CLIMATE OF PENNSYLVANIA

INTRODUCTION

This publication consists of a narrative that describes some of the principal climatic features and a number of climatological summaries for stations in various geographic regions of the State. The detailed information presented should be sufficient for general use; however, some users may require additional information.

The National Climatic Center (NCC) located in Asheville, NC is authorized to perform special services for other government agencies and for private clients at the expense of the requester. The amount charged in all cases is intended solely to defray the expenses incurred by the government in satisfying such specific requests to the best of its ability. It is essential that requesters furnish the NCC with a precise statement describing the problem so that a mutual understanding of the specifications is reached.

Unpublished climatological summaries have been prepared for a wide variety of users to fit specific applications. These include wind and temperature studies at airports, heating and cooling degree day information for energy studies, and many others. Tabulations produced as by-products of major projects often contain information useful for unrelated special problems. A copy of each tabulation on file at the Center may be obtained for the cost of duplication.

The Means and Extremes of meteorological variables in the Climatography of the U.S. No.20 series are recorded by observers in the cooperative network. The Normals, Means and Extremes in the Local Climatological Data, annuals are computed from observations taken by National Weather Service personnel who are generally located at airports.

CLIMATE OF PENNSYLVANIA

TOPOGRAPHIC FEATURES - The erratic course of the Delaware River is the only natural boundary of Pennsylvania. All others are arbitrary boundaries that do not conform to physical features. Notable contrasts in topography, climate, and soils exist. Within this 45,126-square-mile area lies a great variety of physical land forms of which the most notable is the Appalachian Mountain system composed of two ranges; the Blue Ridge and the Allegheny. These mountains divide the Commonwealth into three major topographical sections. In addition, two plains areas of relatively small size also exist, one in the southeast and the other in the northwest.

In the extreme southeast is the Coastal Plain situated along the Delaware River and covering an area 50 miles long and 10 miles wide. The land is low, flat, and poorly drained, but has been improved for industrial and commercial use because of its proximity to ocean transportation via the Delaware River. Philadelphia lies almost in the center of this area.

Bordering the Coast. Plain and extending 60 to 80 miles northwest to the Blue Ridge is the Piedmont Plateau, with elevations ranging from 100 to 500 feet and including rolling or undulating uplands, low hills, fertile valleys, and well drained soils. These features, combined with the prevailing climate, have aided this area in becoming the leading agricultural section of the State. Good pastures, productive land, and short distances to markets have resulted in dairy farming becoming one of the leading agricultural activities. Another activity is the growing of fruit, primarily apples and peaches. Gentle hillside slopes provide an excellent place for fruit trees, as cold air drainage helps to prevent unseasonable freezing temperatures on these slightly elevated lands. The area has many orchards, with Adams County leading all others within the region in the production of apples. The climate and soils in the Lancaster County area are especially well suited for the growing of cigar leaf tobacco, as is pointed up by the fact that Pennsylvania is the leading producer of cigar leaf of any type in the Nation.

Just northwest of the Piedmont and between the Blue Ridge and Allegheny Mountains is the Ridge and Valley Region, in which forested ridges alternate with fertile and extensively farmed valleys. Vegetables, grown primarily for canning, are the leading crop. This has led to a well developed canning industry, which is concentrated in the middle Susquehanna Valley. The Ridge and Valley Province is 80 to 100 miles wide and characterized by parallel ridges and valleys oriented northeast-southwest. The mountain ridges vary from 1,300 and 1,600 feet above sea level, with local relief 600 to 700 feet.

North and west of the Ridge and Valley Region and extending to the New York and Ohio borders is the area known as the Allegheny Plateau. This is the largest natural division of the State and occupies more than half the area. It is crossed by many deep narrow valleys and drained by the Delaware, Susquehanna, Allegheny, and Monongahela River systems. Elevations are generally 1,000 to 2,000 feet; however, some mountain peaks extend to 3,000 feet. The area is heavily wooded and among the most rugged in the State. Numerous lakes and swamps characterize this once glaciated area, creating a very picturesque landscape; this is particularly outstanding in the more northerly counties. The combination of lakes and forests at elevations high enough to keep summer temperatures comfortable and its location close to heavily populated cities have made the Pocono Mountain area a leading tourist and recreational center.

Bordering Lake Erie is a narrow 40-mile strip of flat, rich land three to four miles wide called the Lake Erie Plain. Fine alluvial soils and favorable climate permit intensive vegetable and fruit cultivation, which is typical of the much larger area surrounding Lake Erie.

Eastern and central Pennsylvania drain into the Atlantic Ocean, while the western portion of the State lies in the Ohio River Basin, except for the Lake Erie Plain in the northwest, which is drained by a number of small streams into Lake Erie. The Delaware River, which forms the eastern boundary, drains the eastern portion and flows into Delaware Bay. The Susquehanna River drains the central portion and flows into Chesapeake Bay. In the western portion, the Allegheny and the Monongahela Rivers have their confluence at Pittsburgh to form the Ohio River.

Floods may occur during any month of the year in Pennsylvania, although they occur with greater frequency in the spring months of March and April. They may result from heavy rains during any season. Generally, the most widespread flooding occurs during the winter and spring when associated with heavy rains, or heavy rains combined with snowmelt. Serious local flooding sometimes results from ice jams during the spring thaw. Heavy local thunderstorm rains cause severe flash flooding in many areas. Storms of tropical origin sometimes deposit flood-producing rains, especially in the eastern portion of the State.

Floods may be expected at least once in most years. For instance, flood stage at Pittsburgh is exceeded on the average of 1.3 times per year, based on the long-term record. However, floods of notable severity and magnitude for the State occur about once in eight years.

GENERAL CLIMATIC FEATURES - Pennsylvania is generally considered to have a humid continental type of climate, but the varied physiographic features have a marked effect on the weather and climate of the various sections within the State. The prevailing westerly winds carry most of the weather disturbances that affect Pennsylvania from the interior of the continent, so that the Atlantic Ocean has only limited influence upon

the climate of the State. Coastal storms do, at times, affect the day-to-day weather, especially in eastern sections. It is here that storms of tropical origin have the greatest effect within the State, causing floods in some instances.

Throughout the State temperatures generally remain between 0° and 100°F and average from near 47°F annually in the north-central mountains to 57°F annually in the extreme southeast. The highest temperature of record in Pennsylvania of 111°F was observed at Phoenixville July 9 and 10, 1936, while the record low of -42°F occurred at Smethport January 5, 1904.

Summers are generally warm, averaging about 68°F along Lake Erie to 74°F in southeastern counties. High temperatures, 90°F or above, occur on an average of 10 to 20 days per year in most sections; but occasionally southeastern localities may experience a season with as many as 30 days, while the extreme northwest averages as few as four days annually. Only rarely does a summer pass without excessive temperatures being reported somewhere in the State. However, there are places such as immediately adjacent to Lake Erie and at some higher elevations where readings of 100°F have never been recorded. Daily temperatures during the warm season usually have a range of about 20°F over much of the State, while the daily range in winter is several degrees less. During the coldest months temperatures average near the freezing point with daily minimum readings sometimes near 0°F or below. Freezing temperatures occur on the average of 100 or more days annually with the greatest number of occurrences in mountainous regions. Records show that freezing temperatures have occurred somewhere in the State during all months of the year and below 0°F readings from November to April, inclusive.

