·50	1870	0	0	2·20	0·50	0·50	1·50	1·10	3·30	0	0	0	1·40	6·40
2·80	1871	0	1·40	0	0	0	4·40	3·00	2·50	0	0	0	0·50	10·40
2·30	1872	0·40	0	1·40	1·20	2·50	4·00	7·70	5·40	2·30	0	0	0·20	23·10
2·00	1873	1·30	0·20	0·30	0	2·20	0·50	1·70	4·10	4·00	1·30	0	0·80	12·50
3·70	1874	1·20	0	0·40	0·70	0	1·50	5·20	3·40	2·20	0	0	0	13·00
1·80	1875	0	1·70	0·10	0	0·60	0·60	1·90	0·90	3·70	0	0·80	0·70	7·70
4·20	1876	0·20	0·90	1·60	1·20	0·90	1·80	3·10	3·90	0·20	1·40	0·80	0	11·10
6·40	1877	1·00	3·20	1·00	2·20	0·30	1·70	0·10	0·50	0	0	3·10	2·30	4·80
15·40	1878	0·40	9·30	0·30	0·90	3·50	0	3·70	4·60	6·60	0	0	0	19·30
2·10	1879	0	0	2·10	0	0	0·90	0·80	6·60	0·20	0	0	0	8·50
1·50	1880	0	1·50	0	0	0·30	0·50	2·50	3·20	1·90	0	0·20	0·60	8·40
2·60	1881	0	0	1·80	1·00	0·20	4·40	3·70	2·40	0	1·10	0	0	11·70
2·50	1882	1·40	0	0	0·90	0·50	0	1·050	1·60	9·00	0	0	0	22·50

SHAHPUR—(Contd.)

Rainfall. *Elevation 647 feet.*

	Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
		″	″	″	″	″	″	″	″	″	″	″		
2·70	1883	2·70	0	0	0	0·30	0	9·10	2·20	0	0	1·40	0	11·60
2·80	1884	0·20	0·50	0·70	1·20	0	0·80	3·00	0·70	3·80	0	0	0	9·50
2·80	1885	2·10	0·70	0	2·10	2·90	0	2·10	1·50	1·80	0	0	0	10·40
5·00	1886	1·20	0·50	3·30	0	1·00	0·10	7·90	0·60	2·10	0	0	0	11·70
·10	1887	0	0	0·10	0·30	0	0·80	1·10	0·60	1·10	0·10	0	0	3·90
3·10	1888	0·80	1·00	1·20	0	0·40	0·40	3·50	4·00	0	0·60	0·40	0	8·30
4·30	1889	1·30	1·70	0·30	0·20	0·40	0·70	1·00	4·60	0·60	0	0	0	7·50
1·03	1890	0·12	0·13	0·78	0·63	0·33	1·82	1·11	2·50	0	0·34	2·50	1·50	6·39
9·12	1891	2·31	1·10	1·37	0·75	0·18	0·28	2·58	2·18	0·15	0·06	0	0	6·12
·38	1892	0·13	0·18	0·01	0	0	1·59	9·41	5·47	0·38	0·19	0	0·94	16·85
4·48	1893	2·29	0·70	0·26	1·58	3·01	0·40	1·49	2·24	2·22	0	0	0·28	10·94
5·46	1894	1·11	0·70	3·37	1·80	0	0·80	9·12	0·52	1·47	0	0	0·26	13·71
4·28	1895	0·31	0·28	3·43	0·52	0·13	2·50	4·00	4·26	0·30	0	0·04	0	11·61
2·59	1896	0·30	0·72	1·53	0	0·09	2·52	3·53	3·93	0·35	0·16	0·03	0	10·42
2·47	1897	1·02	0·28	0·98	0·88	0·18	1·60	7·45	5·73	0·81	0·10	0	1·60	16·65
4·45	1898	0·65	2·10	0	0	2·15	2·00	5·95	0·15	1·25	0	0	0	11·50
·52	1899	0	0·37	0·15	0·31	0·25	2·31	0·96	0·62	0	0	0	0	4·45
1·25	1900	0·45	0·54	0·26	0·98	2·15	0·56	0·63	0·74	2·97	0·42	0	1·04	8·03
3·95	1901	1·47	0·30	0·72	0·98	4·13	0·92	2·59	1·74	1·52	0	0	0	11·88
·58	1902	0	0	0·58	0·36	1·37	1·50	1·53	5·57	1·04	0	0	0	11·37
1·69	1903	0·38	0	1·31	0·72	0·53	0·35	3·05	4·60	0·32	0	0	0·35	9·57
6·45	1904	2·05	0	4·05	0	0	0	2·22	3·99	0	0	0·74	0·12	6·21
3·44	1905	1·11	1·26	0·21	0	0·19	0·59	2·31	0·80	3·53	0	0	0·80	7·42
4·86	1906	0	3·10	0·96	0·17	0	1·05	1·74	7·60	0·29	0·11	0	0·08	10·85
3·02	1907	0	1·94	0·89	2·78	0·52	0·84	1·73	2·01	0	0	0	0	7·88

KOHAT.

Rainfall. *Elevation* 1,754 *feet.*

	Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
		″	″	″	″	″	″	″	″	″	″	″		
	1852	0·63	?	4·54	?	?	?	?	?	?	?	?		
	1853						Not	on	record					
	1854	5·94	?	?	?	?	?	13·70	4·90	0·40	0·60	0·10	0	19·00
3·93	1855	2·13	0	1·10	3·70	0·30	1·80	10·80	2·60	3·30	0·60	0	0	22·50
2·35	1856	0·20	1·05	0·50	1·00	0·70	0·10	2·10	?	?	?	?	?	3·90
	1857 to 1861						Not	on	record					
	1862	?	?	?	2·30	0·60	0·40	0·70	0·90	1·30	1·10	1·20	0	6·4
5·60	1863	2·30	0	0	0·10	0·20	4·10	5·80	2·70	0·30	0	0	0·60	13·20
1·10	1864	0·30	0·20	0	4·30	0·50	2·00	0	0·80	0·80	0	0	0·20	8·40
8·00	1865	0·80	3·50	3·50	2·50	0·40	0	3·10	2·30	2·80	0·90	0	2·30	11·10
5·70	1866	0·40	0·90	1·20	0·50	5·90	0·10	1·60	2·30	3·40	0	0	0	13·30
2·20	1867	0	1·40	0·80	3·00	0·90	0	0	1·90	0·10	0	0	0·70	5·90
7·70	1868	0·70	3·40	2·90	3·40	0·40	0·70	1·20	0·20	0·90	0·10	0	1·80	6·80
14·00	1869	0·80	1·00	1·30	1·80	0·20	0·10	3·00	3·50	6·00	1·10	0	0	14·60
4·00	1870	0·80	0	2·10	0·50	0	0·90	6·30	2·60	1·40	0	0	0	11·70
6·70	1871	0·10	5·90	0·70	0·60	1·60	4·00	3·30	2·50	0·90	0	0	0·60	12·90
4·00	1872	·220	1·20	0	2·10	3·50	0	10·40	3·10	0·50	0·80	0·20	0	21·60
3·20	1873	·050	0·60	1·10	0·10	2·00	0	2·20	2·70	2·00	0·30	0	0·60	9·06
6·20	1874	6·00	0·20	1·10	0·30	0	10·30	7·80	1·30	0·60	0	0	0	20·00
4·40	1875	0	3·00	1·40	0	3·40	0·20	3·90	4·70	9·10	1·30	1·20	0·40	21·30
9·20	1876	2·00	0·60	3·70	1·50	0·20	1·20	4·80	2·10	1·20	3·00	2·10	0·90	11·00
13·10	1877	1·80	3·30	2·00	0·50	2·60	3·40	0·70	1·00	0·80	1·90	13·00	4·10	9·00
22·60	1878	1·90	1·60	0·10	2·00	2·20	0·10	7·00	8·80	0·10	2·60	0	0	20·20
5·30	1879	0	0·40	2·30	0	0	0·80	2·40	2·80	1·50	0	0	0·60	7·50
1·10	1880	0	0·50	0	0	2·30	2·10	2·20	1·60	1·90	0	0	0·70	10·10
4·50	1881	0·20	0·50	3·10	3·90	0·80	1·60	1·80	2·00	0·60	0·80	0	0	10·70

KOHAT.—(Contd.)

Rainfall. *Elevation* 1,754 *feet.*

	Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
		"	"	"	"	"	"	"	"	"	"	"		
3·25	1882	1·30	0·05	1·10	2·20	1·20	1·10	10·20	1·50	1·60	0	0	0	17·80
2·90	1883	1·20	0·20	1·50	1·30	0·10	0·40	5·70	2·70	0	0·60	1·80	0	10·20
7·80	1884	1·90	1·30	2·20	0·40	0·40	1·30	3·32	2·59	2·16	0·78	0·33	0	10·17
7·88	1885	3·26	0·75	2·76	6·48	5·80	0·21	1·60	2·88	0·58	0	0·10	0·52	17·55
8·99	1886	2·77	1·64	3·86	1·80	2·62	0·54	1·09	1·77	1·10	0	0·24	0·25	8·92
1·65	1887	0·06	0	1·10	0·98	0·26	0·96	2·07	1·50	1·29	0·47	0	0	7·06
3·03	1888	0·72	1·14	0·70	0·82	0	0·18	0·56	2·08	0	0·27	2·00	0	3·64
8·06	1889	1·12	2·87	0·80	1·60	0·71	1·50	3·14	3·78	0·84	0	0	0	11·57
3·38	1890	0·78	0·29	2·31	2·22	1·65	0·94	0·78	5·01	0	0·21	2·60	1·53	10·60
15·51	1891	4·66	2·77	3·74	1·07	1·62	0·15	0·48	0·56	1·64	0·37	0	0	5·52
1·21	1892	0	0·12	0·72	0	0·78	0·18	3·75	14·99	0	0·81	0	0·10	19·70
5·94	1893	2·07	0·33	2·63	0·70	3·17	0·24	6·21	1·12	2·98	0·35	0	1·31	14·42
5·09	1894	0·92	0·95	1·56	2·61	0·32	2·95	9·11	1·68	1·32	0	0	0·19	17·99
7·82	1895	0	0·05	7·58	0·79	0	0·83	1·88	3·26	0·15	0	0·09	0	6·91
4·37	1896	1·16	1·83	1·29	0	0·34	1·43	2·48	2·01	1·90	0·37	0·86	0	8·61
6·73	1897	2·30	1·82	1·38	4·11	1·65	1·27	1·54	4·19	0·27	0·16	0	0·97	13·03
5·94	1898	0·10	3·15	1·56	0	2·04	0·43	2·28	2·85	1·27	0	0	0·61	8·87
4·50	1899	0	1·78	2·11	0·84	0·07	1·44	2·85	0·81	1·23	0	0·03	0	7·24
7·26	1900	2·77	1·51	2·95	1·93	1·48	0·57	2·55	4·10	1·07	0·01	0·04	0·98	11·70
7·00	1901	2·71	0·83	2·43	0·30	8·20	1·27	0·79	2·23	3·68	0·50	0	0	16·47
2·74	1902	0	0·10	2·14	1·38	0·72	0·46	2·39	2·57	1·63	1·25	0	0	9·15
7·40	1903	0·63	0	5·52	0·94	1·39	0·75	1·36	1·64	6·30	0	0	1·06	12·38
11·81	1904	2·63	0	8·12	0·14	1·31	0·32	0·83	3·11	0·86	1·93	0·84	0·16	6·57
11·36	1905	2·22	2·58	3·63	0·40	0·96	0·24	0·82	0·30	0·44	0·17	0	2·67	3·16
8·14	1906	0	3·55	1·75	1·46	1·41	1·00	2·51	1·59	1·08	0·58	0	2·63	9·05
8·95	1907	1·03	2·10	2·61	3·61	1·67	0·79	0·86	3·42	1·18	0	0	0	11·53

LAHORE.

