have been publiſhed but his treatiſe on the Art of Painting. —For his anatomical knowledge, see Anatomy (hiſtory of), p. 669.

VINCULUM, in algebra, a character in form of a line, or ſtroke drawn over a factor, diviſor, or dividend, when compounded of ſeveral letters or quantities to connect them, and ſhows that they are to be multiplied or divided, *Sec.* together by the other term.

Thus *d × a* + *b—c* ſhows that *d* is to be multiplied into *a + b — c.*

VINE, in botany. See Vitis.

VINEGAR, Acetum, an greeable acid and penetrating liquor, prepared from wine, cyder, beer, and other liquors ; of conſiderable uſe, both as a medicine and a ſauce. The word is French, *vinaigre ;* formed from *vin,* "wine;” and *aigre,* “ sour.” See Acetum, and Chemistry-Index.

Wine and other vinous liquors are changed into vinegar by the acetous fermentation. The acetous fermentation is nothing more than the acidification or oxygenation of wine, produced in the open air by means of the abſorption of oxygen. Vinegar is compoſed of hydrogen and carbon, united together in proportions not yet aſcertained, and chan­ged into the acid ſtate by oxygen. As vinegar is an acid, we might conclude from analogy, that it contains oxygen ; but this is put beyond doubt by direct experiments. In the firſt place, we cannot change wine into vinegar without the contact of air containing oxygen : ſecondly, this proceſs is accompanied by a diminution of the air in which it is carried on from the abſorption of its oxygen ; and, thirdly, wine may be changed into vinegar by any other means of oxydation. Independent of the proofs which these facts furniſh of the acetous acid being produced by the oxyge­nation of wine, an experiment made by Mr Chaptal, professor of chemiſtry at Montpelier, gives a diſtinct view of what takes place in this proceſs. He impregnated ſome water with about its own bulk of carbonic acid gas, procu­red from beer vats in fermentation ; and placed this water in a cellar, in vessels communicating with the air, and in a ſhort time the whole was converted into acetous acid. This carbonic acid gas, procured from beer vats in fermentation, is not perfectly pure, but contains a great quantity of al­cohol in ſolution ; wherefore water impregnated with it contains all the materials necessary for forming the acetous acid. The alcohol furniſhes hydrogen and one portion of carbon ; the carbonic acid furniſhes oxygen and the rest of the carbon ; and the air of the atmoſphere furniſhes the rest of the oxygen necessary for changing the mixture into ace­tous acid. From this obſervation it follows, that nothing but hydrogen is wanting to convert carbonic acid into ace­tous acid ; or, more generally, that by means of hydrogen ; and according to the degree of oxydation, carbonic acid may be changed into all the vegetable acids : and, on the contrary, that, by depriving any of the vegetable acids of their hydrogen, they may be converted into carbonic acid.

The proceſs indicated by Boerhaave for making vinegar is ſtill the moſt frequently uſed. It conſiſts in fixing two caſks in a warm room or place. Two falſe bottoms of baſket-work are fixed at a certain diſtance from the bottom, upon which the refuſe of grapes and vine twigs are placed. One of theſe tuns is filled with wine, and the other only half filled. The fermentation begins in this laſt ; and, when it is in full action, it is checked by filling the caſk up with wine out of the other. The fermentation then takes place in the laſt-mentioned caſk, that remained half filled ; and this is checked in the same manner by pouring back the same quantity of liquid out of the other : and in this way the proceſs is continued till the vinegar is made, which is uſually in about 15 days. When the fermentation developes itself, the liquid becomes heated and turbid ; a great num­ber of filaments are ſeen in it ; it emits a lively ſmell ; and much air is abſorbed, according to the obſervation of the Abbé Rozier. A large quantity of lees is formed, which ſubſides when the vinegar becomes clear. This lees is very analogous to the fibrous matter.

Vinegar is purified by diſtillation. The firſt portions which paſs over are weak ; but ſoon afterwards the acetous acid riſes, and is ſtronger the later it comes over in the diſtillation. This fluid is called *distilled vinegar* ; and is thus cleared of its colouring principle, and the lees, which are always more or leſs abundant. Vinegar may likewiſe be concentrated by expoſing it to the froſt. The ſuperabundant water freezes, and leaves the acid more condenſed.

*Method of making Cyder Vinegar.—*The cyder (the meaneſt of which will ſerve the purpoſe) is firſt to be drawn off fine into another vessel, and a quantity of the muſt of ap­ples to be added : the whole is ſet in the ſun, if there be conveniency for it ; and at a week or nine days end it may be drawn off.

*Method of making Beer Vinegar.—*Take a middling sort of beer, indifferently well hopped ; into which, when it has worked well and grown fine, put ſome rape, or huſks of grapes, uſually brought home for that purpoſe : maſh them together in a tub ; then letting the rape ſettle, draw off the liquid part, put it into a caſk, and ſet it in the ſun as hot as may be ; the bung being only covered with a tile, or ſlate- ſtone : and in about 30 or 40 days it will become a good vinegar, and may paſs in uſe as well as that made of wine, if it be refined, and kept from turning muſty.

Or thus :—To every gallon of ſpring-water add three pounds of Malaga raisins ; which put into an earthen jar, and place them where they may have the hotteſt ſun from May till Michaelmas ; then preſſing all well, tun the liquor up in a very ſtrong iron-hooped vessel, to prevent its burſting : it will appear very thick and muddy when newly preſſed ; but will refine in the vessel, and be as clear as wine. Thus let it remain untouched for three months before it is drawn off, and it will prove excellent vinegar.

*To make Wine Vinegar.* Any sort of vinous liquor being mixed with its own faeces, flowers, or ferment, and its tar­tar firſt reduced to powder ; or else with the acid and auſtere ſtalks of the vegetable from whence the wine was ob­tained, which hold a large proportion of tartar ; and the whole being kept frequently ſtirring in a vessel which has formerly held vinegar, or ſet in a warm place full of the ſteams of the ſame, will begin to ferment anew, conceive heat, grow ſour by degrees, and ſoon after turn into vinegar.

The remote subjects of acetous fermentation are the ſame with thoſe of vinous ; but the immediate ſubjects of it, are all kinds of vegetable juices, after they have once undergone that fermentation which reduces them to wine : for it is abſolutely impoſſible to make vinegar of muſt, the crude juice of grapes, and other ripe fruits, without the previous aſſiſtance of vinous fermentation.

The proper ferments for this operation, whereby vinegar is prepared, are, 1. The faeces of all acid wines. 2. The lees of vinegar. 3. Pulverized tartar, eſpecially that of Rheniſh wine, or the cream or cryſtals thereof. 4. Vinegar itſelf. 5. A wooden vessel well drenched with vinegar, or one that has long been employed to contain it. *6.* Wine that has often been mixed with its own faeces. 7. The twigs of vines, and the ſtalks of grapes, currants, cherries, or other vegetables of an acid auſtere taſte. 8. Bakers leven, after it is turned acid. 9. All manner of ferments, compounded of thoſe already mentioned.

*Vinegar Concentrated.* See Chemistry, n⁰ 881.

*Vinegar (Salt of).* See Chemistry, n⁰ 882.