(The flood stage is 15 feet.)

Year.	Month.	Highest stage.	Authority.
1872..	.....	31.5	Local reports.
1892..	August.....	20.2	United States Weather Bureau.
1893..	.....	.....	No flood.
1903..	June.....	21.0	Estimated on rise at Roma just above Rio Grande.
1904..	October.....	30.0	Estimated on rise at Fort Ringgold.
1909..	August.....	30.0	Estimated.
1910..	September....	26.0	Do.
1913..	October.....	28.0	United States Weather Bureau.
1914..	October.....	25.5	Do.
1915..	September....	16.8	Do.
1916..	September....	20.8	Do.
1917..	October.....	21.7	Do.
1918..	May.....	23.5	Do.
1919..	September....	26.2	Do.

FLOOD WARNINGS IN NEW ZEALAND.

The problem of flood prevention in New Zealand is dealt with in a recent report by the dominion meteorologist, Lieut.-Col. D. C. Bates, to whom we are indebted for the following notes. The interference of civilization with natural conditions is not usually in the direction of lessening flood damage, clearing and drainage, causing the water to run off quickly, thus increasing the scouring of slopes and deposition of silt in the lower reaches. The effect is to raise the general level of the lower beds and aggravate flooding. The problem of prevention is one which appears only to be soluble as a national task, the reconciliation of conflicting interests being too difficult to achieve on any other lines and the report recommends strongly the organization of both prevention and warnings on a proper basis.

Attention is directed to the abnormal flooding which not infrequently occurs when the winter snows melt, these being entirely disproportionate to the actual amount of precipitation. Apart from snow the run-off is stated to be approximately 25 per cent of the precipitation, a figure which we imagine must be applied only with a very generous margin of uncertainty. Experience in the British Isles shows us that the expression of the run-off as a percentage of the amount of precipitation is misleading, since quite apart from the very great variability at different seasons and under different conditions of soil and weather, recognized by Mr. Bates, it is practically certain that a much larger proportion of run-off occurs when the average rainfall is large than when it is small.

The prediction of floods may be attempted on (a) the weather chart; (b) the records of rainfall in the river basins, and (c) the actual rise of the streams in their upper reaches. Owing to the known uncertainty, especially in respect to locality, in forecasting heavy rain, the first mentioned method is only applicable in a general manner. The second source of information is undoubtedly capable of development by provision of more observing stations and improving means of communicating records, but the actual rising of the river affords the most certain and striking means of forecast, not only for the time but for the height of an inundation.

The report recommends the closer observation of rainfall, the establishment of flood gages, and the formation of a committee of safety or rivers board charged with the organization and administration of flood warnings in consultation with the dominion meteorological service, the public works, and railway departments.—Symons's Meteorological Magazine, Oct., 1919, p. 101.

PRECIPITATION AND RUN-OFF IN THE DRAINAGE BASIN OF THE ODER.

By KARL FISCHER.

[Abstracted from Yearbook of Hydrology of North Germany, Special Communication, Vol. 3, No. 2.]

Records of precipitation and run-off for eleven subdivisions of the Oder drainage basin were maintained for the most part during the period 1896 to 1905. Stream discharges were determined from rating curves based on current-meter measurements. Rainfall records for the determination of the mean precipitation on each area were presumably numerous and complete, but are not given. Records of precipitation and run-off, either annual or monthly, are not given in complete form, but only in the form of averages for five-year periods and for the complete records.

The most important results, perhaps, are the general averages for the different streams which are summarized in the accompanying tabulation. Plotting rainfall against yield, the author finds an approximately linear relation, which holds however, only in a general way for the different subdivisions of the Oder Basin. The author expresses these relations by means of formulas of the linear type used by Penck—

$$y = 0.702p - 260.5 \text{ year},$$
$$y' = 1.167p' - 181 \text{ winter},$$
$$y'' = 0.512p'' - 118 \text{ summer},$$

in which y is the yield of the drainage basin in millimeters and p the precipitation in millimeters.

These formulas are intended to apply only to the average yield of subdivisions of the Oder basin and not to the yield of any given subdivision in different years.

There are several exceptions which are discussed by the author. Transposing the formulas so as to express water losses in terms of precipitation, the author finds that the water losses decrease as the precipitation increases for the winter season, but water losses increase with precipitation both for the summer season and for the year as a whole.

The paper is accompanied by numerous tables and diagrams, among which may be specially noted hydrographs of monthly precipitation, yield, and water losses at each gaging station. These hydrographs are in general very similar, showing in nearly all cases a minimum of precipitation in January and maximum in July, a maximum of yield in April, and a maximum of water losses in July, and a minimum of water losses in February or March.

Summary of Karl Fischer's gagings in the Oder drainage basin, 1896-1905.

[P=Precipitation in mm. Y=Yield in mm. L=Water losses in mm. Winter=Nov.-Apr. Summer=May-Oct.

Stream and location.	Drainage area (square kilometers).	Winter.			Summer.			Year.		
		P′.	Y′.	L′.	P″.	Y″.	L″.	P.	Y.	L.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1. Oder at Ratibor	6,737	285	160	125	551	151	400	836	311	525
2. Malapane	2,037	292	137	155	435	112	323	727	249	478
3. Glacial Netz	4,534	263	137	126	496	131	365	759	268	491
4. Bober	5,938	282	155	127	438	132	306	720	287	433
5. Lansitz Netz	4,222	298	134	164	451	102	349	749	236	513
6. Mountain areas 1+3+4+5.	21,441	282	148	134	488	132	356	770	280	490
7. Warthe, at Posen	24,820	221	73	148	337	46	291	558	119	439
8. Netz, at Vordamm	15,872	216	74	142	321	54	267	537	128	409
9. Warthe, at Landsberg	51,893	216	71	145	326	49	277	542	120	422
10. Oder, at Steinau	20,878	254	115	139	460	104	356	714	219	495
11. Oder, at Pollenzig	47,293	250	97	153	427	85	342	677	182	495
12. Oder, at Hohensaathen	109,564	233	81	152	375	65	310	608	146	462