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in the Darjeeling district for fibre. From the evidence relating to other parts of the Himalayas, it is improbable that such cultivation does not exist.

166. Though there is not any great amount of illicit cultivation, it will be

Irregular cultivation. It may yield ganja, but probably does not often do so.

interesting to note the information furnished by reports and evidence as to the methods employed in it.

Mr. Basu, Assistant to the Director of Land Records and Agriculture, reports that he observed signs of the spontaneous growth where it was not plentiful being looked after with some degree of care. Talking of Bhagalpur and Purnea, he says : "As a rule the people of these districts could not distinguish between male and female plants, the leaves of both being used as a bhang; but one man pointed out to me a plant which was a female, and said that this class of plants produced the best drug. It is not uncommon to see a few selected plants, mostly females, left on the ground; these acquire a more bushy appearance not unlike that of the ganja-bearing plant. All this made me suspect that the people knew a great deal more about the bhang plant than they were willing to avow." This would lead to the belief that the secret cultivator not unfrequently succeeds in producing smokable ganja. An Excise Deputy Collector describes one method by which the plant is not only concealed from view, but which may result in effectually secluding the female plant. When the plant is a foot high, an inverted earthen pot is placed over it supported by pegs fixed in the ground. The confined growth takes the form of a cabbage-flower (*sic*), and would in all probability retain the resin in more than common quantity. A Burmese witness has described a similar method as being the regular practice in the Shan States. The Registrar of Calcutta (98), enquiring from fakirs and religious mendicants, learns that the wild plant is made to produce ganja for smoking by lightly rolling the flower spikes of the growing plants between the hands, thereby causing the component parts of the spike to stick together, and preventing the access of the pollen. "This treatment, repeated several times, converts the spikes into what is commonly called *jata*, which gives the matted appearance to the article." Witness (53) states that he has seen ganja plants cultivated illicitly from the twigs of which ganja as good in appearance as excise ganja can be prepared, but the flavour of it is alleged to be inferior. There is not in the evidence, however, any general confirmation of the supposition that the illicit cultivation produces the stronger form of the drug. The matter will be further examined in dealing with the preparation of the drugs.

There are not, however, sufficient grounds for supposing that the homestead cultivation or the fostering of the wild plant is carried on on any extensive scale. It is not often that either practice produces anything superior to bhang, and where there is an unlimited quantity of good bhang growing wild, there can be little inducement to illicit cultivation with its attendant risks. No information has been given of occupants ever being paid for allowing the bhang growing on their lands to be collected, and that incentive to fostering the plant appears to be wanting. It will be seen also that where the wild plant does not prevail, the licit consumption of ganja is comparatively small, and the consumers are therefore few.

167. The Tributary States of Orissa after the Ganja Mahal contain the most extensive and important cultivation in the Province of Bengal. This cultivation has never been made

Tributary Mahals.

the subject of detailed enquiry and report, and the information now given in answer to the Commission's questions is but scanty. It appears to be of the homestead sort, and limited to a few plants in each plot. The only suggestion offered that it is sometimes conducted on a larger scale comes from the Sub-divisional Officer of Jajpur in Cuttack (52), who says: "If the lands be small, the seeds are sown broadcast; if the lands be large, the seeds are first sown in a nursery plot." Mr. Wylly, Government Agent at Keonjhar, states that the plant is grown in seed beds in April and May and transplanted, which may be regarded as some confirmation of the above witness. If this fact is accepted, the evidence shows that the plants are raised in three ways—either accidentally sown, sown broadcast, or transplanted. At the beginning of the rainy season—that is, in June-July—the plants will be about a foot high, and standing in greater or less number in a plot near the homestead. The plant takes some five or six months to mature from the time it has reached this stage. Mr. Taylor (36), an officer who has served in Orissa since 1866, says that the plants are hoed and weeded, and the roots loosened and dressed with vegetable mould or well-rotted cowdung. Rai Nand Kissore Das, District Officer of Angul, states that the plants are watered when necessary. There is no evidence that the male plants are extirpated. Witness (63) does not speak positively on the point, but it would appear from the evidence of Mr. Wylly that some distinction is made in the treatment of plants

The female plants are twisted of different sex. "The *male* plant," he says, doubtless meaning the *female*, "is emasculated by having its stem punctured or cut, and pieces of broken tile inserted in these cuts." That this process is in vogue is confirmed by Babu Manmohan Chakravarti, who does not, however, make any distinction of sex with reference to it. The plant is subjected to still another operation, which is mentioned by Rai Nand Kissore and Babu Manmohan Chakravarti, without any distinction of the sex of the plant, except that the female plant is indicated by the language used. The former says "nothing more than the twisting of the stem for the production of ganja is done;" the latter, "to prevent over-branching of the flower heads, they are roughly twisted." There is no more information of the treatment of the plant till it ripens and is gathered in December-January. This appears to be the season of growth notwithstanding that Babu Kanti Bhushan Sen makes it synchronous with the Rajshahi season. It cannot be correct, as he states that the plant grows spontaneously from the previous year's seed towards the close of the rainy season, for this is contrary to the habits of the hemp plant in the plains of Northern India, and the fact that the natural conditions at the close of the south-west monsoon do not seem to be favourable to the spontaneous germination of any kind of seed.

168. The summary of the results of the inquiry made by Mr. Grimley in 1890 Political States, Chota Nagpur. in the States of the Chota Nagpur Division gives Information derived from an inquiry made in 1890. a few details of the method of cultivation in that region. Unfortunately no question was directed to ascertaining the season of growth, and the information on this point is not, therefore, decisive. Sirguja reports that seeds are sown or plants grow during the rainy season. This agrees with the account from the Garhjat States as was to be expected. The practice of transplanting is mentioned from Udaipur. In the answers to the question whether the male plants are destroyed, the sexes are confounded, but it is clear that the general external differences are recognised. Bonai reports that those

plants on which flowers grow are destroyed, and those on which the leaves become intertwined are preserved. The latter description clearly indicates the clustered spike of the female plant. Gangpur reports that the male plants (really female) which produce flowers and fruit are not destroyed, which may well imply that the others are. It may be inferred generally that the practice is not well established or systematically carried out. It is probably in the empirical stage described by Dr. Prain (page 12), and directed to the removal of a plant which is useless rather than mischievous; for Bonai says: "No one can distinguish which is the male or female plant." The answers show also that the male plant is very generally preserved for use as bhang, while the one with intertwined leaves is kept for ganja. The ground is ploughed and dressed, but not apparently treated in any special

Mutilation of the female plant. manner. The splitting of the stem with insertion of a potsherd and the twisting of the plants are

practised; but it would appear from the Udaipur answer that the twisting is merely the means of splitting the stem. It is reported from Gangpur that cross incisions are made in the stem with a knife, and "something like opium or other intoxicating thing is put into it, and the interstice is then closed up with earth to increase the power of intoxication." It may be concluded that the method of cultivation does not differ from that in vogue in the Garhjat States.

