

SECTION A. HYDROLOGIC CYCLE

FIGURE 2-1. THE HYDROLOGIC CYCLE - A DESCRIPTIVE REPRESENTATION

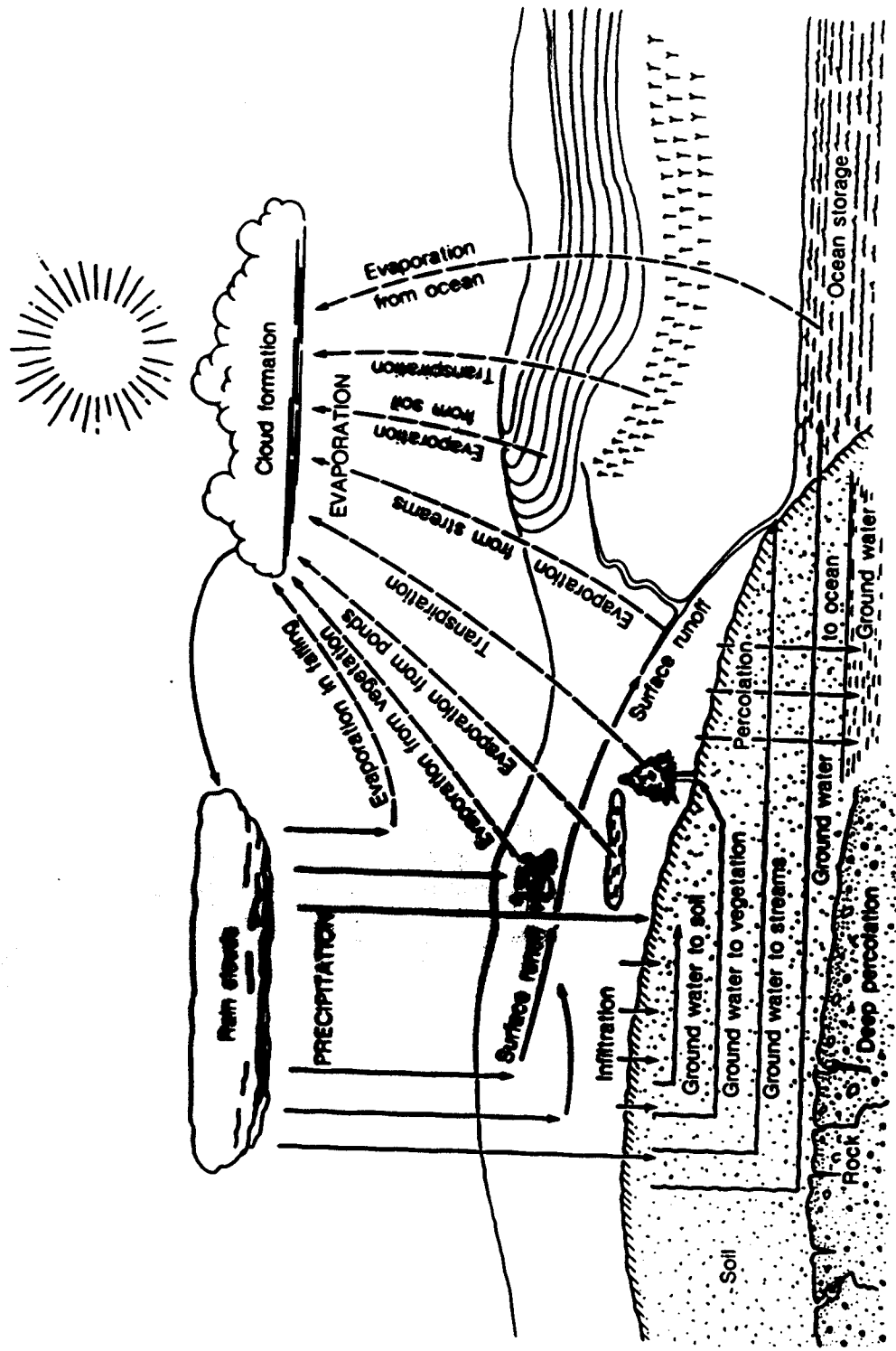
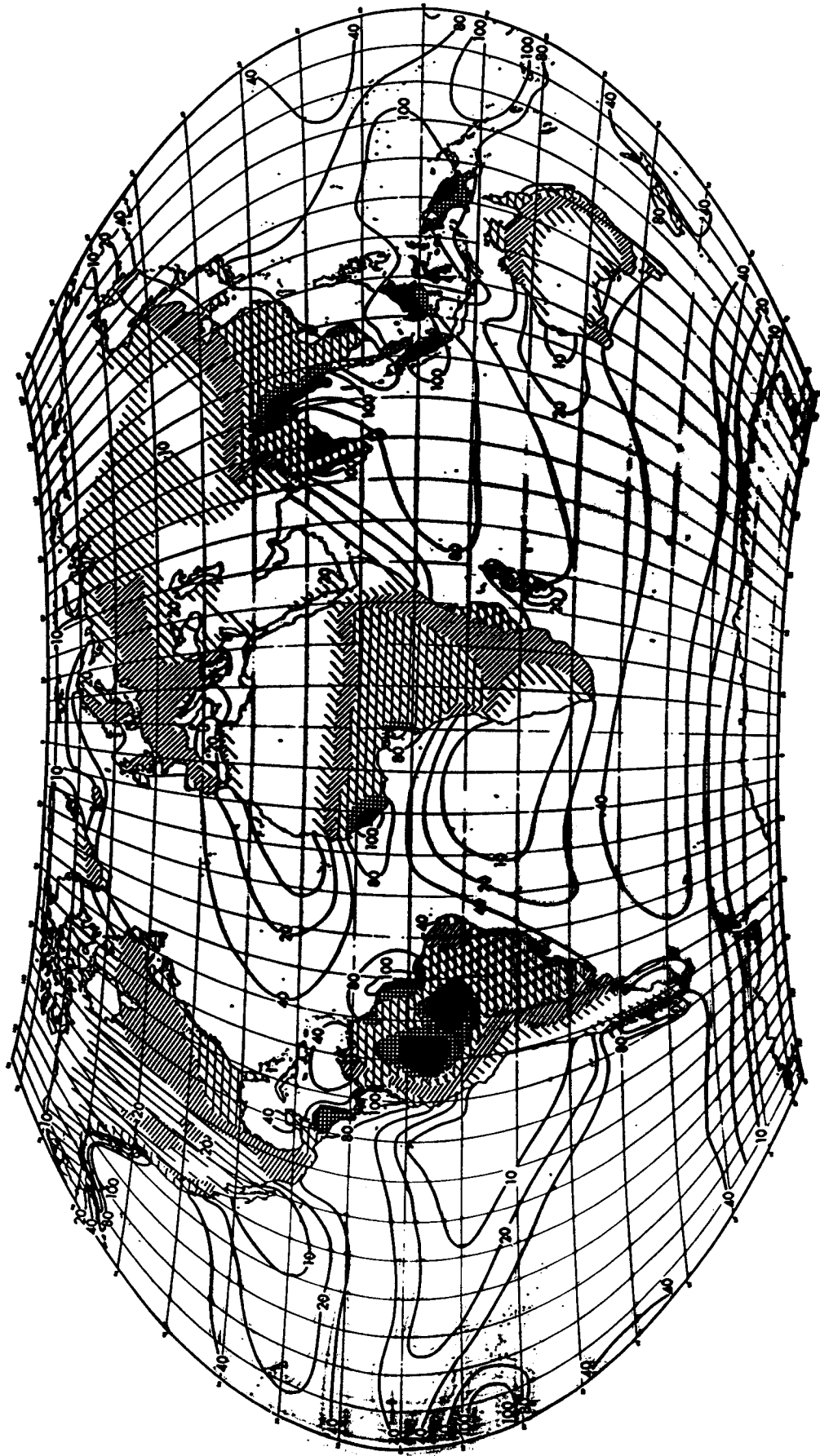