Rainfall. *Elevation 702 feet.*

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	″	″	″	″	″	″	″	″	″	″	″	
1851	?	?	?	1·00	0·45	0·54	15·11	1·49	2·35	0	0·60	0·10
1852	0	1·78	6·49	2·50	1·14	8·80	3·13	5·51	0·57	0	0·34	0·05
1853	0·09	?	0·22	?	?	?	?	?	?	?	?	?
1854	0·34	2·53	0·33	0·20	0·21	2·98	14·05	9·35	0·79	2·15	0·50	0·04
1855	0·45	?	?	?	?	?	?	?	?	?	?	?
1856 to 1860						Not	on	record				
1861	?	?	?	?	2·10	3·50	9·10	6·50	0	0	0	1·30
1862	0·10	0	2·50	0	0·50	1·30	9·40	3·50	0·30	2·30	0·30	0
1863	2·40	0·30	0·30	0	0	2·00	17·30	2·20	0	1·70	0	0·20
1864	0	0·30	0·50	1·10	0·30	1·30	3·60	4·80	0	0	0	0·50
1865	1·30	2·50	1·80	0·50	0·70	0	4·90	3·30	7·20	0	0	1·80
1866	0·40	0·50	0	0·20	0	0·50	5·30	10·00	0	0·30	0	0
1867	0	0·80	0·50	0·80	3·40	1·50	5·50	4·80	1·60	0	0	1·20
1868	1·50	3·00	1·60	1·20	1·10	0·90	4·60	0·70	0	0	0	0·50
1869	0·60	0	3·40	0	0	1·70	5·50	0·20	4·90	3·60	0	0
1870	0	0	0·30	0·10	0	0·60	1·20	6·20	0·20	0	0	0·60
1871	0	1·50	0	0	1·30	0·70	4·30	0	0	0	0	0·90
1872	0·90	0·80	1·40	0	0·60	2·60	6·30	2·80	1·70	0	0	0
1873	0	0	0	0	1·50	0·40	13·20	4·50	4·40	0	0	1·30
1874	2·00	0·90	1·00	0	0	2·00	4·60	3·30	1·40	0	0	0
1875	0	1·53	0	0	1·35	1·60	3·37	16·42	11·40	1·63	0·20	0·30
1876	0·06	0·13	1·45	0·72	0·35	1·12	16·65	2·10	0·95	1·44	0	0
1877	1·88	4·67	0·90	3·34	0·69	0	2·01	0·12	2·03	0·70	1·32	2·57
1878	0·20	2·46	0·19	1·45	1·77	0·36	5·96	8·03	0·33	0	0	0·13
1879	0	0·01	1·32	0	0·01	5·48	1·13	7·49	3·12	0·17	0	0·45

LAHORE—(Contd.).

Rainfall. *Elevation 702 feet.*

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	"	"	"	"	"	"	"	"	"	"	"	
1880	0	0·78	0	0	0·89	3·10	4·73	0·58	0·29	0	0·26	0·64
1881	0·03	1·31	2·35	0·57	0·95	0·44	12·38	8·05	0·18	0·12	0	0
1882	1·43	1·81	0·03	0·99	0·22	0·47	13·03	9·10	10·35	0	0	0
1883	2·39	0·33	0·43	0·18	3·05	0·58	2·27	0·70	10·72	0	0·66	0·07
1884	0·31	1·64	0·16	0·58	0·53	2·43	9·35	2·80	3·29	0·24	0·08	0
1885	1·47	0·46	0	1·06	4·38	0·81	4·50	4·43	0·37	0	0	1·23
1886	2·31	0·20	2·34	0	0·08	3·93	11·53	3·93	0·97	2·27	0·06	0·09
1887	0·41	0	0·05	0·01	0·14	2·41	2·50	9·98	1·18	0	0	0
1888	0·93	0·71	0·53	0·12	0·02	0·53	3·67	6·15	0	0·16	0	0·02
1889	1·54	3·83	0·12	0·44	1·10	1·51	7·32	6·83	0·26	0	0	0
1890	0·30	0·34	0·58	0·99	0	3·35	11·27	7·38	0·25	0·12	0·50	2·25
1891	3·22	0·47	2·87	0·51	0·65	0·36	1·56	5·70	1·22	1·12	0	0
1892	0·44	0·18	0·06	0	0·72	0·99	8·11	11·68	0·53	0	0	0·80
1893	2·01	3·13	0·64	0·49	1·90	2·72	7·36	0·50	6·85	0	0	0·40
1894	3·91	0·76	0·98	0·40	0·04	7·54	3·54	3·60	2·10	0	0	0·32
1895	1·96	0·98	0·63	1·28	0	1·49	1·16	4·64	0	0	0	0·02
1896	0·39	1·29	0·37	0	0·25	0·91	2·66	3·73	0·14	0·02	0·12	0·03
1897	1·42	0·78	0·44	0·11	0·41	2·41	3·25	9·87	0·33	0	0	1·23
1898	0·06	3·25	0	0	1·06	2·28	10·49	0·28	0·65	0	0	0·37
1899	0	0·13	0·20	0·29	0	1·61	2·73	0·90	0·25	0·10	0	0
1900	0·45	0·32	0·19	0·38	0·46	0·22	6·14	5·67	7·13	0·17	0	0·94
1901	1·54	0·22	1·33	0·19	1·34	0·56	9·86	2·83	0·09	0	0	0
1902	0	0·03	0·77	0·25	0·73	0·92	2·59	3·86	2·45	0·23	0	0
1903	0·52	0·05	0·64	0·02	0·82	0·33	4·36	5·31	2·25	0·10	0	0·31
1904	1·39	0	5·37	0·32	0·21	0.99	0·76	2·55	0·49	0·04	0·06	0
1905	1·86	1·12	0·43	0	0·03	0·56	3·34	0	9·19	0·33	0	0·56
1906	0·01	2·99	1·16	0·14	0·17	0·96	2·46	3·21	8·69	0	0	0·25
1907	0·72	2·48	0·97	1·48	0·07	1·41	1 51	6·25	0	0·15	0·01	0

BEAWAR.

Rainfall. *Elevation* 1,559 *feet.*

	Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
		"	"	"	"	"	"	"	"	"	"	"		
	1856	?	?	?	0·10	0	1·70	11·60	5·30	1·20	0	0	0	19·90
3·10	1857	2·70	0·40	0	0·30	0·30	7·40	1·20	11·50	3·20	0	0	0	25·90
1·00	1858	1·00	0	0	0	0	0	19·50	0·30	1·20	0	0	0	25·90
1·00	1859	0·40	0	0·60	0	0	2·10	10·60	6·50	3·80	0	0	0	23·00
0·20	1860	0	0·20	0	0	1·30	0·70	2·80	1·90	0·30	0	0	0	7·00
0·00	1861	0	0	0	0	0·30	2·30	2·40	14·20	0	0	0	0·20	19·20
0·20	1862	0	0	0	0	0	2·10	23·50	7·30	9·20	0·60	0	0	42·10
0·60	1863	0	0	0	0	0	9.50	10·90	2·50	0	0	0	0	22·90
0·00	1864	0	0	0	0	0	0·30	9·30	10·20	0·90	0	0	0	20·70
2·50	1865	0·30	0·10	2·10	1·00	0	0·40	2·80	11·10	1·50	0	0	0	16·80
0·00	1866	0	0	0	0	0	1·10	3·80	9·00	0	0·70	0	0	13·00
0·90	1867	0	0	0·20	0·20	0·50	1·20	4·40	8·00	0·80	0	0	1·60	15·10
1·70	1868	0	0	0·10	0·30	0·10	0·40	3·80	0·80	0	0	0	0	5·40
1·40	1869	0·50	0·30	0·60	0	0	0	2·00	2·40	10·70	1·00	0	0·20	15·10
1·90	1870	0	0	0·70	0	0	0·80	4·70	5·10	1·10	0·40	0	1·00	10·70
1·40	1871	0	0	0	0·32	0·75	8·53	6·94	0·85	1·71	0	3·20	0·21	19·10
3·41	1872	0	0	0	0	0·30	0·90	3·70	15·80	0·49	0	0	0	21·19
0·30	1873	0·10	0·20	0	0	1·85	0·74	18·75	8·06	1·71	0	0	0	31·11
0·12	1874	0·07	0·05	0	0	0·02	1·68	10·74	6·48	1·75	0	0	0	20·67
2·03	1875	0	2·03	0	0	2·90	1·26	6·04	1·18	16·56	0	0	0·68	27·94
0·68	1876	0	0	0	0·09	0·62	1·76	7·20	4·69	9·00	0·19	0·23	0	23·36
0·42	1877	0	0	0	0·50	0·18	2·78	8·59	0·43	0·41	2·52	1·12	0·66	12·86
4·39	1878	0	0·09	0	0	0·28	2·98	4·58	12·64	0·29	0	0	0	20·79
0·10	1879	0	0	0·10	0	0·20	5·20	1·60	8·80	0·30	0	0	0·70	16·10
0·70	1880	0	0	0	0	0·60	1·10	6·90	3·30	3·50	0·60	0	0	15·40
0·80	1881	0	0	0·20	0·40	0	0·10	10·50	6·80	2·10	0	0	0·50	19·90

BEAWAR.—(Contd.)

Rainfall. *Elevation* 1,559 *feet.*

	Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
		″	″	″	″	″	″	″	″	″	″	″		
1·60	1882	0·80	0·30	0	0	0·80	0·90	15·30	2·10	3·50	0	0	0	22·60
0·30	1883	0·30	0	0	0	1·16	0·60	5·00	0·30	5·20	0·20	0	0	12·26
0·20	1884	0	0	0	0	0	2·40	7·10	4·30	10·85	0	0·05	0	24·65
0·45	1885	0·40	0	0	0	0·70	3·10	5·10	9·90	0	0	0	0·40	18·80
0·40	1886	0	0	0	0	0·10	1·65	3·70	3·95	0	0·50	0	0	9·40
0·70	1887	0·20	0	0	0·20	0	0·70	12·90	5·50	0·60	0	0	0	19·90
1·10	1888	0·60	0	0·50	0	0	0·50	2·30	11·10	0	0	0	0	13·90
0·20	1889	0·10	0·10	0	0·20	0·70	6·00	2·33	7·40	0	0·10	0	0	16·63
0·20	1890	0	0	0·10	0	0·10	0·50	4·90	4·80	3·20	0·10	0·30	0·50	13·50
1·80	1891	0·40	0	0·50	0·60	0	0·20	5·10	1·20	1·18	0·12	0	0	8·28
0·68	1892	0·56	0	0	0	0·21	1·71	5·48	11·74	10·82	0·21	0	0·20	29·96
2·36	1893	1·00	0·53	0·42	0	1·60	8·15	5·45	4·72	2·81	0·15	2·25	0·20	22·73
2·93	1894	0·10	0·01	0·22	0·08	0	10·93	4·15	2·10	2·84	0	0	2·86	30·10
3·63	1895	0·19	0	0·58	0·56	0	0·57	5·52	7·04	0·94	0·13	0	0	14·63
0·16	1896	0·03	0	0	0	0	3·67	7·43	12·76	0	0	0·39	0·05	23·86
0·44	1897	0	0	0	0·02	0	0·87	12·25	7·27	2·04	0·16	0	0	22·45
0·56	1898	0	0·40	0	0	0·48	1·19	4·47	0·93	4·56	0	0	0·70	11·63
0·70	1899	0	0	0	0	0	1·54	2·68	0	0·66	0	0	0	4·88
0·00	1900	0	0	0	0·49	0·91	1·36	5·33	6·57	6·51	0	0·57	0·54	21·17
1·80	1901	0·50	0	0·19	0	0·12	2·54	5·08	2·20	0·16	0·47	0	0	10·10
0·47	1902	0	0	0	0	0·15	1·23	3·45	3·60	3·78	0·36	0	0	12·21
0·91	1903	0	0·10	0·45	0	0·26	0·55	11·86	4·70	2·65	0	0	0	20·02
0·65	1904	0	0·04	0·61	0	1·49	2·95	4·20	3·79	0·41	0	0	0·17	12·84
0·73	1905	0·07	0·47	0·02	0	0·05	0	2·44	0·19	4·75	0	0	0	7·43
0·91	1906	0	0·91	0	0	0	0·94	9·83	3·44	5·84	0.26	0	0·44	20·05
3·17	1907	0	2·58	0·59	0·09	1·17	0·46	1·37	17.14	0	0	0	0	20·23

AJMER.