169. No description is furnished of the cultivation in Hill Tippera, but a well informed witness classes it with that of the Garhjat States. It is not likely that it is more skilful or elaborate.

Hill Tippera.

170. There is no regular cultivation in Kuch Behar, and the homestead cultivation, if there is any, cannot be different from that of the surrounding British territory.

Kuch Behar.

171. There is no regular cultivation in Assam, and the evidence gives no information about the processes employed in the illicit and hill cultivation. Mr. Anderson states that the Miris of Lakhimpur hedge in the wild growth; Mr. Godfrey that the plant is weeded. The cultivators named are, besides the Miris of Lakhimpur, the Nagas of the Sibsagar frontier. Mr. Spicer mentions Kukis, Patnies, and a few coolies, and his evidence relates to the Cachar Valley. The hill tribes of the province and its frontiers may be included in the list, and the coolies generally. The drugs produced are bhang and very inferior ganja. The two things are practically the same.

Assam.

172. There are three classes of cultivation in this province—that carried on in the Himalayas for fibre and seeds with charas as a bye-product, the recognised cultivation of bhang in Farakhabad and Hardoi, and the desultory homestead cultivation which prevails to a greater or less extent everywhere in the plain country.

North-Western Provinces.

173. The first is well described by witness (49) and in the "Field and Garden Crops of the North-Western Provinces and Oudh" by Duthie and Fuller. Mr. Dharma Nand Joshi is Settlement Deputy Collector, Garhwal, and his account is probably based on personal inquiry and observation, and may therefore be quoted. The fields near houses are generally selected for hemp because they are better manured,

Cultivation in the Himalayas.

and the soil must be light. Early in June the field is cleaned of all rubbish which is burnt upon it. It is ploughed immediately after a good downfall of rain. In the beginning of July the seed is sown; and this must be done on a fine day, for the seed will not grow if sown in the wet. Chaff is then scattered over the field to protect the seed from the birds. In eight days the seed germinates, and fifteen days afterwards the crop is carefully hoed so that the plants are not injured. After another fortnight the field is weeded a second time. No other operation is described till September (Bhado), when the plants have grown up, and some have begun to bear seed. These are called "sujango" or "kalango" (according to Duthie "*gul* bhang"), and are the female plants. Some do not bear seed, and are called "phulango" (according to Duthie "*phul* bhang"), and they are the male plants. These latter are plucked up and laid in the sun for a few days to dry, and are then manufactured into fibre. The fibre from the male plant is superior. The female plants have meantime been growing up to a height of some ten feet, of which the upper third is full of leaf and seed. In (Kartik) November the female plants are cut down from the root, and spread in the sun for twenty-four hours to dry. The charas is then got from the plants by rubbing the heads between the hands. This description gives the female plant a life from germination to harvest of little more than four months. Duthie and Fuller put the sowing in May, and this gives a longer life, more nearly approaching the period of growth, about six or seven months, in the ganja tract of Bengal. The latter is probably the more correct.

174. Duthie and Fuller write that hemp growing is restricted to the lowest Class of cultivators : Cultivation is not reputable. classes of cultivators, being considered beneath the dignity of the higher castes. So much is this the case that the phrase "May hemp be sown in thy house" is one of the commonest of abusive imprecations. Mr. Dharma Nand and other witnesses corroborate this account. The principal cultivators appear to be the Khasias or Tabhilas, a class of people above the Domes and below Rajputs in the social scale, who do not wear the sacred thread. If a Brahman or Rajput wishes to cultivate hemp, he engages a Khasia or Dome to work for him; but, after the crop is taken off, he has no prejudice against making charas or separating the fibres from the stalks. Dr. Prain (page 48) has traced the contempt in which the hemp cultivator is held to the original motive of the cultivation, *viz.*, the production of fibre, and points out that the cultivators of other fibres, such as *sann* (*Crotalaria*), are similarly regarded. Mr. Cockburn (34) confirms this explanation, suggesting that the offensiveness of the operation of rotting the stalks is the origin of the dislike. Unfortunately Mr. Dharma Nand from direct knowledge contradicts this, which might have been a reasonable solution of the question; for he says that the higher classes have no objection to this operation. The origin of the prejudice is probably to be sought in very early social institutions.

The seeds are, next after the fibre, the important part of the products of Himalayan cultivation. They are eaten, and yield oil. The seed of the uncultivated plant is very inferior in size, and is not therefore used for sowing.

175. There is very little information about the methods employed in the regular cultivation of bhang in the districts of Farakhabad and Hardoi. The regular cultivation of bhang. The crop must be grown in fairly large plots or fields, for it is capable of being measured, and the Agricultural Department apparently keeps a record of the area. The seed would seem to be sown at

the same season as wheat and barley, and mixed in patches with these crops. It is harvested in May after the other crops have been taken off the ground. There is no evidence of the male plant being eradicated.

176. The homestead or desultory cultivation for the production of ganja seems to be carried on for the most part secretly. Mr. **Secret cultivation.** Bruce of Ghazipur, referring to his own district of course, states that the cultivation is not carried on openly, and it is therefore difficult to obtain any particulars about it; that the seed is sown broadcast in good soil, and the plants afterwards moved to some enclosed place, such as the courtyard of a house, and carefully tended; and that the female plants are used for ganja. Regarding the practice of eradicating the male plant, the evidence is not decisive, and what there is refers sometimes to the tending of wild growth, and sometimes to the more methodical cultivation. Thus Mr. Ferrard, Magistrate and Collector of Banda, referring to the spontaneous growth on the Gumti river, says that, in spite of close police supervision, "the people continue to keep some plants and leaves, and prepare drugs from them. In such cases the male and female plants are kept separate." He may be talking in this place of the drugs and not the growing plants, for he says further that he has been told that "the male plants are cut down when young and dried, and its leaves form bhang. Ganja is made from the female flower and petals when almost ripe. The plants can grow together until the period of fertilisation." Witness (48) has been told that the male plants are extirpated. On the other hand, the drug contractor of Moradabad (248) had never heard of the male plant being extirpated.

177. The information regarding bygone cultivation throws some light on the knowledge of the people and the practice in respect of the removal of the male plant. **Cultivation for ganja in former days.** Witness (61) states that there was a good deal of cultivation formerly at Loohaisar, tahsil Fatehpur, in Barabanki, but it was forbidden. Witness (249), referring to the same cultivation, seems to say that it was grown in a tract called Mahadeva, and this must have yielded the ganja which other witnesses speak of as Mahadeva. Witness (61) gives some details of the methods then employed. The seed used to be sown with wheat and other crops, and when the plants had attained a little growth, the Kabariyas, and they only, were able to distinguish which were ganja and which bhang plants, *i.e.*, female and male respectively. The ganja plants were then transplanted to some suitable spot. He mentions also the practice of twisting the leaves (*sic*) to make the plant produce ganja.

