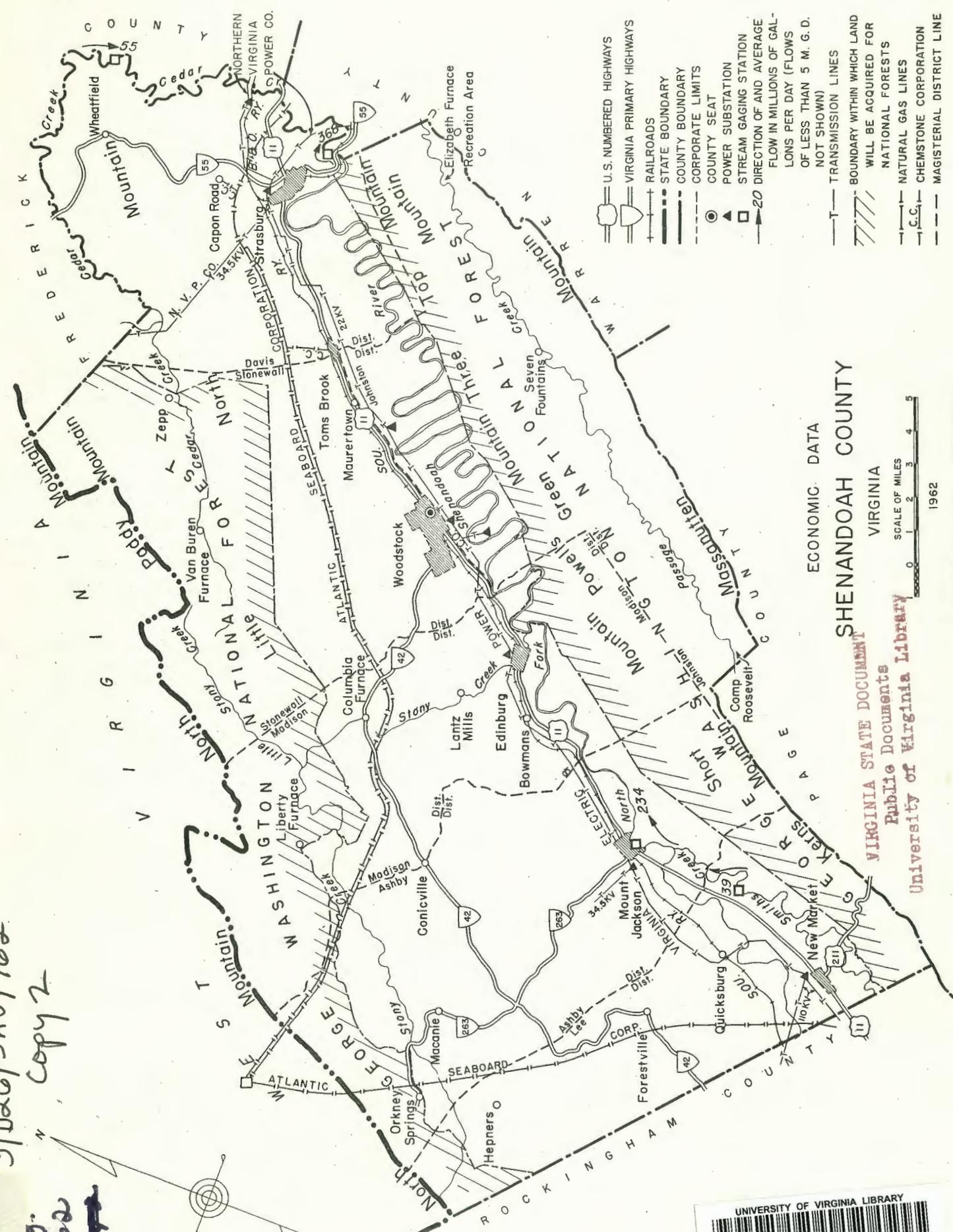


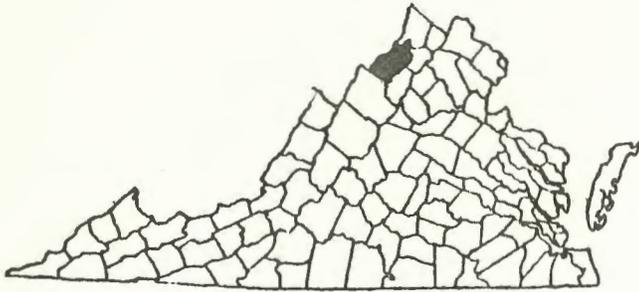
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ECONOMIC DATA  
**SHENANDOAH COUNTY**  
 VIRGINIA  
 VIRGINIA STATE DOCUMENT  
 Public Documents  
 University of Virginia Library  
 SCALE OF MILES  
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 1962  
 DIVISION OF INDUSTRIAL DEVELOPMENT  
 AND PLANNING