Precipitation is fairly evenly distributed throughout the year. Annual amounts generally range between 34 to 52 inches, while the majority of places receive 38 to 46 inches. Greatest amounts usually occur in spring and summer months, while February is the driest month, having about two inches less than the wettest months. Precipitation tends to be somewhat greater in eastern sections due primarily to coastal storms which occasionally frequent the area. During the warm season these storms bring heavy rain, while in winter heavy snow or a mixture of rain and snow may be produced. Thunderstorms, which average between 30 to 35 per year, are concentrated in the warm months and are responsible for most of the summertime rainfall, which averages from 11 inches in the northwest to 13 inches in the east. Occasionally dry spells may develop and persist for several months during which time monthly precipitation may total less than one-quarter inch. These periods almost never affect all sections of the State at the same time, nor are they confined to any particular season of the year. Winter precipitation is usually three to four inches less than summer rainfall and is produced most frequently from northeastward-moving storms. When temperatures are low enough these storms sometimes cause heavy snow which may accumulate to 20 inches or more. Annual snowfall ranges between wide limits from year to year and place to place. Some years are quite light as snowfall may total less than ten inches while other years may produce upwards to 100

inches, mostly in northern and mountainous areas. Annual snowfall averages from about 20 inches in the extreme southeast to 90 inches in parts of McKean County. Measurable snow generally occurs between November 20 and March 15, although snow has been observed as early as the beginning of October and as late as May, especially in northern counties. Greatest monthly amounts usually fall in December and January; however, greatest amounts from individual storms generally occur in March as the moisture supply increases with the annual march of temperature.

As mentioned earlier, hurricanes or low pressure systems with a tropical origin seldom affect the State. Damages as a result of hurricane winds are rare and usually confined to extreme eastern portions. However, nature's most violent storm, the tornado, does occur in Pennsylvania. At least one tornado has been noted in almost all counties since the advent of severe storms records in 1854. On the average, six or seven tornadoes are observed annually in Pennsylvania, and the State ranks 27th nationally. June is the month of highest frequency, followed closely by July and August. Principal areas of tornado concentration are in the extreme northwest, the Southwest Plateau, and the Southeastern Piedmont. The frequency in the latter area is the highest in the State per square mile, similar to what is observed in portions of the Midwestern United States. Many of the tornadoes in Pennsylvania have caused relatively minor damages. However, several have claimed lives and dealt severe local economic setbacks. The most destructive activity occurred June 23, 1944, when three tornadoes raked the southwestern portion of the Commonwealth, killing 45 persons, injuring another 362, and causing over $2 million in property damage.

More detailed information is given for each of the four rather distinct climatic areas of the state.

THE SOUTHEASTERN COASTAL PLAIN AND PIEDMONT PLATEAU - In this region the summers are long and at times uncomfortably hot. Daily temperatures reach 90°F or above on the average of 25 days during the summer season; however, readings of 100°F or above are comparatively rare. From about July 1 to the middle of September this area occasionally experiences uncomfortably warm periods, four to five days in length, during which light wind movement and high relative humidity make conditions oppressive. In general, the winters are comparatively mild, with an average of less than 100 days with minimum temperatures below the freezing point. Temperatures 0°F or lower occur at Philadelphia, on an average, one winter in four, and at Harrisburg one in three. The freeze-free season averages 170 to 200 days.

Average annual precipitation in the area ranges from about 30 inches in the lower Susquehanna Valley to about 46 in Chester County. Under the influence of an occasional severe coastal storm, a normal month's rainfall, or more, may occur within a period of 48 hours. The average seasonal snowfall is about 30 inches, and fields are ordinarily snow covered about one-third of the time during the winter season.

THE RIDGE AND VALLEY PROVINCE - This region does not have a true mountain type of climate, but it does have many of the characteristics of such a climate. The mountain-and-valley influence on the air movements causes somewhat greater temperature extremes than are experienced in the southeastern part of the State where the modifying coastal and Chesapeake Bay influence hold them relatively constant, and the daily range of temperature increases somewhat under the valley influences.

The effects of nocturnal radiation in the valleys and the tendency for cool air masses to flow down them at night result in a shortening of the growing season by causing freezes later in spring and earlier in fall than would otherwise occur. The growing (freeze-free) season in this section is longest in the middle Susquehanna Valley, where it averages about 165 days, and shortest in Schuylkill and Carbon Counties, averaging less than 130 days.

The annual precipitation in this area has a mean value of three or four inches more than in the southeastern part of the State, but its geographic distribution is less uniform. The mountain ridges are high enough to have some deflecting influence on general storm winds, while summer showers and thunderstorms are often shunted up the valleys.

Seasonal snowfall of the Ridge and Valley Province varies considerably within short distances. It is greatest in Somerset County, averaging 88 inches in the vicinity of Somerset, and least in Huntingdon, Mifflin, and Juniata Counties, averaging about 37 inches.

THE ALLEGHENY PLATEAU - This region has a continental type of climate, with changeable temperatures and more frequent precipitation than other parts of the State. In the more northerly sections the influence of latitude, together with higher elevation and radiation conditions, serve to make this the coldest area in the State. Occasionally, winter minimum temperatures are severe. The daily temperature range is fairly large, averaging about 20° in midwinter and 26° in midsummer. In the southern counties the daily temperature range is a few degrees higher and the same may be said of the normal annual range. Because of the rugged topography the freeze-free season is variable, ranging between 130 days in the north to 175 days in the south.

Annual precipitation has a mean of about 41 inches, ranging from less than 35 inches in the northern parts of Tioga and Bradford Counties to more than 45 inches in parts of Crawford, Warren, and Wayne Counties. The seasonal snowfall averages 54 inches in northern areas, while southern sections receive several inches less. Fields are normally snow covered three-fourths of the time during the winter season. With rapidly flowing streams in the Ohio Drainage system (except the Monongahela), it is fortunate that this part of the State is not subject to torrential rains such as sometimes occur along the Atlantic slope. Although average annual precipitation is about equal to that for the State as a whole, it usually occurs in smaller amounts at more frequent intervals; 24-hour rains exceeding 2.5 inches are comparatively rare.

THE LAKE ERIE PLAIN - This region has a unique and agriculturally advantageous climate typical of the coastal areas surrounding much of the Great Lakes. Both in spring and autumn the lake water exerts a retarding influence on the temperature regime and the freeze-free season is extended about 45 days. In the autumn this prevents early freezing temperatures, which is a critical factor in the growing of fruit and vegetables.

Annual precipitation totals about 34.5 inches, which is fairly evenly distributed throughout the year. Snowfall exceeds 54 inches per year, with heavy snows sometimes experienced late in April.