FIGURE 1-3. GENERAL PATTERN OF ANNUAL WORLD PRECIPITATION



PRECIPITATION (INCHES)

□	UNDER 10
▨	10 TO 20
▩	20 TO 40
▧	40 TO 60
■	60 TO 100
■	OVER 100

Source: Environmental Science Service: Administration, Climates of the World, 1969

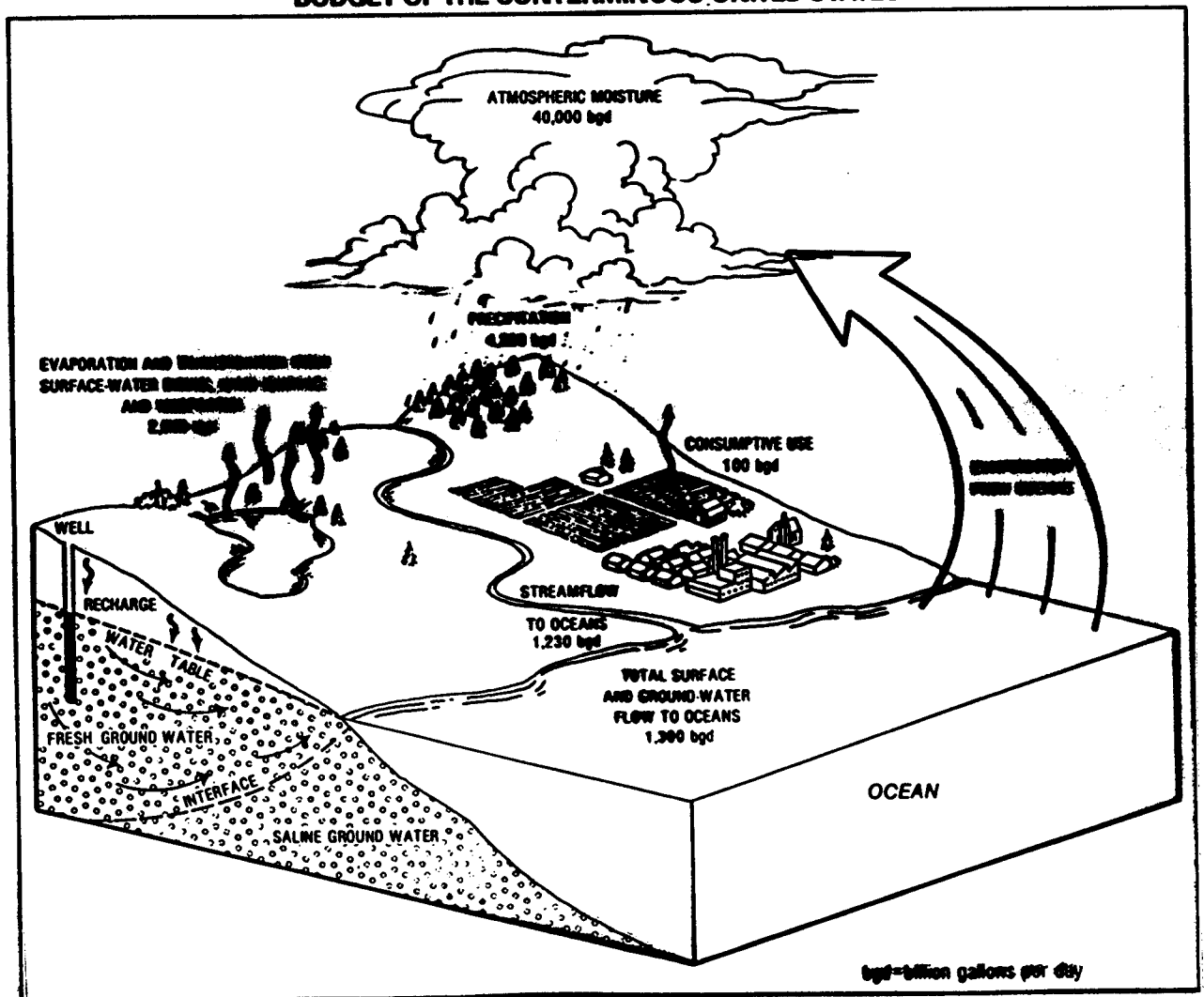
SECTION B. WATER RESOURCES — UNITED STATES

TABLE 2-2. DISTRIBUTION OF WATER IN THE CONTINENTAL UNITED STATES

	Volume		Annual Circulation (X 10 ⁹ m ³ /year)	Replacement Period (in years)
	X 10 ⁹ m ³	%		
Liquid water				
Groundwater				
Shallow (<800 m deep)	63,000	43.2	310	>200
Deep (>800 m deep)	63,000	43.2	6.2	>10,000
Freshwater lakes	19,000	13.0	190	100
Soil moisture (1-m root zone)	630	0.43	3,100	0.2
Salt lakes	58	0.04	5.7	>10
Average in stream channels	50	0.03	1,900	<0.03
Water vapor in atmosphere	190	0.13	6,200	>0.03
Frozen water, glaciers	67	0.05	1.6	>40

Source: Ad Hoc Panel on Hydrology, Scientific Hydrology, Washington, D.C.: Federal Council for Science and Technology, 1962

FIGURE 2-2. HYDROLOGIC CYCLE SHOWING THE GROSS WATER BUDGET OF THE CONTERMINOUS UNITED STATES



Source: U.S. Geological Survey, 1984, National Water Summary 1983 - Hydrologic Events and Issues, Water-Supply Paper 2250

