# FOR THE FARMER.

## Contagious Diseases of Cattle.

Professional men quite often evince a narrowness of view, and a prejudice even at times, which prevent them from discussing in a useful manner, some vexed questions which may be public property as well as professional. The time has long since passed away when professional men had a monopoly of matters pertaining to their profession or could hold themselves above criticism by intelligent persons outside of their class. And this view of the case becomes clear when we read the remarks made in the paper read by a veterinary surgeon at the Chicago convention. We propose to refer to but one of the views of several which we think to be mistaken in that paper. The author of the paper compares the origin of the diseases under consideration to the seeding of a field with corn, without which there could be no possible growth. This is a wholly erroneous view of the case. On the other hand, it would have been much more reasonable and truthful to compare the animal system to a soil apparently free from vegetable growth, but still charged with dormant seeds of weeds which are waiting for some favorable conditions, some warm shower and sunshine, to burst into sudden and vigorous growth.

This is the view taken by physicians and physiologists as regards the nature of many of these so called germ diseases *ab initio*. There are many cases of these diseases, of which no apparent outside origin can be even suspected that has relation to infection or contagion. There are sufficient cases, however, to warrant the beliefs, or certainty, that the dormant seeds of disease which are always present in the system, waiting for development by favorable conditions, have been quickened into active life by these exciting causes, just as the soil, apparently clear and entirely free from pernicious growth, is quickly covered with an eruption of verdure from the effect of warmth and moisture.

And in a similar manner we have seen an apparently healthy and vigorous man working in the harvest field, remove his coat, and, when saturated with perspiration, sit in the shade and enjoy the cool breeze, which quickly closed the pores of the skin, turned back the current of evoporation of impure matter from the blood, and struck a chill to the very marrow. Within a few hours the man is stricken with typhoid fever which is an infectious disease,) and is at the very gates of the grave or within its cold walls. This is a type of perhaps the majority of sporadic cases of such diseases, and is especially true of those "germ" disorders which are popularly termed 'malaria," such as "ague," "chills," and intermittent or remittent fevers. Our own experience in regard to animals proves the same thing. Hog cholera is produced *de nova* beyond any doubt. So is splenic fever among cattle, and so is glanders among horses. But no doubt, too, these diseases are spread by contagion as well.

We might argue the question in the direction of the uselessness of precautionary hygiene and sanitary measures as a method of preventing this class of disease, and of the utter helplessness of man to avoid them, if they are always necessarily produced by contagion, because the contagion virus—the germs—are indestructible by any ordinary measures. But this is scarcely necessary. It is not long since, as might be pointed out, the Department of Agriculture reported that swine cholera was utterly exterminated and had disappeared. But yet, as usual, when the feeding season, with all its unwholesome conditions and environments, has begun, cholera appears here and there with the prevailing characteristics and results. No doubt each case is a centre from which the disease spreads, until, like the rings in a pool caused by the dropping of the rain upon it, the whole surface is soon in commotion the disease sweeps over wide localities and invades every herd.

It is to be regretted that the dangerous and ineffective practice of vaccination is recommended, or rather suggested. It has been very conclusively shown that this merely perpetuates the disease, especially as regards the fatal pleuro-pneumonia, and tends to divert attention from the indispensible sanitary precautions which alone can avoid the exciting causes of the diseases.

The usefulness of these precautions is conclusively shown in the present rarity of epidemic diseases in the well drained, more clean and wholesome cities, where formerly they ran fearful riot and slew thousands upon thousands of victims, whose lives were sacrificed to the filth and foulness with which large cities then overflowed. Sanitary precautions should be to the veterinary surgeon, as well as to the physician, what hoeing and clean cultivation are to the farmer, to destroy the seed or the germs of the organisms—weeds in either case—which lie dormant in the blood in the one and in the soil in another; for it is abundantly clear that the seeds of disease exist in the blood, waiting for favorable chances to germinate, just as those of the weeds exist in the soil, and that the diseases are not always sown after the manner in which we sow corn.—*Chicago Times.*

