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Description of the river Mississippi and its Delta, with that of the adjacent parts of Louisiana. By William Dunbar, of the Natchez, communicated by the Author, a Member of the Society; through the President.

[Concluded.]

There are many other inlets along the coast of the Delta which flow with fresh water during the inundation, and admit the waters of the ocean at other seasons: those have all got their bars, and are, as before observed, miniatures of the Mississippi; a small tide of about three feet perpendicular facilitates the passage of those bars for small er [illegible], some of them are seen above water while the tide is out; the remedy for the removal of those bars has already been noticed: our posterity will see those inlets or Bayous converted by the hand of industry into extensive canals, penetrating in all directions this tract of inexhaustible fertility, which will become the garden of the United States.

Sugar having become of late a staple commodity of the lower country, it cannot be uninteresting to enquire how far, in its present state, it is susceptible of that culture. The following short statement is derived from the practical experience of the planters. It is now admitted that the sugar cane does not arrive (regularly) to full maturity beyond 75 miles above New Orleans, following the sinuosities of the river; and this corresponds with a line drawn westerly along the sea coast of Pensacola and Mabille, crossing the island of New Orleans, below the city the lands decline so rapidly that, beyond 15 miles, the soil is so much imbrued in the waters of the Mississippi, as to be totally unfit for the culture of the cane; within those limits, the most experienced planters admit that one quarter of the cultivated lands of any considerable plantation may be planted in cane, one quarter left for pasture, and the remaining half employed for provisions, &c. and a reserve for change of crops. One Parisian arpent, of 180 feet square, may be expected to produce, on an average, 1 hhd. (12 cwt.) of sugar, and fifty gallons of rum. From the above data, admitting that both sides of the river, are planted for ninety miles in extent, and about three quarters of a mile in depth, it will result that the annual product may amount, in round numbers, to twenty five thousand hhds. of sugar, with twelve thousand puncheons of rum. Enterprising young planters say, that one third, or even one half of the arable land might be planted in cane; it may also be remarked, that a regular supply of provisions from above, at a moderate price, would enable the planter to give his attention to a greater body of land cultivated in cane: several of the departing branches of the Mississippi furnish strips of land along their margins within the sugar latitude; there is also a portion of the Alacapas, parallel to the sea coast, favorable for this culture; every circumstance being therefore taken into view, we may admit that in the existing state of the lower country, double the quantities of sugar and rum abovementioned may be produced, although hitherto the annual product has been only 5000 hhds. of sugar.

When the immense regions watered by the tributary streams of the Mississippi, particularly those extending to the sources of the Missouri, shall be opened up and cultivated by the persevering labor of man, our winters will be enchained in the north, and a milder climate will extend itself over the whole of the Delta; and as it lies under the same parallels of latitude, so will its productions be similar to those of the Delta of Egypt: and if we extend our views to a future period, when the waters of this great river shall be completely under the power of man, by a regular system of canals and embankments, such as probably existed in Egypt in its best days under its antient kings, some idea may be formed of the inestimable value of a country, which most happily for itself and for the United States, now constitutes a very precious portion of the union.

It has already been said that the tides on the coast rise about three feet perpendicular, but they are not lunar tides; another cause must be sought: the bay of Mexico being a species of Mediterranean sea, surrounded by the continent and a close chain of islands, is not sensibly susceptible of the gravitating power of the sun and moon; the tides take place only once in twenty four hours, and nearly at the same hours in the morning; they depend altogether upon the winds, which, during the regular summer season, blow in upon the land all day; and in the night, it is either calm, or there is a small returning land breeze: the sea breeze commences in the morning about nine or ten o'clock, and ceases in the evening about sun set; the waters having acquired a momentum from the action of the wind continue to rise until about day break, when it is high water; a tide depending upon such a cause must be subject to frequent anomalies: in the winter, as may be expected from this theory, the tides are extremely irregular, being governed by the variable winds of that uncertain season.