Rainfall. *Elevation* 1,611 *feet.*

	Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
		″	″	″	″	″	″	″	″	″	″	″	″	″
	1863	0·50	0	0·10	0	0·53	9·70	12·34	2·97	0	1·20	0	0	25·54
2·62	1864	0·92	0·50	0	0	0·11	0·08	7·97	8·54	0·52	0	0	0	17·22
6·00	1865	0·25	0·75	5·00	0	0	0·02	1·47	7·38	1·18	0·42	0	0	10·05
0·42	1866	0	0	0	0·44	0·35	1·33	3·70	20·04	0	0·30	0	0	25·86
0·30	1867	0	0	0	0·30	0·51	2·05	7·00	13·92	1·66	0	0	1·83	25·44
2·28	1868	0	0·12	0·33	0·30	0·22	1·03	6·37	0·85	0	0	0	0·06	8·77
2·81	1869	0·40	0·40	1·95	0	0	0	4·65	1·55	14·60	0·20	0	0·17	20·00
1·09	1870	0	0	0·72	0	0·03	3·40	0·67	11·30	0·05	0·40	0	0·40	15·45
0·80	1871	0	0	0	0·05	1·12	8·23	6·65	0·50	4·25	0	0·90	0	20·00
1·20	1872	0·30	0	0	0	1·20	1·28	7·57	18·15	3·35	0	0	0·15	31·55
0·30	1873	0·15	0	0	0	1·77	1·71	9·13	5·82	2·58	0	0	0·11	21·01
0·21	1874	0·05	0·03	0·02	0	0·66	4·59	5·47	5·02	1·91	0	0	0	17·65
2·94	1875	0·10	2·84	0	0	1·53	0·98	8·00	4·19	17·80	0	0	0·93	32·50
0·94	1876	0	0	0·01	0	0	2·41	8·05	5·98	6·33	0·63	0·28	0·04	22·77
2·04	1877	0·04	0·89	0·16	0·43	0·82	0·21	4·23	0·23	0·19	1·81	1·35	1·40	6·11
4·60	1878	0	0·04	0	0·03	2·78	1·65	10·06	15·32	1·17	0	0	0	31·01
1·16	1879	0	0·89	0·27	0·02	0·13	6·56	0·38	16·71	2·03	0·10	0	0·51	25·83
0·89	1880	0	0·28	0	0	0·18	0·94	10·2	2·85	2·91	0·47	0·28	0·10	17·09
1·40	1881	0·03	0·03	0·49	0·70	0·18	0·45	9·26	7·17	2·45	0	0	0·45	20·21
1·81	1882	1·05	0·31	0	0	0·57	0·33	16·18	5·82	3·20	0	0	0	26·10
0·40	1883	0·38	0	0·02	0	2·19	1·09	9·24	0·45	3·91	0	0	0	16·88
0·39	1884	0·23	0·12	0·04	0	0·12	5·05	6·65	4·96	10·41	0·05	0·18	0·01	27·19
0·61	1885	0·37	0	0	0	1·31	4·54	7·19	10·92	0·21	0	0	0·28	24·17
0·53	1886	0·20	0·05	0	0	0·95	1·89	3·94	4·60	1·50	2·01	0	0	12·88
2·81	1887	0·80	0	0	0	0·08	1·97	10·55	7·82	0·70	0	0	0·01	21·12
2·75	1888	0·47	2·22	0·05	0	0	1·16	5·76	13·89	0·02	0·25	0·60	0	20·8

AJMER—(Contd.)

Rainfall. *Elevation* 1,611 *feet.*

	Year.	January.	February.	March.	April	May.	June.	July.	August.	September.	October.	November.	December.	
		"	"	"	"	"	"	"	"	"	"	"	"	"
2·38	1889	0·62	0·34	0·57	0·15.	1·25	3·99	4·00	12·65	0·20	1·40	0	0	22·24
1·55	1890	0	0	0·15	0	1·25	1·77	4·38	4·14	1·48	0·37	0·10	0·91	13·02
3·32	1891	0·97	0	0·97	0·25	0·33	0·10	3·77	1·22	1·20	0·12	0	0	6·87
1·31	1892	1·19	0	0	0	0·40	0·68	5·08	7·09	6·36	0	0	0·07	19·61
2·57	1893	1·53	0·67	0·30	0	0·45	4·19	8·40	8·21	7·15	0·07	1·86	0	28·40
2·92	1894	0·57	0·01	0·41	0·05	0·20	7·27	6·66	3·72	5·79	0	0	2·31	23·69
3·21	1895	0·58	0	0·32	0·31	0	0·99	10·78	11·34	0·10	0·01	0	0	23·52
0·08	1896	0·07	0	0	0	0·23	5·66	9·85	8·44	0·41	0	1·73	0·07	24·59
1·80	1897	0	0	0	0·21	0·27	0·17	8·03	12·39	1·05	0·92	0	0	22·12
1·14	1898	0	0·22	0	0	0·40	0·70	6·80	1·57	2·86	0·05	0	0·37	12·33
0·42	1899	0	0	0	0·96	0·20	3·38	4·91	0·10	0·45	0	0	0	10·00
0·12	1900	0·12	0	0	0·70	0·11	0	3·98	12·12	7·37	0·09	0·40	0·75	24·28
2·86	1901	1·40	0	0·22	0	0·45	1·11	5·32	4·18	0·25	0·60	0	0·04	11·31
0·64	1902	0	0	0	0·11	1·45	1·75	3·51	4·76	5·44	0	0	0	17·02
0·44	1903	0·08	0·18	0·18	0	0·26	0·19	8·70	7·33	1·29	0·07	0	0	17·77
1·40	1904	0·20	0	1·13	0	1·37	2·07	4·14	6·83	0·31	0	0·15	0·60	14·72
1·70	1905	0·15	0·75	0·05	0·05	0	0·41	1·62	0·30	3·78	0	0	0	6·15
1·48	1906	0	1·13	0·35	0	0	3·68	7·45	3·35	3·11	0·02	0	0·25	17·59
2·70	1907	0	2·18	0·25	0·25	0·57	0·10	2·33	8·70	0	0	0	0	11·95

NAGPUR.

Rainfall. *Elevation* 1,025 *feet.*

	Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
		"	"	"	"	"	"	"	"	"	"	"	"	
	1854	?	?	?	?	?	6·43	24·81	4·44	95·7	3·15	0	0	45·25
5·10	1855	0·98	0·45	0·52	0·11	0	5·40	7·50	3·60	4·45	3·09	0	0	21·04
3·09	1856	0	0	0	0	2·03	7·20	24·00	10·02	2·79	0·32	0	0	46·04
0·56	1857	0·14	0·06	0·04	0·62	1·91	10·52	4·46	8·56	7·17	2·75	0	0	33·24
5·23	1858	0	2·07	0·41	0	0·84	3·85	11·96	5·88	9·60	0·58	0	0	32·13
0·58	1859	0	0	0	3·93	0·28	6·59	6·36	14·94	1·51	0·08	0	0·71	33·61
0·54	1860	0	0·41	0·05	0	0·15	4·76	15·23	8·72	15·76	0·03	0	0	44·62
6·38	1861	3·11	0	0·54	0	1·35	13·84	17·16	8·63	1·26	0	0	0	42·24
0·12	1862	0·12	0	0	0·05	0·98	10·48	1·57	11·02	6·66	3·56	1·07	0·31	30·76
6·65	1863	0·12	0	1·59	0	0·52	10·44	15·66	4·24	6·51	0·61	0	0	37·37
2·65	1864	2·04	0	0	0·74	1·95	7·34	9·10	8·52	4·00	0	0·97	0	31·65
4·57	1865	0	0	3·60	1·30	1·00	10·60	13·46	8·60	3·70	1·80	0·50	0	38·66
4·20	1866	0	1·90	0	0	0	6·20	10·10	14·42	8·89	1·40	0	0·20	39·61
1·04	1867	0	0	0·34	2·60	1·04	14·50	12·70	10·70	13·28	2·54	0	0·05	64·82
8·15	1868	4·84	0	0·72	0	0·65	4·00	8·87	4·66	1·67	0·08	0	0	19·85
0·76	1869	0	0	0·68	0·20	0	4·12	8·62	9·61	7·30	2·46	0	0·39	29·85
5·97	1870	2·14	0	0·98	0·57	0·01	9·49	18·98	1·78	5·00	2·09	0·59	0	35·83
3·05	1871	0·17	0·20	0	0	1·33	12·80	17·15	2·04	12·86	0	0	0·20	46·18
0·26	1872	0	0	0·06	1·01	0	4·01	7·44	9·35	14·80	4·22	0	0·05	36·61
5·99	1873	0	1·02	0·70	0·35	0·58	4·80	6·03	8·02	9·11	0	0	0·02	28·89
0·27	1874	0	0·25	0	0	0·57	8·53	19·43	7·33	4·61	0·04	0	0·12	40·47
2·05	1875	0·39	1·50	0	0·11	0	12·57	20·84	8·73	6·84	3·88	0	0	49·09
4·05	1876	0	0	0·17	0	0·37	2·81	13·95	10·15	9·06	0·91	0	0	36·34
6·05	1877	4·23	0·66	0·25	2·16	1·09	9·88	14·86	12·76	4·53	4·76	0·10	1·57	45·28
8·04	1878	0	0·65	0·96	1·54	1·30	3·86	17·91	19·46	12·78	4·37	0	0	56·85
5·00	1879	0	0·63	0	[illegible]	5 92	13·46	8·48	13·50	6·54	3·65	0	0	47·90

NAGPUR.—(Contd.)