## Poultry—Breeds for Laying.

The best breeds of fowls for laying, are those that suit the climate in which they are kept. It is an oft-repeated inquiry as to which breeds is most suitable, by those who contemplate poultry keeping. Such inquiry can only be answered by those who have experimented with different varieties in different locations. There is no doubt that the Leghorns are equal to any other breed for egg production, but it does not follow that they are the most profitable fowl under all circumstances. They are divided into two classes—the single, and rose combs—and there is a further subdivision, according to color. The single comb varieties of fowls are subject to frozen combs in very cold weather, but when properly managed they escape harm. The difficulty may be overcome by "dubbing" them, as is done with Games, but as the principal points of the Leghorns are given to the comb, they would thereby be disqualified from competition at the fairs and poultry shows. A frosted comb would not be very objectionable to those who only breed fowls for profit and not for exhibition, but when the comb becomes frosted, the hen ceases to lay until the injured member is completely healed. As the comb may be frozen several times during the cold season, the loss of time from egg production, owing to the effect of the temperature, would be quite an important item. The double comb varieties though exposing quite a large surface to the action of cold, have their combs closer to the head.

In thus noticing so small a matter as the comb, the object is to present one of the difficulties in the way of keeping a breed that never sits, but lays well. While the breed may not find favor in cold climates, that is no reason why it should not be popular in other sections. As the Leghorns have their virtues and faults, so do the other breeds of fowls. In raising fowls for market, many object to the Brahmas and Cochins on account of their slow growth, and this objection may be a strong one if the fowls are to be sent to market as chicks, as they do not feather until well advanced. If matured fowls are intended for shipment; the largest carcasses, with fine appearance, may be obtained from such breeds. The Plymouth Rocks, which grow fast, and are uniform in appearance when young, also make good market fowls when grown, but while they are excellent layers, they are liable to become excessively fat when highly fed, especially when they are confined, which is a hindrance to egg production. This may also be an objection to the Brahmas and Cochins. The best results are derived from Plymouth Rocks when they have free range. All breeds do best with freedom, but the larger ones are more contented under restriction. It is best, therefore, in selecting a breed for laying, to take into consideration its hardiness, fitness for market, time of maturity, adaptability to climate, and disposition. By selecting that breed which possesses qualities adapting them to the conditions of the particular sections of country, the best breed for laying as well as for other purposes will be secured.

## THE CARE OF FRUIT TREES.

STARTED TREES.—If trees are transported in warm weather, especially if packed moist the buds will push, and when unpacked will be found to have white, weak shoots, several inches long. The only way to save such trees is to cut back every branch to a good bud that is still dormant.

INJURED TREES.—Nursery trees when sent a long distance, may be injured by drying, and when received, the bark will be shrivelled, and the tree apparently dead. Such trees may usually be saved. Open a trench large enough to receive them, and lay in the trees, root and branch, and sprinkle in the soil among the branches, laying the trees one upon another, taking care to have the soil come in contact with even the smallest branches. The bark will gradually absorb moisture from the soil, and in a few days become plump and apparently as bright and as fresh as ever.

STAKING NEWLY PLANTED TREES.—In exposed localities, trees are apt to get a "list" in the prevailing winds. If the trees are small and properly pruned at planting, there will be less trouble than when large trees, which must be staked. The safest way is to drive two stakes at a little distance, upon each side of the tree, and secure the trunk to both stakes by means of a straw band, or soft rope so as not to chafe.

PASTURING THE ORCHARD.—It is a singular fact that the orchard is the only field that farmers, as a general thing, expect to yield more than one crop. There is so much apparently unoccupied ground between the trees, that there is a desire to utilize it with some crop. When the trees are in bearing, they need all the soil. While the trees are young, a manured crop may be grown between the rows. The best treatment of an established orchard is, to sow it to clover and pasture young pigs upon it. By this, the fruit, soil and pigs will be benefited.

PROTECT THE ROOTS.—In transplanting or handling trees, recollect that every minute of exposure to the air injures them. If a tree can not be planted at once, make a hole and bury the roots. Those who go to a near nursery and take home their own trees, should puddle them. Make a hole in the ground a foot deep and as large as needed. Have a plentiful supply of water. Pour water into the hole and stir up the soil, until a thin mud is formed. Draw the roots of the trees through this until they, even the smallest, are completely covered with mud; then sprinkle dry soil over them to dry them off. This "puddling" or "grouting" of the roots, as the English call it, is useful not only for trees, but for plants of all kinds.

## FACTS AND FIGURES.

The government envelope factory at Hartford, Conn., uses a ton of gum a week.