STATIONS IN THE CURRENT SERIES OF CLIMATOGRAPHY OF THE U.S. NO. 20:

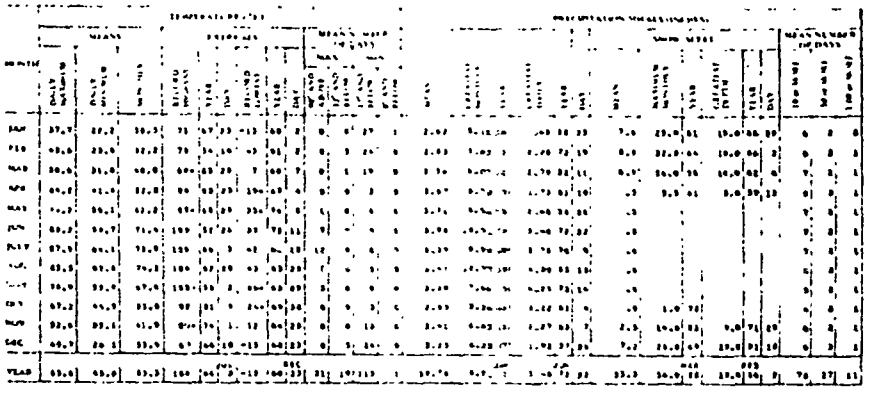
PENNSYLVANIA	PERIOD	LAT. (N)	LONG. (W)	ELEV. (FT.)
Carlisle	1951-74	40°13'	77°12'	465
Chambersburg 1 ESE	1951-74	39°56'	77°38'	640
Claysville 3 W	1951-70	40°07'	80°28'	1000
Donora 1 SW	1951-74	40°10'	79°52'	762
Ephrata	1951-74	40°10'	76°10'	485
Franklin	1951-74	41°23'	79°49'	987
Gettysburg	1951-74	39°50'	77°14'	500
Holtwood	1951-74	39°50'	76°20'	187
Jamestown 2 NW	1951-74	41°30'	80°28'	1050
Johnstown	1951-74	40°20'	78°55'	1214
Lawrenceville	1951-73	42°00'	77°08'	1000
Marcus Hook	1951-74	39°49'	75°25'	12
Montrose	1951-74	41°50'	75°52'	1560
Phoenixville 1 E	1951-74	40°07'	75°30'	105
Port Clinton	1951-74	40°35'	76°02'	450
Reading 3 N	1951-72	40°22'	75°56'	270
Ridgway	1951-74	41°25'	78°45'	1360
State College	1951-74	40°48'	77°52'	1170
Stroudsburg	1951-74	41°00'	75°11'	480
Towanda 1 ESE	1951-74	41°45'	76°25'	745
Warren	1951-74	41°51'	79°08'	1280
York 3 SSW Pump Sta	1951-74	39°55'	76°45'	390

STATIONS FOR WHICH LOCAL CLIMATOLOGICAL DATA, ANNUAL, IS PREPARED:

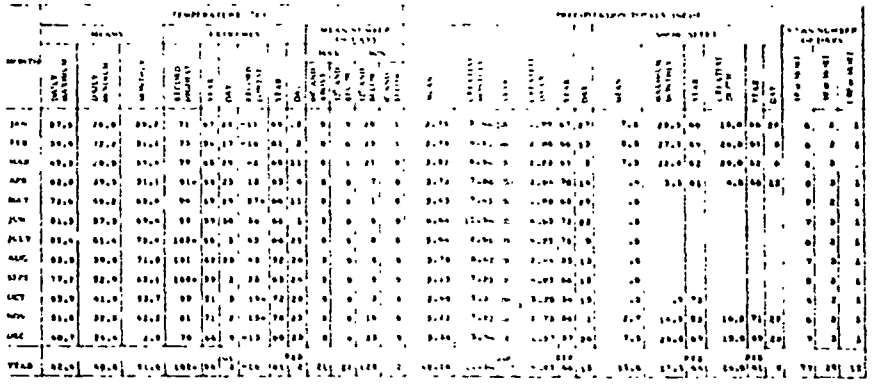
PENNSYLVANIA	PERIOD	LAT. (N)	LONG. (W)	ELEV. (FT.)
Allentown	1976	40°39'	75°26'	387
Avoca	1976	41°20'	75°44'	930
Erie	1976	42°05'	80°11'	731
Harrisburg	1976	40°13'	76°51'	338
Philadelphia	1976	39°53'	75°15'	5
Pittsburgh AP	1976	40°30'	80°13'	1137
Pittsburgh Fed. Bldg.	1976	40°27'	80°00'	747
Williamsport	1976	41°15'	76°55'	524

CLIMATOLOGICAL SUMMARY

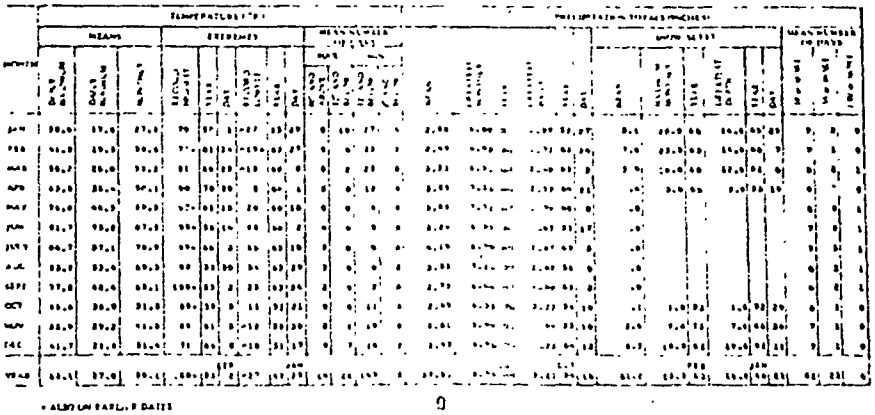
CARLISLE, PA 1951 - 1974 40° 2' N 77° 12' W 468 FT.



CHAMBERSBURG 1 ESE, PA 1951 - 1974 39° 56' N 77° 38' W 640 FT.



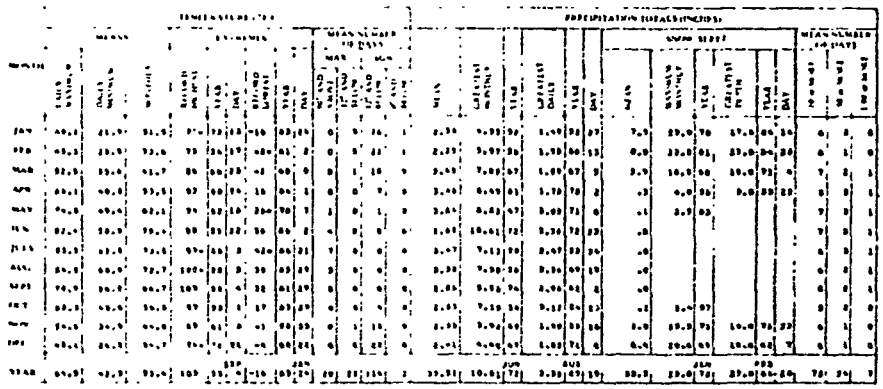
CLAYSVILLE 3 W, PA 1951 - 1970 40° 27' N 80° 28' W 1000 FT.