INDEX TO COUNTY LOCATION

The Indian name Shenandoah is said to mean "Beautiful Daughter of the Stars." Shenandoah County, formed in 1772 as Dunmore County but renamed in 1778, was settled about 1730 by Scotch-Irish and Germans, many of whom moved down the valley from Pennsylvania. Woodstock, the county seat, was established in 1752. At New Market the Henkel Press, one of America's oldest publishing houses, has been in business since 1806. The county was the scene of much action in the War Between the States, and at New Market on May 15, 1864, the Virginia Military Institute cadets made

their famous charge. A Confederate hospital was at Mount Jackson. In 1960 Shenandoah had a population of 21,825 and Woodstock 2,083.

The county (land area 507 sq. mi. or 324,480 acres) is bounded by the Massanutten Mountains on the east and the North Mountains of the Alleghenies on the west, with the North Fork of the Shenandoah River winding a twisting course in the beautiful valley between. Elevations vary from about 1,200 feet in the valley to 3,500 feet in the western ridges. The average temperature is 36° in January, 76° in July. Annual precipitation averages 36 inches.

A little more than half the total county area is forested, chiefly on the mountains. The George Washington National Forest embraces large portions of both the Massanutten and the North Mountains. Manganese, limestone, iron, lead, zinc, and types of clay are present. Several limestone quarries are producing crushed limestone and various types of chemical lime. Iron smelting furnaces, long inactive, operated on local ores for over a hundred years. There are many mineral springs and in the Valley around New Market are several of the caverns famous for their limestone formation.

The limestone soils of the well cleared valley are excellent for agriculture, and the great volume of grains which were produced here caused this region to be called the "Granary of the Confederacy." Today, however, Shenandoah County is more famous for its poultry - especially turkeys - and it ranks 8th highest among the nation's counties in the number of turkeys raised. Livestock raising has increased greatly and dairy herds have been enlarged to supply the demands of the Washington markets. Fruits continue to contribute much to the farm income. Among the counties of Virginia, Shenandoah ranks near the top in production of turkeys, chicken broilers, eggs, calves, hogs, apples, peaches and cherries.

Although Shenandoah is an agricultural county more people are employed in manufacturing than in farming. Many find work in construction, in services of every type and in shops and stores of the excellent marketing areas of the several towns. Much of the local manufacturing is geared to the farm economy. Locally grown fowl are processed in a large poultry dressing plant in the county. Other agriculturally related products include vinegar and other apple products, flour and meal, poultry and livestock feeds, dairy products, fertilizers, agricultural lime, and equipment for fruit and poultry grading and processing. Many are employed in the manufacture of apparel such as infants' wear, blouses, knitted wear, trousseurs and lingerie. Other manufactures include rayon fabrics, concrete products, fiberglass boats, and printing and publishing.

Within the county are two private schools, Massanutten Military Academy at Woodstock and Shenandoah Valley Academy at New Market. Two popular summer camps are operated in the remote regions of the county, Camp Strawderman for girls and Camp Lupton for boys. Located in Woodstock is the well equipped Shenandoah County Memorial Hospital and the Susan B. Miller Nursing Home for the care of the aged and of chronic cases. At Strasburg, there is a public library.

SHENANDOAH COUNTY

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## SHENANDOAH COUNTY

University of Virginia Library

	<u>POPULATION</u>		<u>1960</u>	<u>1950</u>
	<u>Total Population</u>	<u>Per cent</u>		
1960.....	21,825	White.....	98.4	98.2
1950.....	21,169	Male.....	49.0	49.3
1940.....	20,898	21 yrs and over.....	62.3	62.0
1930.....	20,655	Rural-farm.....	24.9	36.3
		Native white.....	97.9	97.5
Population of incorporated towns, 1960:				
Edinburg.....	517	Strasburg.....	2,428	
Mount Jackson....	722	Toms Brook.....	244	
New Market.....	783	Woodstock.....	2,083	

Source: U. S. Census of Population, 1950 and 1960

PERSONAL INCOME

	<u>Shenandoah County</u>	<u>The State</u>
Per capita income, 1961.....	\$1,261	\$1,911
Per capita income, 1958.....	\$1,151	\$1,748
Per capita income, 1950.....	\$ 959	\$1,222

## Families:

Median income, 1959.....	\$3,812	\$4,964
Per cent having incomes less than \$3,000	36.9	27.9

Sources: 1950 and 1960 per capita figures from Bureau of Population and Economic Research, University of Virginia. 1961 estimate for Virginia from U.S. Department of Commerce. The 1961 estimate for Shenandoah County is based on the assumption that it is in the same ratio to the state average as in 1958. 1959 median figures from 1960 U. S. Census of Population, based on 25 per cent sample.