Forty-one counties in West Virginia prohibit the sale of intoxicants.

It is estimated that the peanut crop of the South this year will be worth $3,000,000.

The Peninsula peach orchards are expected to yield about 5,000,000 bushels this season.

There are fifty illicit distilleries and only three licensed ones in one district in North Carolina.

New York city, it is reported, has 40,000 persons who depend on gambling for a livelihood.

The number of cotton mills in the southern states has increased from 180, four years ago, to 315 at the present time.

A recent report from the Minister of Public Instruction shows that there are 100,000 public school teachers in France.

The amount of gold coin and bullion now owned by the United States Government is larger by $24,000,000 than it was a year ago, and the amount of standard silver dollars owned by the Government is less by $8,000,000 than it was a year ago, and less by $17,000,000 than it was six months ago, and less by $9,000,000 than it was the first of November.

Detectives were posted at the doors of six prominent concert saloons in Chicago on the same evening, with instructions to count all the people who entered there between 7 p.m and midnight. At one door there were counted 1,680 males and 290 females—total, 1,970; at another, 1,423 males and 58 females—total, 1,481; at another, 2,609 males and 254 females—total, 2,863; at another, 2,658 males and 148 females—total, 2,806; at another, 1,657 males and 163 females—total, 1,820; at another, 1,591 males and 94 females—total, 1,685. It was found impracticable to make a separate count of the minors who entered these places on that evening, but it was plainly seen that of these 11,618 male and 2,007 female customers an astonishingly larger proportion were boys and girls, and as there were at that time about 3,000 saloons in the city, it was reasonably estimated that not less than 30,000 boys and girls were among their patrons.

## THE TRAGEDIES OF NIAGARA.

### An Old Guide and Hackman of the Falls Rehearses some of Them.

"To think that I should have left Niagara Falls twenty years ago after having been a witness of two terrible tragedies of the Falls, and then upon my first visit to them in that time be there in the midst of the excitement of the Vedder-Pearson horror!"

The speaker was an old man, who said his name was Andrew Dalrymple, of Camden. He was a passenger on the Erie Railway train, returning from a visit to Niagara Falls, where he said he was a hackman and a guide for ten years.

"I was greatly surprised to see the old tree trunk still rising in the American Rapids, between the small islands off of Goat Island and the American shore. I guess no one remembers, when the tree lodged there, but I remember it, for thirty years, and it never entered my mind that it could be there yet. But there it was, and as I stood on the Goat Island bridge last week and looked down at the gnarled trunk the thought of that early summer morning, over twenty years ago, when I was one of the first people to the Falls to discover a man clinging to the log, came back to me with a vividness that made me shudder. No one ever knew how he came there or who he was, but it was supposed that he had been rowing across the river somewhere above during the night before, and losing control of his boat had been swept down into the rapids, and the boat striking the tree trunk he had, by some miracle, gained a foot hold upon it. News never spread so rapidly as that of the discovery of this man in his perilous situation. Word was telegraphed at once to Buffalo, and a party of life-savers came on a special train to try and rescue the man. Before 10 o'clock thousands of people were gathered at every available spot where a sight of the unfortunate man and the efforts to save him could be obtained.

ALL THE RAILROADS RAN SPECIAL TRAINS,

and the people came in conveyances of all kinds from the surrounding country. No one seemed to know at first how to go to work, but the man clung to the tree watching every movement that was made. Of course it was impossible to make him hear or give him any directions. Finally, a life-boat was attached to a cable, and let down from the bridge toward him. It was drawn toward the log by ropes attached to it and handled by men on the island. The boat was making directly for the spot, and hopes that the poor man would soon be safely drawn ashore began to be felt by the assembled multitude. Suddenly, however, it was caught in a whirl of the rapids, the cable parted like a kite string, and the boat rushed past the man like a flash within two feet of him, and was carried over the Falls.

"After this the life savers were all at sea again. Several plans were suggested, and one was adopted which it took until late in the afternoon to get in readiness. In all those long hours of suspense I don't believe one of the spectators ever moved from his tracks. Everything else about Niagara Falls was forgotten except the terrible scene of a fellow-being hanging on the verge of death and patiently awaiting the success or failure of the efforts that were being made to rescue him.