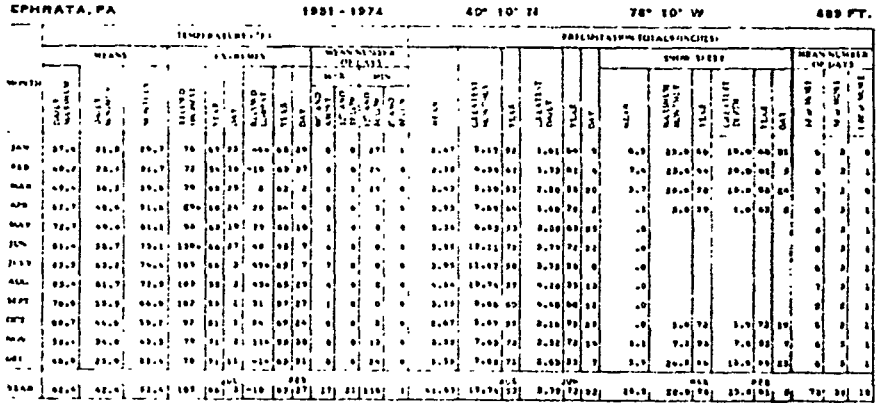
* ALSO ON PAPER, P DATES

CLIMATOLOGICAL SUMMARY

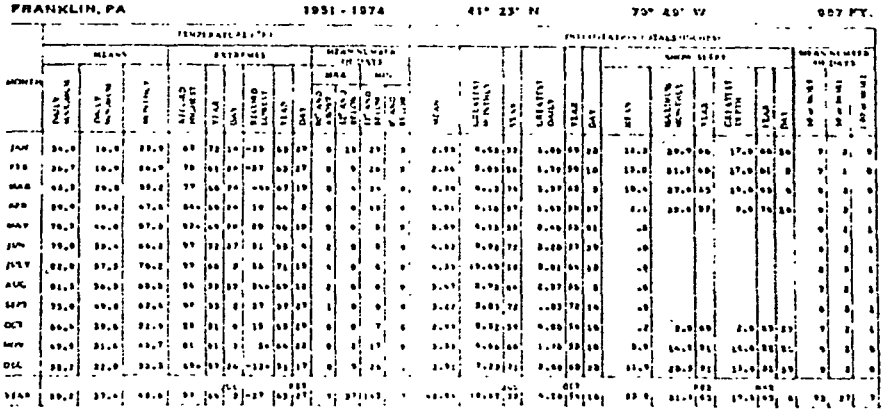
DONORA 1 S.W., PA — 1931 - 1974 — 40° 10' N — 79° 52' W — 762 FT.



EPHRATA, PA — 1931 - 1974 — 40° 10' N — 76° 10' W — 489 FT.



FRANKLIN, PA — 1931 - 1974 — 41° 23' N — 79° 49' W — 907 FT.



CLIMATOLOGICAL SUMMARY

GETTYSBURG, PA 1931 - 1974 39° 50' N 77° 14' W 500 FT.

MONTH	TEMPERATURES (°F)	PRECIPITATION TOTALS (INCHES)
JAN	[illegible]	[illegible]
FEB	[illegible]	[illegible]
MAR	[illegible]	[illegible]
APR	[illegible]	[illegible]
MAY	[illegible]	[illegible]
JUN	[illegible]	[illegible]
JULY	[illegible]	[illegible]
AUG	[illegible]	[illegible]
SEPT	[illegible]	[illegible]
OCT	[illegible]	[illegible]
NOV	[illegible]	[illegible]
DEC	[illegible]	[illegible]
YEAR	[illegible]	[illegible]

HOLTWOOD, PA 1931 - 1974 39° 50' N 76° 20' W 187 FT.

MONTH	TEMPERATURES (°F)	PRECIPITATION TOTALS (INCHES)
JAN	[illegible]	[illegible]
FEB	[illegible]	[illegible]
MAR	[illegible]	[illegible]
APR	[illegible]	[illegible]
MAY	[illegible]	[illegible]
JUN	[illegible]	[illegible]
JULY	[illegible]	[illegible]
AUG	[illegible]	[illegible]
SEPT	[illegible]	[illegible]
OCT	[illegible]	[illegible]
NOV	[illegible]	[illegible]
DEC	[illegible]	[illegible]
YEAR	[illegible]	[illegible]

JAMESTOWN 2 NW, PA 1931 - 1974 41° [illegible] N [illegible] W 1030 FT.

MONTH	TEMPERATURES (°F)	PRECIPITATION TOTALS (INCHES)
JAN	[illegible]	[illegible]
FEB	[illegible]	[illegible]
MAR	[illegible]	[illegible]
APR	[illegible]	[illegible]
MAY	[illegible]	[illegible]
JUN	[illegible]	[illegible]
JULY	[illegible]	[illegible]
AUG	[illegible]	[illegible]
SEPT	[illegible]	[illegible]
OCT	[illegible]	[illegible]
NOV	[illegible]	[illegible]
DEC	[illegible]	[illegible]
YEAR	[illegible]	[illegible]

* ALSO ON EARLIER DATES

CLIMATOLOGICAL SUMMARY

JOHNSTOWN, PA 1951 - 1974 40° 20' N 78° 55' W 1214 FT.

MONTH	TEMPERATURE (°F) MEANS DAILY MAXIMUM	DAILY MINIMUM	MONTHLY	EXTREMES RECORD HIGHEST	YEAR	DAY	RECORD LOWEST	YEAR	DAY	MEAN NUMBER OF DAYS MAX 90° AND ABOVE	MAX 32° AND BELOW	MIN 32° AND BELOW	MIN 0° AND BELOW
JAN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
FEB	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MAR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
APR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MAY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
JUN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
JULY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
AUG	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SEPT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
OCT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NOV	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
DEC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
YEAR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

MONTH	PRECIPITATION TOTALS (INCHES) MEAN	GREATEST MONTHLY	YEAR	GREATEST DAILY	YEAR	DAY	SNOW, SLEET MEAN	MAXIMUM MONTHLY	YEAR	GREATEST DEPTH	YEAR	DAY	MEAN NUMBER OF DAYS .10 OR MORE	.50 OR MORE	1.00 OR MORE
JAN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
FEB	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MAR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
APR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MAY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
JUN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						[illegible]	[illegible]	[illegible]
JULY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						[illegible]	[illegible]	[illegible]
AUG	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						[illegible]	[illegible]	[illegible]
SEPT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						[illegible]	[illegible]	[illegible]
OCT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NOV	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
DEC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
YEAR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

LAWRENCEVILLE, PA 1951 - 1973 42° 00' N 77° 08' W 1000 FT.

MONTH	TEMPERATURE (°F) MEANS DAILY MAXIMUM	DAILY MINIMUM	MONTHLY	EXTREMES RECORD HIGHEST	YEAR	DAY	RECORD LOWEST	YEAR	DAY	MEAN NUMBER OF DAYS MAX 90° AND ABOVE	MAX 32° AND BELOW	MIN 32° AND BELOW	MIN 0° AND BELOW
JAN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
FEB	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MAR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
APR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MAY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
JUN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
JULY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
AUG	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SEPT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
OCT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NOV	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
DEC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
YEAR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

MONTH	PRECIPITATION TOTALS (INCHES) MEAN	GREATEST MONTHLY	YEAR	GREATEST DAILY	YEAR	DAY	SNOW, SLEET MEAN	MAXIMUM MONTHLY	YEAR	GREATEST DEPTH	YEAR	DAY	MEAN NUMBER OF DAYS .10 OR MORE	.50 OR MORE	1.00 OR MORE
JAN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
FEB	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MAR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
APR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MAY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
JUN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						[illegible]	[illegible]	[illegible]
JULY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						[illegible]	[illegible]	[illegible]
AUG	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						[illegible]	[illegible]	[illegible]
SEPT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						[illegible]	[illegible]	[illegible]
OCT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NOV	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
DEC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
YEAR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

MARCUS HOOK, PA 1951 - 1974 39° 49' N 75° 25' W 12 FT.