Rainfall. *Elevation* 1,025 *feet.*

	Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
		″	″	″	″	″	″	″	″	″	″	″	″	
3·65	1880	0	0	0	0	0·34	9·21	8·06	2·91	10·31	2·64	0·07	0	30·83
4·87	1881	0·03	0	2·13	0	0·76	19·71	14·28	11·56	10·24	0·44	0·61	0	56·55
1·51	1882	0·42	0·02	0·02	0·11	0·27	8·92	23·44	1·85	9·88	0·11	4·79	0	44·47
5·63	1883	0·39	0	0·34	0	0·27	11·37	15·21	12·17	15·72	5·98	0	0	54·74
7·34	1884	1·25	0	0·11	0·01	0·20	4·08	18·99	15·02	13·74	0·22	0	2·68	52·04
4·87	1885	0	0·57	1·40	1·47	2·10	9·70	17·22	7·13	3·01	1·08	0·53	4·17	40·63
6·44	1886	0·02	0·34	0·30	0	0·08	5·95	16·03	6·97	3·38	9·65	0·03	0·60	32·41
10·31	1887	0·03	0	0	0·30	0·36	9·99	18·05	12·62	6·65	4·86	1·76	0·13	47·97
9·00	1888	1·75	0·33	0·17	0·06	0	9·83	12·41	8·01	5·49	0·37	1·16	0	35·80
1·53	1889	0	0	0	1·19	0·06	7·66	9·62	11·19	6·10	3·53	0	0	35·82
3·79	1890	0	0	0·26	0·19	0·04	9·67	15·66	11·72	13·92	0·06	2·53	2·62	51·20
7·87	1891	1·17	0·63	0·86	0·44	0·33	0·01	19·79	5·59	24·69	0·59	0	0	50·85
1·16	1892	0	0·57	0	0·02	0·01	6·17	13·46	8·57	11·54	3·74	0	0·03	39·77
11·23	1893	3·57	0·63	3·26	0·09	0·81	9·84	7·59	15·75	8·04	5·83	2·96	0	42·12
9·07	1894	0·12	0	0·16	0·18	0·16	7·95	13·56	13·50	14·12	4·15	2·48	0·18	49·47
8·17	1895	0	0·65	0·71	1·88	0·75	11·32	19·07	18·76	3·45	1·02	0·16	0	54·53
1·35	1896	0	0	0·17	0·12	0·03	11·96	17·97	18·33	2·30	0	0·57	0·14	50·71
1·72	1897	0·66	0·20	0·15	0·56	0·18	4·96	12·55	13·04	5·32	0·91	0	0	36·61
3·55	1898	0	2·64	0	1·36	0·35	6·47	19·92	12·83	9·64	0·15	0	0·08	50·57
0·39	1899	0	0·14	0·02	0·42	0·57	4·94	3·54	2·69	2·04	0	0	0	14·20
0·48	1900	0	0·48	0	0·12	0·14	2·69	14·32	20·64	11·23	0	0	0	49·14
3·00	1901	0·97	1·04	0·99	2·46	0·58	5·99	7·97	13·70	3·92	0	0	0	34·62
0·00	1902	0	0	0	0·04	0·08	1·78	9·86	9·43	4·09	1·02	0·46	1·48	25·28
3·10	1903	0·01	0·13	0	0·06	2·09	7·01	23·49	14·50	5·05	4·32	0	0	52·20
6·59	1904	0·07	0·19	1·11	0	0·51	8·52	5·15	9·22	6·74	1·92	0	0·04	30·14
3·10	1905	0·22	0·76	0·16	0·90	0·37	7·48	13·50	10·13	17·72	0	0	0	50·10
3·05	1906	0·21	0·31	2·53	0	1·14	18·47	14·64	22·37	3·99	0·20	0	0·50	60·61
3.66	1907	0·09	2·86	0·01	1 66	0·11	12·14	13·63	11·80	5·14	0	0·72	0·09	44·48

JUBBULPORE.

Rainfall. *Elevation 1,327 feet.*

Total (O to M.)	Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
		″	″	″	″	″	″	″	″	″	″	″	″	
	1844	?	?	?	?	?	2·04	12·55	12·26	1·61	0	0	0	28·46
1·80	1845	0·50	0·50	0·80	0	0	3·95	19·28	16·51	1·70	0	0	1·68	41·44
2·45	1846	0	0·75	0·02	0	0	14·11	23·57	9·66	9·34	1·10	0	0	56·68
1·30	1847	0·20	0	0	0	0	9·74	11·31	18·60	2·57	2·13	0·41	0	42·22
2·69	1848	0	0·15	0	0	0·27	6·04	13·86	10·87	3·47	0·46	0	0	34·51
3·29	1849	1·80	0·86	0·17	0·21	2·40	3·66	10·13	16·63	7·72	3·09	0·10	0·15	40·75
4·24	1850	0	0·90	0	0·45	0	9·89	13·86	10·08	6·33	3·03	0	0·05	40·61
4·50	1851	0·50	0·90	0·02	0	0·47	5·97	17·19	3·93	8·22	1·34	0	0	35·78
4·81	1852	0·58	0	2·89	0	1·12	7·56	12·40	26·40	23·00	1·70	0	0·40	70·48
3·60	1853	1·50	0	0	0	0	24·40	20·50	13·40	?	?	?	?	?
?	1854	?	?	?	?	?	6·97	6·72	13·90	12·75	5·84	5·71	0·90	40·34
18·93	1855	1·66	2·94	1·88	0·28	0	7·17	30·07	0·41	9·71	3·85	0	0	47·64
5·61	1856	0·03	1·71	0·02	0·11	0·04	4·81	19·22	10·58	5·21	0·61	1·62	0	39·97
2·71	1857	0	0·48	0	0	0·10	2·50	11·10	26·50	10·40	0	0	0	50·60
·12	1858	0·12	0	0	0	0	0·70	20·00	12·60	5·60	0	0	0	38·90
·41	1859	0·01	0·30	0	1·00	0	5·40	15·90	14·90	10·10	0·60	0	0·80	47·30
1·40	1860	0	0	0	0	0	2·48	17·53	14·84	13·50	0	0	0	48·35
2·90	1861	2·12	0	0·78	0	0·36	8·56	17·59	10·65	4·97	0	0	0	42·13
1·86	1862	1·18	0	0·68	0·09	0	5·02	8·84	16·68	5·66	0·95	0	0	36·29
1·95	1863	0·35	0·06	0·59	0	0	17·73	17·21	10·78	7·98	4·75	0	0	53·70
6·34	1864	1·21	0·38	0	0·35	2·51	1·33	14·59	14·05	9·46	0	1·55	0	42·29
7·08	1865	2·20	1·99	1·34	0	0	5·56	27·21	14·89	5·80	1·28	0·15	0	53·46
1·69	1866	0·03	0·20	0·03	0·59	0	13·15	23·76	10·96	4·39	0	0	0	52·85
·94	1867	0·42	0·07	0·45	0·28	0·04	11·15	20·45	20·70	17·36	1·73	0	0·45	69·98
7·25	1868	2·81	1·11	1·15	0·04	0·32	9·34	5·81	4·25	3·81	0	0	0·16	23·57
·24	1869	0·08	0	0	0	0	3·37	28·25	8·90	16·97	5·06	0	0·14	57·49

JUBBULPORE—(Contd.)

Rainfall. *Elevation* 1,327 *feet.*

Total A to S.	Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
		"	"	"	"	"	"	"	"	"	"	"	"	
7·60	1870	0·67	0·22	1·51	0·10	0	12·84	27·39	18·39	12·63	3·82	0·21	0	71·35
5·01	1871	0·37	0·61	0	0·02	0·71	12·41	19·71	11·20	13·19	0	0	1·00	57·24
3·45	1872	0·27	0·14	2·04	0·65	0	5·45	28·67	21·95	6·14	1·48	0	0·40	62·86
2·61	1873	0	0·49	0·24	0	0·76	0·33	16·89	12·98	14·21	0	0	0·21	45·17
·60	1874	0·36	0·13	0	0	0·97	19·58	25·12	36·14	4·38	0·20	0	0·05	86·19
·53	1875	0·20	0·08	0	0·10	0	7·49	22·60	8·80	11·54	0·82	0	0	50·53
·82	1876	0	0	0	0	1·02	2·19	28·33	12·72	12·37	0	0	0	56·63
5·40	1877	2·33	1·09	1·98	3·52	2·62	17·26	7·05	9·82	1·63	1·07	0	0	41·90
1·66	1878	0·12	0·47	0	0·12	0·32	1·85	11·71	12·41	7·20	0·17	0·11	0	33·61
1·01	1879	0	0·73	0	0	0·06	8·60	10·84	17·45	8·67	3·92	0	0	45·62
3·92	1880	0	0	0	0	0	6·30	19·11	7·13	10·89	4·73	2·06	0·03	43·43
9·17	1881	0·01	0·24	2·10	0·05	0·27	6·81	21·45	17·10	1·75	0·11	0·16	0	47·43
·29	1882	0	0·02	0	0·98	0·14	23·93	30·26	11·00	2·21	0·07	1·14	0	68·52
1·99	1883	0·57	0	0·21	0	0·24	9·25	18·10	5·98	12·50	1·43	0	0	46·07
4·04	1884	0·76	1·50	0·35	0 01	0·39	13·06	36·55	25·32	14·04	2·33	0	0·46	89·37
4·55	1885	1·37	0·27	0·12	0·08	4·41	13·71	20·27	12·51	0·76	0·14	1·45	4·92	51·74
7·55	1886	0	0·10	0·94	0	1·34	11·48	18·34	7·25	2·98	6·26	0	0·42	41·39
10·66	1887	3·98	0	0	0	0·28	7·38	40·57	22·82	10·38	5·08	0·29	0·32	81·43
8·05	1888	2·02	0·26	0·08	0·02	0·18	4·77	17·60	17·34	2·24	0·13	0·25	0	42·15
1·96	1889	0·05	0·89	0·64	1·06	0·08	9·57	20 39	30·02	2·22	1·66	0	0	63·34
3·23	1890	0	0·08	1·49	0·11	0·05	8·35	12·46	13·91	9·90	0·73	0·60	0	44·78
2·24	1891	0	0·70	0·21	0	0·30	2·63	24·30	17·80	28·84	0·51	0	0	73·87
2·46	1892	0·65	1·30	0	0·15	0·14	4·47	21·38	16·41	9·13	1·77	0	0	51·68
7·32	1893	2·68	0·93	1·94	0·35	2·44	20·71	9·86	22·54	16·36	3·80	1·94	0	72·26
6·67	1894	0·46	0·34	0·13	0·07	0	12·81	19·65	9·60	7·49	7·25	2·55	0·30	49·62
13·15	1895	0·70	0·85	1·50	0	0·04	17·55	13·47	18·42	1·43	0·10	0	0·06	50·91

JUBBULPORE—(Contd.)

Rainfall | *Elevation 2,327 feet.*

Total (O to M.)	Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
		″	″	″	″	″	″	″	″	″	″	″	″	
·20	1896	0·01	0	0·03	0	0·05	15·07	21·93	27·98	0·37	0	0·31	0·75	65·40
3·84	1897	2·10	0·51	0·17	0·72	0·23	7·99	9·69	19·67	8·18	0·62	0	0	46·48
3·97	1898	0	3·35	0	0·10	0·18	4·83	27·31	21·28	12·51	0·16	0	0	66·21
·38	1899	0·04	0·18	0	0·08	0·92	4·34	18·46	7·57	3·51	0	0	0	34·88
2·31	1900	2·31	0	0	0·61	0·10	0·70	14·28	24·76	12·26	0·76	0	0·92	52·71
5·61	1901	2·28	1·12	0·53	0·31	0·06	1·53	10·97	34·78	4·97	0·61	0	0	52·62
1·07	1902	0·27	0·19	0	0·22	0·08	0·77	18·11	7·67	9·03	0·10	0·76	0·01	35·88
1·22	1903	0·32	0·03	0	0	2·30	3·30	12·16	19·90	9·47	7·17	0	0	47·13
9·38	1904	0·17	0·69	1·35	0	0·11	3·93	15·11	12·26	5·00	2·64	0·02	0·64	36·41
3·98	1905	0·29	0·23	0·26	0·09	0·08	2·36	18·63	11·39	9·99	0·06	0	0·05	42·54
3·71	1906	1·31	1·29	1·00	0	0·05	11·08	19·19	5·91	10·96	0	0	0	47·19
5·43	1907	0·26	5·16	0·01	1·43	0·93	2·16	9·77	15·75	0·69	0	0·48	0	

Statement showing Rabi Barani cropped area in acres, of the following villages in Zafarwal Tahsil.

