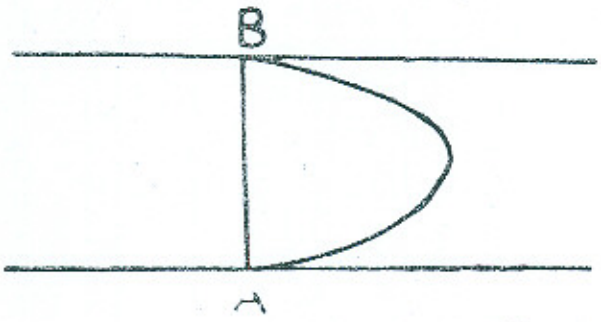
PAPER No. 293.

K. B. PIR MUHAMMAD IBRAHIM :—

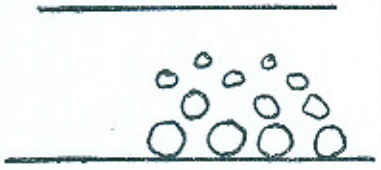
Liquid Flow and Silt Transport.

K. B. Pir Muhammad Ibrahim :—The hydraulic laws discovered by me are rather difficult but I will make them as simple as possible so that you may be able to understand them.

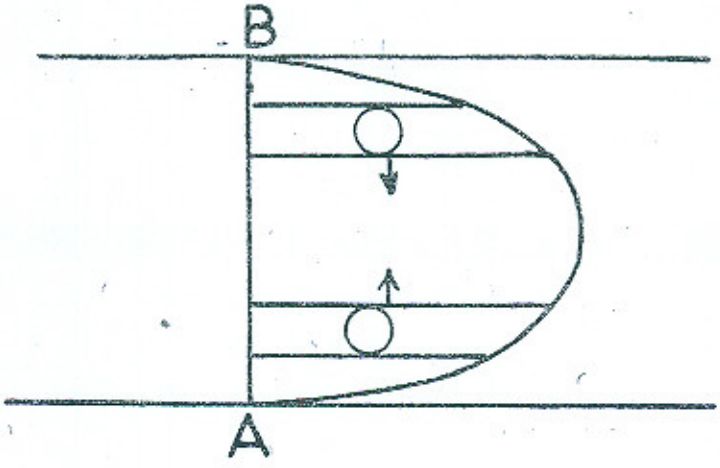
The velocity curve of a pipe is as illustrated below :—



Now the velocity at point A is said to be zero. This is wrong. If the velocity is zero at this point, no erosion should take place here. But as the erosion does take place which means that the earth is dragged by water, this dragging by the filament adjacent to the edge gives it a velocity. Hence it is evident that the filament next to the edge has got some velocity which is not equal to zero. As regards the sediment problem it has been found that the silt particles near the banks are greater in diameter than those in the middle of the river (see fig. in the margin). This shows that there is a force acting from the banks to the centre of the river. Now this force is the vertical component of the eddies.



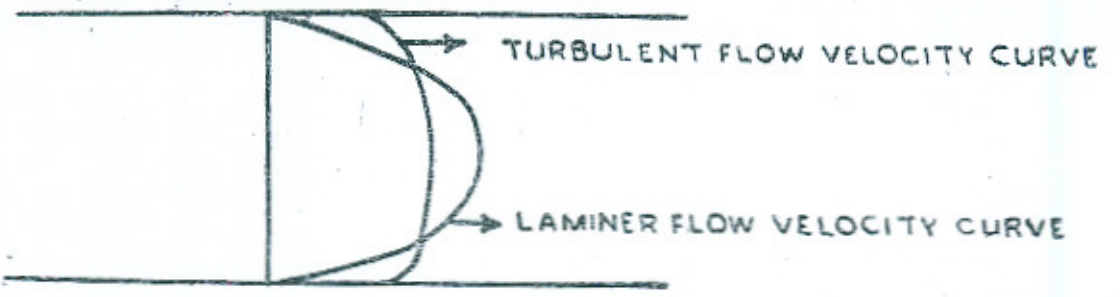
The creation of eddies is not due to the inter-filamental shear as is clear from the illustration given below :—