178. It is not worth while discussing the evidence of individual witnesses further. It may be inferred from the whole that the **Principal features of irregular cultivation.** distinction between the male and female plants is pretty widely known; that where the spontaneous growth is in small and manageable quantity, and where plants have been sown in suitable places, or transplanted into such places, the female plants often receive special care and have the males removed from among them; and that for the more desultory sort of cultivation it is not very material whether the seed is taken from the cultivated or wild growth, from ganja or from bhang.

179. There is no information of any methods in vogue in the States of Tehri **Tehri Garhwal and Rampur.** Garhwal and Rampur different from those of the province generally.

180. There is more or less evidence of cultivation of the hemp plant all over Punjab. the Himalayan portion of the province, including the smaller Native States. The cultivation is in small patches. A report from Kulu in 1880 says: "Almost every house has a small patch near it, a long strip beside a hedge, or a small bed a few square yards long (*sic*) in area." The only other detail of cultivation furnished is that the season of growth is from April and May to October and November. It may be safely assumed that the method of cultivation does not materially differ from that practised in Kumaon, which has been fully described. Whether charas is produced to the same extent may be open to doubt, but the information on the point is defective.

181. Though the extent of cultivation in the Punjab plains is not great, the details of the methods employed in it, which can be gathered from the evidence and papers, may be noted. A memorandum by Hari Chand, Assistant to the Commissioner of Excise, states that "people grow it in both harvests in the months of March and November. They cut plants for use in February and June." The latter named months appear to relate to the period within which the plant is gathered if it is sown with the late or *rabbi* crops. An account of the cultivation is furnished in the appendix of Mr. James Wilson's evidence as having been given him by his Excise Assistant, Mr. Kirthee Singh. The plant is reared for bhang only, never for ganja, and charas is not extracted except rarely for private consumption. The land is usually close to the village, and of the description called *niain*, the same as that described by Duthie and Fuller, when speaking of the Himalayan cultivation, which the daily offices of the villagers provide with a plentiful supply of manure. It is ploughed frequently in August and September, the seed is sown broadcast in the latter month, and the field is watered. The watering is repeated three or four times, and the crop is hoed now and then and kept clear of weeds. The crop is ready to cut in March and April. No distinction is made between male and female plants. The whole is cut and dried together, and the leaves, flowers, and small twigs are then shaken out and form bhang. The outturn is eight to ten maunds a bigha. A little charas is sometimes made by beating the flowering twigs over a piece of cloth laid on the ground. A greyish white powder falls on the cloth which is collected and dried.

182. This account gives only one season of cultivation, but there are witnesses to corroborate the Assistant to the Commissioner of Excise as to the plants being grown with both the early and late crops, and other fragmentary information is furnished as to the processes employed. Witness (68) mentions the use of goat and sheep dung, and the advantage of sowing four or five seeds together when the plant is to be grown amongst tobacco or garden crops. This would be cold weather cultivation. He also mentions the broadcast sowing, and states that the product of the plants grown in *sailaba* lands is more intoxicating. Witness (26) states distinctly that there are two seasons for the cultivation, from *Kartik* to *Chait* (October-November to April-May), and *Baisakh* to *Sawan* (May to August); and he mentions two curious manures, the "excreta of a serpent" and "decayed swallow-wort." The cultivation is carried on in small plots, and only by the keepers of

takyas and *dharamsalas*, especially by Sikhs. Witness (74) states that transplanting is practised, and that the cultivators are the fakirs and keepers of *dharamsalas* and consumers generally. Witness (67) gives three seasons for cultivation, probably the times of sowing, October-November, February-March, and July-August, and states that the plant is sometimes manured after it has grown a foot or two high. Witness (19) gives the season of sowing as from October to January and the harvest time as March, and states that the crop is cultivated like other *chahi-hatri* crops on *chahi*, *hatri*, or *sailaba* lands. The crop is cut at night to prevent the loss of seed that would otherwise occur. But this witness has not seen the cultivation. Witness (36), Civil Surgeon of Jhang, a native gentleman, has made direct enquiries in his district. The male plant is, he says, extirpated in February and March, and the rest are gathered in April, the cultivators are of the ordinary class, but are in the employ of the fakir consumers, for whom they grow the drug. Witness (24), Excise Officer, states that the seed is sown in November at the same time as wheat. The field is well drained, cleaned, and manured. The bhang seed is soaked in cow's milk and water the night before sowing. It is sown broadcast. The crop is watered. In March-April the male plant called *kera*, which is smaller than the female and bears a flowery head, is eradicated. The female plants are cut with the wheat in May. The cultivators are for the most part fakirs, Hindus and Muhammadans, and the products are bhang and ganja. Mr. Dames (9), Deputy Commissioner of Dera Ghazi Khan, states that the land is well watered before sowing between the months of June and September. The seed is sown between October and January, and the crop gathered in March and the beginning of April. Frequent waterings are required, and the crop must be gathered in at night, or it loses much of its value. It may be concluded that the crop is generally grown in the *rabbi* season, though occasionally in the monsoon; that it requires high tilth, including a liberal supply of manure and irrigation; that transplantation and the extirpation of the male plant are sometimes practised; that the cultivation is for the most part carried on by consumers, of whom a very large proportion are fakirs and religious characters.

183. The evidence from the Punjab States supplies nothing new regarding the cultivation. From Bahawalpur there is corroboration of Mr. Dames's statement that in the processes preceding the sowing of the seed the land is watered.

184. The cultivation of the Khandwa tahsil has been described by the Deputy Commissioner of Khandwa and the Excise Commissioner. These papers, with the Commission's notes, furnish materials for the following account.

185. The average rainfall of the tract in which ganja is cultivated is 33 inches. The soils which are considered most suitable to the crop are—

Pandhar, or white soil—land near the village site which is largely mixed with ashes and sweepings from the village;

Mand—a light yellow alluvium pervious to moisture;

Kali—black soil or regur.



Survey of India Offices, Calcutta, August 1894.

SPECIMENS OF MALE (RIGHT) AND FEMALE (LEFT) HEMP PLANTS FROM THE SEED FIELD, KHANDWA.

28TH OCTOBER 1893.