This small tide produces an effect upon the Mississippi; I have noted at New-Orleans (during the absence of the inundation) a rise of fourteen inches, about sun rise; and at Ma-chac from 6 to 8 inches; this ascent of the waters of the Mississippi is produced merely by a swell or wave; the current at the same time continually issuing from the channel into the ocean; this tide requires a considerable time to make its progress upwards against the current: those who have perused Condamine's account of his voyage down the Maragnon are acquainted with every thing that can be said upon this curious subject. The great Newton has observed, that the tides which take place nearly at the same time at London-bridge, and at the mouth of the Thames, are not the same; but that at the bridge is the same which happened twelve hours before at the Nore.

It is probable that any tide coming up to New-Orleans is the same which arrived three days before at the mouth of the river, consequently the distance from New-Orleans to the mouth of the river is divided by the tides into three parts; (i.e.) one tide at each extremity, and two others making their progress upwards. This statement is only conjectural, founded upon probable circumstances, having been unable to procure a sufficient number of accurate observations to be made at different points.

When the river is very low, the velocity of the stream is scarcely a mile per hour at Natchez, and much slower at New-Orleans, probably not above half a mile; but during the time of the inundation from 4 to five miles.—It is asserted that the current is swifter during the night than the day; this perhaps might be accounted for by saying, that there is generally a breeze by day blowing up the river, which opposes the current and dams up the water to a certain degree; and that the night being generally still, the water descends with accelerated velocity; but another fact is not so easily accounted for, viz. that saw-mills, which are constructed upon canals leading from the Mississippi, perform more work (cæteris paribus) in the night than in the day, the number of strokes of the saw being found greater in a given time.—The increase of the specific gravity of water by the coldness of the night will be of no avail in the solution of this question, because the weight and velocity of water in a lateral canal cannot thereby be encreased. We cannot suppose that evaporation during the day produces a sensible effect in diminishing the quantity of water, because the water thus diminished in the course of the day arrives at the mill during the night. Is it not rather owing to the perfect stillness of the night, that the machine performs its office without any unnecessary agitation or friction, which in the day is greatly promoted by the vivifying influence of the sun, causing a more rapid circulation of the atmosphere, and exciting to motion every body on the surface of the earth, whether animate or inanimate? It is known to mariners that the relative cessation of motion on board a vessel under sail, contributes greatly to the rapidity of her movement. This phenomenon merits a more perfect solution.

Although the velocity of the water has been said to be from one to five miles per hour, yet this is to be understood of what may be called the thread of the current, it being considerably less along the shores, and very frequent counter-currents or eddies of great extent are found in favorable situations, which greatly facilitate the ascending navigation of the river; but as the current is continually deflected from shore to shore, boats are at many points unable to stem the force of the current, and are under the necessity of crossing frequently to get as far as possible out of the main current.

No abrasion takes place at the bottom of the channel of the Mississippi (in Lower Louisiana), an equilibrium has long since been established; it is believed rather that its bed is on the rise: as the margin of the river rises by the influence of every inundation which passes over it, it is thought that the bottom must rise also; but this effect must depend altogether upon the protrusion of the cradle of the river into the ocean, by which means the extremity of the inclined plane which the river has carved out for the conveyance of its waters, being prolonged horizontally, the waters within the channel must acquire a new elevation, placing themselves parallel to their former position, and the bed of the river will rise proportionably so far only as the alluvial bottom extends; and thus there will be a low but progressive rise of the margin and bed of the river, which is perfectly agreeable to observation.

The formation of land is surprisingly quick in certain situations; the moment the waters lose their great velocity, they begin to deposit their contents; the most favorable position is on either side of the main channel, where the current is nearly but not absolutely destroyed: as for example, when the river suddenly makes a breach or off-cut from bend to bend, leaving a circle of several leagues of the former bed with little or no current, the waters immediately begin to block up the two entrances, leaving the interior in form of a lake: in five years the soil will be tolerably firm, nearly of equal height with the adjoining lands, and covered with forests of willow and cotton-wood (probably populus deltoides*) 50 feet high; some parts of the old channels were perhaps not less than a hundred feet deep: this wonderful creative power of the Mississippi may, by the ingenuity of man, be applied to the accomplishment of grand objects: by proper embankments, and a regular supply and discharge of the waters of the Mississippi, the surface of the earth may be raised to a great height, far above the general level of the inundation: travellers inform us that the towns and villages of the Delta of the Nile are built upon elevated situations, which are so many islands during the season of the inundation. How shall we account for the formation of those islands? we have no reason to believe that they pre-existed in the Delta, and they could not be formed by the natural agency of the inundation; the accumulation of earth by mere labour for the formation of so many islands would have been an Herculean task; it is therefore more rational to suppose that the ingenuity of the aborigines of ancient Egypt, directed by the example of nature herself, pursued the more simple and facile mode of elevating the site of their habitations in the manner above described.

