FORECASTING THE EARLY POTATO PRICES IN VIRGINIA

A thesis submitted to the Department of Agricultural Economics of the Virginia Agricultural and Mechanical College and Polytechnic Institute, in partial fulfillment of the requirements of the Degree of Master of Science.

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M. E. Downing,

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FORECASTING THE EARLY POTATO PRICES IN VIRGINIA

INTRODUCTION

Purpose of the thesis.- The purpose of this thesis is to discover and explain the factors that influence the price of early potatoes in Virginia.

Groups of production.- The production of potatoes may be divided into two groups - the late and early potato crops. The late potato production is confined chiefly to the northern states, Maine, Minnesota, New York and Michigan being the leading states in the production of late potatoes. The early crop is divided into two sub-groups, the early and second early states, Virginia, North Carolina, South Carolina, Florida and Texas being the leading states in the early production, while New Jersey, Kansas and Maryland are the leading states in the second early group.

Our primary interest in this paper is the Virginia production of early potatoes. The early potato crop of Virginia is confined chiefly to the Eastern Shore and Norfolk sections of Virginia.

Because of the early season, ideal soil and geographic location, these sections are especially adapted to the growing of early potatoes.

The early potato crop became commercially important immediately after the Civil War. Since its beginning, it may be said to have passed through five periods of progress.*

1. The consignment period, from its remote beginning to 1891.

2. The cash-buyer period, 1891 to 1900.

* U. S. D. A. Circular No. 87. October 1929." Problems in cooperation and experiences of farmers in marketing potatoes."

3. The Farmer Owned selling agency, 1900-1918.

4. The period of duplication among marketing agencies, 1918-1926.

5. The period of attempted control over competing dealers, 1927-to date.

During the consignment period the entire crop was sold on consignment in the larger cities that could be reached by boat. The potatoes as a rule were marketed in bulk. The quality of the potatoes during this period was poor. If they were in good condition when they left the shipping point, they were in poor condition when they reached the market, because of the slow transportation of the boats and the poor ventilation in the boats. In 1884 a railroad was put through this section. This aided the growers considerably in marketing their crop in smaller quantities and aided them in reaching other markets that were not accessible by water. Toward the end of this period the consignment method of selling early potatoes became unsatisfactory due to the corrupt business methods of the commission men. The growers insisted on being paid cash for their potatoes at the shipping point. This led to the cash buyer period. The cash buyers encouraged the growers to grade out the inferior potatoes and use a standard barrel as a container. The cash buyers, toward the end of this period became more or less affiliated and were active in fixing the price that the growers were to receive.

Because of these conditions the growers consolidated and organized in 1900 what is known as the Eastern Shore Producers' Exchange. This cooperative organization was organized for the sole purpose of purchasing supplies and marketing the produce of its members. Through its influence definite grades were established and the standard barrel was adopted as the container. This period was a period of progress for the growers. Their organization controlled the price through this period by uniformly distributing the potatoes through the short marketing season. The success of this organization led to the

organization of lesser similar cooperatives in the same region. By 1918 these organizations had reached the point of competing with one another on the markets. This competition increased with the depression after the World War. In 1925 and 1926 the organizations were cutting one another's prices to the extent that in 1927 a committee was formed for the purpose of eliminating undue competition. The members of the committee were representatives of the different marketing organizations and growers.

The duty of this committee was to agree on a fair price for their potatoes each day. The associations whom the members represented agreed not to sell below this price. This method held the price steady through the year of 1927. In 1928 it failed because a number of the organizations failed to comply with the price agreed upon and also to the enormous production of the early and second early crops.

The method that will be used in pointing out the factors that influence the price of early potatoes in Virginia will be to investigate the prices received by the growers in Virginia in the past years and show what factors influenced them and how they will in return influence the price in the future years.

The five periods of progress in the early potato production were noted above. The prices received by the growers in the first two periods were influenced more by the questionable business practices of the buyer and the poor marketing methods of the growers than they were by the law of supply and demand. Such prices would have no relation to the prices received today or the prices to be received in the future.

In the third period the prices were controlled by the growers. During the war period they could receive almost any price they wished to ask.

Neither will these prices have any relation to the prices that the growers would expect to receive in the future.

The next two periods including the years from 1919 to 1929 constituted the only periods during which the price received would be expected to have in any marked degree any relation to the price that the growers would expect to receive in the future. This allows only eleven years of early potato prices from which to discover the factors that influence the price and to what extent each factor influences the price. Furthermore, early potato production statistics are separately quoted only since 1919. Should an attempt be made to show the extent that each factor influences the price of early potatoes with only eleven observations, one would find the probable error too large to justify the attempt. With this in mind, to offset this disadvantage, it will be well to first investigate those factors that influence the prices of the late potato crop in the United States, then attempt to show to what extent these factors will also influence the early potato price in Virginia.

THE LATE POTATO STUDY

Nature of Potatoes

It will be well to first note the nature of potatoes. Potatoes are grown principally as a human food. There are a relatively small quantity of potatoes of poor quality used in the manufacture of starch and alcohol. In the years of over production a limited quantity of potatoes is fed to hogs. Other than human consumption the sources of potato utilization are trivial and will be treated as such in this paper.

As stated above the primary purpose of producing potatoes is to serve as a human food. As a human food, potatoes are the most important source of starch in the human diet. There are other sources of starch that can be used as a human food, such as rice, hominy, peas, beans, etc., but these foods are not as palatable as the potato is to the average person.

Because of the fact that potatoes have few competitive products, and that potatoes are produced for the sole purpose of being a human food, and that potatoes are a necessity as a food, one would expect to find a relative inelastic demand for them. That is, regardless of the price of potatoes, the demand would stay almost the same. This would result in having a very low price in the years of over production, and a very high price in the years of under production.

The Production of Potatoes

The first step to take is to consider the production of late potatoes in the United States. Table I, column 2, presents the production for each year from 1890 to 1929.

By casually observing Table I, it can be readily seen that there has been an increase in the production of potatoes in the last forty years. This is to

Table I.- U. S. Production Potatoes and Dec. 1st Price Per Bushel
For Years 1890 to 1929

Year	Actual Production	Production Per Capita	Price Per Bushel	Adjusted Price Per Bushel	Index
1890	150,494,000	2.39	.753	$ .930	81
1891	256,122,000	3.99	.556	.434	82
1892	164,516,000	2.51	.655	.862	76
1893	195,040,000	2.92	.584	.758	77
1894	183,481,000	2.82	.529	.767	69
1895	317,114,000	4.57	.262	.374	70
1896	271,769,000	3.84	.290	.439	66
1897	191,025,000	2.65	.542	.809	67
1898	218,772,000	2.98	.415	.601	69
1899	260,257,000	3.48	.397	.536	74
1900	247,759,000	3.26	.423	.529	80
1901	198,626,000	2.56	.763	.966	79
1902	293,918,000	3.70	.469	.552	85
1903	262,053,000	3.23	.609	.716	85
1904	352,268,000	4.25	.448	.560	86
1905	278,885,000	3.30	.611	.650	85
1906	331,685,000	3.85	.506	.575	88
1907	322,954,000	3.68	.613	.652	94
1908	302,000,000	3.37	.697	.766	91
1909	394,553,000	4.33	.542	.559	97
1910	349,032,000	3.75	.557	.563	99
1911	292,737,000	3.10	.799	.841	95
1912	420,647,000	4.40	.505	.500	101
1913	331,525,000	3.41	.687	.687	100
1914	409,921,000	4.12	.487	.487	100
1915	359,721,000	3.60	.617	.611	101
1916	286,953,000	2.82	1.461	1,178	124
1917	442,108,000	4.31	1,228	.698	176
1918	411,860,000	4.25	1.193	.609	191
1919	322,867,000	3.07	1.595	.774	206
1920	403,296,000	3.78	1.145	.511	224
1921	361,659,000	3.35	1.101	.749	147
1922	453,396,000	4.14	.581	.390	149
1923	416,105,000	3.76	.781	.507	154
1924	421,585,000	3.67	.625	.416	150
1925	323,465,000	2.85	1.868	1.174	159
1926	354,328,000	3.04	1,414	.936	151
1927	402,741,000	3.45	.965	.674	147
1928	463,943,000	3.99	.540	.370	146
1929	357,451,000	3.00	1.314	.906	145

Statistics obtained from U. S. D. A. Yearbooks: 1923, page 759; 1924, page 806 1183. Crops and Markets December 1929, page 459.

be expected because there has been a gradual increase in the population. To eliminate this growth factor due to the increase in the population, the production may be put on the production per capita basis. This is done by dividing the production by the population in the United States. Thus the production is put on the basis of bushels per person. Table I, column 3, presents the production per capita.

In contrasting column 2 with column 3 in Table I, it can be seen that the large production of the more recent years was not so large when considered in this way. For instance, the production in 1928 of 463,000,000 bushels seemed larger than the production of 317,114,000 bushels in 1895. By comparing the production per capita in these two years on Table I, it can be seen that the production per capita in 1928 was 3.99 bushels per person, while in 1895 the production was 4.56 bushels per person. Production is depressingly large only when considered on a per capita basis.

Tha Value of the Dollar

By common observation one can observe that the prices of potatoes vary from year to year, and within the year. Table II gives the average monthly prices of potatoes in the United States. As the harvesting of potatoes begins in July of each year, the fiscal year will be considered as being from July to July, rather than from January to January.