SECTION C. WORLD WATER BALANCE

TABLE 2-4. ESTIMATED WORLD WATER SUPPLY AND BUDGET

Water Item	Volume (Thousands)		Percent of Total Water
	Cubic Miles	Cubic Kilometers	
Water in land areas:			
Fresh-water lakes	30	125	0.009
Saline lakes and inland seas	25	104	.008
Rivers (average instantaneous volume)3	1.25	.0001
Soil moisture and vadose water	16	67	.005
Ground water to depth of 4,000 m (about 13,100 ft)	2,000	8,350	.61
Icecaps and glaciers	7,000	29,200	2.14
Total in land area (rounded)	9,100	37,800	2.8
Atmosphere	3.1	13	.001
World ocean	317,000	1,320,000	97.3
Total, all items (rounded)	326,000	1,360,000	100
Annual evaporation:¹			
From world ocean	85	350	0.025
From land areas	17	70	.005
Total	102	420	0.030
Annual precipitation:			
On world ocean	78	320	0.024
On land areas	24	100	.007
Total	102	420	0.031
Annual runoff to oceans from rivers and icecaps	9	38	0.003
Ground-water outflow to oceans²4	1.6	.0001
Total	9.4	39.6	0.0031

¹ Evaporation (420,000 km³) is a measure of total water participating annually in the hydrologic cycle.² Arbitrarily set equal to about 5 percent of surface runoff.

Source: Nace, U.S. Geological Survey, 1967

TABLE 2-5. WORLD WATER BALANCE, BY CONTINENT

Water Balance Elements	Europe ¹	Asia	Africa	North America ²	South America	Australia ³	Total Land Area ⁴
Area, millions of km ²	9.8	45.0	30.3	20.7	17.8	8.7	132.3
	in mm						
Precipitation, P	734	726	686	670	1,648	736	834
Total river runoff, R	319	293	139	287	583	226	294
Groundwater runoff, U	109	76	48	84	210	54	90
Surface water runoff, S	210	217	91	203	373	172	204
Total infiltration and soil moisture, W	524	509	595	467	1,275	564	630
Evaporation, E	415	433	547	383	1,065	510	540
	in km ³						
Precipitation	7,165	32,690	20,780	13,910	29,355	6,405	110,303
Total river runoff	3,110	13,190	4,225	5,960	10,380	1,965	38,830
Groundwater runoff	1,065	3,410	1,465	1,740	3,740	465	11,885
Surface water runoff	2,045	9,780	2,760	4,220	6,640	1,500	26,945
Total infiltration and soil moisture	5,129	22,910	18,020	9,690	22,715	4,905	83,360
Evaporation	4,665	19,500	16,555	7,950	16,975	4,440	71,475
	relative values						
Groundwater runoff as percent of total runoff	34	26	35	32	36	24	31
Coefficient of groundwater discharge into rivers	0.21	0.15	0.08	0.18	0.16	0.10	0.14
Coefficient of runoff	0.43	0.40	0.23	0.31	0.35	0.31	0.36

¹ Including Iceland.² Excluding the Canadian archipelago and including Central America.³ Including Tasmania, New Guinea and New Zealand, only within the limits of the continent: P - 440 mm, R - 47 mm, U - 7 mm, S - 40 mm, W - 400 mm, E - 393 mm.⁴ Excluding Greenland, Canadian archipelago and Antarctica.

Source: Lvovitch, M.I., EOS, Vol. 54, No. 1, Jan. 1973, Copyright by American Geophysical Union

TABLE 2-6. WORLD-WIDE PER CAPITA WATER RESOURCES, BY CONTINENT

	Popula- tion in Millions (1969)	Annual Volume of River Runoff, km ³		Runoff Volume per Capita, m ³ /year	
		Total	Stable Runoff	Total	Stable Runoff
Europe	642	3,110	1,325	4,850	2,100
Asia	2,047	13,190	4,005	6,440	1,960
Africa	345	4,225	1,905	12,250	5,500
North America	312	5,960	2,380	19,100	7,640
South America	185	10,380	3,900	56,100	21,100
Australia ¹	18	1,965	495	10,900	2,750
Total land area	3,549	38,830	14,010	10,940	3,950

¹ Including New Guinea and New Zealand.

Source: Lvovitch, M.I., EOS, Vol. 54, No. 1, Jan. 1973, Copyright by American Geophysical Union

FIGURE 2-7. AVERAGE ANNUAL RUNOFF IN THE UNITED STATES.