MONTH	TEMPERATURE (°F) MEANS DAILY MAXIMUM	DAILY MINIMUM	MONTHLY	EXTREMES RECORD HIGHEST	YEAR	DAY	RECORD LOWEST	YEAR	DAY	MEAN NUMBER OF DAYS MAX 90° AND ABOVE	MAX 32° AND BELOW	MIN 32° AND BELOW	MIN 0° AND BELOW
JAN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
FEB	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MAR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
APR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MAY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
JUN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
JULY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
AUG	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SEPT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
OCT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NOV	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
DEC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
YEAR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

MONTH	PRECIPITATION TOTALS (INCHES) MEAN	GREATEST MONTHLY	YEAR	GREATEST DAILY	YEAR	DAY	SNOW, SLEET MEAN	MAXIMUM MONTHLY	YEAR	GREATEST DEPTH	YEAR	DAY	MEAN NUMBER OF DAYS .10 OR MORE	.50 OR MORE	1.00 OR MORE
JAN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
FEB	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MAR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
APR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]	[illegible]
MAY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						[illegible]	[illegible]	[illegible]
JUN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						[illegible]	[illegible]	[illegible]
JULY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						[illegible]	[illegible]	[illegible]
AUG	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						[illegible]	[illegible]	[illegible]
SEPT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						[illegible]	[illegible]	[illegible]
OCT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						[illegible]	[illegible]	[illegible]
NOV	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
DEC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
YEAR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

* ALSO ON EARLIER DATES

CLIMATOLOGICAL SUMMARY

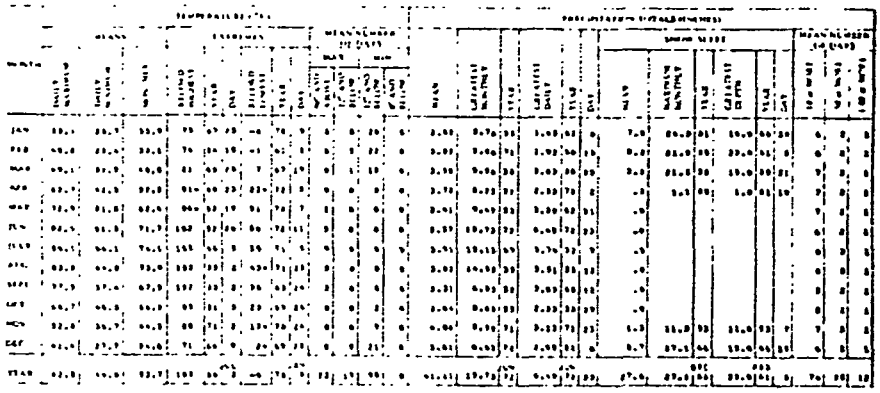
MONTROSE, PA 1951 - 1974 41° 50' N 75° 52' W 1560 FT.

PHOENIXVILLE, PA 1951 - 1974 40° 07' N 75° 31' W 109 FT.

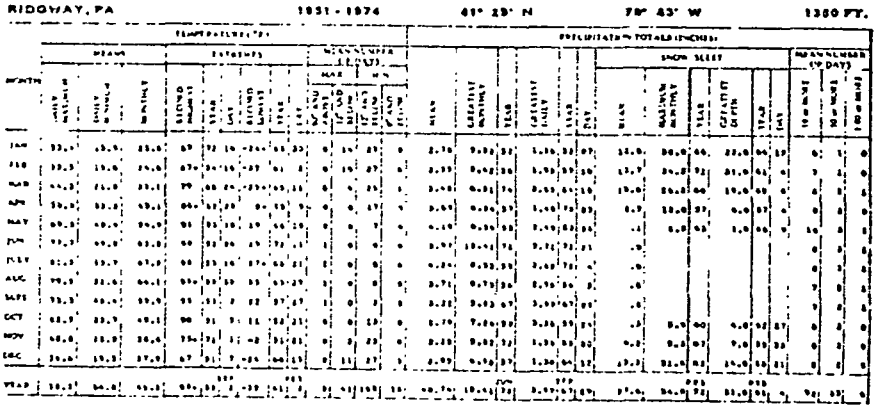
PORT CLINTON, PA 1951 - 1974 40° 33' N 76° 02' W 430 FT.

CLIMATOLOGICAL SUMMARY

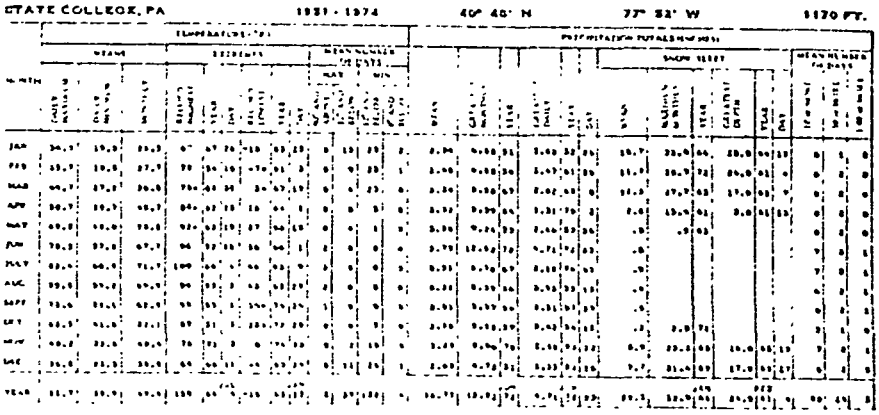
READING 3 N, PA — 1931 - 1972 — 40° 22' N — 75° 56' W — 270 FT.



RIDGWAY, PA — 1931 - 1974 — 41° 25' N — 78° 43' W — 1360 FT.

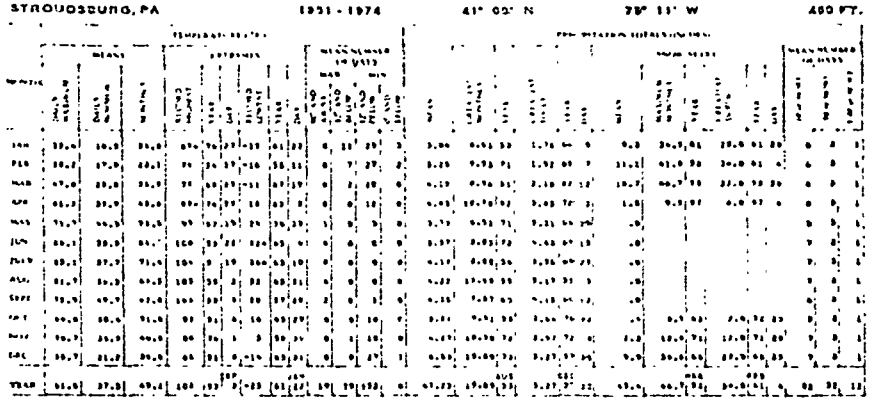


STATE COLLEGE, PA — 1931 - 1974 — 40° 48' N — 77° 52' W — 1170 FT.