The first two are the best ; the last is too stiff if the season happens to be very wet. The seed is specially cultivated in fields apart from the ganja, and in this the practice differs from that of Bengal, where the seeds which fall from the ganja in the process of preparation are kept for sowing. The seed of Dhakalgaon, a village in Indore territory, is considered the best, and fetches double the price of other seed. It gives a stouter and more branching plant than the local seed. The same fields are used year after year for hemp cultivation, and it is thought sufficient to manure heavily once in three years. Here again the practice differs essentially from that of Bengal, where the land will only grow hemp every three years, and heavy manuring is required each time it is sown. The manure used in Khandwa consists of household refuse, cow-dung, and ashes, and is given to the land at the rate of sixteen to twenty cartloads per acre. The crop is sown about fifteen days after the first good fall of the south-west monsoon, *i.e.*, in June or July. If the field is not under any crop, it is ploughed in January or February, and in any circumstances it is thoroughly worked up in April or May. The latter is the season for manuring if it is the turn of the field to be manured, and two ploughings and two applications of the *bakhar*—an instrument which serves the purpose of a harrow—are considered necessary between this time and the sowing. The seed is sown on a sunny day by means of a bamboo drill (*sarta*), which is used in combination with the *bakhar*. The seed germinates within a week, and in twenty days the plants have reached the height of about nine inches. The spaces between the furrows are then cleaned with the bullock hoe (*kolpa*), and between the plants in each row with the gardening hand-implement called *khurpi*, the plants being thinned out at the same time, so that they shall stand six or nine inches apart. The weeding process goes on for a month, and during it the lower leaves of the plants are removed. There is no transplantation at any time.

186. About six weeks after sowing the examination (*parakhai*) for eradication of male plants begins. The first plant to be detected and uprooted is the pure male called *naria* or *bhangra*. The cultivators recognise a variety of the male plant which they call *sheoria*, and this is treated like the *naria*. The male plant, either *bhangra* or *sheoria*, occasionally bears some female flowers, and is then called *adnaria*, with the addition of *bhangra* or *sheoria* according as it is supposed to belong to either variety. *Naria* of course means *male*, and *adnaria* *half-male*. It is to be noted that no mistake is made about the true sexes of the plant by the cultivators of Khandwa. So clearly do they understand the distinction that when asked the reason for removing the male plants, a cultivator replied by asking what would happen if a ram were let loose amongst a flock of ewes. The cultivators themselves undertake this eradication, and no specialist is required. But it is not done very perfectly, for when the Commission visited a ganja field on the 9th September male plants in full blossom were discovered without much difficulty. In September or October the field begins to be irrigated. It will be noted that the south-west monsoon has now nearly ceased, and that rain is henceforward harmful, as it washes off or otherwise dissipates the resin which has begun to accumulate in the female flower spikes. The crop ripens about the middle of November, maturity being indicated by a brownish appearance in the flower spikes.

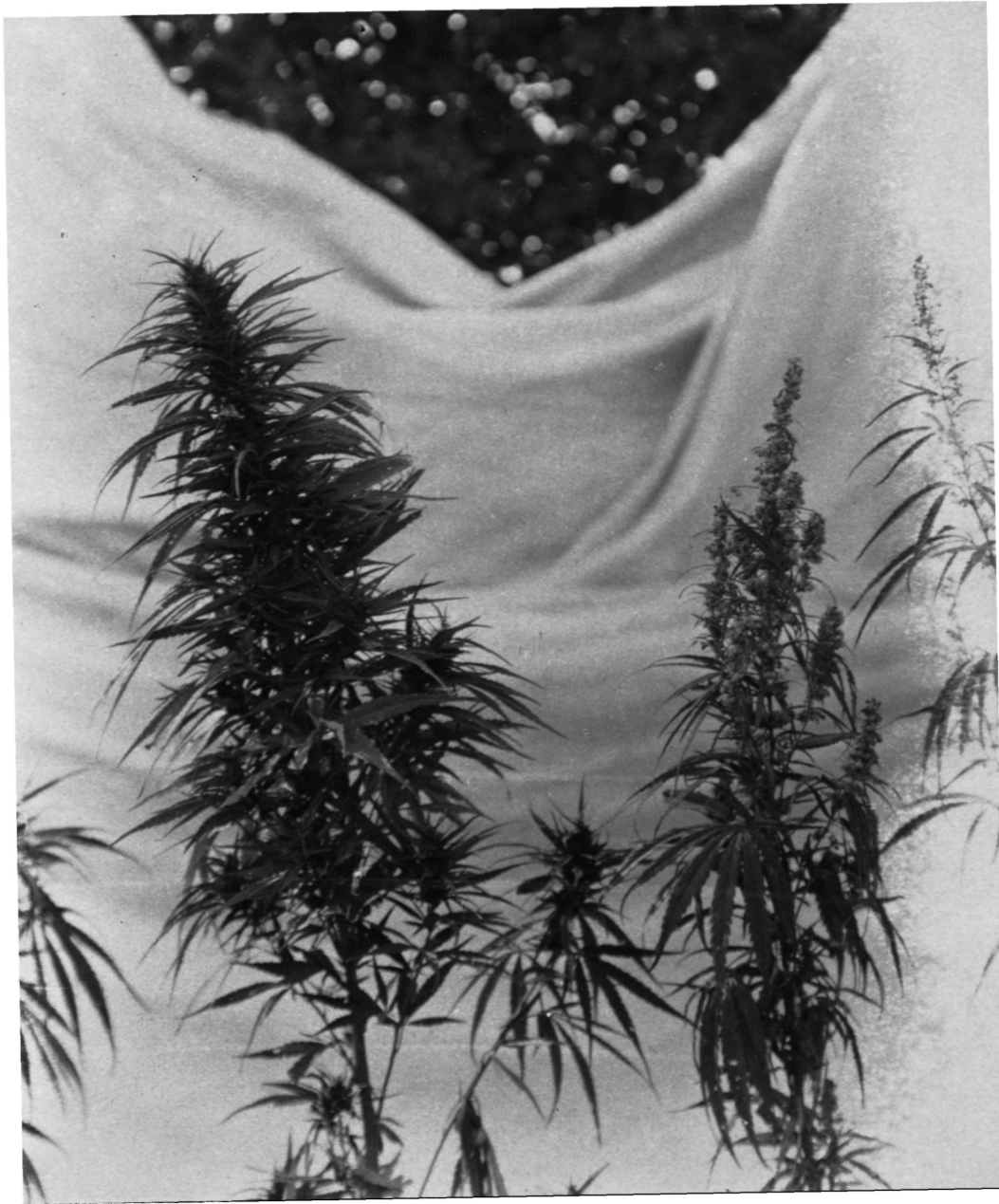
187. The Commission inspected some fields in this month, and found that those in which the crop was pure ganja contained a number of plants which the cultivators called by the name of *moria*. These had generally at the ends of the branchlets composing the spikes one or two male blossoms. They are said to be deficient, though not wanting in resin. They are therefore regarded as inferior, but the Khandwa cultivator does not appear to recognise the mischief that they do in the ganja crop. He, however, attributes to them a specially noxious character in that their seed invariably produces plants of the same kind (*moria*). They are therefore ruthlessly eliminated from the seed field, while they are sometimes allowed to remain, as was seen, in the ganja field, and are in that case harvested with the good ganja (*mal*). These appear to be the plants referred to by Dr. Prain as those which "the *poddar* could not possibly have foretold," and which the Bengal cultivator roots out for himself after the *poddar's* visits have ceased. They do not appear to be, as Mr. Drake-Brockman supposes, the *k hasia* plant of Bengal, but it is possible that the latter is included in them. The khasia form of the plant is not recognised by the Khandwa cultivator.