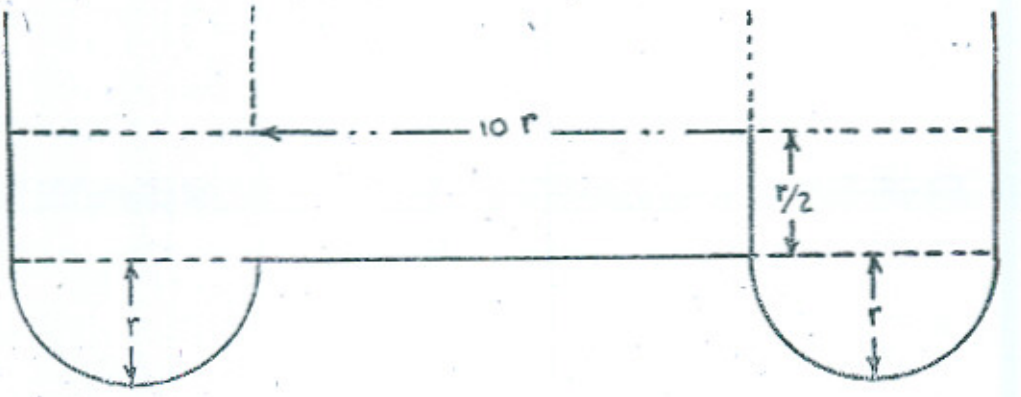
Supposing it were the inter-filament shear which created the eddies then the vertical component of the eddies thus created would be in the direction of the filament with greater velocity. Similarly if the eddies are created in the same manner in the upper half of the pipes the vertical component of the eddies would also be in the direction of the filament with greater velocity or in other words the direction of the vertical components of the eddies in the lower half of the pipe will be in the upward direction and of those in the upper half in the lower direction. This would result in upper half of the pipe being clear of sediments which is not the case.

The higher the temperature of liquid flowing through a pipe the greater is its velocity of flow. This is due to the fact that the increase in temperature reduces the energy required for production of eddies leaving behind more energy that results in increasing the velocity of flow. If the water is at a high temperature the convaction currents start much earlier than in the case of water at a low temperature.

It is not the inter-filamental shear which causes eddies but it is the unevenness of the constraining surface which is the cause of eddy generation. Had it been due to inter-filamental shear the depth velocity curve of the laminer and turbulent flow would have been different from what they actually are.



Mr. I. A. Zaffar:—To examine the fallacy put forth by him to declare the present conception of H. M. D. as wrong and unscientific, let us examine the following example where rise is $r/2$, length of straight portion is $10r$.



$$V = c\,\frac{\sqrt{rs}}{2} = \cdot 5c\sqrt{rs} \qquad \text{———}(a)$$

$$Q = c\pi\sqrt{\frac{s}{2}} \times r^{\frac{5}{2}} = 1\cdot 57\, c\sqrt{s}\, r^{\frac{5}{2}} \qquad \text{———}(b)$$

After rise of depth by $\frac{r}{2}$:—

$$\text{Area} = \pi r^2 + 10r \times \frac{r}{2} = 8\cdot 14\, r^2$$

$$\text{Wetted Perimeter} = 2\pi r + 2 \times \frac{r}{2} + 10\, r = 17\cdot 28\, r$$

$$\text{H. M. D.} = \frac{8\cdot 14 r^2}{17\cdot 28 r} = \cdot 47r$$

$$V = c\sqrt{\cdot 47r \times s} = \cdot 68\, c\sqrt{rs}\,. \qquad \text{———}(a_1)$$

$$Q = \cdot 68\, c\sqrt{rs} \times 8\cdot 14 r^2 = 5\cdot 535 c\sqrt{s} \times r^{\frac{5}{2}} \qquad \text{———}(b_1)$$