RECREATIONAL RESOURCES

Shenandoah County's natural assets make possible many types of recreation. In the George Washington National Forest are scenic drives, hiking trails, picnic and camp areas, and hunting and fishing in season. One of the state's most beautiful drives runs along Powell Fort Valley in the Massanutten Mountains. A road from Woodstock into this valley passes over Powells Mountain near a viewing tower from which one can see the seven horseshoe bends of the Shenandoah River. There are picnic grounds at Elizabeth Furnace on Passage Creek and in Little Fort, the valley between Three Top Mountain and Green Mountain. There is a camp operated by religious and civic groups in Little Fort which accommodates about 200 persons and has a swimming pool and several playfields. Two privately owned youth camps, one for girls and one for boys, are located in this county.

Two of the famous limestone caverns of Virginia, visited by thousands each year, lie within Shenandoah County-- Battlefield Crystal Caverns near Strasburg and Shenandoah Caverns north of New Market-- and Endless Caverns are just over the Rockingham County line three miles south of New Market.

The Shenandoah County Fair at Woodstock, one of the largest county fairs in Virginia is a summer event and there are small fairs in some of the communities where recreational events are often sponsored by church, school, and civic organizations. Woodstock has a recreation park with a swimming pool and Strasburg has

a pool. A horse show is held at Orkney Springs in August. Hotels and boarding places, especially at the mineral springs, draw summer visitors and provide golf, horseback riding, swimming, and other sports.

At Shrinemont near Orkney Springs is a collection of paintings open to the public, and near New Market there is a permanent exhibit of china, pottery, earthenware, and crystal. There is a museum of Indian relics and handcrafts between Edinburg and Mount Jackson. Several chinchilla farms are interesting to visit.

INDUSTRIAL DEVELOPMENT ORGANIZATIONS

The New Market Industrial Development Corporation, the Strasburg Industrial Development Corporation and the Shenandoah Industrial Development Corporation are all actively seeking to bring new industry to the county. These organizations have information available on plant locations and offer active assistance to new industries coming into the area.

PLANNING

The town of Woodstock has a planning commission and has enacted zoning ordinances and subdivision regulations. Shenandoah County has enacted subdivision regulations.

HOUSING

	<u>Shenandoah County</u>	<u>The State</u>
All housing units, 1960.....	7,208	1,168,913
Per cent of all units:		
One-housing unit structures (including trailers).....	92.5	81.7
Built 1950-1960.....	17.1	31.7
With all plumbing facilities, not dilapidated.....	52.9	71.8
Vacant, for rent or sale, nonseasonal, not dilapidated	2.4	3.5
Per cent of occupied units:		
Occupied by owner.....	70.8	61.3
Occupied by nonwhite.....	1.2	17.6
Rural farm units.....	23.4	9.4
With telephone available.....	74.2	69.3
With automobiles available.....	81.4	78.0
Median number of persons per occupied unit.....	3.1	3.2

Source: U. S. Census of Housing, 1960

COMMUNITY FACILITIES

Banks - Banks are conveniently located in the county's principal communities-- two in Woodstock, two in Strasburg, and one each in Edinburg, Mount Jackson, and New Market. Total assets of these seven banks amounted to nearly \$24,000,000 December 31, 1961.

Churches - Many Protestant denominations are represented in the numerous churches scattered throughout the county. There is a Catholic church in Woodstock and Jewish places of worship are found in Harrisonburg and Winchester, a few miles from the southern and northern boundaries of the county respectively. Most of the churches maintain Sunday schools, youth programs and other activities that make an important contribution to community life.

Medical Facilities - The county is served by the Shenandoah Memorial Hospital, an 81-bed general hospital with well equipped medical, surgical and obstetrical departments. The Susan B. Miller Nursing Home is an accredited 68-bed home for the nursing care of chronic and aged patients. Sixteen medical doctors serve their communities, and four ambulance services are ready for emergencies. The County Public Health Department, with offices at Woodstock, dispenses clinic and other health services throughout the county. There are also three qualified veterinary hospitals in Shenandoah County.

Civic Facilities - Seven strategically located volunteer fire departments with modern equipment protect the county from fire hazards. The County Sheriff's Department in Woodstock and five community police departments afford police protection.

### WATER AND SEWAGE SYSTEMS

#### Waterworks Systems

The town of Edinburg owns its water system supplied by two mountain streams and a well as an auxiliary source. The water is chlorinated and the safe dry weather yield from all sources is 100,000 gallons per day. The total finished water storage in the distribution system is 500,000 gallons. Average daily use is 75,000 gallons and water hardness is about 1.5 grains per gallon.