It will be observed from this table that the price may vary from $0.48 per bushel to $4.07 per bushel, and that the months of September, October, and November are the lowest months of the year, while April, May, and June are the highest. One may expect September, October, and November to be the lowest price months in the year, because the producers are rushing the newly dug potatoes upon the market. This causes a large supply and the price is

Table II.- Potatoes: estimated price per bushel received by producers, United States 1909 - 1929

Year	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Weight of average
1909	.880	.783	.679	.610	.560	.550	.561	.554	.510	.429	.379	.388	.579
1910	.525	.689	.704	.618	.557	.549	.546	.552	.554	.590	.629	.792	.613
1911	1.162	1.248	1.010	.823	.781	.828	.894	.982	1.096	1.222	1.235	1.116	.996
1912	.950	.758	.580	.483	.480	.506	.518	.526	.512	.492	.517	.525	.556
1913	.595	.722	.746	.718	.692	.686	.690	.702	.704	.707	.714	.764	.706
1914	.843	.810	.698	.588	.508	.492	.500	.504	.491	.492	.506	.514	.580
1915	.542	.534	.496	.548	.612	.662	.793	.912	.960	.962	.968	1.006	.708
1916	.988	1.024	1.106	1.238	1.409	1.467	1.598	2.066	2.377	2.572	2.768	2.610	1.663
1917	2.094	1.550	1.306	1.250	1.253	1.219	1.220	1.216	1.064	.864	.778	.852	1.225
1918	1.182	1.452	1.462	1.354	1.252	1.177	1.152	1.119	1.074	1.112	1.202	1.249	1.256
1919	1.606	1.902	1.758	1.585	1.562	1.690	1.981	2.308	2.696	3.446	4.074	4.036	2.238
1920	3.444	2.439	1.598	1.266	1.164	1.100	1.006	.898	.809	.729	.676	.685	1.315
1921	1.034	1.528	1.531	1.306	1.168	1.094	1.120	1.166	1.157	1.090	1.042	1.037	1.213
1922	1.090	1.014	.788	.662	.605	.588	.620	.642	.686	.774	.790	.798	.739
1923	1.029	1.208	1.096	.914	.825	.815	.864	.881	.878	.911	.913	1.007	.942
1924	1.090	1.113	.810	.688	.635	.641	.702	.723	.714	.705	.706	.844	.765
1925	1.255	1.554	1.211	1.256	1.984	2.015	2.205	2.260	2.256	2.705	2.448	1.901	1.835
1926	1.746	1.404	1.306	1.264	1.413	1.370	1.391	1.341	1.270	1.268	1.460	1.910	1.408
1927	1.831	1.463	1.074	.979	.954	.941	.936	.962	1.131	1.168	1.033	.836	1.084
1928	.779	.731	.648	.580	.569	.577	.589	.595	.584	.533	.593	.633	
1929	.870	1.386	1.355	1.382	1.348	1.353							

Statistics obtained from U. S. D. A. Yearbook 1928, page 815. Crops and Markets, February, March, April, May, June, July, August, September, October, November and December, 1929, and January 1930.

correspondingly depressed. The price can be expected to be high in April, May, and June, because the supply of the late crop has been practically exhausted by this time. The producers who held their potatoes until April, May or June before selling them are expected to receive a higher price than they would had they sold in September, October, or November, because there are certain losses associated with holding potatoes, such as shrinkage and decay. They also expect to receive at least something for the use of the money that they had invested in the potatoes.

Taking the weighted yearly average, one will find that the year 1912 was the lowest with $0.556 per bushel and the highest in 1919 with $2.238 per bushel. This can be partly attributed to the production. The production in 1912 was 4.44 per capita and in 1919 3.09 bushels per capita. But there have been years with less production than in 1919, and in those years the prices have been lower. For instance, in 1916 there was a production of 2.86 and a price of $1.66 per bushel, and in 1925 a production of 2.87 and a price of $1.24 per bushel.

This suggests that there is another factor that affects the price of potatoes other than the production - the value of the dollar. It is known that in 1917, 1918 and 1919 the dollar had very little value in exchange. The purchasing power of the dollar was small. That is, when an article was purchased one was compelled to pay a higher price for it than in previous years. With the rise in price of other products, potatoes rose. Hence, it can be seen that the change in the value of money would cause potato prices to fluctuate.

To eliminate this factor, i.e. the change in the value of the dollar, these prices must be adjusted by expressing them in relation to an index number of the general price level of the respective years. The index to be

used is the average of wholesale prices of all commodities in the United States. Table I gives the index to be used. It can be seen that these index numbers are constantly changing and would affect the price of a product considerably.

To adjust for this factor the price received in a given area by producers is divided by the index number of that year. Table I gives the adjusted price.

CORRELATION BETWEEN THE PRODUCTION PER CAPITA AND THE ADJUSTED PRICE

It will now be worth while to show the correlation between the adjusted price of potatoes and the production per capita. Chart 1 shows this relation. The vertical scale or ordinate represents the adjusted price per bushel on December 1st of each year. To obtain as many observations as possible, it was necessary that the December 1st price be used, because there are no available statistics on the yearly weighted average price further back than 1909. Also December 1st prices were nearer than the yearly weighted average price than any other price obtainable.

The horizontal scale or abscissor represents the production per capita. The data represent the intersection between the adjusted price and the production per capita of each year. In other words, with a certain production in a certain year represented by the horizontal distance from the point of origin the price was so much, as represented by the vertical distance to the dot. The number above the dot is the year that the production and price occurred.

The line drawn between the dots represents the price which one would expect under average conditions at that production. The dots are distributed on either side of the line. This is because of the fact that there are other variables that have not been held constant, such as quality of the potatoes, decay, etc.

Change in Demand for Potatoes

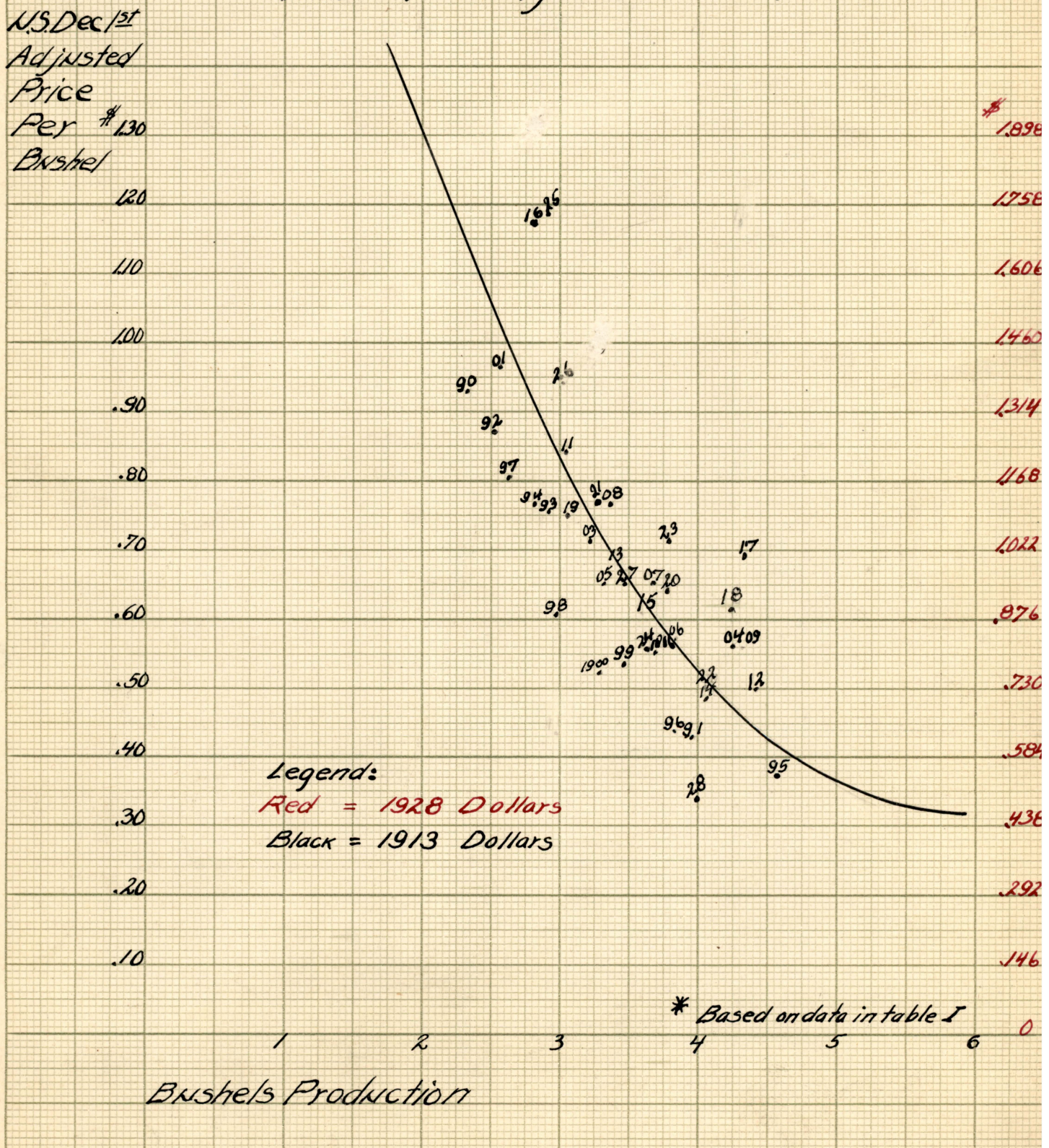
There is another factor, the influence of which, on the relation between the production and the price of potatoes will be shown. This factor will be

Chart 1

U.S. Bushel Per Capita Production Potatoes

In Relation With

U.S. Dec. 1st Adjusted Price Per Bushel



called the "change in the demand for potatoes."

It is known that the demand for an article or a product does not always remain the same, even if the price should remain the same. That is, the utility of a product changes with the customs and habits of the people. For example, it will be well to recall the extraordinary demand and the high prices paid for strawberries during the years of 1858 - 1865 and then the decline in the consumption the years following. Today the change in demand for clothing changes with the styles. The change in demand for automobiles changes with the yearly models and improvements, and so with all utilities. Hence we have a change in the demand for potatoes.

To explain the change in demand for potatoes by the consumer, correlation charts have been constructed illustrating the change. The curves are plotted from a series of consecutive years on which the production and price showed a constant relation. The first relationship is illustrated by chart 2. The relationship existed between the years 1890 and 1900. The second relationship is illustrated by chart 3, and existed between the 1900 to 1909 years. The third is illustrated by chart 4, and existed between the years 1910 to 1918, and the fourth is illustrated by chart 5, and existed between the years 1919 to 1929.

It can be seen at a glance that the curves differ, but still show a slight relationship to one another. To analyze the changes in the demand for potatoes chart 6 was constructed. On this chart different colors were used to represent the different series of consecutive years on which the production and price had shown a marked relation, black being used for the years 1890 to 1900, yellow for 1901 to 1909, green for 1910 to 1918, and red for 1919 to 1929. On observing this chart, the changes in demand for potatoes are quite evident.