188. The processes in cultivating the seed plant seem to be the same as those above described as regards preference of soil, manuring, and tilth. It may be mentioned, however, that irrigation is not invariably practised for either ganja or seed crops. In the case of the seed crop, plants bearing flowers of both sexes are as far as possible eliminated. The process is rational. The blameless female is the more likely to reproduce her own kind. The evidence gives no information of peculiar methods followed in the homestead cultivation. There is no special class of cultivators.

189. There is no information of the methods of cultivation, if any still exists, in the Tributary States.

190. Mr. Benson's bulletin describes in detail the methods of cultivation in the two regions where alone ganja is supposed to be regularly cultivated in the Madras Presidency. The methods differ, and it is necessary to deal with them separately.

191. In the Javadi Hills of the North Arcot district the cultivation is carried on by the Malayalis. These people "claim to alone possess the knowledge necessary for the manufacture of ganja, a practice which has been carried on, they state, in these hills from time immemorial." There being no considerable level areas, though the ground is to a certain extent terraced, the crop is sown in small plots. "The soil is free, friable, and open, derived directly from the rocks on which it rests, thoroughly well drained, and appears to be fairly fertile." It grows the ordinary dry food-grains of the country, and the hemp alternates with them. A heavy dressing of cattle dung is absolutely necessary, and this is given in May or June before the rains begin. When the ground has been sufficiently moistened to allow of ploughing, it is broken up, and the ploughing is repeated three or four times until July. The seed is then sown in furrows, opened with the plough three feet apart, and covered in with the feet. The seeds germinate in about a week, and are allowed to grow for three weeks, when they are thinned out. In



Survey of India Offices, Calcutta, August 1894.

SPECIMENS OF MALE (RIGHT) AND FEMALE (LEFT) HEMP PLANTS FROM THE
SEED FIELD, KHANDWA.

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the meantime the field is kept clean by ploughing between the rows and weeding. When about a foot high, the plants are earthed up by means of the plough. When the crop is four months old, the males—called female by these raiyats—are eradicated. This process goes on continuously as the males betray their presence, but is never quite successful, as a certain amount of seed always sets. The harvest begins in January and continues up to March, ripeness being indicated by leaves and flower heads turning yellow and the former beginning to drop. The crop is never cut on a damp or cloudy day.

192. The other tract of cultivation is in the Kistna district; the only village which has any considerable area is Daggupad, near the borders of Nellore, and about fifteen miles from the sea. It is a wide open plain, the soil being a stiff black loam with a considerable admixture of *kankar*. The lands devoted to hemp are sometimes near the village, sometimes at a distance, but always reasonably accessible. The crop is sometimes cultivated and handled by the raiyat himself, but more frequently he supplies only the cattle labour, and the rest is done by others, chiefly Muhammadans, of whom there are many in the village. The crop usually follows millets, dry rice, coriander, tobacco, indigo, or chillies, but sometimes hemp is grown in successive years. In the last case heavy manuring is necessary. This is supplied by folding sheep upon the field or carrying cattle manure to it. The land is ploughed about three times between July and October, and finally worked with a three-tined grubber (*gorra*, or seed drill used without its seed hopper and tubes). It is then marked off in two feet squares with a marker similar to the *gantaka*, or scuttle worked without its share. At the angles of the squares four or five plants are dibbled in with a stick, and watered to set them.

193. The seed-bed is usually made on the dam of a tank, and is about six feet wide by sixty feet long. It is dug up with a crowbar, reduced to a fine tilth, and levelled. In August the seed is scattered upon it and covered up by hand, and the bed is hand-watered as often as necessary for the next two months. When the plants are two feet high they are topped off, and in a few days they put out numerous side branches, and are then transplanted into the field. This takes place in October. A month after planting the fields are hand-weeded, and about a fortnight later a plough is run between the rows, and the plants are thereby slightly earthed up. Flowering begins two months after planting out, and the male plants are removed. Here, as in Bengal, the male plants are called female. These plants are cut down at the root and thrown away, and the process goes on as long as male plants are detected. The harvesting begins in February and goes on into March. Nothing is said of the employment of professional *parakhdars* in either tract. And in neither does irrigation appear to be practised beyond the extent above-mentioned in the Kistna cultivation.

194. The evidence, as far as it relates to the regular cultivation of the tracts described above, does not add anything to this information. But details more or less interesting and some curious are furnished regarding the stray cultivation. Mr. Morgan, Deputy Conservator of Forests, says of the surreptitious cultivation in forests that the seed is scattered in old cattle kraals, and the plants thinned out to enable them to branch, the males being extirpated. A Cuddapah witness (121) states that the plants are moved from a seed-bed and planted out over the fields,

after which they are carefully tended, the big leaves being removed, the trunks twisted, and the plants themselves manured. Another witness from the same district (57) mentions watering and the extirpation of the males. And yet another (134) alleges that the best sorts of ganja are produced by planting the seed or seedling—it is not clear which—in the mouth of a dead dog which has been buried in a suitable position, and by splitting the stem and binding up opium or arsenic in the cleft. The practices of splitting the stem and inserting a potsherd and of twisting the stems are mentioned by so many witnesses that there can be little doubt they are more or less in vogue. The statement that opium is inserted in the stem is also not uncommon; but the rare evidence that arsenic and assafoetida are so used must be classed with that relating to the dead dog, to the use as manure of fowls' and pigeons' dung, of serpents' heads, of debris of dead snakes, of *Ptychotis fructus*, and of water made dirty by washing fish, and the getting plants poisoned by cobras. These aids to cultivation are some of them not generally known and others not easily procurable, and do not deserve much attention. The point to be noted is that even in the desultory cultivation of the garden, the homestead, and the field, the practice of isolating the female plant is not uncommon, and results in the production of the stronger and more valuable form of the narcotic, *vis.*, ganja. The evidence seems to show beyond doubt that the knowledge of this process is very widespread, extending over the whole Presidency from the hill tracts of Ganjam to the Wynaad. It may also be mentioned as affording facility for cultivation that in the climate of the Madras Presidency the plant requires but little artificial watering. When it has once taken root, the rainfall suffices for it ordinarily. The homestead cultivation is not carried on by any special class except in so far as religious devotees, Hindu and Muhammadan, very commonly engage in it, and it may be said that the cultivators are frequently consumers of the drugs.

