applied to the large quantities of corn which were unavoidably housed in a damp state, in consequence of the unpropitious weather, during the late harvest. The author considers the mustiness to be confined principally to the exterior amylaceous part of the grain, and the process proposed consists in pouring upon the tainted grain thrice its quantity of boiling water. When cold, the water and floating grains are to be poured off; the corn is to be washed with cold water, drained, and carefully kiln-dried. It will be found perfectly sweet, and the loss of weight is inconsiderable.

The advantages of this process are its simplicity and cheapness; and although the author has hitherto only applied it to wheat, there can, he observes, be little doubt that oats and other grain may be deprived of must with equal success.

Observations on an astringent Vegetable Substance from China. *By* William Thomas Brande, *Esq. Sec. R.S.* Read December 12, 1816. [*Phil. Trans.* 1817, *p.* 39.]

The substance described in this communication was sent to Sir Joseph Banks as a species of galls, used by the Chinese in dyeing black. They have the appearance of irregular vesicles, of a purely astringent flavour, and closely agree with those described by Du Halde under the name of *ou poey tse*, which are also employed in China as the bases of many astringent medicines.

By digestion in cold distilled water, these galls yielded a pale brown infusion, of a highly astringent taste, and furnishing a copious white precipitate with solution of animal jelly: 100 parts thus yielded 78 of soluble matter, which, when obtained by evaporation, was of a brown resinous appearance; and, though only slightly sour to the taste, powerfully reddened the infusion of litmus.

The author remarks that the perfect solubility of this part of the galls in cold water, and its pale colour, indicate that the tannin it contains is nearly, if not perfectly, free from extractive matter; and, by pursuing the usual processes, he succeeded in obtaining it in a considerable state of purity. The tannin thus afforded is also soluble in alcohol; whence, if previous experiments be correct, it is analogous to the tannin of catechu, but distinct from that of galls, which is said to be insoluble in that menstruum.

When all soluble substances in water were removed from the Chinese galls, the residuum afforded to alcohol a minute portion of resinous matter, and 23 per cent. of insoluble woody fibre then only remained.

A further examination of the aqueous infusion proved it to contain gallic acid in considerable proportion; and the method which best succeeded in its separation, consisted in adding lime water to the cold aqueous infusion of the galls, which produces a precipitate composed of tan and lime, and leaves a gallate of lime in solution, which, when cautiously decomposed by oxalic acid, furnishes oxalate of lime and gallic acid nearly, but not perfectly, pure. The author

was equally unsuccessful in procuring that acid in a pure form by the other processes usually had recourse to. It was either combined with minute portions of tan, or, when obtained by sublimation, was empyreumatically tainted.

In conclusion, it is remarked, that the Chinese galls differ from other analogous vegetable substances in the absence of extractive matter, whence they may be regarded as the most promising source of pure tan and gallic acid; that the same circumstance renders them peculiarly fitted for the basis of a black dye, and of writing-ink, while it at the same time renders them ill calculated for the production of leather, which without extractive matter is brittle and imperfect.

Some Researches on Flame. *By Sir* Humphry Davy, *LL.D. F.R.S. V.P.R.I.* Read January 16, 1817. [*Phil. Trans.* 1817, *p.* 45.]

This communication is subdivided into four sections, of which the first treats of the effect of rarefactions of the air, by diminished pressure, upon flame, and explosion. An inflamed jet of hydrogen was placed in the receiver of an air-pump, and the flame was observed to enlarge during exhaustion, till the gauge indicated a pressure of one fourth or one fifth; it then diminished in size, but was not extinguished till the pressure was reduced to between one seventh and one eighth. A somewhat larger jet burned until the rarefaction amounted to one tenth, and rendered the glass tube whence the gas issued white hot. To this circumstance the author refers the long-continued combustion of the gas, and thinks the conclusion confirmed by the following experiment. A platinum wire was coiled round the jet tube, so as to reach into and above the flame, and it became white hot during the exhaustion, and continued red hot even when the pressure was only one tenth. The lower part of the flame was now extinguished, but the upper part in the contact of the wire continued to burn till the pressure was reduced to one thirteenth. The flame, therefore, of hydrogen is extinguished in rarefied atmospheres, whenever the heat it produces is insufficient to communicate visible redness to platinum wire. Sir Humphry Davy was thus led to infer, that those combustibles which require least heat for combustion would burn in rarer atmospheres than those requiring more heat; and that bodies which produce much heat in combustion would burn in rarer air than those producing little heat, and experiments are detailed proving this to be the case: thus, an inflamed jet of light carburetted hydrogen, which produces little heat in combustion, and requires a high temperature for its ignition, was extinguished whenever the pressure was below one fourth, even though the tube was furnished with a wire. Carbonic oxide burned under a pressure of one sixth; sulphuretted hydrogen of one seventh. Sulphur, which burns at a lower temperature than any other ordinary combustible, except phosphorus, had its flame maintained in an atmosphere rarefied 15 times, and phosphuretted hydrogen was inflamed when admitted into the best vacuum of an excellent air-pump.