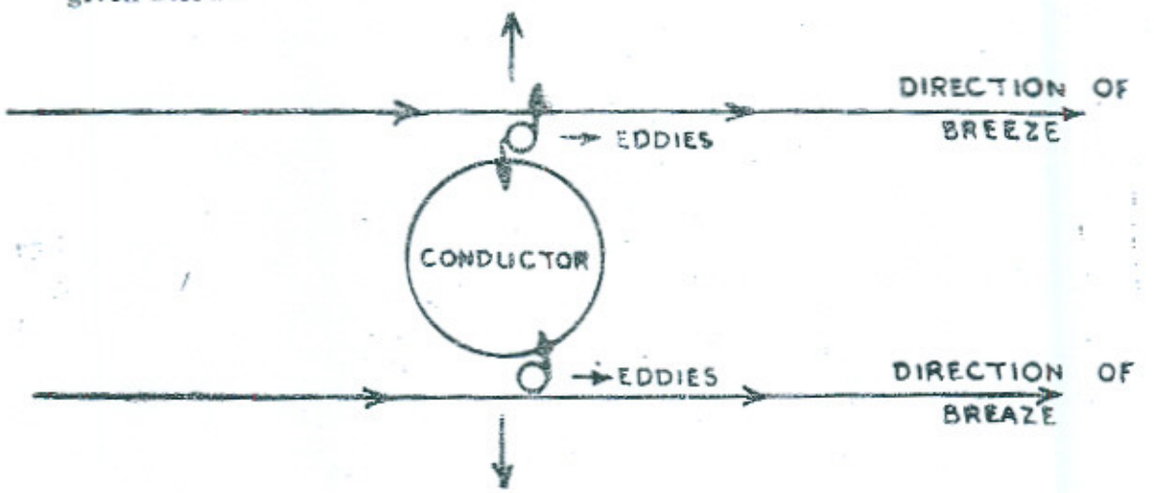
Comparing (a) with (a_1), (b) with (b_1), it is established that both velocity and discharge are increased.

The author has taken length of the horizontal surface too excessive as compared with size of the curved portions and it would appear that for an insignificant rise in water height there will be no increase in the velocity. In fact the prevailing velocity in the semi-circular portions will be diminished because energy of flow will be consumed to wet an abundantly large surface in-between. Similarly because of negligible additional height which has not been considered for addition in the discharge at all and because of reduction in velocity, rather than any increase it is sure that by such like hypothetical calculations amount of discharge will be reduced if this section is tested for an appreciable rise as actually taken in the example considered it is certain that the present conception of H. M. D. will be confirmed.

There is no part B of the paper to give defects in the present conception of H. M. D. The author of the paper is requested to benefit the members with what according to him the correct relations for depth of flow should be.

Mr. Shaukat Omar :—The breeze blowing horizontal to the conductor produced vertical movements in it. Due to this vertical movement of the conductor the points on the towers showed signs of wearing off after two years. He had contacted some foreign experts in this connection who were unable to provide him any remedy. The foreign experts remarked that they had seen this trouble to such a great extent in Punjab only and no were else in the world. He thought that the creation of eddies as explained by Pir Mohammad Ibrahim might have to do some thing with this phenemon. He therefore desired Pir Sahib to throw some light on it. As they had

not been able to devise any remedy so far in this connection, the verticle movement of the conductor can be illustrated as given below.



The shape of the transmission line moving vertically to the direction of the wind can also be illustrated as below.