Chart 2

U.S. Bushel Per Capita Production Potatoes

In Relation With

U.S. Dec/1st Adjusted Price Per Bushel

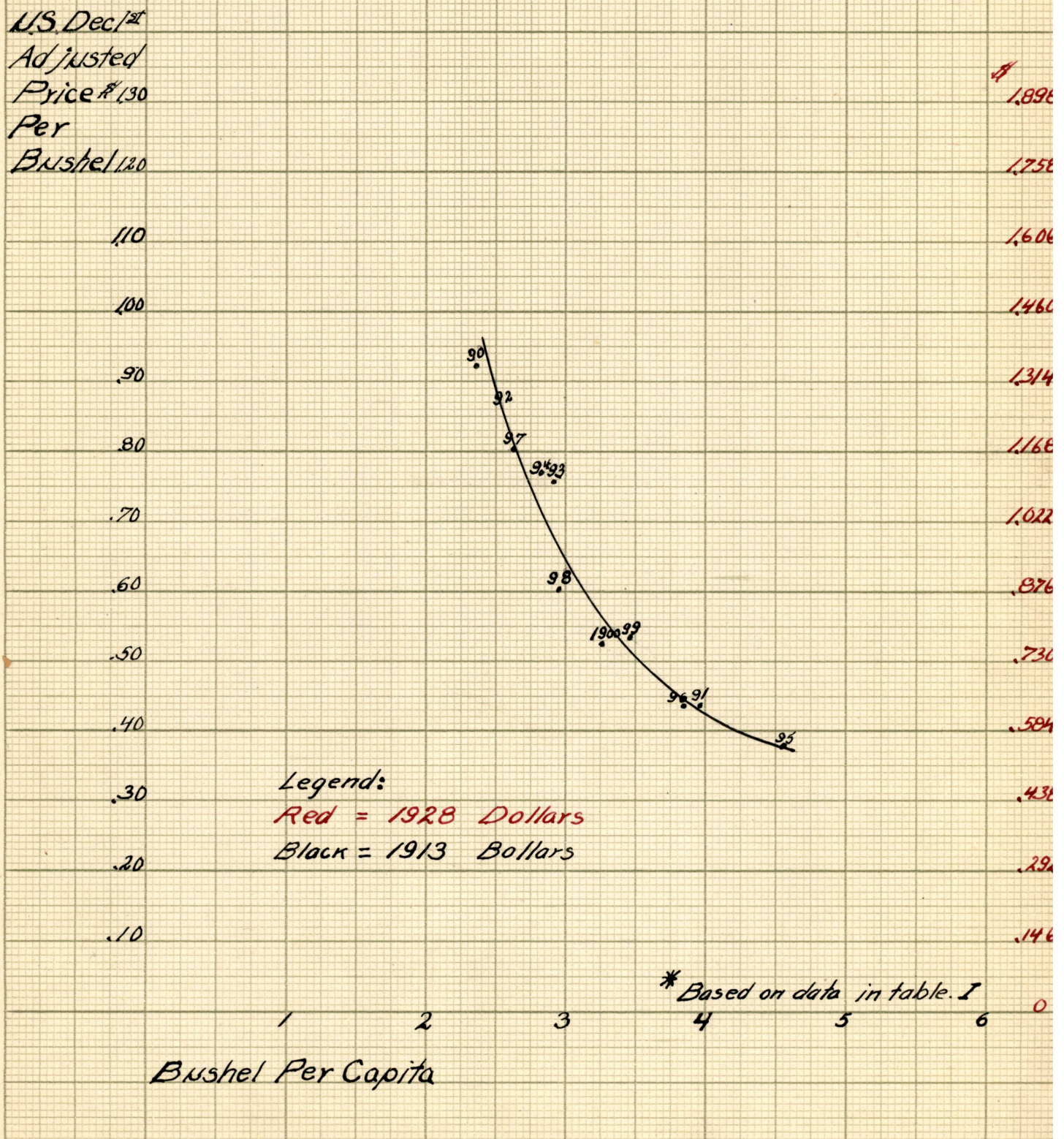


Chart 3

U.S. Bushels Per Capita Production Potatoes

In Relation With

U.S. Dec. 1st Adjusted Price Per Bushel

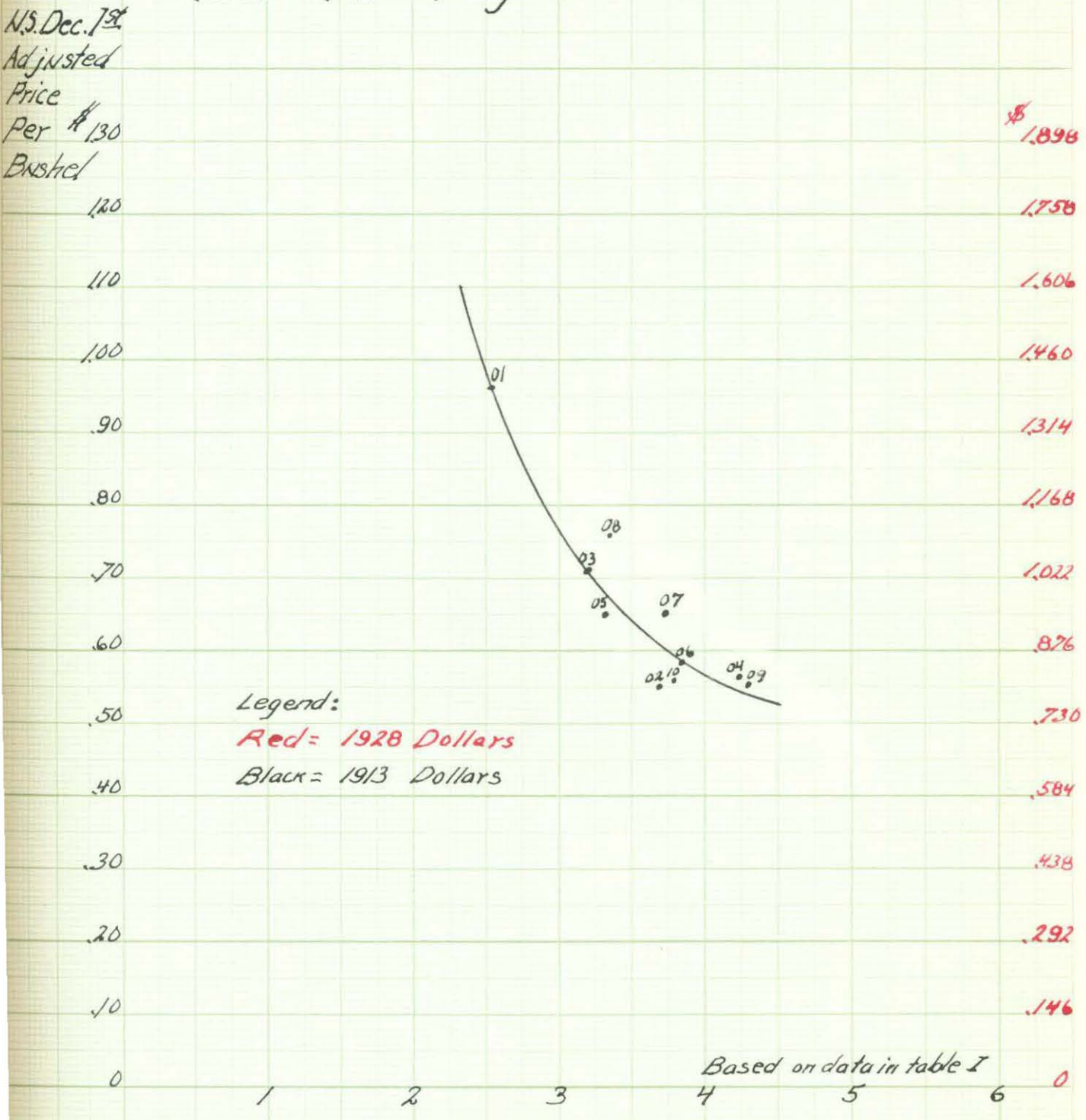


Chart 4

U.S. Bushel Per Capita Production Potatoes

In Relation With

U.S. Dec. 1st. Adjusted Price Per Bushel

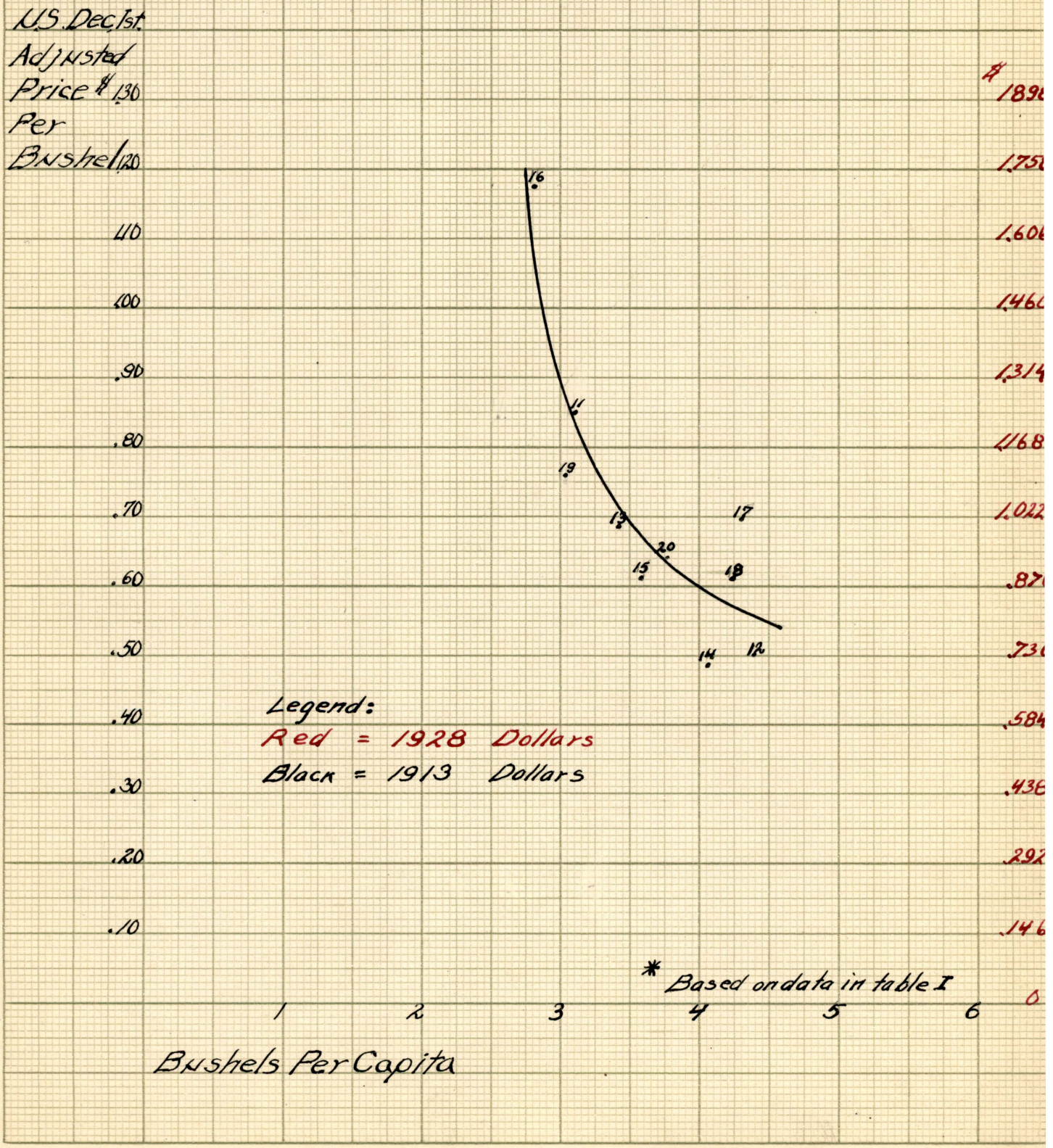


Chart 5

U.S. Bushels Per Capita Production Potatoes

In Relation To

U.S. Dec. 1st Adjusted Price Per Bushel.