The municipally owned system at Mount Jackson obtains water from a mountain stream and one well. The safe dry weather yield of the well is about 40 gallons per minute, and that of the mountain supply 75,000 gallons per day. The well pumps direct to the distribution system which has a total finished water storage of 2 million gallons. Average finished water hardness of the mountain supply is 1.5 grains per gallon and of the well 5.5 grains per gallon. About 125,000 gallons are used per day. The town has recently developed a second well that has been test pumped in excess of 100 gallons per minute, but this well is not connected to the system at present.

At New Market the system, also municipally owned, gets its water from three sources. One is a small mountain stream having a drainage area of one-half square mile. This water is chlorinated. Smiths Creek is another source and its water is filtered and chlorinated in a plant having a designed capacity of 110 gallons per minute. The third source is a well with a safe yield in excess of 250 gallons per minute. This wellwater is chlorinated. The total finished water storage in the distribution system is 6.5 million gallons. Hardness of the mountain supply is about 1.5 grains per gallon, of Smith Creek and the filter plant 4.5 grains per gallon, and of the well approximately 6.5 grains per gallon. Average use is 300,000 gallons per day.

The town of Strasburg owns its water system, the main source of which is a mountain stream with an impounding reservoir and a series of springs. A total raw water storage of 43.5 million gallons is available. The water flows by gravity to the distribution system and is chlorinated. A supplementary supply obtained from North Fork Shenandoah River is filtered and chlorinated in a plant having a capacity of 440 gallons per minute. The total finished water storage in the distribution system is 228,000 gallons. The average finished water hardness is 2 grains per gallon and average daily use is 285,000 gallons.

The municipally owned system at Woodstock is supplied by a mountain stream known as Stony Creek. There is a drainage area of approximately 12 square miles above the

impounding reservoir which has a capacity of 36 million gallons. The water flows by gravity to the distribution system and is chlorinated. Average daily use is 500,000 gallons and hardness is about 1.5 grains per gallon.

In addition to the above, there are in the county five small supplies either in use or under development that serve, or will serve industries. Wells supply these systems which furnish water for domestic purposes as well as industrial uses. Average finished hardness of well water in this area is about 6 grains per gallon. Storage on these systems varies, depending on the demands, but in all cases is adequate.

Sewerage Systems

At Edinburg the plant is owned by the town and provides primary treatment with chlorination. It is designed to handle a flow of 100,000 gallons per day. The average daily flow is 75,000 gallons.

Mount Jackson's municipally owned plant is designed to handle a flow of 150,000 gallons and provide primary treatment with chlorination. The average daily flow is 125,000 gallons.

The town-owned treatment plant at Strasburg provides primary and secondary treatment with chlorination and is designed to handle a flow of 300,000 gallons. Daily flow averages 250,000 gallons.

New Market's town owned plant provides primary and secondary treatment with chlorination and is designed to handle a flow of 300,000 gallons per day. The average daily flow is 200,000 gallons.

The municipally owned plant for Woodstock provides primary and secondary treatment with chlorination. The plant is designed to handle a flow of 300,000 gallons. Daily flow averages 450,000 gallons.

Source: Virginia Department of Health

SCHOOLS AND COLLEGES

Shenandoah County is well provided with educational facilities. Three large high schools and six large and several small elementary schools accommodate the nearly 5,000 pupils of the public schools. There are two privately operated schools in the county, Shenandoah Valley Academy (coeducational) in New Market and Massanutten Military Academy in Woodstock.

<u>Enrollment in public schools, 1960-61</u>	<u>Male</u>	<u>Female</u>
White elementary schools.....	1,660	1,484
White secondary schools.....	798	850
Negro elementary schools.....	55	40
Negro secondary schools.....	-	-
Total.....		4,887

Source: Virginia Department of Education

Higher Education - There are three four-year accredited colleges in adjoining Rockingham County. Madison College for women and the coeducational Eastern Mennonite College are both in Harrisonburg. At Bridgewater is Bridgewater College, also co-educational. All these institutions offer standard courses leading to the B.S. and

B.A. degrees. In Winchester to the north in Frederick County is the Shenandoah Conservatory of Music, a four-year degree-granting institution for music only, and Shenandoah College offering two years of college work. Both are coeducational. The University of Virginia offers extension courses in Woodstock.

#### TRANSPORTATION

Highways - U. S. Route 11, an arterial road running the entire length of the Shenandoah Valley and connecting Virginia with points north and south, passes through the county and serves the towns of New Market, Mt. Jackson, Edinburg, Woodstock, and Strasburg. State highways connect this main route with all parts of the area. Fast motor freight to all parts of the nation is provided by 19 trucking companies authorized to operate in the area. Most national trucking companies have routes through the county on U. S. #11 and four have offices and facilities either in Shenandoah or adjacent counties. Five locally owned truck companies operate throughout the area. Passenger bus service is supplied by Greyhound Bus Lines on the run between Washington, D. C., Roanoke, and Knoxville, Tennessee. There are 5 daily schedules in each direction on this route. A locally owned charter bus company operates on an interstate basis.