Name of villages.	YEAR.																						
	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908
Deswál ..	214	198	105	92	36	205	150	129	191	174	84	67	89	106	13	159	5	71	136	214	184	212	22
Saidowál ..	126	130	68	79	25	151	120	112	95	137	58	90	91	107	40	157	27	72	143	168	150	150	30
Ghaun ..	83	73	35	41	9	64	40	39	68	61	20	12	27	32	1	42	..	3	32	69	55	72	1
Kak ..	67	49	22	40	10	72	16	55	66	64	3	15	24	19	1	69	4	4	24	66	63	82	2
Jáhar ..	192	170	136	171	37	88	101	101	308	231	234	85	117	98	16	308	..	10	120	121	273	330	12
Bhakko Bhatti ..	156	109	89	109	39	198	104	124	153	188	110	99	114	113	13	274	11	20	146	164	178	213	4
Jarwál ..	435	432	305	404	243	491	231	317	412	426	148	128	236	243	26	384	37	135	363	433	391	412	26
Badiána ..	949	801	654	443	5	902	827	928	743	512	85	145	313	402	49	876	3	206	700	954	1103	1073	10
Sidhpur Becharagh	58	41	38	24	1	48	27	45	59	41	10	7	31	32	5	53	..	17	36	63	69	69	..
Mahuga ..	113	89	75	46	2	99	47	95	79	74	22	9	41	35	6	87	1	31	70	97	154	145	1
Kaulpur ..	179	195	167	60	4	231	69	196	150	62	28	35	31	53	4	93	7	43	98	183	258	366	13
Dhalwán ..	381	392	303	146	12	389	165	358	416	357	61	52	51	97	84	149	7	105	216	380	451	401	42
Kot kalál ..	175	144	77	50	5	137	76	123	124	71	28	14	25	55	8	74	7	2	62	65	118	125	3
Bhatti ..	140	148	117	93	10	130	111	128	164	147	43	22	51	59	8	163	9	17	126	157	201	218	5
Bhaganian	411	395	284	276	12	365	259	331	360	355	240	127	151	360	..	358	3	4	319	419	403	446	2
Buttar Sahj-din ..	290	274	254	202	6	277	128	164	220	286	186	61	79	220	..	261	14	19	197	210	229	282	5
Sarangpur ..	182	196	183	125	24	198	125	168	149	152	138	135	82	137	19	166	6	20	122	150	190	186	12

Lappewálí ..	246	269	221	194	49	271	194	243	247	206	221	79	116	177	36	286	12	24	242	258	278	279	42
Mutteke ..	181	176	159	120	30	217	149	162	134	167	120	96	70	135	11	187	16	18	152	189	219	212	17
Jam Mahál	117	127	124	142	103	132	116	119	116	97	93	54	63	75	6	98	48	53	91	76	92	96	..
Tatarpur ..	141	140	135	190	147	181	136	141	151	109	108	63	108	98	14	146	37	64	134	147	172	174	9
Sáwalí ..	170	153	95	178	67	186	151	170	217	160	122	82	136	138	9	204	58	74	154	178	191	209	21
Chak Sángu	213	181	144	188	33	228	131	163	153	223	185	98	147	152	18	194	27	49	129	191	205	156	31
Chak Wichla	143	178	169	145	91	186	169	167	163	188	128	112	159	158	43	183	82	110	194	198	191	220	73
Kot Nánu ..	266	304	178	276	194	304	311	275	285	277	243	184	275	248	17	267	127	184	254	257	277	266	61
Ghásípur ..	203	208	217	206	140	219	215	217	226	236	213	115	170	135	68	194	70	72	181	155	189	192	32
Chhajju Khiwa ..	177	164	155	129	108	198	154	164	167	157	133	103	156	154	39	174	132	132	166	174	189	204	76
Laungoke ..	173	223	234	190	145	211	183	183	208	200	185	145	203	191	4	212	105	147	186	185	186	199	98
Ainowáli ..	649	644	503	446	368	760	562	533	492	504	438	381	509	427	4	677	78	315	629	692	732	809	83
Chikri ..	244	280	274	227	171	265	256	199	214	224	244	137	255	243	6	254	139	118	254	257	277	266	61
TOTAL ..	6830	6603	5246	4805	2125	7403	5323	6149	6530	6086	3931	2712	3922	4499	568	6731	1072	2139	5676	6840	7568	8064	794

Statement showing Kharif Bárani cropped area in acres, of the following villages in Zafarwal Tahsil.

Names of villages.	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907
Deswál ..	14	121	108	135	114	198	74	155	91	117	143	157	144	144	123	194	97	170	217	142	142	146	103
Saidowál ..	10	102	102	82	100	132	64	159	118	117	111	137	118	142	81	167	124	107	175	120	120	163	67
Ghaun ..	2	45	125	129	103	108	43	78	65	143	111	193	39	159	15	186	78	88	116	34	94	115	37
Kak ..	2	14	39	44	46	57	27	61	36	50	33	43	45	46	15	42	17	39	38	14	18	30	12
Jáhar ..	14	73	59	57	57	89	59	163	152	142	123	138	120	158	134	132	166	162	238	189	174	161	106
Bhakko Bhatti ..	23	73	93	88	104	77	58	15	118	96	74	117	114	141	21	120	90	133	195	59	112	86	49
Jarwál ..	114	237	248	324	267	397	203	355	231	175	282	153	322	279	193	338	266	343	330	294	230	273	59
Badiána ..	375	605	362	524	521	446	445	610	501	494	301	509	558	539	24	615	313	609	728	376	368	373	160
Sidhpur Becharágh	25	22	24	41	34	41	37	32	22	26	23	34	22	38	..	26	19	19	43	15	19	24	9
Mahuga ..	60	56	56	86	78	77	66	87	58	65	..	82	80	71	8	97	66	100	98	55	56	64	53
Kaulpur ..	57	128	99	152	143	117	89	113	62	128	79	81	92	123	59	187	111	132	128	95	118	80	25
Dhalwán ..	177	270	233	281	207	194	243	197	147	241	247	144	138	205	95	270	195	216	302	239	189	230	52
Kot Kalál ..	36	119	81	136	124	128	104	128	107	111	79	93	64	90	47	120	76	118	109	85	69	81	31
Bhatte ..	4	77	51	84	83	155	95	135	96	116	105	144	94	124	8	76	80	71	185	101	76	81	78
Bhaganián ..	117	191	142	153	116	189	104	273	116	100	177	148	161	9	6	282	65	223	219	149	110	121	45
Butar Sahj Din ..	63	99	102	137	118	160	74	120	104	97	153	120	131	96	92	134	92	110	175	159	102	98	68
Sárangpur ..	46	86	63	77	82	115	87	116	46	73	91	82	118	93	33	135	48	100	133	67	98	68	23

Lappewali ..	71	124	101	104	101	123	103	150	84	67	133	106	145	137	67	185	90	156	193	80	120	119	33
Matteke ..	53	80	96	98	87	120	84	111	82	44	126	85	127	106	14	151	30	102	149	39	86	89	26
Jám Mahál	150	36	56	54	61	92	63	85	56	27	79	94	94	73	13	74	59	55	65	68	56	66	18
Tatárpur ..	70	97	58	107	101	146	137	99	100	90	89	120	133	142	8	144	146	121	140	131	93	105	76
Sáwalí ..	73	106	73	113	102	143	53	109	67	67	51	80	87	112	40	109	101	75	126	114	104	94	23
Chak Sánga	47	81	56	100	112	129	92	138	90	77	88	118	119	13	43	138	97	138	138	117	106	91	23
Chak Wichlu	119	113	106	144	144	129	104	114	107	124	124	119	133	153	82	156	122	144	156	185	133	136	73
Chikrí .	129	182	125	204	192	182	169	180	148	202	148	195	188	186	133	206	154	235	195	198	139	153	88
Kot Nánu	113	140	117	168	151	177	108	158	142	117	142	150	155	162	55	130	141	177	173	162	105	127	70
Gházípur	117	141	93	129	130	170	88	128	141	86	100	138	133	169	96	167	162	103	148	148	99	129	64
Chhajju Khíwa ..	64	64	37	100	104	126	39	122	107	104	121	95	112	132	37	147	56	81	107	90	84	81	20
Laungoke ..	70	75	56	115	146	102	44	99	100	108	84	89	93	107	507	98	84	100	104	95	91	89	52
Ainowálí ..	90	333	302	362	403	522	269	429	394	386	326	323	444	398	107	459	278	487	369	284	255	272	112
TOTAL ..	2,305	3,689	3,263	4,328	4,131	4,841	3,225	4,719	3,688	3,784	3,143	4,087	4,323	4,347	2,156	5,285	3,423	4,714	5,492	3,904	3,566	3,745	1,655

Statement showing Rabi cropped area in the following villages Barani (in acres) for Sialkot Tahsil.

Names of villages.	YEAR. 1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907
Bharth ..	..	190	147	113	171	59	187	190	275	246	249	69	10	23	44	..	171	45	11	176	86	207	255
Karol ..	..	207	198	134	159	39	267	191	184	201	199	132	146	152	139	167	180	106	94	153	127	189	..
Gulbhár Khurd ..	..	287	243	44	184	43	292	176	271	236	231	62	66	107	162	33	279	111	66	229	233	226	273
Det ..	..	104	96	72	68	25	119	71	114	104	98	43	24	31	52	9	97	18	37	76	83	99	106
Tokan ..	..	129	220	67	184	11	269	101	201	157	155	38	13	38	119	1	159	37	60	78	221	77	206
Gulbhar Kalán ..	..	219	218	162	198	34	291	175	215	261	209	82	23	71	129	17	233	83	..	135	192	320	219
Harspur Malaná ..	..	354	265	123	148	55	368	275	219	265	245	120	60	127	207	17	236	38	62	186	306	268	282
Nandpur ..	..	262	216	105	121	20	240	213	265	222	148	68	88	122	150	31	196	33	72	212	243	214	223
Bans Uncha	..	110	78	61	51	11	108	98	102	117	113	53	31	48	51	9	98	11	7	87	145	124	130
Kasire ..	..	68	70	27	37	6	59	47	49	68	117	20	23	22	30	9	74	7	8	29	113	63	67
Chak Ráni	..	283	150	91	43	4	181	210	207	162	168	10	5	14	49	..	116	32	2	94	71	170	109
Bans Ninwán	..	133	93	67	18	18	86	77	73	35	115	27	27	19	50	12	129	14	13	100	141	114	125
Bhoth ..	..	72	65	37	33	3	104	46	132	132	124	15	7	9	18	..	81	8	12	35	23	43	51
Rampur ..	..	190	140	87	96	5	134	162	135	162	156	42	12	33	101	75	96	51	21	104	117	133	111
Dhele ..	..	171	106	103	81	9	175	214	136	190	175	18	19	64	45	14	105	32	21	128	126	165	143
Kundanpur	..	661	300	272	66	4	582	394	361	282	293	18	66	89	160	1	382	41	153	314	475	284	409
Jálapwálí ..	..	132	103	46	69	8	139	96	104	118	121	12	12	65	69	14	12	16	33	111	108	140	147