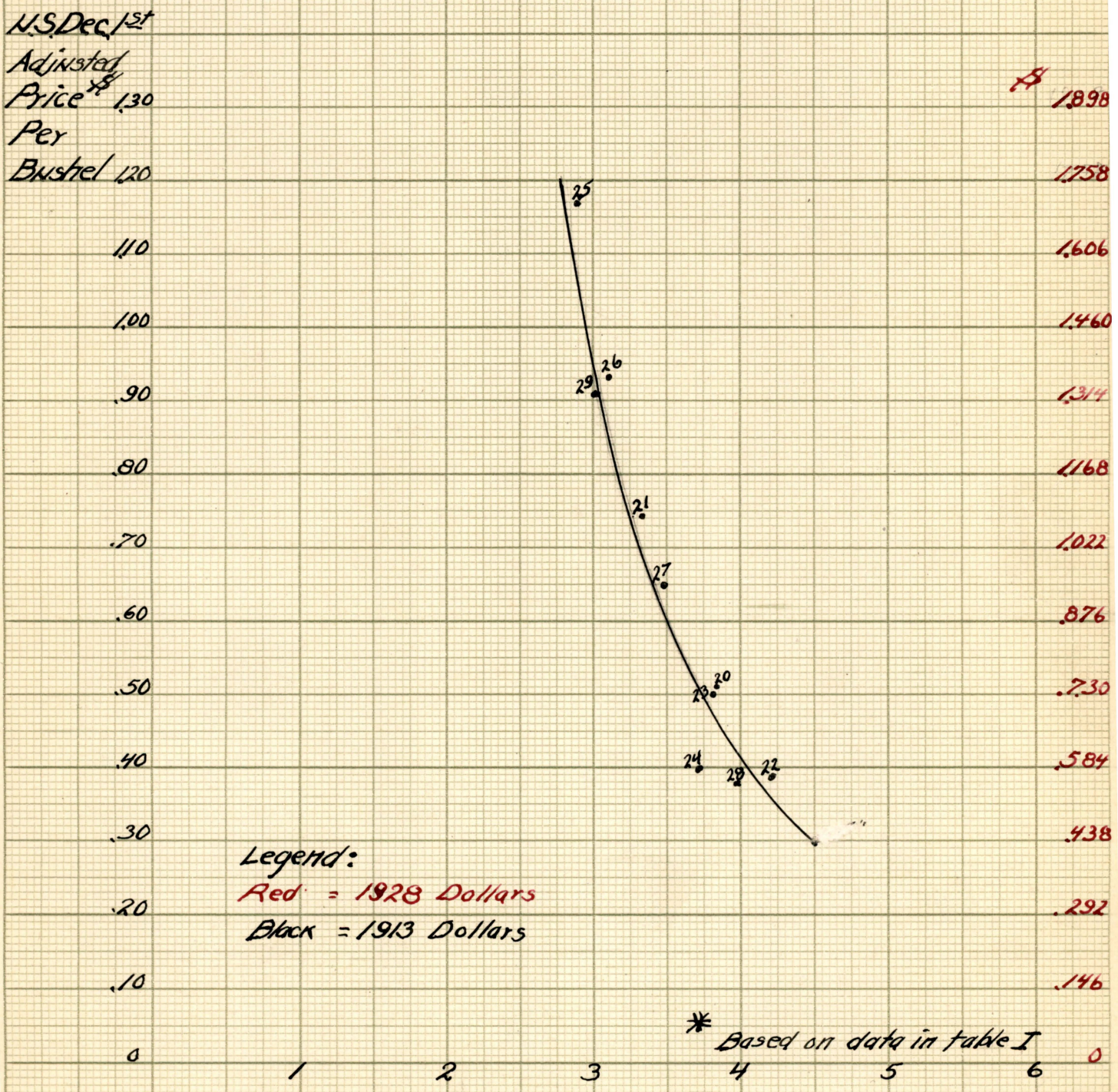
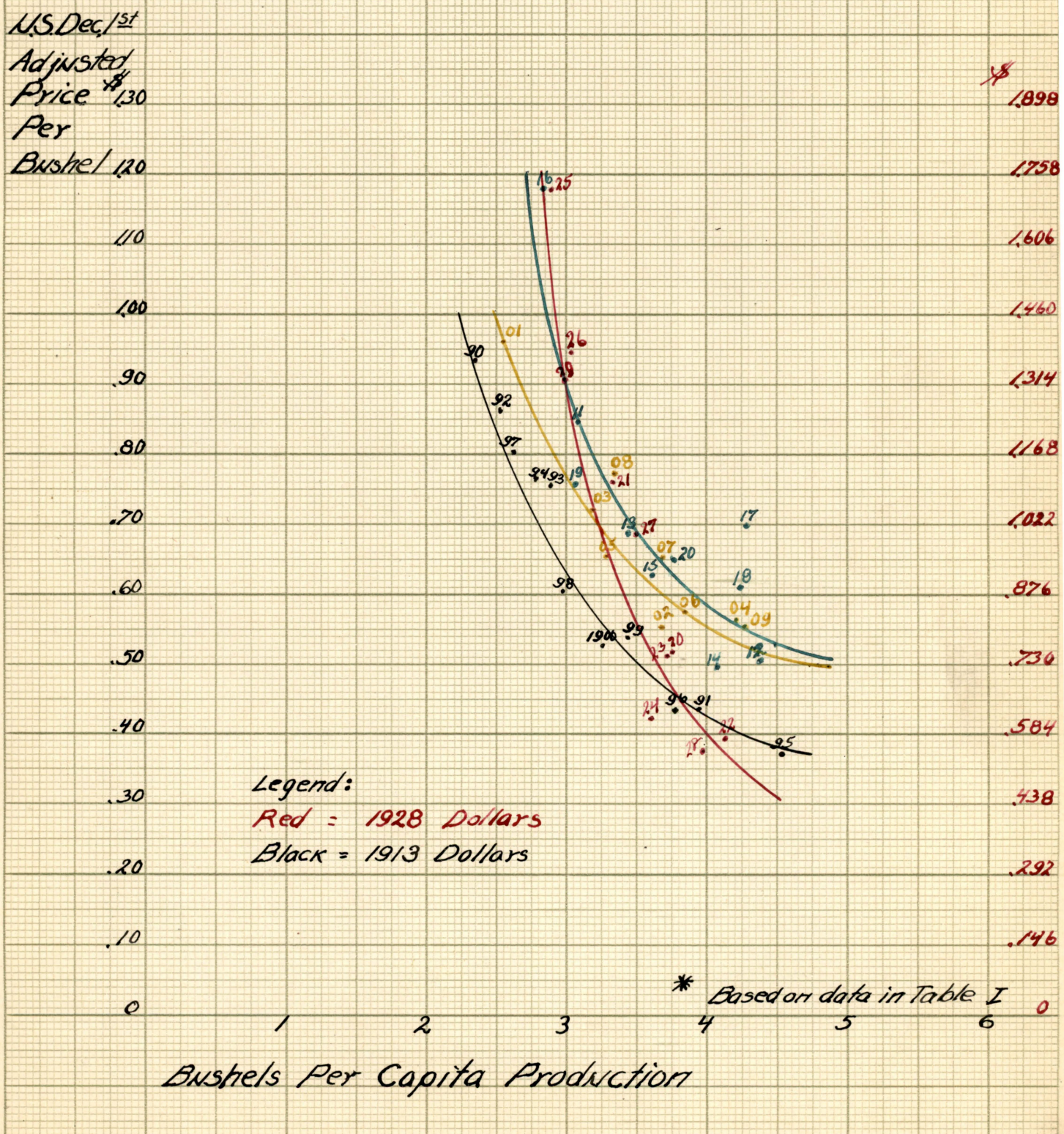


Chart 6

U.S. Bushels Per Capita Production Potatoes

In Relation To

U.S. Dec. 1st Adjusted Price Per Bushel



To analyze this chart it can be noted that all the lines are more or less horizontal on the right, or in the large production years, and more or less vertical on the left, or in the years of small production. To explain this, it will be well to take the black line which represents the earlier years. Take for instance the years 1891, 1895 and 1896. These were years of heavy production or surplus years. The year 1891 had a production of 3.98 bushels per capita and the price of $0.43 per bushel. The year 1895 had the production of 4.56 bushels and a price of $0.37 per bushel, and the year 1896 had the production of 3.84 bushels and a price of $0.44. In the three years there is a difference of .72 of a bushel per capita production, and a $0.06 difference in price. Hence it can be seen that in the years of over production, or surplus years, the price responds very little to the change in production. This is because of the fact that the public will consume a certain amount of potatoes in the years of surplus production and no more, no matter how low the price may be. As there are no important sources of potato consumption other than as a human food, the marginal producers will continue to put their potatoes on the market as long as they receive harvesting expenses. When the price drops below this, the potatoes are left in the field or stored with the intention of putting them on the market, should the price of potatoes go up. In the years of over production the price will ultimately drop to such a figure as to pay only the harvesting or marketing expenses and go no further. In such years the consumers may purchase potatoes below the cost of production.

On the other extreme, it will be observed that the years 1890, 1892 and 1897 are short production or deficit years. In the year 1890 the production was only 2.39 bushels per capita and the price of $0.929 per bushel. In 1892 the production was 2.51 bushels and the price of $0.86 per bushel. In the year of 1897 the production was 2.65 bushels and the price of $0.809

per bushel. The difference in production was .26 of a bushel per capita and the difference in price was $0.12. Thus in the years of deficient production, the price is more sensitive to fluctuation in the production. This sensitiveness to the fluctuation in production in deficient years is because of the fact that potatoes are considered a necessity, and when the crop is insufficient to supply the wants of the consumers, they are forced to bid among themselves for the potatoes. The consumers that have the higher financial standing will ultimately purchase the most potatoes. Those consumers that cannot afford to eat so many potatoes at such a high price will purchase other foods that are lower in food value and price. Should the financial standing or wages of the consumer increase, they would bid higher for the potatoes in the years of deficient production, and increase the price of potatoes in proportion to their increase in financial standing or wages. On the other hand, should the wages be lowered or a large number be thrown out of employment in the years of over production, the consumers would be expected to increase their consumption of potatoes, because as stated before, potatoes are a cheap food. This increase in consumption in the years of over production would increase the price to a certain extent, unless the over production should be enormous and the marginal growers were merely receiving the cost of marketing.