Railroads - A branch of the Southern Railway from Harrisonburg to Washington, D. C. closely parallels Route 11 through the county and has a junction with the Baltimore and Ohio Railroad at Strasburg. Daily freight service is available from all points on these lines.

Airports - Shenandoah Valley Airport (near Weyers Cave in Augusta County) serving Augusta and Rockingham counties and the cities of Staunton, Waynesboro and Harrisonburg, is conveniently close to Shenandoah County. Piedmont Airlines schedules from 4 to 6 flights from this field daily, and connections are made with principal airlines serving the nation. In Shenandoah County are several small local airports suitable for private planes. Local taxi service is available in each major town.

#### PUBLIC FINANCES

	Rates of local tax levies per \$100, 1961			
	Real estate	Tangible personal	Machinery and tools	Merchants' capital
Shenandoah County: Ashby district...	\$2.60	\$2.60	\$1.55	\$0.60
Davis district...	2.60	2.60	1.55	0.60
Johnston district	2.60	2.60	1.55	0.60
Lee district.....	2.60	2.60	1.55	0.60
Madison district	2.60	2.60	1.55	0.60
Stonewall district	2.60	2.60	1.55	0.60
Edinburg town....	3.70	3.70	1.55	0.60*
Mt. Jackson town..	3.60	3.60	1.55	0.80*
New Market town..	4.60	4.60	1.55	0.30*
Strasburg town...	3.40	3.40	2.35	0.60*
Toms Brook town..	3.10	3.10	1.55	0.60*
Woodstock town...	3.90	3.90	2.85	0.60*

\*Merchants license tax is imposed.

The true tax rates on real estate will be considerably below these nominal rates, since according to the Virginia Department of Taxation, the average ratio of the assessed value of real estate to its actual sale value in 1956 was 16.0 per cent in Shenandoah County. According to the Virginia State Corporation Commission, the state-wide ratio of the assessed value of public service corporation property to its true value is 40.0 per cent.

Assessed values subject to taxes, 1960

		<u>Shenandoah County</u>
Local:	Real estate.....	\$10,150,145
	Tangible personal property.....	8,627,990
	Machinery and tools.....	1,138,747
	Merchants' capital.....	4,090,364
	Public service corporations.....	3,862,908
State:	Intangible personal property.....	2,474,464
	Bank and trust company stock.....	1,803,409
	Aggregate.....	\$32,148,027

License taxes are imposed by the state upon persons, firms, and corporations engaged in a group of businesses, professions and occupations too numerous to be listed here. Information with reference to any particular license may be obtained from The Code of Virginia, or upon inquiry to the State Department of Taxation or to local commissioners of revenue.

Counties generally are not authorized to adopt a system of license taxation, but most of the cities and towns impose local license taxes upon the businesses, occupations and professions referred to above. Information concerning local license taxes may be obtained from the tax authorities of the various cities and towns.

Source: Virginia Department of Taxation, (1) Local Nominal Tax Rates are from the Annual Report on Local Tax Rates, tax year 1961; (2) Assessed values are from the Annual Report for Fiscal Year Ending June 30, 1961.

LABOR RESOURCES

	Male		Female	
	<u>1960</u>	<u>1950</u>	<u>1960</u>	<u>1950</u>
Shenandoah County:				
Persons 14 years and over.....	7,697	7,578	8,285	7,932
In labor force.....	5,942	6,059	2,793	1,641
Per cent in labor force.....	77.2	80.0	33.7	20.7

Source: U. S. Census of Population, 1950 and 1960

LABOR AVAILABLE FOR NEW JOBS WITHIN THE COUNTY

NOTE: The following estimate covers only Shenandoah County. In actual practice, the available supply for any community would also be drawn from a commuting area adjacent to the county. This usually results in a potential labor force several times greater than that of the county alone.

	<u>Total</u>	Male		Female	
		<u>White</u>	<u>Negro</u>	<u>White</u>	<u>Negro</u>
Outside labor force 1/.....	500	0	0	500	0
From agriculture 2/.....	115	115	0	0	0
Annual net new entrants....	130	85	0	45	0
Total.....	745	200	0	545	0

1/ Women now outside the labor force who would apply for manufacturing employment if jobs were available.

2/ An estimate of the males who would transfer from agriculture to manufacturing employment.

NOTE: The above estimates do not include the number of unemployed available. Unemployment is not shown because of the frequent fluctuations due to changing cyclical and seasonal conditions.

