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Photographer

PRIZES AWARDED:

- Fell Cup
Des Moines, 1905
- Grand Sweepstake
Des Moines, 1906
- Medlar Cup
First Years' Competition
Cedar Rapids, 1907
- Picture Selected for Da-
guerre Memorial Institute
Cedar Rapids, 1907
- Medlar Cup
Second Years' Competition
Davenport, 1908

- Picture Selected for Da-
guerre Memorial Institute
Davenport, 1908
- Medlar Cup
Final Competition
Waterloo, 1909
- Salon Honors
Daguerre Memorial, 1909
- Certificate of Honor
Wisconsin, 1909

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The Flood Problem of the Mississippi and Its Solution

[By Walter Parker.]

Four hundred million tons of silt, the surface soil, is washed from the lands of the Mississippi river watershed into the Gulf of Mexico each and every year. This is waste insofar as everybody now living is concerned, and the farmers and land owners of the Ohio and Missouri valleys are paying the bill.

Water enough passes down the Missouri when in flood stage to irrigate fifteen or twenty million acres of the dry plains or bench lands in the upper watershed of that river.

More than enough water goes to waste down the Ohio river each flood season to supply dry season navigation and millions of electrical horse power units. The same thing is true of the upper Mississippi river.

All of this water, concentrated into a raging uncontrolled torrent, combines at Cairo, and, on its mad rush to the sea, carries waste and destruction in its wake in the shape of broken levees, devastated farms, homeless terror-stricken people, and retarded development.

Reverse the picture. Harness the source streams. Conserve the freshest waters for dry season navigation. Draw power from dams and reservoirs. Turn the floods of the upper Missouri out over the dry bench lands. Build strong levees from Cairo to the gulf that will hold the partially controlled floods in the lower river. And what will be the result? The reservoirs will supplement the summer flow and thereby provide at all times an adequate supply of water for the system of locks and dams so that there will always be a navigable stage in the Ohio on which to float out to tide water the coal, the iron, the steel and the manufactured products of that portion of the country, while the power developed will go a long way toward increasing the economy of manufacture.

In the upper Missouri river country hay will grow on millions of acres of land now devoted to grazing and the production of cattle that will then thrive on that land will be increased tenfold. In addition, summer seepage will return enough water to the river to supply a navigable stage throughout the dry season.

The upper Mississippi will enjoy all the year navigation and an abundance of power.

From Cairo to the Gulf the floods will not then climb anywhere near so high as they have done in the spring of 1912, and with a complete and well-constructed levee system on both sides of the river the farmers and planters will no longer fear crevasses and overflows and limit their investments for improvements accordingly.

The silt waste will be checked because no adequate system of flood control can ignore soil erosion. Then the farms of the north and middle west will not annually lose in fertility, and there will be fewer bars and mud lumps in the lower river to check the flow and obstruct navigation.

Development Unrestrained. With floods and overflows abated, development in the Mississippi valley will start on a new scale, and gather headway every year because there will then be no periodical disaster to check and hamper it.

With such development, the tens of millions of acres of lowlands which are not now cultivated will be brought under the plow, and the food produced thereon will appreciably reduce the cost of living, aid in maintaining the national trade balance on the right side of the ledger, and greatly assist in removing the cause of the social unrest in the factory towns by supplying homes to the underfed and discontented people who cannot now make both ends meet.

Direct and Indirect Damage. One of the most important economic aspects of floods in the Mississippi valley watershed is the immediate direct and indirect damage caused by the floods.

Starting with the upper regions of the tributaries of the Mississippi river, the valley of the Ohio river has for many years been devastated by destructive floods recurring every few years with a steadily increasing volume and frequency.

The flood commission of Pittsburgh has been engaged for more than three years in making a complete survey of the watershed of the Allegheny and Monongahela rivers and investigation of the flood problems of Pittsburgh, which is now completed. The following is quoted from the first chapter of the report of the commission:

1.—Floods at Pittsburgh are increasing in frequency and height.

2.—There is every probability that Pittsburgh will some day experience a forty-foot flood.

3.—The damage at Pittsburgh resulting from a flood of a given height is steadily increasing.

4.—The direct losses due to flood damage at Pittsburgh amounted to over \$12,000,000 in the last ten years, while in one year and five days, between March 15, 1907, and March 20, 1908, three floods occurred, causing a direct loss at Pittsburgh of about \$6,500,000.

5.—If works for flood relief are not carried out the direct losses due to flood damage at Pittsburgh alone will on a conservative estimate, amount

to \$40,000,000 in the next twenty years.

6.—The flood losses along the Ohio valley in one year, 1907, are stated in the preliminary report of the inland waterways commission for 1908 to have amounted to over \$100,000,000.

Annual Losses.

The chief of the water resources branch of the United States Geological Survey, Mr. M. O. Leighton, estimates that the average annual damage by floods on the Ohio river and all its tributaries, averaging the damage over ten-year periods, is not less than \$50,000,000; \$50,000,000 annually is 5 per cent per annum interest on a total investment of \$1,000,000,000, and the state and national government would be justified in spending that amount of money to completely safeguard the entire region drained by the Ohio river from destructive floods, because the works for flood prevention would not only protect against floods, but would create a commercial and industrial development that would justify the expenditure of the money in that territory even though the question of floods was not involved.

When reservoirs are built for flood prevention, storage must be provided for the normal flow of the streams which may be used for power development as well as flood prevention. In addition to this, a very large emergency surplus of storage capacity must be provided, which can be done on all streams by building reservoirs which would flood a given area of territory only in the event of unusual floods which come only once in several years. In the intervening period the lands thus overflowed at long intervals would be used for grazing and for timber production.