195. There is no information about the mode of cultivation in the Madras States, except that from Travancore, regarding the stray (and clandestine) cultivation by the Kanikars or hillmen, mendicants and Musalmans. It is said that the seed either of the imported ganja or of locally grown plants is sown thickly in loose soil. The seedlings are in due time planted out six feet apart. "The *chada* ganja grows denser and shorter than the other variety," presumably the male. "It thrives best in rich loam or alluvial soil. It requires no special manure, but it is believed that the decomposed bodies of snakes, particularly of serpents, is the most efficacious manure. Some even go the length of thinking that there is a special advantage in dropping the seeds into the mouths of serpents killed and planting the thing whole. Excessive rain, it appears, is injurious to ganja. The plant flowers in about ten months from date of planting." The hillmen are those who engage in this cultivation most, but it does not seem to be common. The processes already described for the Presidency in the desultory cultivation are doubtless those employed for similar cultivation in the other States.

196. The cultivation, it has been seen, is almost wholly confined to the Central Division of the Bombay Presidency, and a few small Native States in the Deccan and Southern Maratha Country. The method of cultivation in this region has been described by many witnesses, and it proceeds on one system through-

Bombay.

Soil preferred, and season of sowing.

out. There is some discrepancy as to the nature of the soil which is most favourable to the crop. The preponderance of evidence is in favour of the lighter mixed soils, and not of the richest and heaviest black soil. Mr. Ebdon, Collector of Ahmednagar, gives the following description of it : " When grown for ganja the plant requires a rich friable soil, and land near a village site is often selected on account of the manure with which native habits supply it. Irrigation being necessary in case of insufficient rain, *bagait* land is preferred. When the plant is grown for seed or for the manufacture of bhang only irrigation is not essential, and in ordinary seasons any good *jirait* land will do." It is principally in Satara that the richest lands are said to be preferred, but in the ganja-growing tract of that district they are probably not the adhesive clay which is the consistency of the best black soils in the Deccan. Rotation is necessary; good crops of hemp cannot be got off the same land in successive years. The field is thoroughly worked up for some month or two before the south-west monsoon, and is heavily manured, sometimes by folding sheep upon it. In Khandesh the seed is sown in the very commencement of the rainy season, *i.e.*, early in June, the *munga nakshatra*. Further south it is put in later, *viz.*, in the *Punarvasa* and *Pushya nakshatras*, which correspond with July-August. The seed generally preferred is that from Ahmednagar.

197. The agricultural processes are the same everywhere. The seed is sown with a single drill, the other pipes of the ordinary triple drill being closed if that implement is used. The lines are from one-and-a-half to two feet apart. The seed springs up within a week, and the plants are allowed to grow till they are about one foot high, the field being kept scrupulously clean meanwhile by the cattle hoe and hand weeding. The rows are now thinned out where they are too crowded, and the lower branches are removed to force up the growth of the tops of the plants. The weeding with the cattle hoe earths up the rows in some degree. In about six weeks from the sowing the plants have reached a height of two feet. The *parakhai* or *parakadar* is then called in. Witness (47), Superintendent, Office of Survey Commissioner, and Director of Land Record and Agriculture, says that the ganja cultivators of the Poona district are skilled in distinguishing the male plants. Everywhere else the *parakhai*, or examination for male plant, is done by an expert, who is paid at the rate of Rs. 8 to Rs. 10, or even more, a month. The plants are at the same time thinned out where necessary to allow of lateral growth. The witness just quoted also states that the female plants are bruised by giving them a half twist a few inches above the root to induce this lateral growth. This process is not described by any other witness. Mr. Ebdon, however, furnishes the interesting information that it is part of the *parakhai's* business to search the country round if he finds symptoms of mischief caused by "pernicious plants." He also says that in the seed field the *parakhai* is not required. But this may be doubted, for Mr. Kennedy (54), Superintendent of Police, has learnt that the female (*sic*) plant is eliminated from the seed field, from which it would appear that some extermination of plants is practised here also. Probably attention is directed, as in the seed field of Khandwa, to the eradication of the bi-sexual plants of all kinds.

198. The educated witnesses who have supplied the information before the Commission understand clearly enough the broad distinction between the male and female plants and their

Male and female plants and their different forms.

functions, but the cultivators seem to be very hazy on the subject (Mr. Ebden). In spite of the fact that one or two of the names applied to the various undesirable plants which the *parakhai* casts out show a correct understanding of the reason why they are mischievous, these names without distinction are given by two witnesses as names of diseases, and it is probable that the plants indicated are popularly regarded as diseased plants. Yet it is difficult to believe that there should be so wide a gulf between this ignorance and the intelligence found in the Central Provinces among people of the same race and occupation, and not separated from the Bombay cultivators by any great distance as distances go in India. The forms of the plant, noxious from the point of view of the ganja grower, which have received special names, are given below, with the explanations of the witnesses regarding them in brief. These explanations are evidently gathered from informants, and are not based on the witnesses' own observations, except in the case of Mr. Ebden.

Andya (36), *Andia* (30).—Indicated by the "pin-like white flowers" (36); by organic molecules formed in the top of the plants; affects plants in the beginning of their growth, and lasts about a month (30).

Remark.—Apparently the simple male.

Bhangira (48), *Dhatura* (5).—Plant examined by Mr. Ebden, who says: "Latter name identical with that of the common poisonous plant," and pronounced male.

Remark.—The simple male.

Shevarya (36), *Sheora* (30), *Shewara* (5).—One of the branches grows higher, and bends down with a flower like jawari grain at the end of it (36). White flowers grow on the flower top (30). Mr. Ebden has not seen specimen.

Remark.—A form of the male plant known by the same name at Khandwa.

Haldya (36), *Haldia* (30).—Recognised by a yellow shoot at one of the knots of the plant (36). Affects the plant by producing a yellow colour in the tops, and lasts till the full growth of the plant (30).

Remark.—The yellow colour may be caused by deposit of pollen.

Kapshia (36), *Kapsha* (30).—Recognised by a jawari like grain which gets transformed into a white or yellow flower (36). Whitens the plant (30).

Remark.—Witness (36) describes a male blossom; witness (30) some sort of disease or the deposit of pollen.

Bundia (36), *Bunda* (30).—Same description as that of *Kapsha* (36). The seed is formed in the flower head, which afterwards produces flower (30).

Remark.—A bi-sexual form probably.

Mora (36), (30), *Morai* (5).—Recognised by the yellow flower on the top branch, which makes its appearance sometimes fifteen days before reaping of the crop, and has the effect of destroying the better quality of the ganja (36). Appears late, and causes breach (*sic*) of the flower spike (30). Female partly gone to seed; is not exterminated; is regarded with regret, its meaning being that the male has somehow got access and partly spoiled the crop. Examined (5).