Chhawani Salahrian	..	126	129	37	96	42	281	242	136	188	177	31	20	36	77	2	187	1	37	124	100	151	191
Kajaliál ..	..	173	163	97	63	21	149	137	151	189	148	73	65	70	75	15	153	33	20	127	197	138	165
Sarfrazpur..	..	235	175	84	100	1	195	298	174	293	292	74	25	40	120	..	114	97	20	129	73	214	238
Jhulkí ..	..	413	249	211	138	14	328	326	284	253	328	31	34	118	144	35	263	79	25	229	285	289	276
Kot Poruna	..	96	87	21	43	..	103	131	129	79	39	11	1	11	51	..	95	23	8	61	14	78	96
Rumál ..	..	57	133	16	59	..	183	142	145	162	160	118	10	19	112	1	170	16	7	39	18	108	195
Chak Khana	..	94	67	64	40	13	49	64	23	55	107	14	9	17	22	3	108	4	4	95	134	72	105
Jaspál ..	..	146	83	45	38	11	220	116	117	103	106	10	41	71	88	4	147	..	24	110	193	197	190
Dhiru Sanda	..	305	276	105	170	6	308	251	239	298	205	71	47	81	160	28	301	7	118	267	250	451	438
Chitti She-khán ..	..	..	6	9	..	..	15	20	17	15	8	11	14	6	14	10	58	16	30	16	20	44	362
Rahimpur Khichian	..	61	73	48	53	14	65	57	62	84	83	36	1	4	13	..	38	19	..	24	23	65	81
Kala ..	..	289	351	133	206	96	500	179	195	289	153	208	152	223	261	37	412	73	193	365	502	550	504
Táhá ..	..	127	88	46	77	19	139	111	121	104	55	21	15	49	49	10	83	21	41	101	134	107	131
TOTAL ..	..	5,694	4,588	2,527	2,810	591	6,136	4,809	4,836	5,070	4,777	1,530	1,066	1,779	2,761	554	4,773	1,072	1,254	3,934	4,753	5,300	5,828

Statement showing Kharif cropped area of the following villages Barani (in acres) for Sialkot Tahsil.

Names of villages.	YEAR. 1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907
Bharth ..	66	85	98	101	112	96	55	82	104	125	94	94	133	144	4	162	123	181	159	31	100	114	..
Karol ..	202	214	244	258	266	252	182	205	196	205	224	172	262	227	102	275	227	270	275	170	231	327	..
Gulbhar Khurd ..	192	246	221	271	292	288	215	234	198	238	229	187	341	239	175	317	287	348	275	120	270	123	..
Det ..	80	89	83	99	111	112	87	94	97	93	102	26	95	83	46	113	103	109	107	31	50	46	..
Tokan ..	85	99	266	176	206	189	209	170	141	158	135	144	274	190	120	226	260	172	316	115	268	123	..
Gulbhar Kalán ..	271	270	251	260	263	346	257	294	264	254	272	219	326	306	146	321	283	301	359	131	200	312	..
Harspur Malána ..	106	257	305	306	330	315	276	303	283	269	274	334	399	345	143	421	363	414	449	255	328	350	..
Nandpur ..	58	246	160	193	233	343	77	236	194	237	225	201	235	..	65	254	248	260	273	186	185	236	..
Bans Uncha	33	97	57	87	103	98	59	92	71	86	84	91	93	97	23	109	97	85	112	57	52	82	..
Yasire ..	25	58	80	54	69	71	37	63	52	81	56	53	70	67	20	90	75	85	91	45	59	83	..
Chak Rání	111	219	184	215	198	269	161	220	174	153	161	141	210	291	7	184	204	214	259	93	118	199	..
Bans Nínwán	15	66	67	67	87	89	27	62	13	63	63	63	60	71	14	82	56	70	102	52	55	67	..
Bhoth ..	14	15	15	25	14	20	19	55	42	37	35	15	19	26	2	29	26	27	45	19	13	56	..
Rampur ..	124	176	207	215	229	250	153	227	180	132	208	198	263	217	..	267	234	253	249	121	176	159	..
Dhele ..	105	152	155	152	181	215	128	191	89	171	156	171	136	189	122	173	147	154	160	149	120	161	..
Kundanpur	179	306	351	269	361	501	139	565	465	465	555	516	202	547	88	378	412	292	569	215	410	301	..
Jálapwálí ..	91	117	129	120	128	105	120	110	95	104	126	111	101	123	82	113	126	105	146	105	87	104	..

Chhawani Salahrián	98	97	117	155	145	250	165	147	130	72	134	112	88	101	..	172	104	148	166	102	109	137	..
Kajalíal ..	120	161	108	137	176	198	108	174	114	145	133	135	153	148	24	158	140	129	166	89	118	128	..
Sarfrazpur	265	325	316	342	338	374	195	207	249	213	182	177	368	301	109	410	279	367	362	156	339	260	..
Jhulki ..	111	258	400	262	328	217	263	349	250	277	282	284	372	330	88	308	323	294	385	247	262	294	..
Kot Poruna	55	66	58	56	157	132	96	90	58	49	86	78	109	93	20	109	70	99	102	39	30	105	..
Rumál ..	45	100	78	98	78	76	49	81	71	97	61	55	35	47	13	86	62	71	72	35	59	71	..
Chak Khaná ..	34	74	58	62	89	67	56	47	34	89	69	33	82	91	8	107	91	63	113	43	68	92	..
Jaspál ..	71	136	95	92	154	168	82	88	99	72	79	46	84	71	6	123	27	98	134	71	28	73	..
Dhíra Sanda	109	200	168	210	181	197	151	231	143	192	165	219	220	255	3	305	152	278	291	193	166	156	..
Chitti Shekhan ..	..	..	1	4	..	..	..	25	6	10	14	21	16	22	21	225	20	29	217	23	37	176	..
Rahímpur Khichián	58	52	40	55	89	47	36	54	48	33	41	23	34	38	54	48	38	57	62	22	27	36	..
Kála ..	110	395	175	268	202	266	188	315	195	289	153	208	193	222	29	326	121	297	323	203	201	222	..
Táhá ..	20	90	69	110	98	96	88	83	77	92	102	98	97	114	20	126	86	87	125	73	86	94	..
TOTAL ..	2,853	4,666	4,556	4,719	5,218	5,647	3,678	5,094	4,132	4,501	4,500	4,225	5,070	4,995	1,554	6,017	4,784	5,357	6,464	3,191	4,252	4,687	..

Statement showing Rabi Barani cropped area (in acres) of the following villages in Pasrur Tahsil.

Names of villages.	YEAR.																						
	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908
Naukarián..	220	205	183	183	60	194	793	160	198	203	112	71	108	97	6	201	20	5	152	175	211	220	..
Khichián Bhattian..	302	284	264	280	156	390	355	294	325	302	168	153	176	182	32	268	41	53	227	249	305	323	..
Malo Patiál	195	181	144	110	33	169	91	84	106	79	82	48	66	60	18	125	9	16	118	127	140	138	..
Bureke ..	379	327	299	296	89	447	260	239	294	341	396	242	245	349	109	395	80	27	409	383	422	427	..
Mardána ..	337	242	249	234	..	290	242	267	252	234	177	175	195	222	95	267	48	49	119	179	201	334	..
Kotli Bájwa	80	80	64	60	11	68	62	70	81	73	56	37	21	52	1	72	7	4	69	74	85	86	..
Sádullapur..	282	214	221	214	113	253	241	188	262	232	133	103	123	171	35	239	58	48	206	180	250	277	..
Mirza Bájwa	201	202	211	156	93	212	189	207	261	181	121	53	88	158	9	176	41	34	180	194	229	236	..
Dullamwála	279	271	174	166	15	256	197	296	270	234	170	79	77	206	15	263	63	64	191	254	306	317	..
Bakhtpur ..	168	139	170	121	75	164	148	229	223	210	163	112	123	201	3	254	109	73	232	216	240	255	..
Jitogil ..	122	124	103	103	96	153	114	146	136	107	99	85	93	116	4	139	59	36	124	118	139	135	..
Tawána ..	106	97	97	96	96	127	104	108	107	111	74	88	96	105	2	116	71	97	111	4	118	125	..
Bhuler ..	745	696	544	552	572	843	629	651	672	694	500	332	442	628	74	760	409	390	674	517	801	832	..
Mirakpur ..	186	148	153	18	119	137	174	132	307	278	218	237	277	252	111	331	153	146	283	203	322	387	..
Chak Hushyára	135	141	152	110	51	116	140	146	154	142	121	39	72	121	8	168	72	11	137	77	162	153	..
Tayab Bhutta ..	135	129	121	100	59	148	138	125	140	128	103	67	88	111	23	137	91	40	101	117	150	142	..
Bakhatpur..	226	216	171	161	21	166	142	144	160	136	112	50	91	129	..	165	48	15	94	106	168	162	..

Mahár ..	423	365	459	308	210	444	362	412	439	378	294	214	226	312	3	424	147	123	250	322	409	411	..
Kalúswala ..	768	736	813	543	315	705	416	676	690	595	442	359	423	509	30	702	224	140	400	518	693	645	..
Doburji ..	308	314	350	263	128	300	261	283	286	244	180	101	146	208	2	299	113	12	166	183	292	291	..
Kotli Khawaja ..	267	226	260	214	116	283	197	265	257	220	176	109	126	187	17	253	80	76	185	176	234	218	..
Daulatpur ..	255	289	277	243	154	323	165	287	299	297	235	103	162	264	27	297	152	67	183	218	236	281	..
Haibatpur ..	246	290	287	298	159	265	214	255	247	269	212	94	112	194	6	269	29	24	179	178	285	299	..
Noshera ..	724	617	623	562	219	757	442	636	706	547	420	242	220	493	23	656	204	65	375	476	698	632	..
Talwandi Inaitkhan	215	617	767	457	413	549	634	697	699	708	505	205	279	501	21	586	84	47	417	543	714	769	..
Dadu Bajwa ..	140	156	135	146	150	116	311	342	395	330	31	205	224	269	22	293	95	85	217	312	354	338	..
Badiana ..	248	244	220	229	194	265	200	259	200	253	184	178	168	232	15	247	68	63	167	244	272	268	..
Sáhiánwáli	155	159	159	146	125	217	154	161	171	164	145	118	125	153	19	174	67	46	133	159	202	194	..
Bhullor ..	302	304	300	303	263	360	343	146	355	315	295	235	243	316	30	322	153	113	282	273	356	349	..
Doburji Kakezián	585	547	613	755	363	649	605	791	821	862	356	293	417	469	115	687	394	202	591	567	667	715	..
TOTAL ..	8,734	8,560	8,583	7,427	4,268	9,366	8,323	8,696	9,513	8,867	6,280	4,428	5,254	7,267	875	9,285	3,189	2,171	6,972	7,342	9,661	9,959	..

Statement showing Kharif Barani cropped area in acres, of the following villages in Pasrur Tahsil.