"The plan adopted was to fasten a strong cable securely to the American shore, attach a staunch raft to it, carry the loose end of the cable over to the island and let it belly down with the raft to the tree trunk. By this means it was hoped the raft could be drawn steadily to the small island between the man and Goat Island, from which no trouble was anticipated in taking him. Some food and a glass of brandy were placed on the raft and ropes were fastened to it by which the man was to tie himself fast. The raft moved down and reached the man in safety. As he stepped upon it, lashed himself fast and then eagerly seized the refreshments such a shout as went up from the thousands of people that had watched the proceedings with beating hearts and bated breath was never heard before.

IT COULD BE HEARD ABOVE NIAGARA.

The raft was moved toward the island. Everything seemed to be working to a charm. The tension that was put upon the feelings of the spectators was so great that many fainted away. I was a strong man, but I know I wept like a child. Suddenly the raft stopped. The cable drawn as it was beneath the water, caught in some obstruction. All efforts to loosen it were unavailing. One groan of agony arose from crowd. Finally the man sprang to his feet, undid the fastenings that held him secure to the raft, and kneeling for a moment as if in prayer, sprang into the raging water and pulled bravely for the island, but a few feet away. At first he gained visibly, and the thought that he would be saved found utterance in another joyful shout from the spectators. But when he was almost within reach of the shore his strength began to fail, and steadily the distance between him and the shore increased. Then every one knew that all hope was gone. He made a few more desperate strokes, but the wild waters seized him and pitching and tossing and whirling him, hurried him over the great cataract. As he reached the edge of the Falls he was thrown upward from the water until his whole length came in view standing upright, and he disappeared as if he had made a voluntary leap over the brink. As he was dashed to and fro over the Falls not a sound was made by one of the vast crowd, and, terrible as was the scene, not an eye was turned away as he was carried along to his destruction. As he disappeared in the face of the cataract one heart rending shriek went up from the crowd. The poor fellow's body was never found nor his identity ever established.

"The other agonizing scene that I was doomed to witness was the carrying over the Falls of young Charles Addington and little Eva de Forest. That happened five or six years before the incident I have just related. The Addingtons and De Forests were prominent families in Buffalo in those days, and young Charles was engaged to be married to Ada De Forest. Miss De Forest's mother and her little sister Eva accompanied by young Addington and herself, came to the Falls one day in the summer to spend the day. While they were on Goat Island little Eva went away by herself, and Mrs. De Forest sent the young man after her. He found her standing near the shore. He thoughtlessly stole behind her, and, grasping her under the arms, held her out over the water. She suddenly threw up her hands and slipped through his arms into the water. He instantly sprang in after her and reached her before the swifter rapids had caught her. He succeeded in getting her back near enough to the shore to throw her on the bank, but she had not strength sufficient to hold on until her mother could grasp her and fell back into the water. They were both carried over the falls in sight of their beloved ones. For years afterward Addington's father visited the falls once a week, and would sit for hours gazing at the water where they were lost. He finally ceased coming, and we learned that he had died grieving for his boy, who was his only child.

## STANLEY AND THE CONGO.

### The American Explorer Solving Great Problems in the Interior of Africa —His Latest Achievements.

The significance of the latest news as to Mr. Stanley's doings and intentions may not be apparent to the ordinary reader without some explanation. He has, we are told, succeeded in planting a station at Stanley Falls. To those who have read the stirring narrative of his journey down the great river in 1877 this must appear a wonderful feat. At the time of the recent visit of Mr. Johnston to the Congo, Bolobo, some eighty miles to the north of Stanley pool and two and a half degrees south of the equator, seems to have been the most remote station; but beyond that there are now at least three stations. One of these, Lukalela, is about sixty miles to the north, and another, Equator Station, is just where the river leaves the equator in its course southward. The third one is that of the foundation of which we have just heard, at Stanley Falls, some five hundred miles further into the interior than the station last mentioned. To reach this remote point Mr. Stanley must have passed through the most dangerous part of the river, studded as are its richly wooded banks and islands with those tribes through which he and his followers had to run the gauntlet seven years ago. Beyond the equator the river expands in many places to a great width, its channel is studded with innumerable islands, and its shores fringed with an almost endless series of villages, some of the inhabitants of which were found to be armed with muskets. There is, for example, the famous village built of ivory, the "ferocious tribe" at Magala, and the "amiable people" of Bubunga. But, above all, Mr. Stanley must have succeeded in passing safely the mouth of the great river Aruwimi,