Source: Virginia Employment Commission

EMPLOYMENT

Shenandoah County:

	Male		Female	
	1960	1950	1960	1950
All employed persons.....	5,665	5,926	2,606	1,578
Agriculture, forestry, fishery.....	1,286	2,328	104	179
Construction and mining.....	739	742	12	18
Manufacturing.....	1,453	1,030	1,044	421
Transportation, communication, public utilities	380	308	52	53
Trade.....	974	749	323	289
Finance, insurance, real estate.....	56	60	73	31
Business and repair services.....	134	163	24	4
Personal services.....	143	97	352	253
Amusements, recreation.....	38	48	22	13
Professional services (including teachers)...	245	163	502	240
Public administration (government).....	138	129	39	35
Industry not reported.....	71	104	59	42
On duty with U. S. Armed Forces.....	8	5	-	-

Source: U. S. Census of Population, 1950 and 1960

RESUME OF VIRGINIA LABOR LAWS

There are certain limitations imposed by Virginia on both labor and management that usually achieve peaceful settlements of labor disputes, and among these is Virginia's Right-to-Work Law which prohibits a closed or union shop.

The Right-to-Work Law does not permit the use of force, violence, or intimidation to induce or attempt to induce any employee to quit employment; nor can any person engage in picketing by force or violence, singly or with others, in such a way as to obstruct free passage to or from any premises. Furthermore, picketing is limited to employees of the concern on strike, and a court of equity may enjoin lawful picketing operations, if necessary, to prevent disorder, protect life, or promote the general welfare.

On the other hand, the right to work shall not be denied any individual on account of membership or nonmembership in any labor union or organization; nor can an employer require employees to become or remain members of a labor union or require that dues or fees be paid to a union or labor organization as a condition of employment.

Certain regulations are enforced in connection with the employment of persons under 18 years of age, and there is a maximum work week for women of 48 hours. Safety devices are compulsory in manufacturing establishments, and workmen's compensation insurance must be carried where seven or more persons are employed.

The Virginia Department of Labor and Industry stands ready to cooperate with both management and labor to effect peaceful settlement of any labor disputes that may arise. This department also stands ready to give more detailed information on Virginia's labor laws upon application.

MANUFACTURING

Shenandoah County:		<u>1958</u>	<u>1954</u>
All employees.....		1,679	1,148
Value added by manufacture.....	\$6,655,000		\$3,661,000
Number of establishments.....		43	51
Size: 1 - 19 employees.....		27	39
20 - 99 employees.....		9	8
100 or more employees.....		7	4
Type: Food and kindred products.....		12	16
Textile mill products.....		1	2
Apparel and related products.....		5	4
Lumber and wood products.....		12	14
Furniture and fixtures.....		1	2
Printing and publishing.....		4	4
Chemicals and allied products.....		-	1
Rubber and plastic products.....		1	-
Stone, clay and glass products.....		2	6
Fabricated metal products.....		2	1
Machinery (except electrical).....		2	1
Transportation equipment.....		1	-

Source: Census of Manufactures, 1954 and 1958

RETAIL TRADE

Shenandoah County:		<u>1958</u>	<u>1954</u>
Number of establishments.....		339	295
Total sales.....	\$21,014,000		\$17,785,000
Paid employees.....		805	659
Active proprietors.....		326	305

Source: U. S. Census of Business, 1954 and 1958

AGRICULTURE

Number of farms, 1959.....	1,618	Cropland, 1959.....	<u>Acres</u> 63,428
Land in farms, 1959.....	185,996 acres	Woodland on farms.....	55,061
Per cent area in farms.....	57.3	Pasture land.....	61,572
Average size of farms, 1959.....	115.0 acres	Other land on farms....	5,935

Farms by size:	<u>Number</u>		<u>Per cent of all farms</u>	
	<u>1959</u>	<u>1954</u>	<u>1959</u>	<u>1954</u>
Under 50 acres.....	653	1,013	40.4	49.3
50 to 99 acres.....	367	422	22.7	20.5
100 to 179 acres.....	289	315	17.9	15.3
180 to 259 acres.....	143	138	8.8	6.7
260 to 499 acres.....	116	134	7.2	6.5
500 to 999 acres.....	45	30	2.8	1.5
1,000 acres and over.....	5	4	0.3	0.2
Total	1,618	2,056		

Reduction in number due to change of definition ..... 139 farms.  
The definition used for a farm in 1959 is more restrictive than that used in 1954.