In observing chart 6 , it will be noted that the lines do not coincide. The yellow line which represents 1901 to 1909 is higher than the black line throughout its length. The green line in return is above the yellow. The red line is below all the lines on the right or in the over production years, and above all the lines on the left, or the deficit production years. These lines do not coincide because there have been changes in demand which also affect the price.

To further analyze the chart 6, the production per capita should be divided into two groups. It will be considered that 3.5 bushels per capita is an average yearly production. Those years that are larger than 3.5 will be considered surplus years. Those years below 3.5 will be considered as deficit years. The surplus production years will be considered first.

As stated before, in the years of surplus production, the marginal producers would continue to market their potatoes until they barely received enough to pay them for their harvesting and marketing expenses. Should these expenses increase, the price of potatoes in these surplus years would increase to cover this additional expense of harvesting and marketing.

It is known that the panic of 1893 had a persistent depressed influence until 1900. Naturally, labor would be cheap, materials cheap, and all crop supplies cheap. And hence, in the surplus years a very low price. This is what occurred in the surplus years of the decade between 1890 and 1900. Therefore the black line is low during the surplus years because the costs of production, harvesting and marketing were low.

The yellow line representing the supply-price relationship during the years between 1901 to 1909 is above the corresponding black line, which represents the preceding decade. During the nine years between 1901 to 1909 there was a recovery from the panic of 1893, which resulted in higher wages and other production and marketing expenses. This resulted in an increase in the price of potatoes in the surplus years. In other words, the marginal grower would discontinue marketing his product at a higher price level because it cost him more to market his potatoes.

The green line is a little higher than the red line, which indicates that the cost of marketing had increased again over the past two decades.

It would seem that since the years 1910 to 1918 include the war period, that the price in the surplus years would be decidedly higher due to the large increase in the marketing expenses. But there is a counteracting factor, the decrease in cost of production. It is true that the wages of labor had decidedly increased during this period. The producers, to counteract the high labor, began to use labor-saving machinery such as tractors, new modern tilling equipment, diggers, etc. They began to produce on a large scale. They used better cultural methods and raised the production per acre from 80 bushels per acre in the decade between 1890 to 1900 to 96 bushels per acre in the years of 1910 to 1918. This increase in production of 16 bushels caused a decided reduction in the cost of production. The whole 16 bushels cannot be attributed to the lowering of the cost of production because in producing them, the growers increasedtheir expenses slightly because they used more fertilizers and better spray schedules.

The red line representing the supply-price relationship in recent years is lower in the surplus years than any of the other lines or periods under observation. During these years the cost of production and marketing had still been lowered; the producers had accustomed themselves to the production on a large scale. The tractors and labor saving equipment had become more general and efficient in use. The production per acre had been increased from 95.37 bushels per acre to 110.76 bushels, an increase of 15.39 over the previous decade. With this more efficient production and marketing, the price of potatoes in the surplus years would be expected to be lower.

As stated before the deficient years will be considered as those years that have had a production less than 3.5 bushels per capita. It will be observed that the black line representing the years from 1890 to 1900 is the lowest. The yellow line representing the years from 1901 to 1908 is a little higher and

Table III.- U. S. yield per acre & 10 year averages 1891 to 1929

Year	Production	Year	Production	Year	Production	Year	Production
1891	94	1901	66	1910	94	1920	110
1892	62	1902	96	1911	81	1921	92
1893	72	1903	85	1912	113	1922	105
1894	64	1904	111	1913	90	1923	109
1895	102	1905	87	1914	111	1924	127
1896	91	1906	102	1915	96	1925	105
1897	68	1907	96	1916	81	1926	114
1898	77	1908	86	1917	101	1927	116
1899	89	1909	108	1918	96	1928	121
1900	83	1910	94	1919	91	1929	106
Average	802		93		96		111

Statistics obtained from U. S. Year Books 1923 page 759, 1924 page 809.
Crops and Markets, February 1930.

nearly parallel to the black line. The green line is a little higher than the yellow and becomes more vertical in the deficient years. The red line is still higher in the deficient years and is the most vertical line of the four.

It was mentioned above that the panic of 1893 exerted a depressing influence on labor and capital until 1900. Labor was cheap. The working people were compelled to eat those foods that were within reach of their pocketbooks or salaries. Because of this low wage scale the price of potatoes in the deficient years was not as high as it was in the next decade.

It is known that the general level of wages increased during the next decade giving the laborers a high purchasing power for those things that they considered necessities. Thus the deficient years between 1901 and 1909 were high in price because of the fact that the consumers could bid higher among themselves for the product.

It is true that the prices on the charts have been adjusted to remove the effect of the fluctuation of the value of the dollar. But it should be remembered that the index of wholesale prices of all commodities in the United States and not of food alone. The most of the salary of an ordinary laborer is spent for food, and it is natural that he would spent a larger portion of the increase in salary for food. The general wage level increased to a high figure during the next decade because of the World War. The laborers still had a high purchasing power and forced the price still higher in the deficient years. The higher the wage level becomes the more sensitive the relation between the production and price becomes.

During the next decade between 1919 and 1929 the general wage level increased slightly over the past decade. This forced the red line higher than the green in the deficient years.

EARLY POTATO STUDY

Economic conditions existing on the Eastern Shore

Before investigating the direct factors that influence the price of early potatoes, it would be well to cite certain economic conditions that would indirectly affect the price of early potatoes in Virginia.

A large percentage of the land devoted to growing early potatoes on the Eastern Shore also produces a crop of corn during the same growing season. The corn is planted between every other row of potatoes about the first of June. The potatoes are harvested in June, July and August, mostly from the 15th of June through July. By the 15th of June the corn is large enough to permit the harvesting of the potatoes without being destroyed. The potatoes must also be dug before the corn gets too large, or it will be injured. Once harvested, because of the hot weather, the potatoes being as a rule not completely mature and no storage facilities being available, they must necessarily be put on the market at once. This gives a relatively short marketing season, and the price of Virginia early potatoes may be expected to vary more than the prices of the main crop.

Factors influencing the price of early potatoes in Virginia

In part I of this paper, the influences of the following factors were observed:

1. The variation in the value of the dollar.
2. The variation in the production each year.
3. The variation in the production per capita.
4. The change in the demand for potatoes.

It can readily be seen that the variation in the value of the dollar and changes in the production each year will influence the price of early potatoes.

The change in the population and the change in the demand will have very little effect on the price of the early potatoes because of the fact that our observations cover a limited number of years, and these years are within the last series of consecutive years in which the price and production showed a constant relationship.

The production has been expressed on a per capita basis only when conditions warranted its use. No attempt has been made to correct the change in the demand for early potatoes.

Methods used in forecasting the Virginia early potato price

The price of early potatoes varies considerably through its short marketing season. With this in mind, an attempt was first made to forecast an average price for the season. Of the various methods used only three gave any noticeable results. These three methods are set forth and explained in this paper. One of the methods gave fairly good results. This method was used to forecast the June and July price of Virginia potatoes.

Multiple weighting method.- The first method to be explained is called the multiple weighting method. The factors that were shown by this method to have had an influence on the price of Virginia early potatoes were:

1. The value of the dollar
2. The production per capita of the ten early states
3. The stock/s on hand January 1st in the United States.

The average adjusted price received by the growers is given in Table IV. These prices vary considerably. The adjusted prices were plotted on the vertical axis of chart 7 and the production in bushels per capita on the horizontal axis. This gave a fair correlation, although several years have a large vertical deviation from the line.

It can be noted on chart 7 that the years that are below or near the line representing the supply-price relationship were the years when there was a large supply of old potatoes on hand January 1st. This was true of every year excepting 1928.

The stocks on hand were then plotted on the horizontal axis of chart 8, and the adjusted Virginia price on the vertical axis. There is no apparent correlation between the Virginia adjusted price and stock on hand per capita. But it can be noted that the two years that were the lowest on the chart were the years of largest production of early potatoes in the ten early states. Thus it can be seen that there is some relationship between the production of the ten early states and the stocks on hand to the Virginia price of early potatoes.

To arrive at the relationship between the stocks on hand, the production of the ten early states, and the price of Virginia early potatoes, the production per capita of the ten early states and the stocks on hand per capita were combined in different ratios and plotted against the Virginia adjusted price per bushel. The first was a one to one ratio, that is, the production per capita of the ten early states was added to the stocks on hand per capita. This ratio was then plotted on the horizontal axis of chart 9 against the Virginia adjusted price per bushel which was plotted on the vertical axis. This gave a poor correlation, that is, the scatter about the line of average relationship was extreme.

Table IV.- Virginia early potato production per capita and stocks on hand per capita in multiple proportions

Year	Va. adj. price	10 early states prod. per capita	Stocks on hand per capita	Early prod. per capita - stocks per capita	3 x early prod. per capita - stocks per capita	5 x	7 x	9 x	15 x	Index
1919:	.874	.161	1.11	1.272	1.596	1.920:	2.244	2.568:	3.540:	2.06
1920:	1.274	.194	.61	.804	1.192	1.580:	1.968	2.356:	3.520:	2.26
1921:	.599	.198	1.01	1.208	1.604	2.000:	2.396	2.792:	3.980:	1.47
1922:	.826	.223	.83	1.053	1.499	1.945:	2.391	2.837:	4.175:	1.49
1923:	1.000	.170	1.21	1.380	1.720	2.060:	2.400	2.740:	3.760:	1.54
1924:	.493	.265	.99	1.255	1.785	2.315:	2.845	3.375:	4.965:	1.50
1925:	.880	.180	1.05	1.230	1.590	1.950:	2.310	2.670:	3.750:	1.59
1926:	.874	.206	.62	.826	1.238	1.650:	2.062	2.474:	3.710:	1.51
1927:	.925	.255	.72	.975	1.485	1.995:	2.505	3.015:	4.545:	1.47
1928:	.281	.320	.85	1.170	1.810	2.450:	3.090	3.730:	5.650:	1.46
1929:	.820	.203	1.25	1.453	1.859	2.265:	2.671	3.077:	4.295:	1.45

Statistics obtained from U. S. D. A. Year Books 1925, page 916; 1924, page 708.
H. M. Taylor, Richmond, Va.

