

the acetic acid combines with and removes. The nature and chemical properties of this alkaline poison have not as yet been investigated. The crude oil is supposed to be "the juice of cursed hebanon," described by Shakspeare as a distilment.*

Thus three active chemical substances unite their influences to produce the sensible effects which are experienced during the smoking of tobacco. All three are contained in variable proportions in the smoke of burning tobacco. The form and construction of the pipe, among other circumstances, influence, as I have said, the proportion of these ingredients which the smoke contains. Thus the Turkish and Indian pipes, in which the leaf burns slowly, and the smoke is made to pass gently bubbling through water, arrest a large proportion of the poisonous vapors, and convey the smoky air in a much milder form to the mouth. The reservoir of the German pipes retains the greater portions of the oily and other products of the burning tobacco, and the long stem of the small Russian pipe has a similar effect. The Dutch and English clay pipes retain less; the metal (bronze or iron) pipes of Thibet, by becoming warm, bring still more of the constituents of the mild Chinese tobacco to the mouth of the smoker; while the cigar, especially if smoked to the end, discharges directly into the mouth of the smoker everything that is produced by the burning. Thus the more rapidly the leaf burns and the smoke is inhaled, the greater the proportion of the poisonous substances which are drawn into the mouth. And finally, when the saliva is retained, the fullest effect of all the three narcotic ingredients of the smoke will be produced upon the nervous system of the smoker. It is not surprising, therefore, that those who have been accustomed to smoke cigars, especially of strong tobacco, should find any other pipe both tame and tasteless, except the short, black *cutty*, which has lately come in favor again among inveterate smokers. Such persons live in an almost constant state of narcotism or narcotic drunkenness, which must ultimately affect the health, even of the strongest. The chewer of tobacco, it will be understood from the above description does not experience the effects of the poisonous oil which is produced during the burning of the

leaf. The natural volatile oil and the nicotin are the substances which act upon him. These, from the quantity of them which he involuntarily swallows or absorbs, impair his appetite, and gradually weaken his powers of digestion.

The same remark applies to the taker of snuff. But his drug is still milder than that of the chewer. During the first fermentation the leaf undergoes in preparing it for the manufacture of snuff, and again during the second fermentation, after it is ground, a large proportion of the nicotin escapes or is decomposed. The ammonia produced during these fermentations is partly the result of this decomposition.* Further, the artificial drying or roasting to which tobacco is exposed in fitting it for the dry snuffs, expels a portion of the natural volatile oil, as well as an additional portion of the natural volatile alkali or nicotin. Manufactured snuff, therefore, as it is drawn up into the nose, and especially dried snuff, is much less rich in active ingredients than the natural leaf. Even the rappees, though generally made from the strongest Virginian and European tobaccos, containing 5 or 6 per cent. of nicotin, retain only 2 per cent. when fully manufactured.

I have already stated that in all the sensible properties by which the unadulterated leaf of the tobacco plant is characterized, the produce of different countries and districts exhibits important economical differences. All such diversities in quality and flavor, in strength, mildness, odor, &c., the chemist explains by the presence of the above-named active ingredients, sometimes in greater, sometimes in smaller proportion; and it is interesting to find science in his hands first rendering satisfactory reasons for the long-established decisions of taste. Thus he has shown that the natural volatile oil does not exist in the green leaf but is formed during the drying; hence the reason why the mode of drying and curing affect the strength and quality of the leaf. He has also shown that the proportion of the poisonous nicotin is smallest in the best Havannah, and largest in the Virginian and French tobaccos. Hence a natural and sound reason for the preference given to the former by the smokers of cigars, who receive directly into their mouths all the substances which escape from the burning leaf. And, lastly, by showing that both of the poisonous ingredients of tobacco are volatile, and tend to escape slowly into the air, he has explained why the preserved leaf, or the manufactured cigar, improves by keeping, and, like good wine, increases in value by increase of age.

As to the lesser niceties of flavor by which certain samples of tobacco are distinguished, these probably depend upon the presence of other odoriferous ingredients, not so active in their nature, or so essential to

* The effects, real or imaginary, of this "juice" are thus described:

"Sleeping within mine orchard,
My custom always of the afternoon,
Upon my secure hour thy uncle stole,
With juice of cursed hebanon in a vial,
And in the porches of mine ear did pour
The leperous distilment: whose effect
Holds such an enmity with blood of man,
That, swift as quicksilver, it courses through
The natural gates and alleys of the body:
And with a sudden vigor it doth posset
And curd, like eager droppings into milk,
The thin and wholesome blood: so did it mine;
And a most instant tetter bark'd about,
Most loathsome, with vile and loathsome crust,
All my smooth body."—*Hamlet*, Act I, Scene 5.

* Nicotin is one of those powerful vegetable principles which, like the *theine* of tea and coffee, are rich in nitrogen. Of this element it contains 17 per cent.