Remark.—Probably the same as the *moria* of Khandwa, and the female with abnormal male blossom of Dr. Prain.

Charkha (30).—Makes the flower yellow, and lasts to the end (30).

Remark.—Much the same as *Kapsha*.

Aradnar (30), *Ardhanar* (5).—From the stock to the top of the plants small buds are formed which give rise to white flowers (30). Not examined; but must be, as its name implies, the bi-sexual plant (5).

Remark.—The same name, *adnaria*, is used in Khandwa for the ordinary male plant with some female blossoms.

Tik (5).—Examined and pronounced bi-sexual; the *ardhanar*, which Mr. Ebdon did not examine, was probably the same (5).

Remark.—Sounds like a short name for the rather clumsy one which goes before.

Ropda (5).—Mentioned, but not seen by Mr. Ebdon.

The fact that the plant in its sexual arrangements takes so many forms will probably be interesting to scientific readers, and the complete list is therefore given. And it is supplemented with such remarks as the information gathered in the course of the Commission's inquiry seems to justify. The Commission do not claim to have made any exact study of the subject, and have not even had an opportunity of personally examining the plant and its cultivation in the Bombay Presidency. As far as the cultivation is concerned, the enumeration of these forms of the plant is of interest as illustrating the fact that the extermination of the male requires considerable practical skill, and that the existence of the *moria* form, which develops its male blossoms with such delay and caution, is a special difficulty in the way of the complete seclusion of the female, and the production of the finest form of the drug.

The crop matures in about five months, and is therefore gathered in November or December in different localities according to the date of sowing. In Bijapur the cultivation is carried on by the ganja farmer, and the *parakhai* seems to supervise it up to harvest; and it would appear that elsewhere his services are required for a longer period than they are in Bengal, and that he exercises a wider control over the cultivation generally. As a rule irrigation is only resorted to if the rainfall is insufficient or untimely; but the crop is nearly always raised under the protection of a well. After the flower spikes are formed on the ganja plants rain does damage. The crop does not ripen till a month or two after the south-west monsoon has ceased, and during this period irrigation must often be required. Witness (27) describes what must be the simple garden cultivation, which, if it exists at all at the present day, is quite unimportant in this Presidency. The evidence shows a striking unanimity on the point that the heavy rainfall of the belt lying immediately to the east of the crest of the Western Ghâts renders that part of the country unsuitable for the cultivation of hemp. There is a strong body of evidence that rich but light soil and only a moderate amount of rain are required. This has an important bearing on the subject of the spontaneous growth.

199. About the cultivation in Gujarat the information is that loamy or sandy soils are suitable, and that black soil is not; that the crop takes six or seven months to mature; that it can be raised either as a monsoon crop or as a cold-weather crop; that the former yields the stronger narcotic; that the males are extirpated; and that irrigation is not required. There is no information about the employment of the *parakhai*, and it is probable that in this cultivation for bhang the moderate skill possessed by the cultivators themselves answers all purposes. Both in the Deccan and Gujarat the cultivators are of the ordinary class; the industry is not confined to any caste or grade among them. The cultivators in Ahmednagar are sometimes Brahmins.

200. The description of the cultivation given above applies to the Southern Maratha Country Agency and all the States in the Southern and Central Divisions where they have any cultivation at all. The following agencies have not any regular cultivation: Kathiawar, Cutch, Palanpur, Mahi Kantha, and Rewa Kantha. Such cultivation as there is consists in the rearing of a few plants which have often sprung up by accident by water-courses in gardens and in fields, generally irrigated fields, such as those where sugarcane is grown. There is no information as to whether the male plants are eradicated, or of any peculiar methods employed in the cultivation. The cultivators are either consumers, often fakirs and bairagis, or, if not, ordinary husbandmen who nurse a few plants to provide themselves with an article that will be an acceptable present to such people. The drugs appear to be very rarely sold.

Aden.

201. There is no cultivation of any kind in Aden.

202. There appear to be two methods of cultivation in Sind, as stated by witness (5)—one by well irrigation, and the other by artificial inundation or flooding. In the latter case it would seem that the preliminary flooding has to suffice for the whole growth of the crop. The best descriptions are given by witnesses (2) and (14).

Sind.

203. In cultivation by well the area is generally smaller than in the other process (2). This would be expected, for the former involves a greater amount of labour in the preparation of the land, systematic sowing in ridges, and periodical watering. Mr. Giles' account apparently describes the cultivation under wells, which he states to be the more general. High tilth and manuring are required, goats' dung being the manure preferred. The seed is sown even as late as the beginning of January. It is put in by pinches of five or six seeds at a time on ridges. The crop is gathered in April and May. The male plants are rooted up and thrown away as useless. When the crop is ripening, some of the flower-heads are cut off and preserved separately. These are called *ghundyun*, and are said to be more intoxicating than the rest of the plants. Small pieces of *ghundyun*, which fall off apparently in the drying of the rest of the crop, are called *dodo* or *dodi*, and are preserved with the *ghundyun*. Witness (14), in describing cultivation by periodical irrigation and not mere flooding, states that the seed is sown broadcast; that after a preliminary soaking the ground has to be worked up, the seed sown, and the ground again turned over and levelled in one day. Manuring, says this

The regular cultivation.

witness, is generally deferred till the plants have made some growth for fear of a noxious worm which attacks the young plants. When the seedlings have appeared two or three inches above ground, weeding begins, and the plants are thinned out. When the plants are a foot high, they are dressed with manure, and this may be done more than once during the period of growth. When the crop reaches the height of about five feet, the male plants, which are distinguishable by their small pale-green flowers, are weeded out. The reasons assigned for this practice are that the female may have more room to grow, and that the male plant is held to cause giddiness when used.

204. This witness says nothing about the separate collection of certain of the flower spikes, but witness (26) does: "The big *ghundis* are separated and kept apart to be used as ganja." It may be that this account refers to selection made at the time of manufacture, and not to such a selection from the still standing crop as Mr. Giles seems to indicate. Broadcast sowing appears to be the more common practice, except where a few plants are grown for private consumption. In that case the sides of water-courses appear to be a favourite situation for the plant. The evidence does not show that the people understand the effect of removing the males in increasing the secretion of resin in the female flower spikes. It would seem that the produce of the female plant is preferred for consumption, and that the male is removed because it interferes with the growth of the superior plant. It is in fact treated as a weed. It cannot, however, be doubted that the practice of eradicating it is general. Witness (10) mentions some curious practices intended to enhance the narcotic quality of the drugs, the like of which have been described elsewhere. Some people, says this witness, make an incision in the stem of the bhang plant and put opium into it, sometimes a dead snake is buried under the plant, or it is watered with dhatura-water or huka-water.