Chart 7

Production Per Capita 10 Early States

In Relation With

Va. Adjusted Price Per Bushel

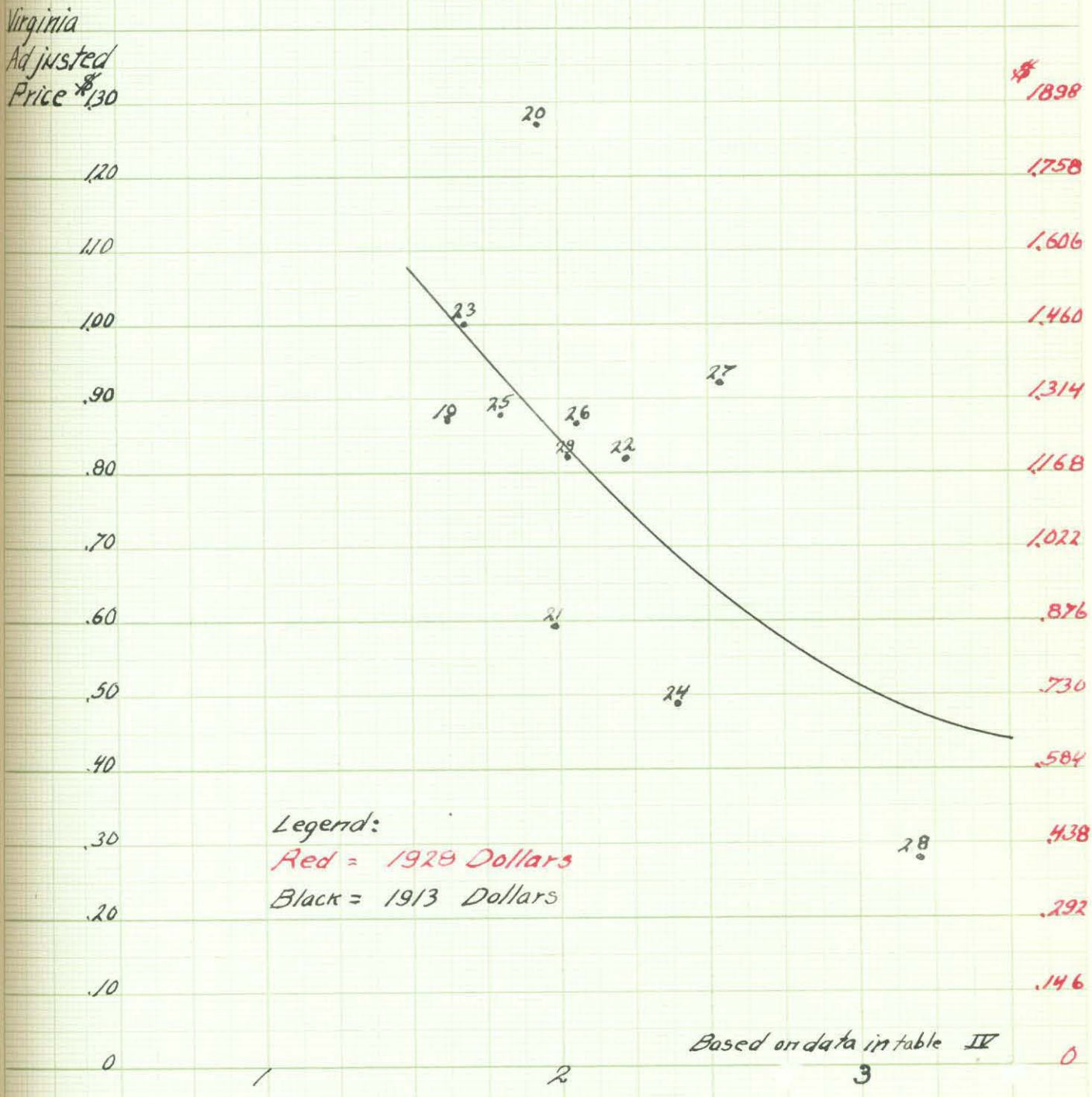


Chart 8

Va Average Adjusted Early Potatoes Price Per Bushel

In Relation With

Stocks On Hand Per Capita Jan 1st In The U.S.

The ratio between the ten early states production and the stocks on hand per capita was then increased, giving the production of the ten early states 3, 5, 7, 9 and 15 times the influence of the stock on hand. Each combined supply of the stated weighting was plotted on the horizontal axis against the Virginia price plotted on the vertical axis of charts. See charts 10, 11, 12, 13, 14..

It can be seen on observing these charts that the correlation between the ratios and the Virginia adjusted price becomes more nearly perfect with the increase in the ratios. This improvement continues until the weighting of nine times the ten early states production per capita plus the stocks on hand per capita is plotted against the Virginia adjusted price per bushel. Beyond this point the correlation diminishes with the increase in the ratio. In other words, the 9 to 1 ratio gave the best correlation.

In contrasting the 9 to 1 ratio correlation with chart 7, it can be seen that the vertical deviations are not as large as they were on chart 7. That is, by using the 9 to 1 ratio the effects of the stocks on hand are most accounted for. The vertical deviation from chart 13 having the 9 to 1 ratio is caused by other factors. This method cannot be called a success because the probable error of forecast based upon this line of relationship is too large.

Chart 9

Early 10 States Production Per Capita + Stocks On Hand Per Capita Jan. 1st In Relation With Va. Adjusted Average Price Per Bushel

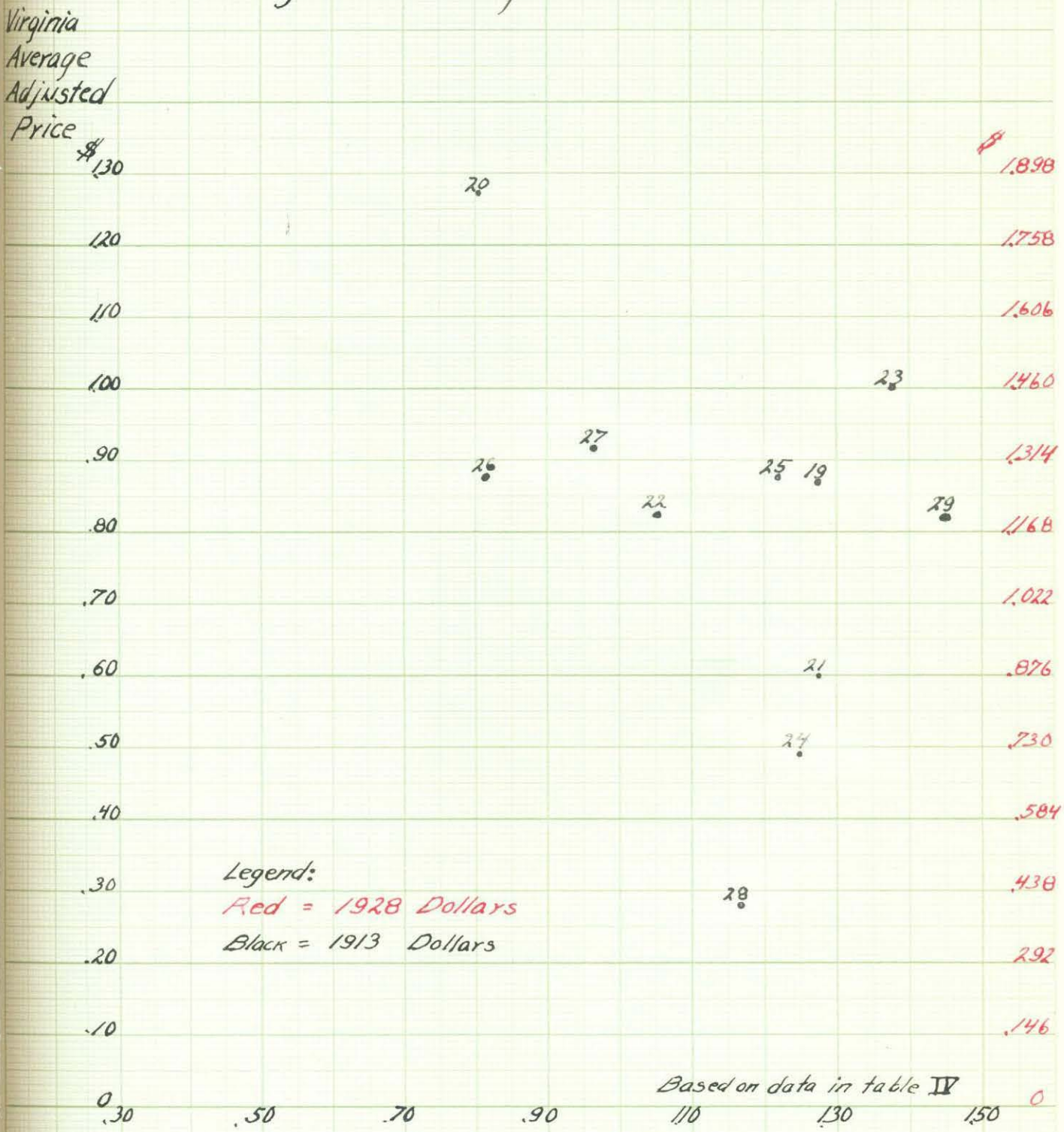


Chart 10

3X Early 10 States Production Per Capita + Stocks On Hand Jan 1st In The U.S.