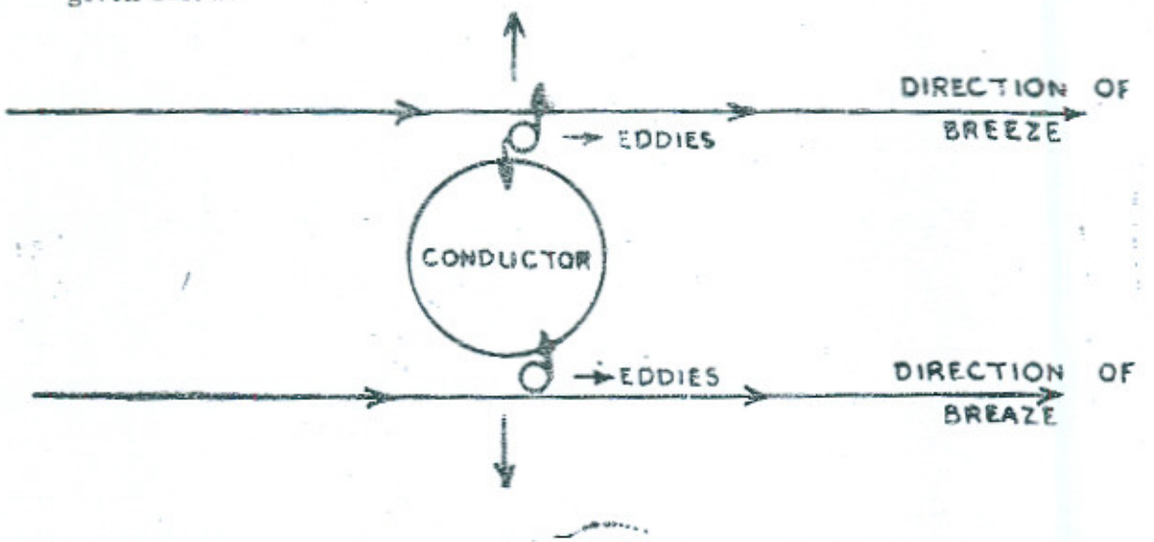


Points A and B start wearing off after 2 years

Mr. S. A. Majid :—Our limitations to understand Pir Sahib's theory of liquid flow are natural. They have been taught and practised for the last 25 years on a certain line of action and I feel that this is like converting a heathen to Islam. I wish I could understand the laws more than I do at present. However, there are one or two points which have come to my notice and would request Pir Sahib to please elucidate.

Streamline flow continues till the critical velocity comes in operation in a flow and after it has passed the critical velocity the turbulent flow starts as shown on the board. If we refer to the diagram in the paper the distribution of velocity on the streamline flow is shown very nearly parabolic and the turbulent flow is shown crossing the parabolic curve. This is not possible according to the

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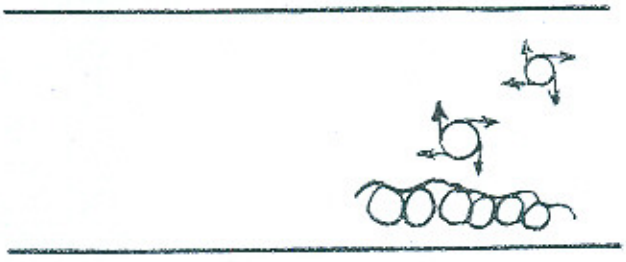
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graph drawn below, as turbulent starts after the streamline flow has passed through the critical velocity and must be drawn away from the parabolic epics.



Pir Sahib has also mentioned that the silt particles are suspended in the water due to vertical component of the frictional forces acting at right angle to the flow between the two adjacent filaments. The component part of the frictional forces mentioned above is not sufficient to carry the silt in suspension. The phenomenon which keeps the silt in suspension is due to the flowing water rolling down the silt by the impact of the flow, as shown in the diagram. As soon as the particle starts rolling down angular velocity comes into play.



The vertical component of the angular velocity which is created due to rolling is responsible for the suspension of the particle in the water, It is this force which is responsible also for distributing the heavier particles near the bed, still smaller particles just above it and very fine particles only move up to the surface as shown below. Thus mostly the force which comes into play in moving the silt or keeping the silt in suspension is the velocity of the water and the impact received by the silt particles due to the above impact.