Names of villages.	YEAR.																						
	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907
Naukaríán..	134	139	137	129	126	99	139	133	107	77	140	154	172	176	18	164	85	77	159	118	127	124	18
Khichíán Bhattíán..	122	145	140	120	141	138	167	149	101	50	120	120	127	183	60	216	86	82	163	81	137	111	20
Malo Patiál	42	50	66	103	89	92	62	57	56	46	57	91	77	86	3	121	28	30	96	88	92	102	5
Bureke ..	122	104	110	136	98	124	274	41	187	175	242	204	230	214	105	221	116	179	251	179	228	207	23
Mardána ..	121	192	187	189	135	125	242	264	206	183	260	220	117	258	33	249	87	98	192	87	105	135	18
Kotli Bájwa	21	27	26	28	29	29	23	32	23	31	56	38	34	43	6	39	2	36	39	22	29	17	4
Sadullápur	98	82	91	184	121	77	114	147	101	135	157	106	109	164	27	197	70	143	176	118	137	102	21
Mirza Bájwa	114	111	107	111	108	99	96	115	116	99	122	132	92	147	23	181	43	124	122	84	103	75	9
Dullamwala	99	110	86	124	129	90	105	133	123	117	126	117	122	143	58	165	51	189	169	239	94	88	6
Bakhtpur ..	57	105	116	66	67	79	87	111	102	65	127	94	99	117	22	124	46	126	97	71	77	61	14
Jitogil ..	62	60	69	72	58	66	51	63	48	60	68	68	52	64	6	67	27	73	68	47	53	50	1
Tawána ..	52	55	53	49	52	47	47	66	50	53	62	52	44	60	1	69	31	58	69	45	45	39	21
Bhuler ..	191	392	341	371	373	420	405	440	399	334	423	329	408	440	10	449	208	405	454	172	238	277	72
Mírakpur ..	57	52	26	82	107	110	120	195	81	83	92	104	109	138	42	117	84	116	100	44	69	87	45
Chak Hush-yára ..	78	77	53	79	72	66	54	53	40	30	71	84	111	98	8	69	19	87	67	25	30	58	15
Tayab Bhuttá ..	46	50	48	60	54	75	52	52	39	44	63	61	52	78	24	72	27	65	89	27	24	45	15
Bhakhtpur	50	89	90	97	95	103	54	66	51	54	70	65	73	87	2	105	51	94	110	59	40	63	10

Mahár ..	135	265	251	182	174	211	138	76	149	128	182	169	189	228	3	242	126	186	252	157	127	148	57
Kalaswáli ..	190	426	496	350	373	405	300	372	347	307	346	325	379	446	63	475	289	376	497	290	286	333	91
Doburjí ..	93	215	209	142	173	185	90	122	97	100	125	155	142	191	12	194	88	161	220	128	80	109	28
Kotli Khawája ..	95	127	99	102	120	133	86	120	107	103	119	120	117	148	16	152	78	103	161	56	64	117	7
Daulatpur ..	107	139	150	138	153	148	145	150	142	152	176	147	164	185	17	205	73	144	218	114	58	134	1
Haibatpur ..	100	146	129	124	172	187	176	178	139	137	160	165	126	225	5	215	49	57	243	26	49	145	7
Noshera ..	252	352	352	353	373	435	157	358	254	256	341	300	301	514	25	510	209	181	658	93	126	241	13
Talwandi Inaitkhan	306	302	369	274	339	396	317	352	254	224	345	311	176	498	15	475	134	277	527	119	279	253	47
Dadu Bajwa	140	156	135	145	150	116	119	145	146	114	178	155	121	183	48	194	108	143	176	136	116	127	6
Badíána ..	92	105	96	95	94	105	106	115	117	80	78	103	85	120	36	129	59	115	121	69	86	85	5
Sáhiánwálí	100	101	94	94	108	99	85	104	91	84	105	100	79	102	17	123	67	93	109	72	70	84	12
Bhullar ..	142	158	149	151	154	147	128	139	117	122	145	149	138	155	13	196	94	167	193	123	143	150	42
Doburji Kakezíán ..	268	305	303	318	179	392	379	287	472	277	409	447	224	452	22	514	222	397	510	328	318	288	102
TOTAL ..	3,496	4,637	4,578	4,468	4,416	4,798	4,318	4,635	4,262	3,720	4,945	4,685	4,269	5,943	740	6,249	2,657	4,382	6,306	3,222	3,430	3,855	735

Statement showing Rabi Barani cropped area in acres of the following villages in Raya Tahsil.

Names of villages.	YEAR.																						
	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908
Chak Nadoke	77	71	66	69	60	76	67	68	68	78	55	47	43	40	28	56	..	..	44	56	63	70	11
Jarowálí ..	52	37	50	31	24	52	44	50	52	50	45	18	22	33	..	54	15	31	51	44	55	55	17
Cháhal ..	185	165	137	142	139	205	135	182	200	195	139	68	101	108	..	186	37	117	194	177	207	235	43
Bubak ..	609	553	523	482	393	642	551	630	630	575	494	296	370	434	18	615	152	419	615	523	661	738	135
Rajáda ..	355	272	260	267	186	319	298	347	319	308	247	118	197	209	68	330	21	209	300	282	326	339	62
Habib Chak	64	55	56	56	56	63	56	60	63	48	46	16	40	39	6	51	7	33	58	51	63	67	13
Shahábadíke	217	195	178	185	158	219	213	211	234	191	173	143	206	194	51	209	44	195	196	192	249	233	92
Chak Shahábadíke .	96	96	106	105	55	128	133	143	195	138	90	51	52	116	..	119	5	37	136	68	126	148	40
Lallahar ..	72	70	73	82	64	75	60	70	76	62	61	43	54	52	8	62	24	51	62	65	67	81	32
Dhola ..	560	414	436	395	385	589	560	506	320	499	431	245	174	213	168	509	118	343	455	447	615	609	144
Domála ..	361	362	370	352	231	389	372	376	385	386	250	250	293	292	9	401	35	238	373	371	462	464	125
Kesúwálí ..	213	202	204	190	169	209	183	204	255	208	176	120	135	199	33	218	34	149	213	187	236	232	96
Akalgurh ..	89	98	95	83	64	99	80	92	99	95	75	54	58	64	2	86	16	66	80	70	90	104	21
Sutto Bajwa	93	97	87	76	70	100	105	109	109	96	87	67	86	79	13	91	20	82	101	92	109	113	24
Ladhar Becharagh.	76	65	57	63	51	90	55	80	87	83	70	15	31	38	..	69	4	41	69	80	96	97	32
Sáhdoke ..	172	167	159	146	128	182	182	199	190	116	141	107	96	135	19	203	77	133	190	184	227	226	79
Buso Waíran	79	72	68	76	37	69	93	87	102	96	65	52	48	52	23	79	9	60	97	73	87	104	20
Marálí ..	415	363	397	363	294	457	344	420	435	414	363	229	320	298	21	386	166	375	420	376	45	492	181

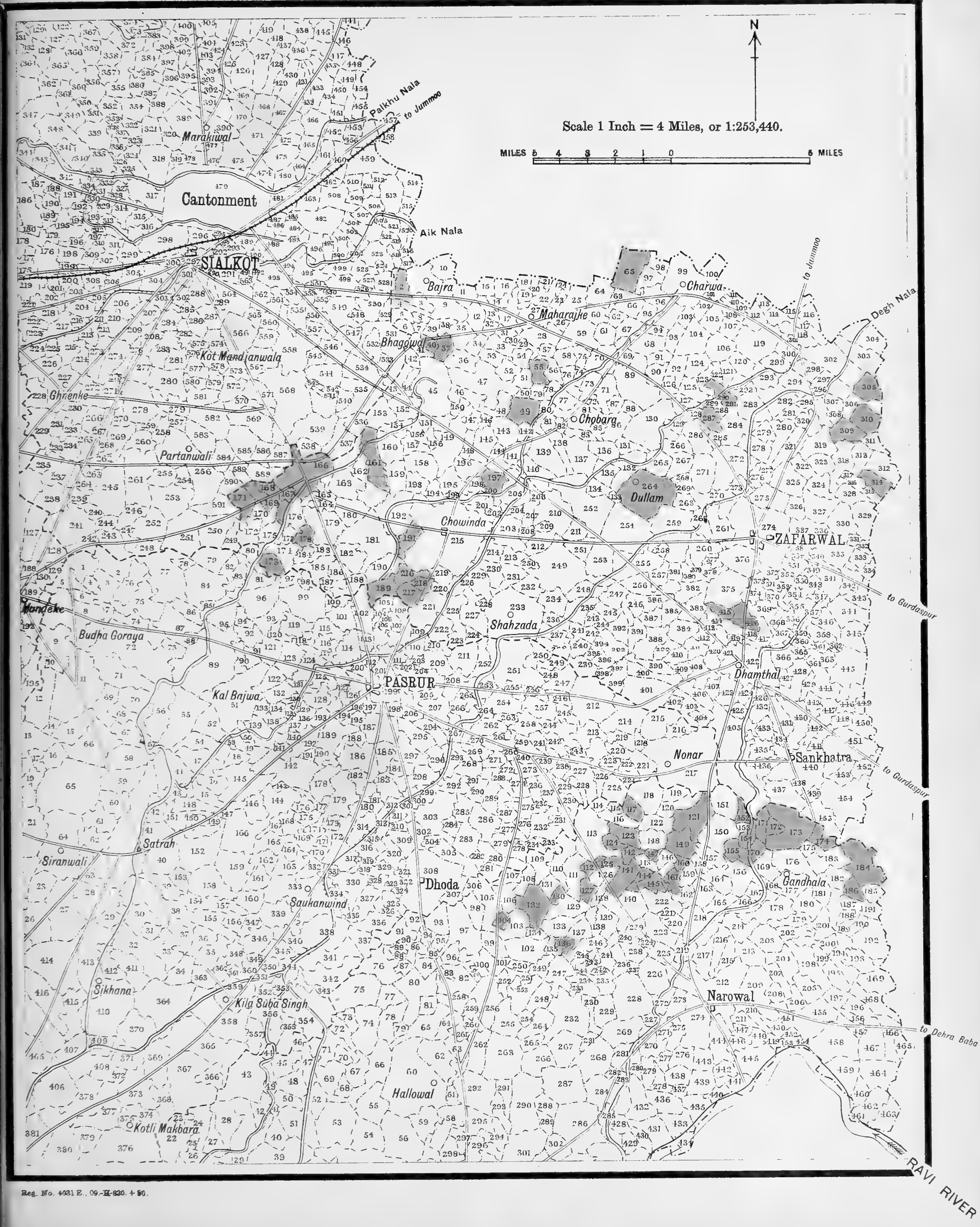
Ruttian Khurd ..	76	63	58	54	42	78	90	64	80	82	53	23	60	62	..	76	29	54	84	86	102	101	31
Chak Mughal ..	87	71	53	66	35	31	92	98	112	111	79	3	12	33	..	114	6	38	114	121	125	135	4
Chak Padda	94	95	71	68	24	99	73	97	97	96	90	41	30	52	..	105	53	74	116	119	116	138	25
Dahír ..	158	140	139	126	108	176	164	163	164	161	136	111	103	103	19	172	61	127	179	166	210	209	42
Budhokot .	154	131	128	132	91	148	138	149	165	141	117	98	127	130	..	157	72	123	163	137	171	178	42
Khúnian ..	202	198	160	176	56	273	200	267	249	234	197	44	56	78	..	267	45	67	204	256	274	321	56
Kaladea ..	128	127	13	85	39	118	118	50	97	129	83	..	10	89	..	136	1	13	115	77	137	160	..
Pandori ..	78	63	16	54	56	20	101	113	136	116	67	3	81	27	..	128	4	20	71	126	109	144	7
Múloke ..	616	633	483	475	184	617	647	612	712	640	400	144	141	142	16	738	41	273	610	746	804	816	88
Dhála Dhálí	248	179	180	184	171	262	224	265	222	260	141	72	186	139	47	259	8	150	249	278	319	337	49
Ladhewálu	552	391	156	198	148	182	225	225	226	227	210	91	228	202	..	505	14	93	389	438	345	597	33
Saháran ..	339	325	244	270	271	354	315	482	340	341	366	136	269	289	..	404	27	241	395	358	427	414	82
TOTAL ..	6,517	5,770	5,023	5,051	3,789	6,321	5,918	6,419	6,419	6,176	4,942	2,705	3,629	3,941	549	6,785	1,145	3,852	6,325	6 246	7,333	7,987	1,626

Statement showing Kharif Barani cropped area in acres of the following villages in Raya Tahsil.