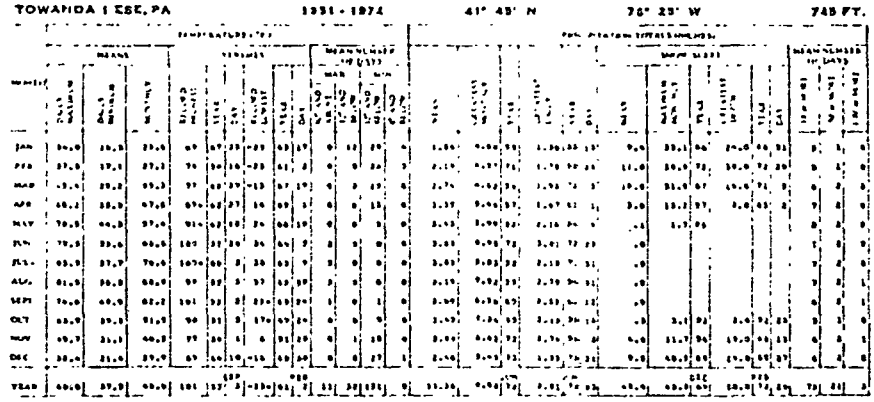


CLIMATOLOGICAL SUMMARY

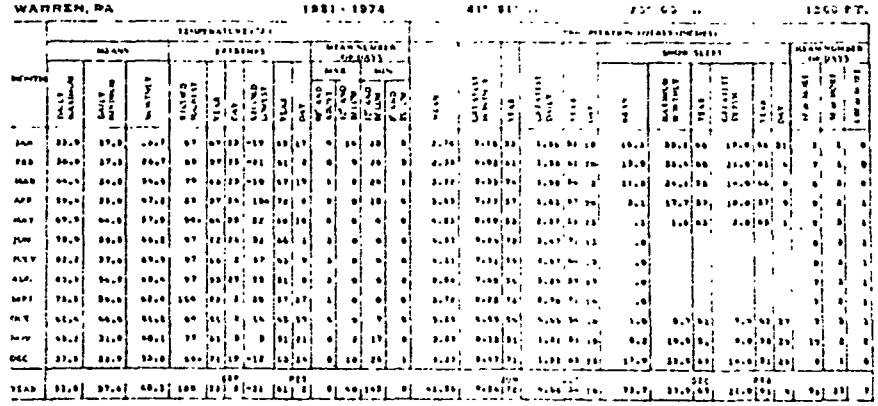
STROUDSBURG, PA 1931 - 1974 41° 03' N 75° 11' W 460 FT.



TOWANDA 1 ESE, PA 1931 - 1974 41° 45' N 76° 25' W 748 FT.



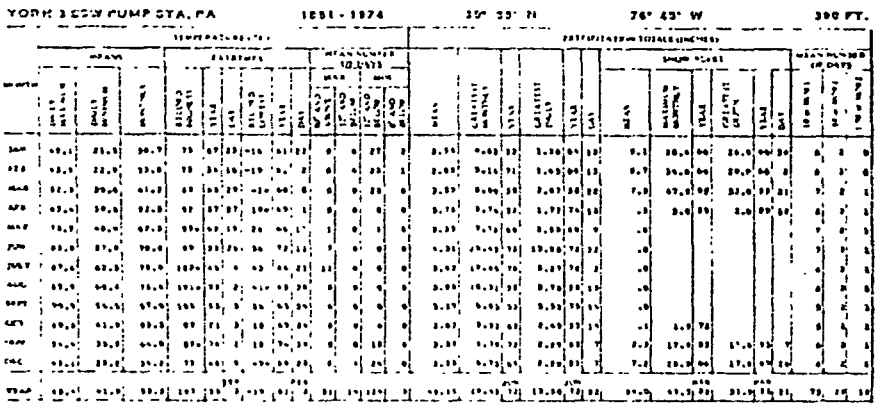
WARREN, PA 1931 - 1974 41° 51' N 79° 09' W 1300 FT.



* ALSO ON EARLIER DATE

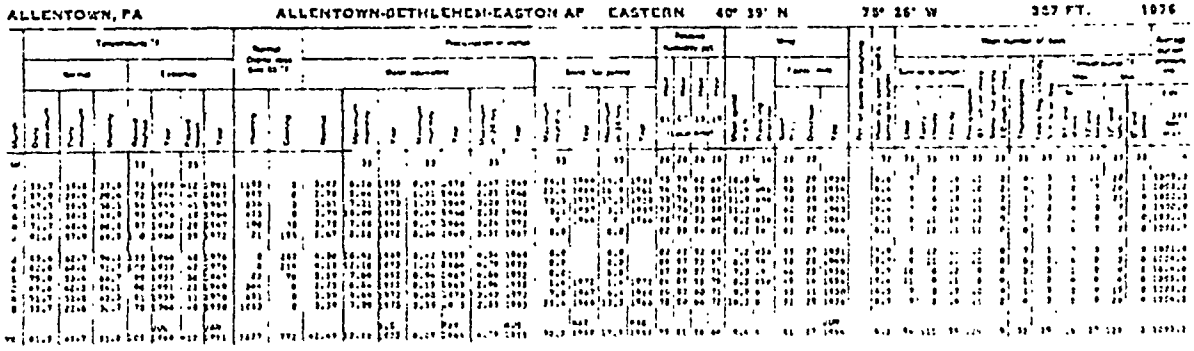
CLIMATOLOGICAL SUMMARY

YORK 3 SSW PUMP STA, PA 1931 - 1974 39° 53' N 76° 43' W 390 FT.