205. Hindus appear to be the chief growers of bhang, while the majority of ordinary cultivators are Muhammadans. Mr. Giles Hindus probably preponderate among the cultivators. writes that "the actual sowing of the seed, the ploughing, weeding, and bird scaring, etc., is always carried out by Bania or Hindu cultivators, the Muhammadan cultivator supplying the bullocks which work the well and the zamindar giving the land. The Bania supplies the seed, but the manure is given in the same proportion as the produce is divided, *i.e.*, one-fifth to the Bania and two-fifths each to the raiyat and the landholder. The landholder also gives takavi or advance in cash to the raiyat." This seems to describe a partnership of a kind which probably exists in the cultivation of other produce in the same country; but there is other evidence to show that the Hindus preponderate in growing this particular crop. The habit or custom is not, however, sufficiently well marked to be regarded as a special feature of the industry.

206. The cultivation in Khairpur is not likely to differ from that of the rest of Sind. There is no detailed information about it. Khairpur.

207. In Berar, as elsewhere, the *pandhri* or white land near villages is preferred; black soil is too stiff, and has to be made lighter with heavy manuring. The crop is grown in the Berar.

south-west monsoon, sown in June, and gathered in November. It must be protected by a well in case of failure of timely rain. The official report says: "If the rains fall favourably, no irrigation is required till about October, when the plants are maturing, when apparently they always require to be watered." The cultivation of Berar does not differ materially from that of Khandwa, whence the seed seems to be imported. There is one curious practice which the Commission have not heard of elsewhere. The seed which is sown with the drill is a mixture of *Cannabis* and *Hibiscus cannabinus*. When the seedlings are a fortnight old, the *Hibiscus* plants are weeded out. One witness explains this practice as being due to the fact that hemp seed will not germinate by itself. The official explanation, which is probably correct, is that the hemp seed is by this means economised, the necessary space between the plants being secured at the expense of *Hibiscus* seed. The male plants (*bhangra*) are picked out after the crop has reached one-and-a-half feet in height. One witness (9) states that the *malis* who carry on the cultivation are able to distinguish the sexes, and one other (7) that the services of experts are required. The others are silent on the point. Witness (14) mentions the practice of opening the lower part of the stem, inserting opium, and binding the part up very tightly to increase the narcotic quality of the drug. The same witness moves on the date of sowing to the *Punarvasu* and *Pusha nakshatras*, July-August, which is the sowing time in the Bombay Deccan. Witness (11) states that under native rule the plant was cultivated by consumers in the yards of houses. It was watered, and when it had grown sufficiently to allow the sex to be discovered, the ganja smokers uprooted and threw away male plants. There is no particular class of cultivators, unless it be that the *malis* preponderate among them for the reason that their vocation is cultivation by means of well irrigation.

208. In Ajmere there is but a small amount of desultory cultivation by the Brahmins of Pushkar, malis, and sadhus. The plant
 Ajmere. may be occasionally tended with some care when it is grown in the garden of a mali or near the hut of a sadhu; but there is some evidence that it is generally allowed to take care of itself. Mr. White King's report of 1886 says: "Even in Pushkar, however, it is grown only in small quantities on the edges of fields and along the banks of water-channels," and this seems to be the most considerable cultivation in the province. This report does not indicate any great care in the cultivation. The produce, according to the same report, is merely bhang. The evidence does not furnish any details whatever of the method of cultivation.

209. In Coorg the methods of desultory homestead cultivation may be employed by some low class coolies. A witness talks of
 Coorg. the seeds being "sown broadcast in rich soil mixed with burnt clay, and afterwards transplanted in good rich soil;" but it is not clear that this method is in vogue in Coorg. Some Madras witnesses gave information of the same kind.

Baluchistan. 210. There is no information from Baluchistan.

211. Mr. Bridges (3) and the ex-Sawbwa of Nyaungwe State (50) are the only witnesses who give any details of the cultivation
 Burma. in Burma. The Shans and the Danu people appear to rear the plant for the drug in their homestead land; the Kachins, Palaungs,

and Lawas to cultivate for fibre in fields. Mr. Bridges is informed that in the former cultivation the male plant is exterminated. The ex-Sawbwa does not know of this practice. But he says that the stem of the plant is split when about the thickness of the finger and a month before maturity, and a piece of wood inserted. A light earthen chatty, or more often a basket, is placed over the flower-head, and allowed to rest upon it, to prevent the plant growing and make the head grow thick. In order to do this, the flower-bearing branches are gathered together and thrust into the vessel, which has a mouth of about a foot in diameter. This is the regular practice in cultivation for drugs. The chatty or basket is kept on the plant for about a month. These processes are not unknown in India. The splitting of the stem is frequently mentioned, but the use of the chatty in only two provinces. No account of the Kachin cultivation has been furnished.

212. A peculiar method of cultivation is described by the Special Assistant
Excise Commissioner and the Excise Assistant
Mysore. Supervisor, Tumkur district: "The seeds are sown in a nursery at the beginning of the south-west monsoon. A month after sowing the seedlings are transplanted into pits, each one foot deep, and dug at intervals of three feet, and well manured. The young plants are watered daily for a month or so. The stem of the plant is twisted just above the ground, and the plant itself is bent horizontally to the level of the earth in order to induce the growth of side branches and prevent the vertical growth of the plants like a stick. Just after the appearance of blossoms on the female plants, male plants are destroyed, etc." Such is the latter officer's description. The last sentence is rather faulty, for the extermination of the male plant after the female was ready to receive its attentions would not be of much use. Mr. McDonnell describes a very similar, but even more remarkable, method, to judge by its results in the size of the plant: "When specially cultivated, a circular pit two or three feet in diameter and a foot or so deep is excavated, and well manured with cow-dung and ashes. The plants are made to form a circle round the edge of the pit, and the centre is heaped up with manure as required. The stems rise five to seven and often twelve feet high, *each as thick as a man's wrist*, and are supported by staves secured with ligatures from the aloe leaf. In other cases single plants are raised in each pit. *The stem is then the thickness of a man's arm*, five feet high, and as much in diameter. The stem is taken in both hands, and twisted at the root just above the surface of the ground to stunt the growth.....The male plant is profitless, and is uprooted and thrown away." It is by no means clear to what extent these methods are actually practised, and, for the practical purpose of producing ganja, the important operation of early eliminating the male plant has hardly sufficient prominence in their description. There appears to be a spice of imagination about them—an element in which the subject of cultivation as well as much else connected with the hemp plant is by no means wanting.

213. A fairly full description of the method of cultivation is given by the
Director of Agriculture and Commerce of the
Hyderabad. Hyderabad State. The greater portion of the cultivation appears to lie in the north-west corner of the State bordering on the Bombay districts of Sholapur, Ahmednagar, Nasik, and Khandesh. The description does not show any important departure from the methods of the British districts. It may be noted, however, that "fresh seed every year from some