deputation to any person to act as President need not be special; a general deputation is sufficient.

2. The Village Council shall consist of not less than three nor more than seven men selected by the President from the proprietors of paddy lands in the district. The G. A. or his deputy shall be President, and shall conduct and keep a record of the proceedings; but he shall not vote on any question, but he shall have a casting vote.

3. The Government Agent or any person authorised by him thereto shall inquire into all alleged breaches of rules, and shall adjudge and award that offenders do pay the penalty prescribed by the Ordinance.

4. The proceedings at such inquiry shall be filed of record in the Kachcheri.

5. The proceedings shall be summary and free from formalities. It shall be the duty of the Council, G. A., or inquirer to do substantial justice between all parties concerned. No advocate, proctor or agent shall be permitted to appear for complainant or defendant.

H. A. J.

MANGROVE BARK.

(Continued.)

Avicennia officinalis is known as the white Mangrove. It belongs to the order Verbenaceæ, of which the genus avicennia, comprising some 3 or 4 species of bushes or small trees, frequents the salt marshes on the coast and in the tidal forests of rivers. Ferguson in his "Ceylon Timber Trees" writes of this tree: "Not uncommon on the coast. A preparation made from the ashes of its wood is used by dhobies for washing cotton cloths, and by painters to mix with their colors to make them adhere; the bark is used for tanning &c." The genus is named in honour of Avicenna, an Arab physician, philosopher, mathematician, &c., who lived between 980 and 1037. The barks of various species of Avicennia are said to be used in Rio Janeiro for tanning leather.

Bruguiera gymnorhiza, belonging to Rhizophoraceæ, is a small evergreen tree of shores and tidal creeks. Dr. Watt says of it: "The bark is valuable, and with *Rhizophora mucronata* constitutes the tan known commercially as Mangrove bark. It is a useful astringent used also in dyeing black."

Ceriops Candolleana, known as the Black Mangrove, also belongs to Rhizophoraceæ. It is a small evergreen tree met with on muddy shores and tidal creeks. This and *C. Roxburghiana* are economically not distinguished. The bark is used for tanning, and is described by Dr. Watt as exceedingly valuable for that purpose, imparting a good red colour to leather, and seeming to deserve to be brought prominently to the notice of European tanners. He further states: "They, no doubt, to a small extent, reach England under the name of Mangrove Bark. This, according to Murray, is said to be superior to oak, completing in six weeks an operation which, with the latter, would occupy at least six months. Sole leather, so tanned is also reported to be more durable than any other." It is interesting to note that a decoction of the shoots is used as a substitute for quinine on the African coast. Watt states that the bark of both species of Ceriops might be supplied to any extent and very cheaply from India. The barks also produce a good dye of a brown colour, and they are supposed to strengthen ropes and boatmen's cloths.

SOME INDIAN DYE-STUFFS.

[By J. J. Hummal and A. G. Perkin.]

[The dye plants mentioned in the following report all belong to the order Rubiaceæ. *Oldenlandia umbellata* or Chay Root is known in Ceylon by the native name of Saya-mul. The root is collected in the Eastern and Northern Provinces, and is in general use among native dyers for colouring cotton cloths. It is also exported to a small extent, we believe. The other dye plants are not, as far as we know, recognised as such in the Island. *Rubia sikkimensis* is indeed not indigenous to Ceylon, but its close ally *R. cordifolia* (Indian Madder or Munjeet) is our native manda-madini-wel. *Morinda umbellata* (morinda root) is the indigenous kiri-wel or maha-kiri-wel, *M. citrifolia* being known as Ahu.—Ed. *A.M.*]

The following is a brief abstract of the results of an examination of a few Indian dye-stuffs, made on behalf of the Imperial Institute, and carried out in the Clothworkers' Research Laboratory, Dyeing Department, Yorkshire College, Leeds.

Some of the dye-stuffs here reported upon are among those specially transmitted to the Imperial Institute by the Government of India, as requiring examination.

Chay-root or Indian Madder.—This dye-stuff is the root of *Oldenlandia umbellata*, and is extensively cultivated in Southern India, being largely employed on the Coromandel and Malabar coasts, for the production of fast reds, purples, and blacks.

Its tinctorial properties were long ago favourably reported upon by several authorities in dyeing, but all attempts to introduce it into European commerce were without success.

The chemical principles of the root have never hitherto been properly examined.

The authors' investigation now shows that it contains, as its most important constituent, the same glucoside as occurs in madder root, namely, *ruberythric acid*, besides a very small amount of ready formed *alizarin*, and certain yellow crystalline substances not possessing dyeing power, *viz.*, two *dimethyl ethers of anthra-gallol* $C_{16}H_{12}O_5$ (A) (melting point 209° C.) (B) (m. p. 225°-227°); a *mono-methyl-ether of alizarin*, $C_{15}H_{40}O_4$ (m. p. 178°-179°); *meta-hydroxy anthra-quinone* $C_{14}H_8O_3$ (m. p. 301°-302°); a reddish-orange amorphous powder and a yellow crystalline substance (m. p. 141°-142°) not yet fully examined. Other constituents are: *rudichloric acid*, a *wax* $(C_{40}H_{1}O)_n$ (m. p. 87°-88°) and *cane sugar*.

It is interesting to note that purpurin which always accompanies alizarin in the madder root is entirely absent in chay-root.

The tinctorial properties of chay-root are entirely consistent with the results of the chemical examination. Generally speaking, it gives colours similar to those obtained from madder, but owing to the absence of purpurin, they are both purer in tone and faster to soap. Although it appears