## Farms by type:

	Per cent	
	1959	1954
Field-crop (other than vegetable & fruit-and-nut)	0.9	2.6
Vegetable.....	-	-
Fruit-and-nut.....	0.5	0.5
Dairy.....	5.5	7.2
Poultry.....	10.0	22.1
Livestock (other than dairy and poultry).....	18.4	16.2
General.....	4.3	8.4
Miscellaneous and unclassified.....	60.4	42.9

Value of all farm products sold, 1959 - \$9,008,150 (11th highest county in state)

Value of all farm products sold, 1954 - \$8,687,326 (10th highest county in state)

Principal sources of farm income in 1959 were:

- \$4,542,606 from poultry and poultry products - 2nd highest county in state-  
(chiefly turkeys - 2nd highest, eggs -3rd highest, broilers -4th)
- \$2,310,137 from livestock (chiefly cattle, calves - 10th highest, and hogs - 8th  
highest)
- \$ 868,460 from dairy products, chiefly whole milk
- \$ 789,905 from fruits - 5th highest (chiefly apples - 5th highest, peaches  
-8th highest, and cherries - 3rd highest)

Source: U. S. Census of Agriculture, 1954 and 1959

#### FOREST RESOURCES

According to the 1957 Forest Survey, Shenandoah County contains approximately 167,560 acres of commercial forest land and 18,300 acres of non-commercial forest land. Much of the non-commercial area is so listed by reason of inaccessibility or poor site. The 1940 Forest Survey listed 157,000 acres of commercial forest and 12,900 acres of non-commercial forest land.

The ownership of commercial forest land in Shenandoah County is 65.7 per cent in private holdings. The remaining 34.3 per cent is accounted for in National Forest land.

#### Acreage of forest types:

Shortleaf pine	15,110 acres
Virginia pine	13,755 acres
Oak-pine	28,186 acres
Oak-hickory	107,070 acres
Oak-gum	3,439 acres
Total	167,560 acres

#### Acreage by stand size classes:

Large sawtimber	28,865 acres
Small sawtimber	46,680 acres
Pole size timber	67,942 acres
Seedlings and saplings	24,073 acres
Total	167,560

Acreeage by degree of stocking:

Well stocked (70-100 percent)	94,824 acres
Medium stocked (40-69 percent)	50,853 acres
Poorly stocked (10-39 percent)	21,883 acres
Total	167,560 acres

Net sawtimber volume:

	Million board feet	
	1961	1957
Softwoods	37.3	41.1
Soft hardwoods	30.3	25.8
Hard hardwoods	247.6	217.1
Total	315.2	284.0

Growing stock, all merchantable trees 5" or over, diamter at breast height:

	Thousand standard cords	
	1961	1957
Softwoods	350	332
Soft hardwoods	108	92
Hard hardwoods	1,668	1,427
Total	2,126	1,851

Estimated current annual net growth and cut, 1960:

Species Group	Sawtimber (million board feet)		Growing stock (thousand cords)	
	Growth	Cut	Growth	Cut
Softwoods	1.3	1.2	15	8
Soft hardwoods	1.8	0.4	6	1
Hard hardwoods	9.0	0.1	73	1
Total	12.1	1.7	94	10

The forests of this county run heavy to pole size and small sawtimber size classes. Thus growing stock continues to show very large increases in the hard hardwood category that comprises approximately 80% of the forest area.

Sawtimber drain has been confined to the softwoods (pine) and soft hardwoods (yellow poplar) primarily, together with a small amount of oak. Thus a net reduction of 3.8 million board feet of softwoods was noted during the past 4 years.

Good pine pulpwood markets exist. At present only a very limited amount of hardwood pulp is produced. Forest site productivity ranges from fair to poor. The Valley portion of the county has very productive hardwood stands held in small woodlots. Timber stand improvement measures, cull disposal and reforestation are needed forestry practices.

Source: Forest Survey of 1957. Current observations and interpretation by Virginia Division of Forestry.

MINERAL INDUSTRIES AND RESOURCES

Shenandoah County is located in the Ridge and Valley province and is underlain by sedimentary rocks. Several limestone and dolomite formations extend across the county in a northeasterly direction and during 1961 several quarries produced from these rocks. The Shenandoah Valley Lime and Stone Corporation produced crushed limestone near Strasburg principally for use as metallurgical flux. The C. S. Mundy

Quarries, Inc., near Forestville produced limestone and the Toms Brook Lime and Stone Company, Inc. at Toms Brook produced limestone and dolomite for crushed stone purposes. The Chemstone Corporation, Dominion Division, operated a limestone quarry and lime plant near Strasburg. The limestone was utilized in the manufacture of lime, as metallurgical flux, and for other purposes. The Kipps Magnesium Limestone Quarry produced crushed stone near Forestville for agricultural use.

Rock and mineral resources that have been produced in the past include manganese ore, iron ore, shale, and clay. Manganese ore has been mined in the Capola Mountain-Cedar Creek Valley district and on Massanutten Mountain. The ore has been produced intermittently in the county since before the Civil War, and as recently as 1957. Iron ore occurs in the western part of the county and also in the south-eastern part in Massanutten Mountain. Prior to the Civil War the county was one of the leading iron-producing counties in Virginia. Shale and clay have been produced near Woodstock and Strasburg for use in the manufacture of brick. Shales at other localities have been determined potentially suitable as raw materials for ceramic use and lightweight aggregate.