In Relation With

Va. Average Adjusted Price Per Bushel

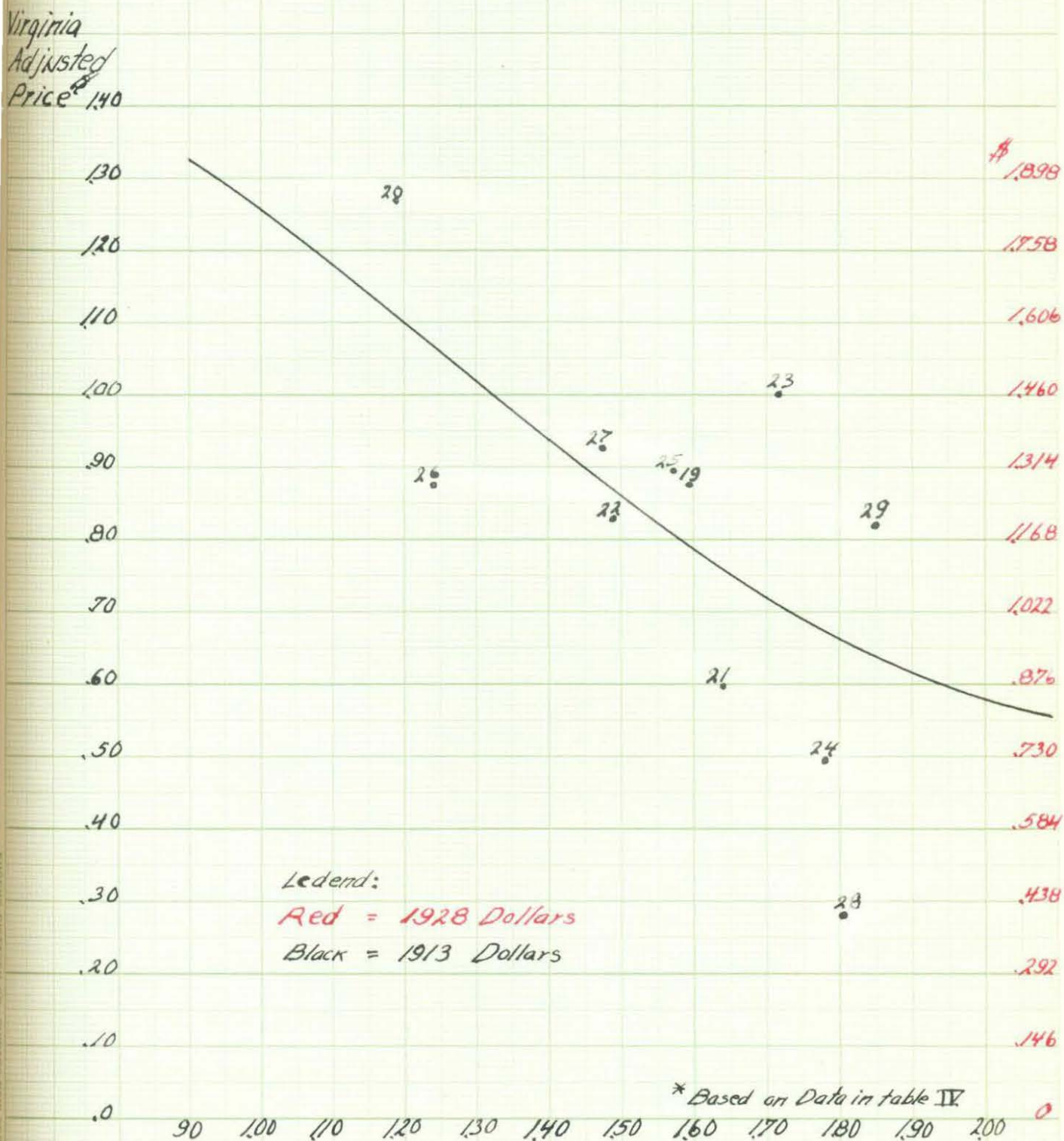
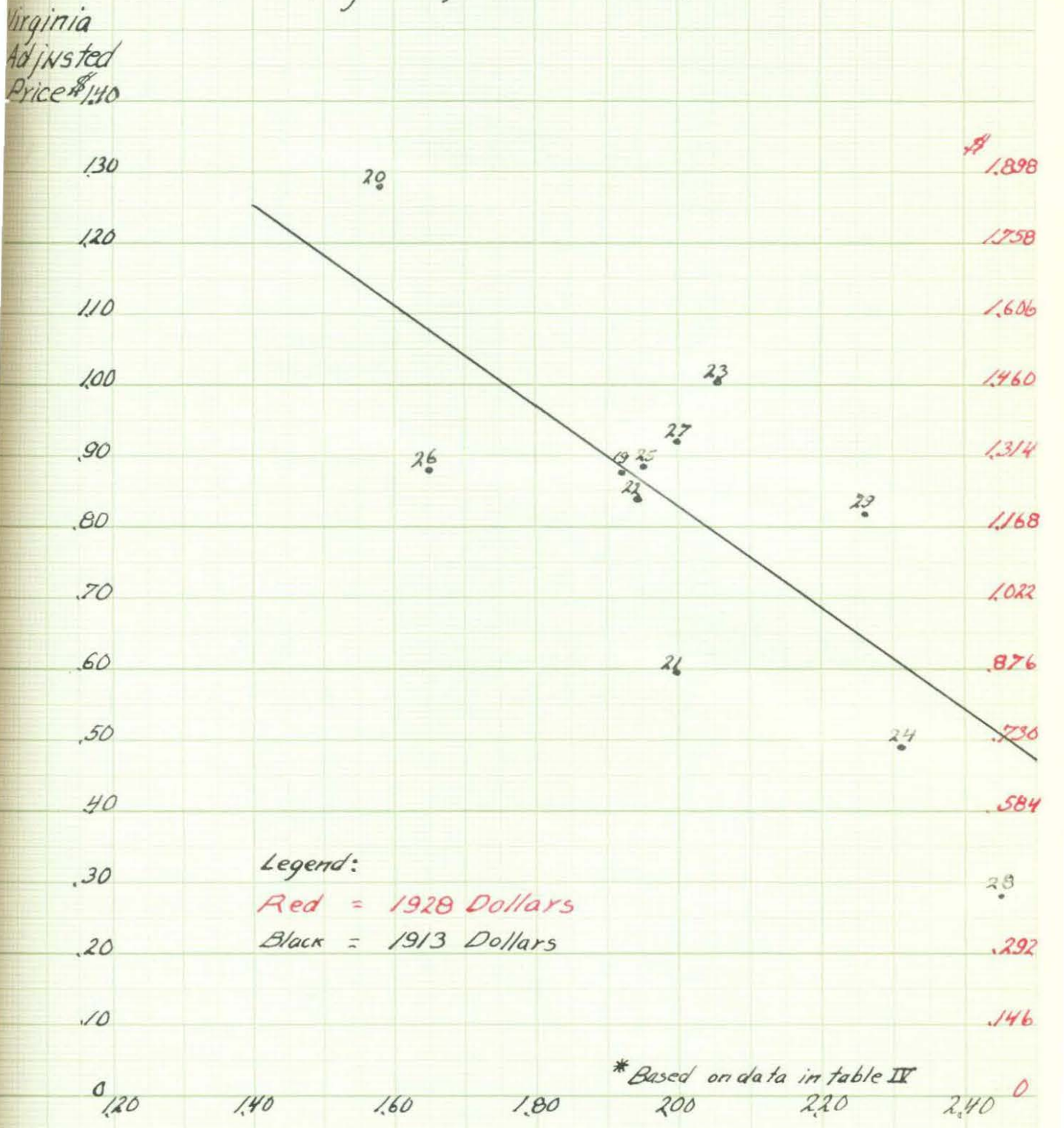


Chart II

5X The Early 10 States Production Per Capita + Stocks On Hand Jan 1st In The U.S.

In Relation With

Va. Average Adjusted Price Per Bushel



* Based on data in table IV

5X Early 10 States Production + Stocks On Hand Per Capita [Bushels]

Chart 12

7 X Early 10 States Production Per Capita + Stocks On Hand Per Capita In The U.S. In Relation With Va. Average Adjusted Price Per Bushels

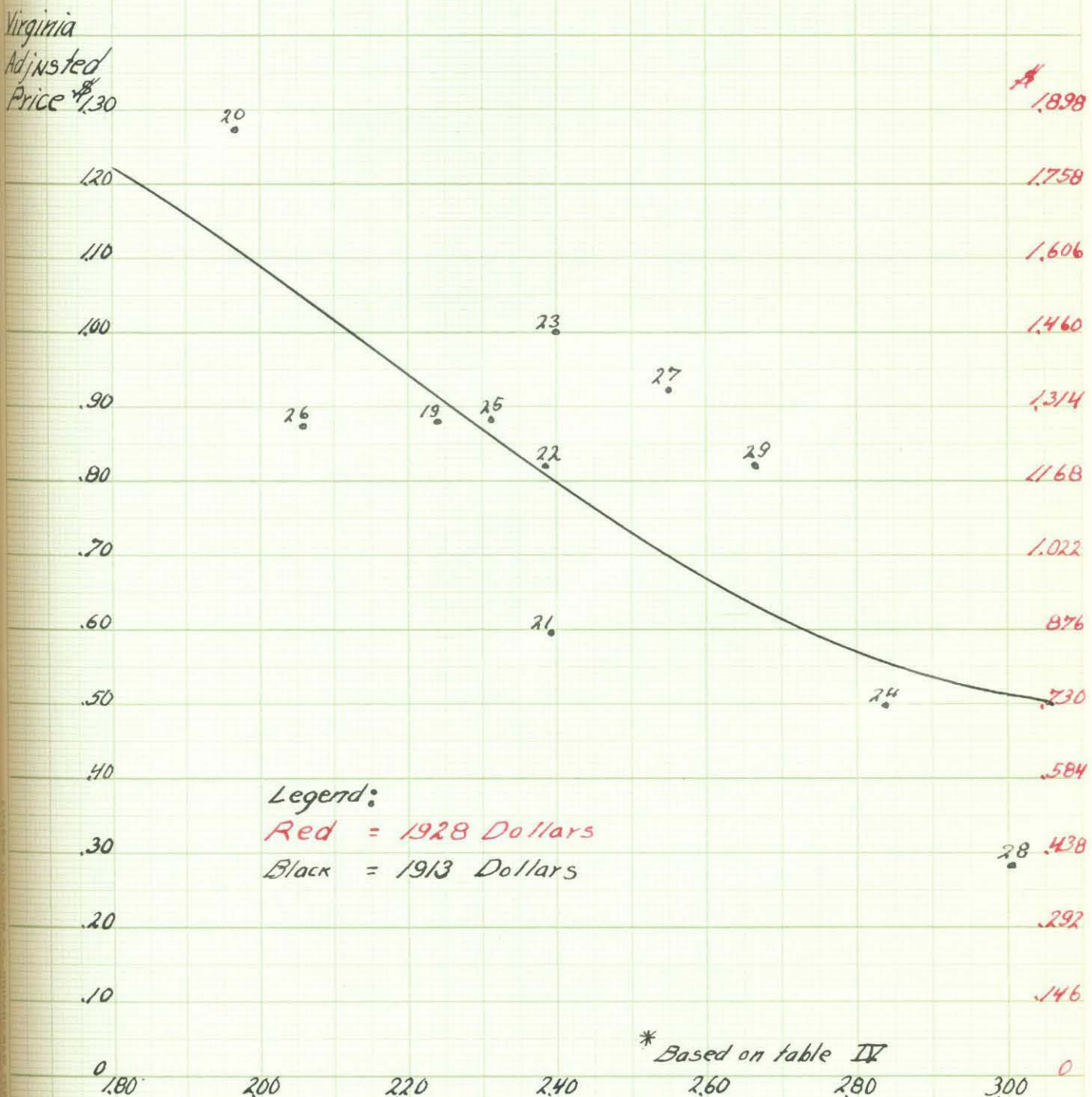
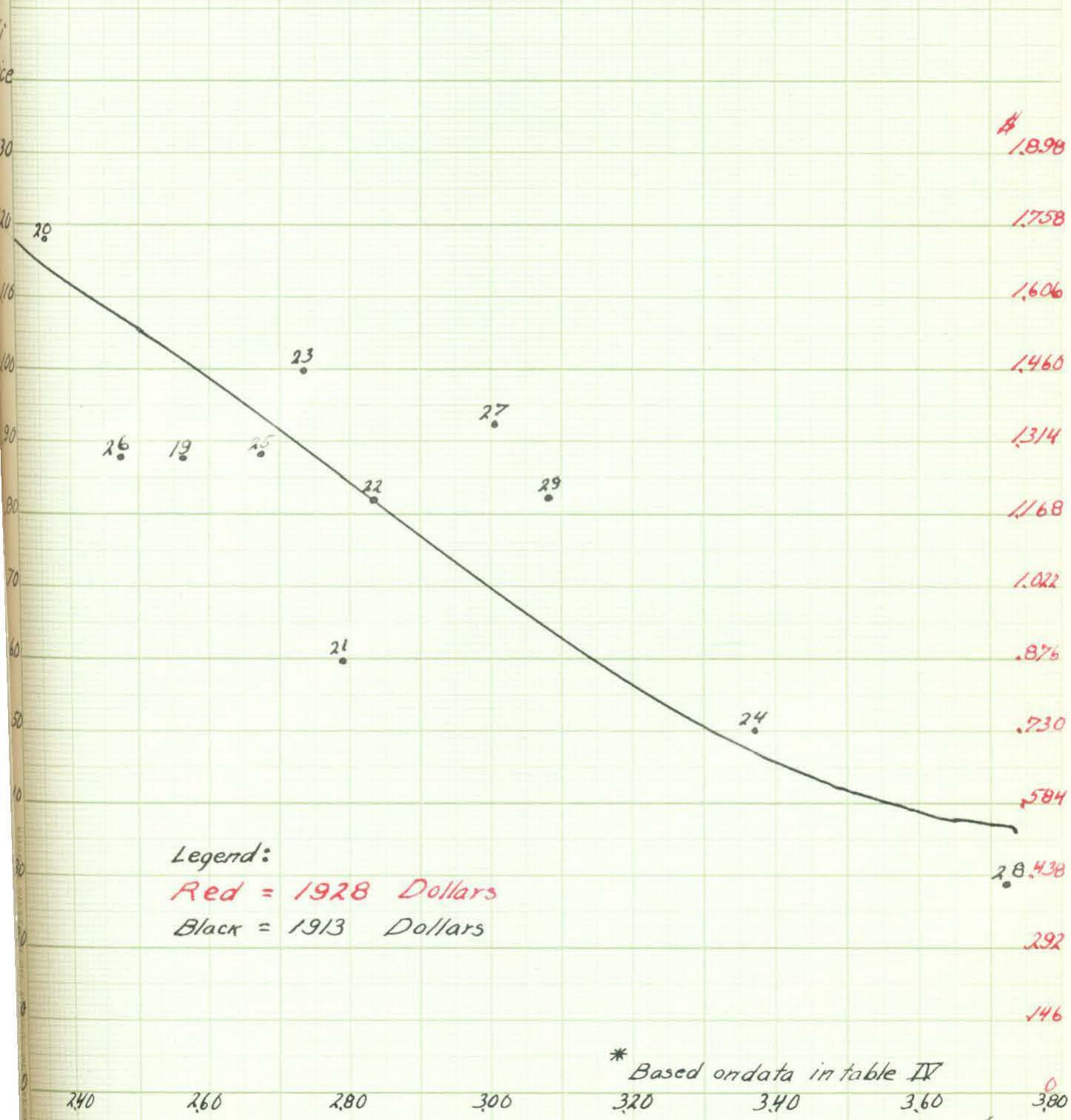


