AL SEPARATION*

ıid. Inasmuch as the ter glass tube is not support the weight of ng centrifuging, break- by supporting the tube on inserted in the bot- ling tube.
eral separation is made ssembled tube is filled until the inner tube be- sample, 10 grams or less d and stirred to remove opper is suspended as . and the cork stopper . The tube is then in- al sling tube of the cen- ng for five minutes at 800 r.p.m. If but one ust be counterbalanced with lead shot or other l. When two or more the total weight of the id, and sample must be h.
light fraction, the inner ff by pushing the glass constricted opening of This tube is then trans- el containing a filter pa- ntents allowed to drain y fraction is obtained by er tube into a second fil- sing a wash bottle and quid, grains adhering to an be washed onto the

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U. S. Dept. of Agriculture.

JOURNAL OF SEDIMENTARY PETROLOGY, VOL. 10. NO. 2, PP. 95–96, TABLE 1, AUGUST, 1940

NOTES ON LIMIT OF SEDIMENT CONCENTRATION

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Sediment concentration in suspension in streams has at times surprisingly high values. The greatest concentrations no doubt occur in the mud flows which sometimes take place in steep regions due to land slides, or extremely intense rainfalls. On very steep watersheds, the sediment and water become mixed into a fluid mass and flow down the steep streams in much the same manner as concrete flows when being placed in a structure. Judging from the quantity of water required to make concrete flow readily, the quantity of water in such a mass may be as little as 10 per cent. The material in such a flow, however, can hardly be considered as suspended material. The addition of sediment to water causes an increase in the viscosity of the fluid, although a considerable quantity can be added without appreciably changing the viscosity. Just how much can be added before high viscosities are set up, no doubt, depends on a number of factors, such as particle shape and size. Todd and Eliassen (Proceedings, American Society of Civil Engineers, December 1938, p. 1950) found that loess in water became plastic when the loess weight became 56 to 58 per cent of the total of the fluid.

In the attached table are given a number of records of unusually high

TABLE 1. *High sediment concentrations of some streams*

River	Location	Per cent by by Weight	Authority	Reference and Remarks
		RIVERS OF THE UNITED STATES		
San Juan	Goodridge, Utah	40.8	Howard and Love	(1)
Rio Puerco	Rio Puerco, N. M.	52.3	Yeo	(2)
Bad	South Dakota	10	Straub	(3)
Rio Grande	San Marcial, N. M.	21.36	Follansbee and Dean	(4)
Colorado	Grand Canyon, Ariz.	14.4	Howard	(14)
		CHINESE RIVERS		
Yellow	Sanchow-Honan	39	Eliassen	(5)
Lo		50	Todd	(6)
Yung Ting		55.7		(7)
Ching	Shensi	51	Eliassen	(5)
Fen	Shansi	23.1	Todd	(8)
San Chuan		30+	Eliassen	(9)
Upper Tang		6.9	Eliassen	(10)
Upper To		7.2	Eliassen	(11)
Yeh		9.0	Eliassen	(11)
Chang		9.8	Eliassen	(12)
Hu		9.1		(7)
Wei		41.3		(7)
		SOUTH AFRICAN RIVERS		
Great Fish	Craddock	9.87	Warren	(13)
Wlekport River		11.24	Warren	(13)

sediment concentrations actually observed in streams. These records show that the percentages in some cases reach as high as 50 per cent in natural rivers. There is good reason to believe that the sediment, in the case of these high concentrations, is very fine. In most cases these figures represent the average concentration in a river in a given time, but, in some instances, they may represent the concentration of a single sample. Only the highest value in each river has been recorded, but, in the case of many of the rivers, more records of very high concentration have been observed.

When streams carry very high concentrations, their appearance is changed. In describing the flow of the San Juan River Pierce states: "When a river carries a very high sediment load it has a smooth oily movement, as a stream of molten metal, instead of the usual rough, choppy surface" (U.S. Water Supply Paper No. 400, page 41). Eliassen has observed a similar condition. He states: "When a river gets more than five per cent of silt by weight, all eddy currents become damped, and water flows in a straight line motion one never sees when the water is clear" (private communication). During these heavy sediment flows, the fish swim around near the surface and are easily caught. It is not known whether it is because they need air or because they are unable to submerge themselves in the higher specific gravity water.

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