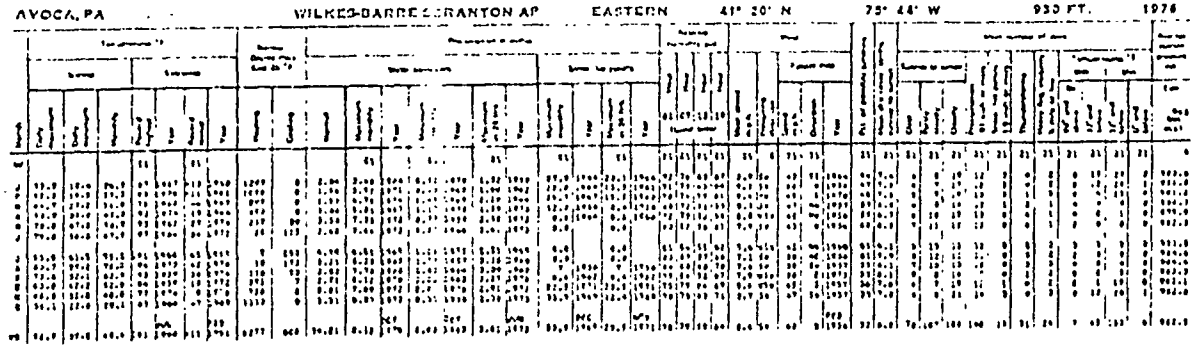


NORMALS, MEANS, AND EXTREMES

ALLENTOWN, PA — ALLENTOWN-BETHLEHEM-EASTON AP — EASTERN — 40° 39' N — 75° 26' W — 387 FT. — 1976

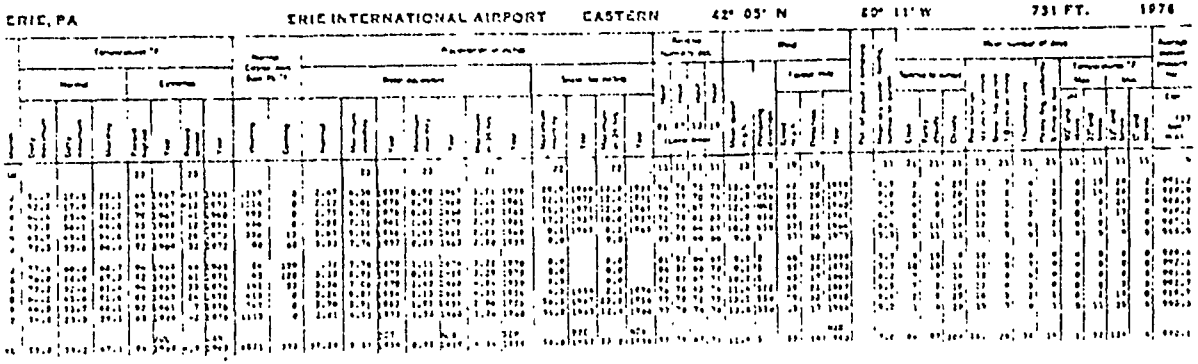


AVOCA, PA — WILKES-BARRE/SCRANTON AP — EASTERN — 41° 20' N — 75° 44' W — 930 FT. — 1976

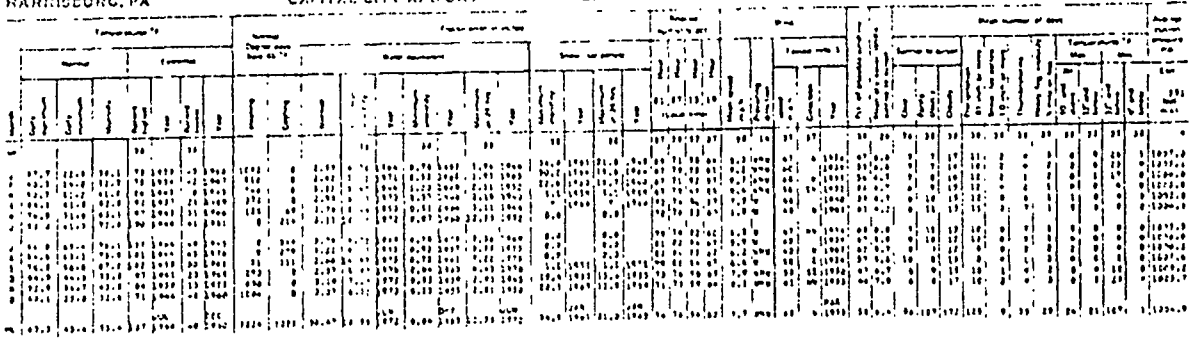


NORMALS, MEANS, AND EXTREMES

ERIE, PA — ERIE INTERNATIONAL AIRPORT — EASTERN — 42° 05' N — 80° 11' W — 731 FT. — 1976

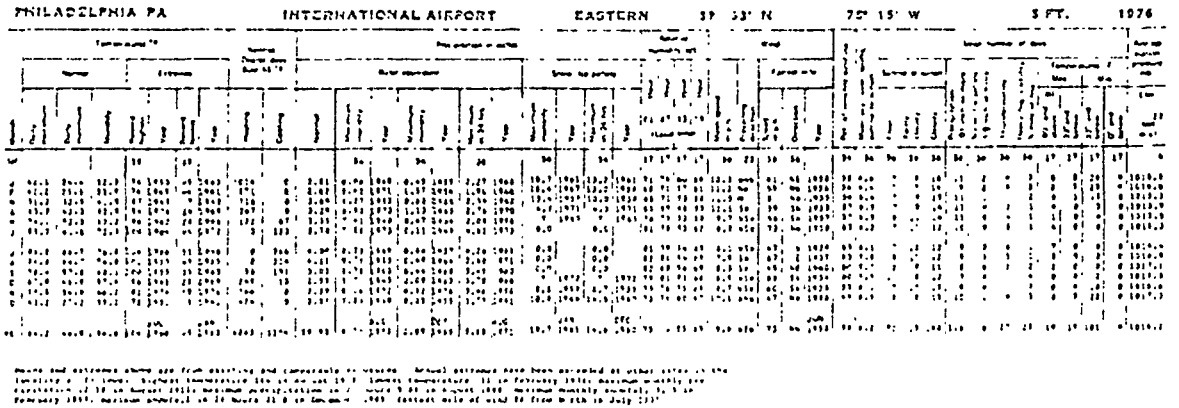


HARRISBURG, PA — CAPITAL CITY AIRPORT — EASTERN — 40° 13' N — 76° 51' W — 338 FT. — 1976

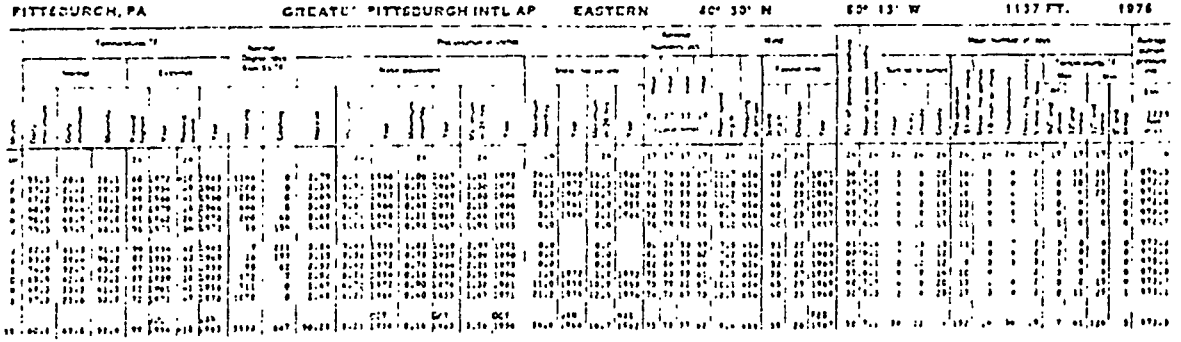


NORMALS, MEANS, AND EXTREMES

PHILADELPHIA PA INTERNATIONAL AIRPORT EASTERN 39° 53' N 75° 15' W 5 FT. 1976

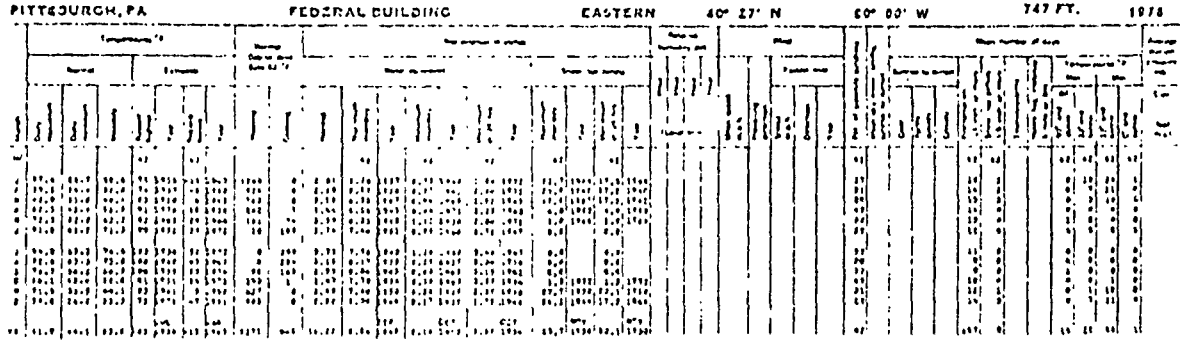


PITTSBURGH, PA GREATER PITTSBURGH INTL AP EASTERN 40° 30' N 80° 13' W 1137 FT. 1976

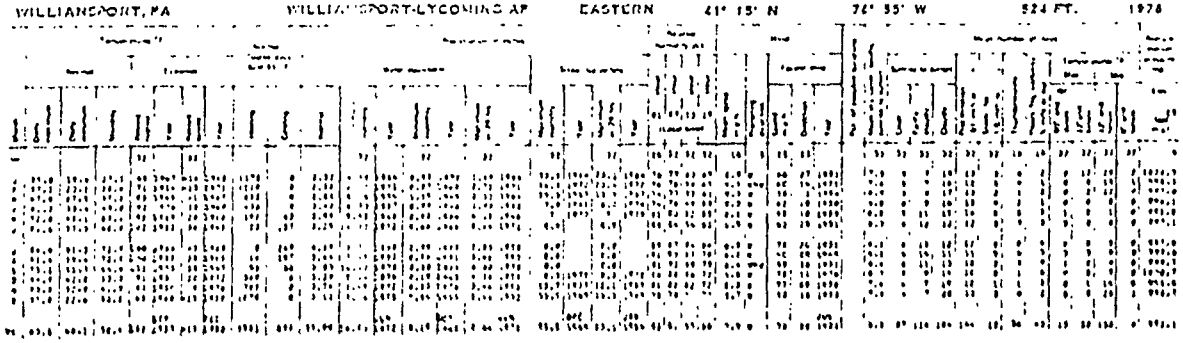


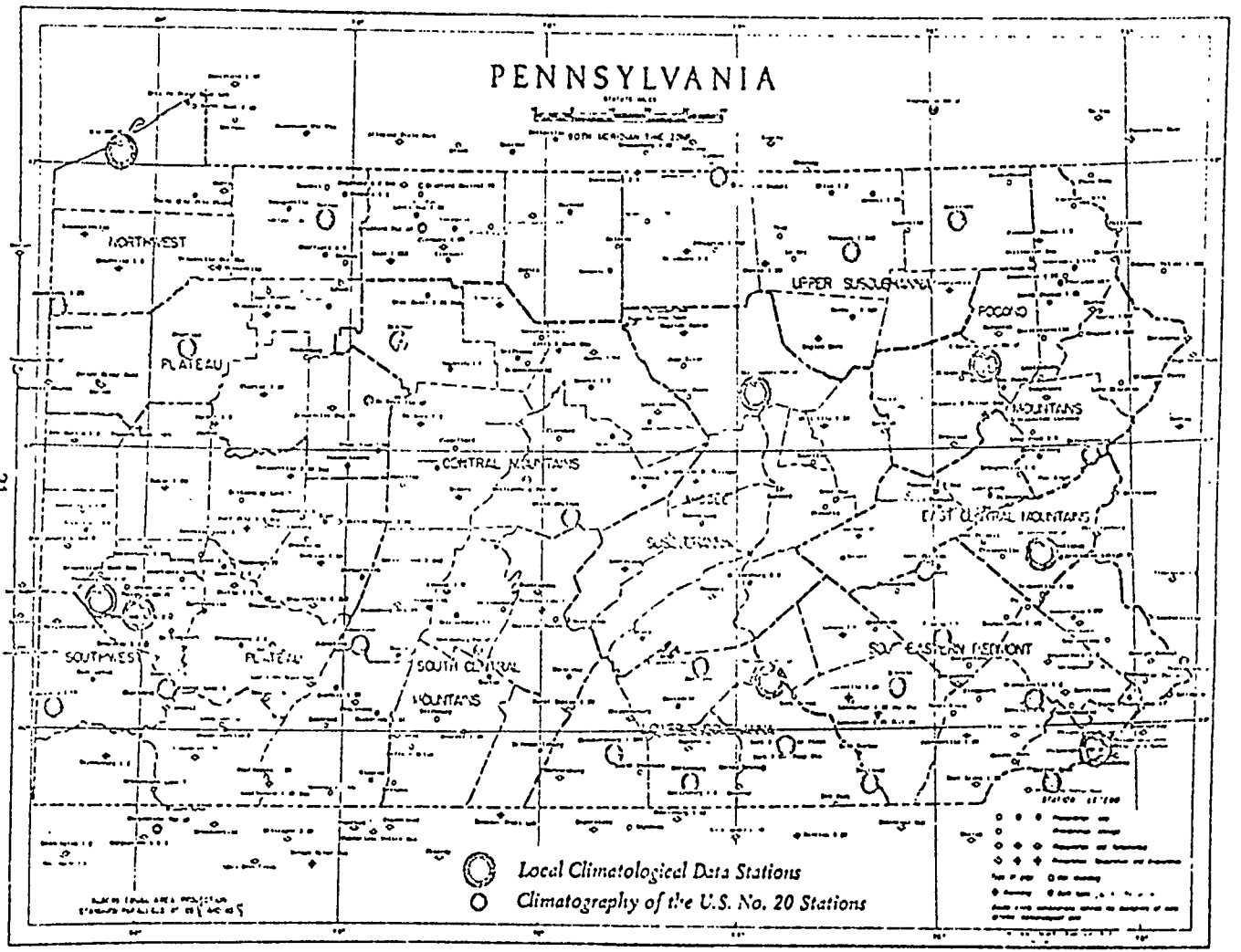
NORMALS, MEANS, AND EXTREMES

PITTSBURGH, PA FEDERAL BUILDING EASTERN 40° 27' N 80° 00' W 747 FT. 1978



WILLIAMSPORT, PA WILLIAMSPORT-LYCOMING AP EASTERN 41° 15' N 76° 55' W 524 FT. 1978





omit to p.4

Appendix IX

The Office for Remote Sensing of Earth Resources

OMIT TO P. 4

THE OFFICE FOR REMOTE SENSING OF EARTH RESOURCES
Institute for Research on Land and Water Resources
The Pennsylvania State University

The Office for Remote Sensing of Earth Resources (ORSER), is an interdisciplinary group, established in 1970 for the purpose of participating in projects involving the use of remotely-sensed data of earth resources. Investigators involved in ORSER research projects have been from the fields of agronomy, anthropology, civil engineering, computer science, electrical engineering, forestry, geology, geophysics, hydrology, meteorology, plant pathology, pattern recognition, regional planning, and soils. A problems-oriented, rather than a discipline-oriented, approach is taken in the completion of tasks, in order that associates from various disciplines may work together toward a common goal.