We shall conclude the above imperfect sketch by observing, that it is the result of occasional observation for a series of years, and of scattered information collected from various sources, probably often uncertain, from a cause which is unfortunately too general, viz. the extreme inattention of persons, even of some education, to the most curious phenomena passing daily under their review.

Circumstances did not favor the investigation of several points of curious enquiry. It would be desirable to ascertain the obliquity of the inclined plane by which the Mississippi conveys its waters to the ocean, both at the surface and at the bottom of the river, and at various distances from its mouth: as also the respective velocities of the water in those positions, at low and high water. The difference of the velocities of the water at and under the surface, was turned to account by an ingenious master of a vessel, who, finding himself detained in his descent by a calm, dropt his anchor ten or a dozen fathom below the surface, by which his vessel was so much retarded in the stream as to enable him to steer sufficiently to keep clear of the shore. This hint might perhaps be improved to advantage: a much more perfect instrument than an anchor may be invented for the purpose of holding the inferior current, and in situations similar to the Gulf-stream, a vessel may thereby be enabled to escape an enemy.

A chart of the alluvial country is a desideratum, with which it is to be hoped the curious will in due time be obliged, under the present enlightened government: a correct sketch of the various reservoirs and canals which this great river has formed for the reception and disemboguement of its immense volume of waters, will become the basis of the vast improvements which at a future day will be made upon this inestimable portion of the United States.

WILLIAM DUNBAR.

Natchez, January 1, 1804.

* Of Bartram.

FOR THE NATIONAL INTELLIGENCER.

To the Legislatures of the respective States.

LETTER FOURTH.

Same subject viz. internal improvements—*Concluded.*

Having thus estimated the weight of the usual arguments advanced against an extensive system of internal improvements, and shewn, as I apprehend, that, however true in the abstract, they form no valid or practical objection, let us proceed to notice concisely the peculiar and forcible considerations which recommend the adoption of such a system.

These naturally divide themselves into two classes, those arising from their relation to the public interest, which we shall denominate *political*; and those arising from their relation to the interests of individuals, which may be denominated *personal*.

In a nation whose wise and liberal policy forbids all monopolies, and whose institutions aim at maintaining unimpaired the rights and immunities of all, that every man may derive benefit from their protection, it becomes an object of vast importance to place the citizens upon a footing of as perfect equality as the state of society and the organisation of man admit. By perfect equality, we mean not to point to any agrarian system, or to any unjust invasion of the rights of property, or the fruits of industry; but to that state of things which places equal means of advancement within the reach of the citizen according to his industry and talent, wherever he may be placed. The necessary effect of this equality is contentment. It destroys in the germ all fretful jealousy or hostility to more favored portions of the community. It distributes over the whole face of the nation equal portions of power. By creating the means of a progressive improvement in equal degrees, it leads forward the entire mass of the nation by the same gradations. In such a state of society, we do, not as is too often the case in countries dissimilarly circumstanced, contemplate the difference of centuries in the degree of civilization in distant parts of the same nation. We do not behold *this* spot the exclusive seat of wealth, of luxury, of science; and *that*, the abode of poverty, of want, and of ignorance. These are the gloomy effects of kings and courts and ecclesiastical establishments.—They are, or they ought to be, unknown in republics. This result would, perhaps, of itself, be conclusive in favor of fostering a vigorous spirit of internal improvement; as it is most evident that the effects of such a disposition will increase the comfort and wealth of our citizens, will present the most effectual antidote to monopoly by the removal of local preferences; will check the growth of luxury, by diffusing instead of concentrating on a favoured spot, the means of enjoyment; will foster the interests of learning by the ease of intercourse; and will produce and confirm the conviction that the interests and happiness of all are equally protected.