Names of villages.	YEAR. 1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907
Chak Nadoke ..	11	15	9	15	9	16	3	11	8	5	12	23	25	28	..	38	4	29	31	3	14	15	..
Jarowálí ..	26	34	30	34	29	40	28	35	34	28	34	36	33	35	4	35	19	36	33	23	26	36	24
Cháhal ..	62	102	97	95	85	112	127	127	107	131	118	104	128	128	3	143	75	140	114	88	74	84	31
Bubak	181	234	210	261	257	281	201	284	246	259	240	248	249	238	1	376	170	343	217	175	149	151	40
Rajáda ..	77	114	19	126	119	124	94	136	112	138	150	95	149	169	2	180	93	187	126	108	87	100	54
Habíb Chak	27	32	26	31	28	33	19	32	29	34	36	24	25	37	3	39	15	38	22	14	17	25	16
Shahábadíke	108	70	86	108	95	117	85	122	127	120	105	126	76	122	7	166	96	94	132	89	77	110	55
Chak Sahá-badike ..	31	53	29	34	52	37	25	43	35	23	35	40	58	69	..	97	35	101	15	23	27	28	13
Lallahar ..	24	26	19	19	33	29	28	31	35	43	30	33	29	39	2	55	32	49	41	19	24	35	17
Dhola ..	57	154	113	130	164	175	126	193	126	193	216	210	272	318	26	373	109	167	259	190	163	185	80
Domála ..	183	187	136	186	198	218	144	319	251	191	202	183	152	228	7	273	194	295	233	148	168	175	67
Kesúwálí ..	103	89	85	109	111	121	106	114	131	107	111	115	91	104	6	164	121	155	102	87	93	105	48
Akalgarh ..	30	27	37	47	57	46	30	34	40	45	41	39	36	36	1	44	43	48	43	28	34	37	22
Sutto Bájwa	43	39	37	54	59	57	37	47	37	58	42	53	56	56	2	57	34	66	49	41	38	35	31
Ladhar Be-charágh ..	22	29	29	63	51	90	20	34	48	30	28	39	39	44	2	66	16	51	30	16	30	30	14
Sáhdoke ..	112	116	111	118	130	128	91	114	120	105	121	130	130	127	9	133	92	148	124	98	101	94	78
Buso Wairán	35	35	44	30	50	53	26	47	47	40	57	50	43	45	2	62	36	61	52	53	36	40	21

Marali ..	112	148	153	163	154	178	136	209	146	166	158	255	195	207	4	273	141	213	170	148	127	130	49
Ratián Khurd ..	15	43	33	30	35	26	28	23	19	26	48	20	49	37	7	55	16	53	27	33	32	36	9
Chak Mughal	52	48	28	60	38	72	33	68	74	51	77	27	93	28	1	39	..	86	35	43	39	46	17
Chak Padda	17	37	22	49	54	62	52	71	60	42	70	50	56	42	..	54	50	95	53	55	45	46	23
Dahír .	85	85	75	74	83	90	70	82	77	64	102	103	83	90	2	107	71	107	75	80	49	65	40
Budhokot ..	53	74	63	67	73	92	63	79	61	61	83	71	54	69	1	102	76	97	75	61	49	44	41
Khúníán ..	86	147	103	158	132	136	91	108	190	160	191	82	105	100	..	91	122	186	146	104	86	110	37
Kaladeva ..	57	61	26	94	52	69	41	87	140	73	102	14	74	69	..	63	51	116	51	70	74	83	5
Pandori ..	34	43	37	53	48	88	52	78	95	77	109	52	88	86	..	110	37	100	76	36	37	67	20
Muloke ..	325	279	174	161	178	225	192	392	331	445	200	220	212	218	15	268	153	539	390	243	257	354	166
Dhála Dhalí	118	91	102	136	108	153	98	114	157	123	136	92	134	131	6	173	64	161	152	113	99	115	72
Ládhewála..	151	152	136	265	200	290	289	288	84	56	56	58	7	320	17	351	166	371	330	285	194	208	81
Sáhárán ..	193	180	163	252	252	319	315	397	163	127	189	73	265	265	17	323	206	350	257	255	202	213	94
TOTAL ..	2,430	2,744	2,232	3,023	2,934	3,477	2,650	3,719	3,130	3,021	3,099	2,696	2,998	3,485	147	4,310	2,337	4,482	3,460	2,729	2,448	2,802	1,265

MAP SHOWING THE 30 SELECTED VILLAGES IN EACH OF THE TAHSILS SIALKOT, ZAFARWAL, RAYA, AND PASRUR.



INDEX.

Memoirs of the Asiatic Society of Bengal, Vol. II.

D

I

T

U

V

Memoirs of the Asiatic Society of Bengal.

1905—1906.

I. *On certain Tibetan Scrolls and Images lately brought from Gyantse.—By* PROF. SATIS CHANDRA VIDYĀBHŪṢAṆA, M.A., M.R.A.S. (Price Re. 1-8; or 2*s.* 3*d.*)

II. *Sal-Ammoniac: a Study in Primitive Chemistry.—By* H. E. STAPLETON, B.A., B.Sc. (Price Re. 1; or 1*s.* 6*d.*)

III. *The Similarity of the Tibetan to the Kashgar-Brahmi Alphabet.—By* The REV. A. H. FRANCKE. (Price Rs. 2; or 2*s.* 10*d.*)

IV. *Alchemical Equipment in the Eleventh Century, A.D.—By* H. E. STAPLETON and R. F. AZO. (Price Re. 1-8; or 2*s.* 3*d.*)

V. *Malaysian Barnacles in the Indian Museum, with a list of the Indian Pedunculata.—By* N. ANNANDALE, B.A., D.Sc. (Price Re. 1-8; or 2*s.* 3*d.*)

VI. *Ashrafpur Copper-plate Grants of Devakhadga.—By* GANGA MOHAN LASKAR, M.A. (Price Annas 8; or 10*d.*)

VII. *Festivals and Folklore of Gilgit.—By* GHULAM MUHAMMAD. (Price Rs. 2; or 2*s.* 10*d.*)

VIII. *Notes on the Bhotias of Almora and British Garhwal.—By* C. A. SHERRING, M.A., F.R.G.S., I.C.S. (Price Re. 1-5; or 2*s.*)

IX. *Religion and Customs of the Uraons.—By* the late REV. FATHER DEHON, S.J. (Price Rs. 2; or 2*s.* 10*d.*)

X. *Notes on the Fauna of a Desert Tract in Southern India* (Herpetology and Entomology).—*By* N. ANNANDALE, D.Sc., C.M.Z.S., with a list of Mammals by R. C. WROUGHTON, F.E.S. (Price Rs. 2; or 2*s.* 10*d.*)

XI. *Amulets as Agents in the Prevention of Disease in Bengal.*—Compiled in the Office of the Superintendent of Ethnography, Bengal. (Price Annas 12; or 1*s.* 2*d.*)

XII. *Earth-Eating and the Earth-Eating Habit in India.—By* D. HOOPER and H. H. MANN. (Price Re. 1; or 1*s.* 6*d.*)

XIII. *On a Cup-Mark Inscription in the Chumbi Valley.—By* E. H. C. WALSH, I.C.S. (Price Re. 1; or 1*s.* 6*d.*)

XIV. *A Descriptive List of the Sea-Snakes* (Hydrophiidæ) *in the Indian Museum, Calcutta.—By* CAPTAIN F. WALL, I.M.S., C.M.Z.S. (Price Re. 1; or 1*s.* 6*d.*)

XV. *Common Saws and Proverbs collected, chiefly from Dervishes, in Southern Persia.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Re. 1; or 1*s.* 6*d.*)

XVI. *The Common Hydra of Bengal: its Systematic Position and Life History.—By* N. ANNANDALE, B.A., D.Sc., C.M.Z.S. (Price Re. 1; or 1*s.* 6*d.*)

XVII. *Animals in the Inscriptions of Piyadasi.—By* MONMOHAN CHAKRAVARTI, M.A. (Price Annas 12; or 1*s.* 2*d.*)

XVIII. *Some current Persian Tales told by Professional Story-Tellers.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Re. 1; or 1*s.* 6*d.*)

XIX. *The Dards at Khalatse in Western Tibet.—By* REV. A. H. FRANCKE. (Price Re. 1-6; or 2*s.*)

Supplement, Miscellanea Ethnographica. Part I. 1. *The Blow-Gun in Southern India* 2. *Miscellaneous objects from the Rámanád subdivision of the Madura district* 3. *Indian Weighing-beams.—By* N. ANNANDALE, D.Sc. (Price Re. 1.)

Supplement, Miscellanea Ethnographica. Part II. 1. *Some Malayan Weapons—By* N. ANNANDALE. 2. *Plan of a Persian Gentleman's House.—By* LIEUT.-COL. D. C. PHILLOTT. (Price Annas 8; or 10*d.*)

Memoirs of the Asiatic Society of Bengal.

Vol. II.

I. *Cirrhipèdes operculés de l'Indian Museum de Calcutta.—Par* M. A. GRUVEL. (Price Rs. 2; or 2s. 10d.)

II. *The Coinage of Tibet.—By* E. H. C. WALSH. (Price Re. 1; or 1s. 6d.).

III. *The Exact Determination of the Fastness of the more Common Indigenous Dyes of Bengal, and comparison with typical synthetic Dye-stuffs. Part I. Dyeing on Cotton.—By* E. R. WATSON. (Price Re. 1; or 1s. 6d.)

IV. *The Saorias of the Rajmahal Hills.—By* R. B. BAINBRIDGE. (Price Rs. 2; or 2s. 10d.)

V. *Mundari Poetry, Music and Dances.—By* REV. FR. J. HOFFMANN, S.J. (Price Re. 1; or 1s. 6d.)

VI. *Tarikh-i-Nuṣratjangi.—By* HARINATH DE. (Price Re. 1; or 1s. 6d.)

VII. *The Exact Determination of the Fastness of the more Common Indigenous Dyes of Bengal, and comparison with typical Synthetic Dye-stuffs. Part II. Dyeing on Silk.—By* E. R. WATSON. (Price Annas 12; or 1s. 2d.)

VIII. *Monograph on Sea Snakes.—By* MAJOR F. WALL, I.M.S. (Price Rs. 5; or 7s.)

IX. *A Polyglot List of Birds in Turki, Manchu and Chinese.—By* E. DENISON ROSS, PH.D. (Price Rs. 4; or 6s.)

X. *Notes on some Monuments in Afghanistan.—By* H. H. HAYDEN. (Price Re. 1; or 1s. 6d.)

XI. *On the Correlations of Areas of Matured Crops and the Rainfall, and certain allied problems in Agriculture and Meteorolgy.—By* S. M. JACOB, I.C.S. (Price Rs. 2-8; or 3s. 10d.)

Ramacarita by Sandhyakara Nandi.—Edited by MAHAMAHOPADHYAYA HARAPRASAD SHASTRI, M.A. (In the press.)

The Journal of Major James Rennell, F.R.S., First Surveyor-General of India.—Edited by T. H. D. LATOUCHE. (In the press.)