Can Regulate All Streams.

There is not a river or stream flowing into the Ohio river, the flow of which could not be regulated by preserving the forests and woodland cover on the watersheds, preventing denudation and erosion, storing the excess flood flow in artificial lakes, and thereby regulating, and, so far as possible, equalizing and standardizing the flow throughout the year. This system of control would develop power for industrial purposes that would more than justify the state and national governments in carrying out the project solely for power for industrial uses, and in aid of navigation and interstate commerce, with supplemental excess storage provided for unusual floods.

The government is already committed to a plan for the improvement of navigation on the Ohio river by the canalization of the Ohio from Pittsburgh to Cairo, by a system of locks and dams which will cost a total of \$60,000,000 when completed.

It is necessary for the continuous and satisfactory operation of this system of locks and dams when completed, that the natural low water summer flow of the Ohio river should be supplemented by an adequate reservoir system, from which water may be drawn whenever needed to fill the pools, prevent stagnation, replenish losses by seepage and evaporation and furnish the necessary river flow when the natural supply is inadequate.

If the Ohio river were continuously navigable the year round as it might be made if the lock and dam system were supplemented by an adequate reservoir system, the commerce that would be developed on that river, and its beneficial effect upon the commercial and manufacturing industries in that section of the country would alone justify the construction of the necessary reservoir system.

Power Development.

Referring again to the question of power development, the possibility of the creation of values by such development is shown by the plans adopted by the city of Los Angeles for bringing a municipal water supply from the Owens river, Inyo county, to the city of Los Angeles. The value of the water supply would have justified the cost of constructing the aqueduct which will bring pure mountain water, a distance of 250 miles in sufficient quantity to supply a city of 2,000,000 inhabitants.

The system will deliver 250,000,000 gallons (net) every twenty-four hours into reservoirs located nearly 1,000 feet above the city. It consists of 98 miles of covered conduit, 40 miles uncovered, 21 miles of open canal, 12 miles of diverted siphons, 43 miles of tunnels 10 to 13 feet in diameter, 4 reservoirs along the line holding three months' supply.

The total cost will approximate \$25,000,000, and the water power incidentally created will be utilized in producing 120,000 H. P. peak load of electrical energy, the sale of which will provide a fund large enough to cover the interest and create a sinking fund that will eventually pay all the bonds issued to cover the cost of both the aqueduct and the electrical power.

The people of the city of Los Angeles will, therefore, eventually become the absolute owners, without cost to them, of one of the largest municipal water systems of the world, together with the electrical power and the income from the sale thereof, after the payment of the bonds.

Every tributary of the Ohio river should be separately studied and a plan made for its complete development for electrical power and to regulate its flow so as to prevent floods

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and pour into the river in the summer season at its low water stage the excess flood water which now runs to waste, causing only disaster and destruction, retarding industrial development, injuring property values, and interfering with and preventing interstate commerce.

Replenishing Summer Flow.

No figures are available as to the annual flood damage or possibilities of power development on the upper Mississippi river above St. Louis, but the same conditions and principles that apply to the Ohio river valley are in the main applicable to the upper Mississippi river. The necessity for replenishing the summer flow for navigation is becoming more manifest each year as the timber is cleared and the swamps are drained throughout the wide extent of territory on the watershed of the upper Mississippi, which was once an unbroken swamp or forest constituting a natural reservoir to make way for civilization and agriculture.

On the Missouri river and its tributaries the necessity for flood prevention is as great as in the Ohio river drainage basin and if the flow of the

Missouri river were regulated, it might again be made navigable as in the old days, all the way from St. Louis to Fort Benton, the whole year round.

In the territory drained by the Missouri river, two additional economic factors enter into the problem as reasons that warrant the expenditure of the large sum of money that would be required to build the controlling works necessary to utilize and standardize the flow of the river through the year.

Making Hay.

One is the enormous area which might be irrigated from flood-water canals, so as to produce on all the lands for which such irrigation could be provided, a crop of hay or grain worth from \$10.00 an acre upwards each year.

The second benefit would be that, if the surplus flood-water of all the tributaries of the Missouri river were distributed but over the vast area of dry plains and bench lands in that region, the water, from canals, in that water that was poured out over the plains and soaked into the earth, would gradually raise the underground water table over millions of acres of

Thunder Storms at Night.

The thunder storm, bursting forth at night, occasions considerable alarm on the farms and in the villages. The cloud filled sky brings a great darkness which makes the flashes of lightning keen and thrilling. Lightning is especially disturbing to the youthful members of the home, while speculations as to hail, wind and water washing occupy older minds.

Speaking of the harm done by lightning, it may be truthfully said to be very impartial in its visitations. Lofty water tanks, church spires, grain elevators and other tall structures are only randomly struck by the electric current; not oftener it would seem than low bushes, solitary animals or fence posts, especially if the latter have wires attached to them.

Apart from particular fears, a thunder storm at night, when the signs of its coming had been gathering at the closing of a hot, fitful day, inspires a certain universal dread. With the blackened heavens shaken by constant peals and their echoes and riven by livid and glittering light, the thread of life binding man to this sphere seems tiny and unsubstantial.

Unnecessary.

Topeka State Journal: It is said that the girl scouts must learn to bake bread and iron, do simple cooking, build a coal fire, darn socks and take care of babies. But what's the use? Girls who can do all these things don't have to do any scouting.

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