WHERE THE NAVAL BATTLE OCCURRED

in February, 1877, so graphically described in his narrative and represented in his sketch. The Stanley Falls, at which the new station has been planted, are seven cataracts, which form the first interruption to the navigation below Nyangwe (memorable for the tragedy witnessed by poor Livingston.) It was between Nyangwe and the Stanley Falls that the treacherous Tibbu Tib deserted Mr. Stanley just as the expedition was entering the country of reputed cannibals. Until Mr. Stanley furnishes us with details of his journey up the river, we can not say how far he has been successful in winning the good will of the people whose villages fringe its banks. But it we may judge from his success up as far as Bolobo, there is every reason to expect that it has not been less between that and Stanley Falls. True, we hear rumors of hostilities and rebellions, but as these come solely from French and Portuguese sources they require confirmation, to put it mildly. It is not to be expected that Mr. Stanley has accomplished his beneficent and hazardous mission without some display of force; but let us hope that this has been more passive than active. By the planting of this last station, Mr. Stanley may be said to have crowned and completed the mission with which he was intrusted by the king of the Belgians. Beyond the Stanley Falls we know that the river is navigable to near Nyangwe, where it is still something like a mile wide. There is at least one fall to the north of Nyangwe, and, we fear, more than one between that and Lake Mocro; and what now remains to be done is to trace definitely the upper course of the river and its numerous branches, many of which are at present conjectural. Perhaps the station at Stanley Falls may be made the basis of further explorations, though it is to be hoped that the German expedition under Dr. Wissmann will do much to complete the work of Livingston, Stanley, and Cameron.

Meantime, Mr. Stanley himself has resolved, before returning to Europe, to break up entirely new ground and solve a problem for which geographers at least will be grateful. He intends, in fact, to do what Gen. Gordon would have done had he not, just when about to start for the Congo, been diverted to Khartoum. Mr. Stanley intends, we are curtly told, to reach one of the Egyptian stations in the Mombuttu country, on the Welle-Makua. One of the great problems of African hydrography is the course of this Welle Makua, often referred to as Schweinfurth's Welle. Mr. Stanley himself was confident that the great northern tributary of the Congo, the Aruwimi, at the mouth of which occurred the naval engagement referred to above, was the Welle of Schweinfurth, and gave what seemed to him at the time cogent reasons for his belief. But within the last four years an able Russian explorer, Dr. Junker, has been at work in this region; and the latest results of his explorations have just reached this country. He has had his headquarters in the Bahr-Gazelle province, ruled over by Lupton Bey, and thence has made several journeys to the south and southwest. No one therefore, is better entitled than he to express an opinion on the hydrography of the region. He is convinced that the Welle does not belong to the Congo basin at all, but that

IT FLOWS INTO THE SHARI,

the great feeder of Lake Chad. The Welle rises in the hilly region of the northwest of Albert Nyanza, where many other streams have their source. So far as Dr. Junker has observed, it receives only two considerable tributaries from the north, although it is of great width and studded with islands. On the south it is fed by one large affluent, the Bomokandi, which itself rises quite close to the Welle, and runs for a long way parallel with the main river. The Bomokandi, however, is fed by many tributaries from the watershed, which lies at a considerable distance to the south. This watershed, Dr. Junker is evidently of opinion, is that which separates the system of the Congo from that of the Shari and Lake Chad. Although, like many other African water-partings, it is scarcely distinguishable, yet it seems to separate two regions of very different characteristics. Dr. Junker had heard of a large river, the Nepoko, to the south of this water-parting, and determined to visit it. This he did, and reached it after four days' travel to the south of the Bomokandi, at what he conjectured to be about the middle of its course. It was almost equal in size to the Bomokandi, and had evidently travelled a long way from the east. Instead of the many fine trees which everywhere clothe the banks of the rivers belonging to the Welle system on the north, the Nepoko and its tributaries flow through broad, flat swamps. A floating vegetation, very similar to what is met with in the Nile, pervades the swamps, and renders them passable for men but not for animals. Dr. Junker concludes his remarks by identifying the Nepoko with the Aruwimi of Stanley, and in another communication hopes to adduce proofs that the Welle is the upper course of the Shari. It is not to be expected that Mr. Stanley has heard of Dr. Junker's discoveries, so that he is likely to start under the impression that the Aruwimi will lead to the Welle. That is of little consequence. If he succeeds in traversing the country which lies between the Congo and the Mombuttu country, he will help materially to fill up a blank in the map of Africa. One of Lupton Bey's explorers a year or two ago discovered a large lake far to the west of Albert Nyanza, across which there is a considerable traffic in European goods. Whether this lake belongs to the Congo water system or to that of Lake Chad remains to be discovered; but it looks as if the Nepoko ran through it. We should say that Cassati, a recent Italian explorer in the same region, attaches the Nepoko to the Welle.