If these be the natural and necessary effects of an enlarged system of internal improvement, is there a man, who calls himself a republican, and who properly appreciates the inseparable connection between the prevalence of republican principles and happiness, that can feel indifferent to the subject, or permit it to be neglected for want of his exertions? Let not one man rely on the efforts of another. In a cause like this where the interests of all are the same, there should be one common effort. The cause of liberty and of human happiness has not a deadlier foe than indolence. It is always owing to the *vis inertia* of good and wise men that vice or folly reigns. Yet such is the folly of the wise, that while the positive infraction of a law is punished as criminal, the omission to discharge duties, without which laws are empty pageants, is attended with no punishment, and does not even excite in all cases a consciousness of guilt. For what purposes were talents conferred but to do good? Are philosophers and, statesmen to be considered as so many excentric comets, sent to this ball to disturb its harmony or to blot it from existence? No! As the enlightened patriot, whose unceasing labors are directed to the promotion of the public welfare is the greatest of men, so ought *he* to be held in the lowest degradation, who, with the power of eminently advancing the happiness of others, passes his days in inglorious apathy! His is the worst of treason! God and nature placed him on an eminence to wield the sceptre of virtue. Elevated above the passions and vices of the world, on him was devolved the high duty of restraining the rage of contending passions, of repressing the daring spirit of vice, of animating the timid feelings of virtue, and of arresting the arm of the patricide. Slumbering on a post, where all should have been thought and vigilance, his country's misery or ruin are justly chargeable upon him! Patriots of America, let not this guilt be laid at your doors!

So great are the benefits that would flow from conducting internal improvements on a large scale, that they would justify and soon repay the imposition of taxes to a considerable extent. This, however, is entirely unnecessary in many, and perhaps in all the states. In the states of Connecticut, New-York, Pennsylvania, Maryland and South Carolina, there are large sums of either accumulated specie, or stock easily convertible into specie; while in many of the other states, land is possessed to a sufficient value, if properly disposed of, to produce very large sums. In the highly mercantile states of New-York and Pennsylvania all the means are in hand for the making canals and turnpikes on as liberal a scale as the most enlarged policy can dictate. Let us descend to particulars. Each of these states, it is believed, have cash resources to the extent of three millions. Should the legislatures of those states offer to expend these sums for these ends, there is not the least doubt of their being supported by individual contributions to a like amount. Six millions would pay the expence of at least one thousand miles of turnpike road, and five hundred miles of canals. Let us suppose that these produce the first year, after their accomplishment only three per cent, which is undoubtedly a smaller profit than would be actually realised. Taking into consideration the regular progress of population, its necessary increase from internal improvements, the vast mass of rich land brought into productive cultivation by the ease and cheapness with which commodities would be interchanged, and the growth of luxury, in perhaps a more rapid extent than any of these other effects, it will be within bounds to estimate the annual rise of the proceeds of tolls at ten per cent. on the first year's receipt. We have data, on this point, which places the correctness of this estimate, so far as it proves it moderate, beyond dispute. The following is a table of our exports of domestic produce for the ten successive years from 1791 to 1800 inclusive.

1791	14 600,000
1792	15 060,500
1793	15,420 000
1794	16 200 100
1795	18,064,050
1796	20,024,621
1797	24,052 671
1798	27,991,413
1799	33,142,187
1800	31,840 903

Since this last year the exports of domestic produce have increased to 42,205,961, which is in even a higher ratio.

Taking then ten per cent as the annual rise on the first year's receipt, the stock will rise in value, as follows.

	Dollars	Cents
1st year	3	00
2	3	30
3	3	63
4	4	00
5	4	40
6	4	84
7	5	32
8	5	85
9	6	33
10	6	96
11	7	65
12	8	41
13	9	25
14	10	17
15	11	18
16	12	29
17	13	51
18	14	86
19	16	34
20	18	00
21	19	80

From this statement it appears that no mode of investiture for the cash funds of a state, or of an individual, can be named, that will be more productive. At the end of twenty-one years, an annual interest of at least twenty per cent. will accrue; and for this vast premium the only sacrifice will be the difference between the amount of tolls received for the first seven years and the interest of six per cent. which the price of stocks shews is considered as a good compensation for money. This difference amounts, on the average, to something less than two per cent. a year. While for the ensuing seven years the average annual