Lead and zinc minerals occur in the vicinity of Forestville and sandstone occurs at several localities but commercial deposits of these materials have not been established.

Source: Division of Mineral Resources.

#### WATER RESOURCES

##### Ground Water

Shenandoah County is in the Ridge and Valley province and is underlain by limestone, sandstone, and shale formations. These rocks are generally inclined to the northwest or southeast, and crop out in relatively narrow belts in a northeasterly direction.

Springs, cisterns and dug wells supply much of the domestic and farm water requirements in all parts of the county. These sources of water are dependent upon precipitation and a shallow water table, often vary in yield with the change of seasons, and are susceptible to surface pollution. The water is generally softer and less mineralized than that from deeper, drilled wells, except for spring water that is usually moderately hard to hard. Along the base of several of the mountains, alluvium overlies the bedrock. Water from this material is sufficient only for domestic needs, and the difficulty of well construction often makes it necessary to case off the alluvium.

Approximately 75 per cent of all drilled wells are less than 200 feet deep, and only 5 per cent are deeper than 400 feet. In the valley of the North Fork Shenandoah River, between U. S. Highway 11 and the Massanutten Mountains, most wells penetrate shale and average 100 feet in depth; between U. S. Highway 11 and Little North Mountain, most wells penetrate limestone and average 110 feet in depth. In the mountainous region west of Little North Mountain, wells penetrate sandstone and limestone and average 120 feet in depth.

Approximately 85 per cent of the drilled wells yield less than 20 gallons per minute, and only 5 per cent yield more than 50 gallons per minute. Wells that have the largest yield are located in the central portion of the county and obtain water from solution channels and caverns in limestone. Nearly three-fourths of the wells

that yield more than 20 gallons per minute encountered water-bearing horizons between 50 and 155 feet below the ground surface. The two most productive wells penetrate limestone near New Market; each yields slightly more than 200 gallons per minute and is less than 225 feet deep.

The ground water from wells between U. S. Highway 11 and the Massanutten Mountains contains more dissolved solids than the water produced elsewhere in the county. The moderately hard water is usually corrosive to some degree, and iron and sulfur are often present in objectionable amounts. Limey and ochreous material frequently discolor the water produced from a new well, but this condition is often cleared by pumping. In the central portion of the county the calcium and magnesium carbonates make the water moderately hard to hard, but the total dissolved solids is low. Iron and sulfur are sometimes present, but seldom in objectionable amounts. Mud conditions are common in new wells located in this portion, but often can be eliminated by several hours of continuous pumping. In the western portion of the county the water is generally soft to moderately hard, and frequently is high in iron and silica. Sulfurous and acidic conditions have been reported in only a few of the wells.

Industrial supplies of water are available at selected well sites in many of the valleys throughout the western two-thirds of the county. The success of these wells is usually dependent upon the penetration of fracture or solution openings, the location of which are unpredictable, but most have been encountered in the first 250 feet of bedrock. In the eastern third of the county any large supplies will come from bedding planes, fractures, and joints in the rock, or from contact between two types of bedrock in areas with adequate recharge.

Source: Virginia Division of Mineral Resources.

### Surface Water

The main stream in Shenandoah County is the North Fork of the Shenandoah River. Smaller streams in the county are Passage Creek, Cedar Creek, and Stony Creek. There are also a number of good springs in the county and measurements of flow are available for some of them.

Four stream gaging stations in this area, two of them on the North Fork of the Shenandoah and one each on Passage Creek and Cedar Creek, provide good information concerning the available water resources. In August 1960 a gaging station was installed on Smith Creek near New Market. Data are available on both the quantity and quality of waters in North Fork Shenandoah River, Cedar Creek, and Passage Creek.

During periods of normal rainfall there is a large volume of water in the streams. During droughts the smaller streams become quite low, but there is still a good flow in the North Fork of the Shenandoah. Some of the springs offer very good possibilities. The water in these springs is hard, but its cool temperature is an advantage for some industrial uses.

The quality of water varies considerably. In the small streams originating in the mountain ridges, water is soft. In the main streams in the valleys and springs water is quite hard. The small mountain streams have slightly acidic water whereas the valley streams are alkaline.

Source: Virginia Division of Water Resources

PUBLIC LANDS, FEDERAL AND STATE

<u>Federal</u>	<u>Acres</u>	<u>State</u>	<u>Acres</u>
George Washington National Forest.....	75,841.00	Memorial to V.M.I. Cadets..... Department of Highways - residue	0.01 0.38
Woodstock Post Office.....	0.50		

Source: Federal and State Agencies

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Revised - August 1962