The Welle region seems to be thickly populated with a great variety of broken tribes, belonging mainly to the Mombuttu stock. It is worthy of remark that, throughout these latitudes, neither to the east nor to the west did Dr. Junker find any definite territory occupied by the dwarfish people so often referred to under the name of Akka. The people were certainly met with in many parts, but without any fixed settlement, wandering about as nomads among the other peoples. When Dr. Junker dispatched the letters from which we have obtained this information he intended to make still another journey to the southwest. A short communication from him dated October, 1883, states that he had then returned from this journey, but would not attempt to transmit his many charts and ethnographical collections to Europe on account of the troubles in the Soudan. The probability is that he may take refuge in the south, where he has made many friends, and so it is not unlikely that he may meet with Mr. Stanley as the latter pursues his journey beyond the Congo.

## Tired Women.

If you look around on the faces in a street car, the number of faded and sad-looking countenances presenting themselves is startling. Mature women have especially a tired air about them, showing itself not only in pallid complexions, but in the wearied lines around the mouth and eyes. It is impossible to associate this appearance with happy lives, and yet, from dress and manner, the majority would seem to be comfortably placed in this world. Usually the climate is supposed to have a great deal to do with the early fading of youthful freshness, and the beauty of health, instead of reviving with the spring of the year, usually delays until the summer holidays, followed by the crisp autumn breezes, invigorate the human system. If the truth was known, however, I suspect that it would be found that the reason why women look tired is because they are perpetually fatigued.

Modern methods have not eased the cares of wives and mothers, whose duties have developed with the growth of science and the expansion of art. When children were thrashed into obedience to parental commands, when young people understood that to hear was to obey, when husbands only expected their regular three meals a day and men led and clean clothing, the duties of women were very much simpler than at the present time. In those happy days, when to eat, sleep and work was the whole duty of man, and the interests of posterity a side issue, the mistress of the household might, after her work was done, eat and sleep, too. At least, she had a chance to work when husband and children were engaged in business or in school for long hours of the day. In those days, rain or sunshine were the same, life moved in a groove, and there was a probability of things running smoothly. In those days people ate what was set before them, because there was not much variety to be had and they were not always developing new ideas in the way of occupations and diversions that upset the regular routine of a household. Perhaps it was monotonous, but it was restful for the housekeepers.

In the great upheaval of mind which has of late years set each individual soul on the search for that good living which the world is supposed to owe it, whether the quest is continued in the direction of business, pleasure, science, art or religion, it is the wife and mother who is expected to be the instrument of Providence in providing the means and forwarding the success of the seekers, and nobody thinks of all the extra burden this throws upon her—the strain on her sympathy, the tax on her bodily strength. From the child who wants a play made for him to the husband who wants to talk over his affairs with her, it is one long intermediate chain of little services which are expected from her. That she has personal tastes or inclinations is never taken into account. She has no time left for her own use, but is actually at the beck and call of all belonging to her from early morning until late at night.

It is a curious fact in connection with the nineteenth century, that few people are self-reliant, and still fewer can occupy themselves agreeably without aid. Like the Turk, they want somebody to amuse them. With the additional burden of seeing that the members of a family are amused, as well as their maternal wants provided for, it is no wonder that wives and mothers look tired. No doubt men feel the fatigue of the constant drive that is requisite to keep up with the general stride, but they have a peculiar faculty of being able to take a rest, even in the midst of turmoil. Women, unfortunately, from long experience in being overdriven, get into that state where they cannot repose, even when the opportunity offers. This is a state of nervous expectation, brought about by the knowledge that there will be something to do in a minute, even if there is nothing calling for attention just now.

In France there are now 4,475 miles of navigable rivers and 2,900 of canals, while in 1852 there were only 4,190 miles of river navigable and 2,449 miles of canal.