ORSER has directed most of its efforts toward processing, analysis, and interpretation of multispectral remotely-sensed data, most of which have been supplied by NASA in both imagery and digital format. Photo-interpretation has been a vital part of the overall analytical process, but emphasis has been on the use of digital computer algorithms for data processing. The end product of a project is typically a computer map showing various environmental and land use characteristics of data points in the analyzed scenes.

Using the IBM 370/3033 Processor at the University Computation Center, ORSER has developed an extensive digital data processing system, employing FORTRAN IV source language, remote job entry (RJE), and an interactive management and editing system (INTERACT). Statistical information, pattern recognition routines, and a variety of analyses of remotely-sensed data can be produced. Portability and computation cost efficiency have been emphasized throughout.

The ORSER facilities include a Ramtek color TV display system and a Tektronix 4010 remote graphic terminal with associated cathode ray tube (CRT) display, hard copy unit, and digitizing graphic tablet. Three additional terminals (one portable) are available, as well as a complete Datacolor image enhancement system. The laboratory also includes a Map-o-Graph unit and a Bausch and Lomb Zoom transferscope, along with Zoom 70 and 95R stereoscope systems, a microfilm reader, a Diazo printer and developer, and a variety of portable stereoscopes and light tables. All staff members have access to a Saltzman projector in the Department of Geosciences and a completely equipped photogrammetry and photointerpretation laboratory, including a Kelsh plotter, in the Department of Civil Engineering.

From 1972 through 1975, ORSER interpreted MSS data from ERTS-1 (now Landsat-1), on a NASA-funded project. The general objectives were to ascertain the usefulness of these data, to develop interpretation techniques, to apply remote sensing techniques to regional resource management problems, to provide student training in remote sensing, and to evaluate the effectiveness of interdisciplinary research and university-industry related research. Specific objectives were met in the fields of digital processing and pattern recognition, inventory of natural resources and land use, geology and hydrology, and environmental quality.