Chart 13

9 X The 10 Early States Production Per Capita + Stocks On Hand Jan 1st In The U.S.

In Relation With

Va. Average Adjusted Price Per Bushel



Legend:

Red = 1928 Dollars

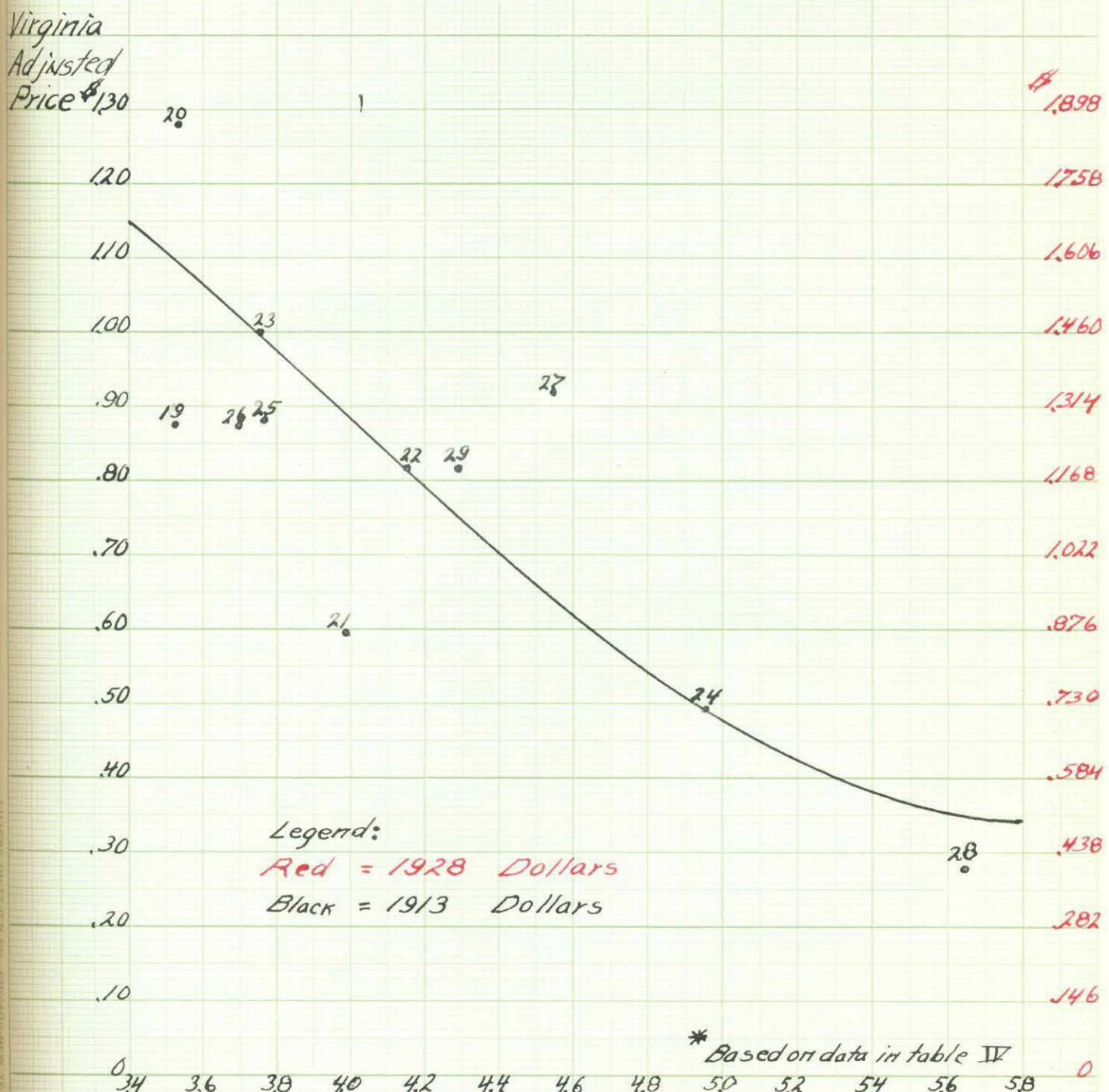
Black = 1913 Dollars

* Based on data in table IV

9X Early 10 States Production + Stocks On Hand Per Capita [Bushels]

Chart 14

15 X The 10 Early States Production Per Capita + Stocks On Hand Per Capita In The U.S. Jan. 1st In Relation With Va. Average Adjusted Price Per Bushel



* Based on data in table IV

15 X Early 10 Production + Stocks On Hand Per Capita [Bushels]

The multiple weighting method method of forecasting was not successful in predicting the price of early potatoes in Virginia. This method was not a success because it was impossible to take into consideration factors that influence the price of early potatoes other than the value of the dollar, the production of early potatoes in the 10 early states, and the stocks on hand January 1st in the United States.

The next method used is called the simplified multiple correlation method. The success of this method may be attributed to the fact that the degree of influence of any number of factors may be independently determined. This method is based on the assumption that the vertical deviation from the line of average relationship between the supply and price is caused by other factors. Should these factors be discovered and each be plotted against the vertical deviations from the line representing the average relationship between the supply and price the degree of influence exerted by each may be determined.

Even with this method it was difficult to determine the proper regional limits within which the production would be most closely correlated with the price of early potatoes in Virginia.

As a lead, the production of the 18 early states was first used. This would not be called a success because the probable error as indicated by the scatter about the line of average relationship, was too large.

The next supply factors used were three regional volumes of production taken separately, namely, the Virginia production of early potatoes, the production of early potatoes south of Virginia that compete with Virginia potatoes on the market and the production of early potatoes north and west of Virginia that compete with Virginia potatoes on the market.

Fair results were obtained by using these separate supply factors.

Simplified multiple correlation method using 18 early states production.- The next method used may be called the simplified multiple correlation method.

The factors that are shown by this method as influencing the price of early potatoes are:

1. The value of the dollar
2. The production of the 18 early states
3. The stocks on hand per capita January 1st

Table 5 presents the above statistics.

The production of the 18 early states is plotted on the horizontal axis of chart 15, and the Virginia adjusted price is plotted on the vertical axis. With the exception of 1928, all the years with a small quantity of stocks on hand are above the line, and all the years with a large quantity are below the line. It is quite evident that the vertical deviations of the dots from the line of supply-price relationship are caused by other factors, and as the years that are below the line have a large quantity of stock on hand, and as the years that are above the line have a small quantity of stocks on hand, it is logical to say that part of this deviation is caused by the quantity of stocks on hand January 1st.

With this in mind the vertical deviations from this line were plotted on the vertical axis of chart 16, and the stocks on hand were plotted on the horizontal axis. This gave a very good correlation. The years 1927, 1928 and 1929 have a large vertical deviation. These deviations are caused by other factors.

The simplified multiple correlation method used with the Virginia production.- The factors that are shown by this method as influencing the price of early potatoes are:

1. The value of the dollar
2. The production of early potatoes in Virginia
3. The production of early potatoes in the states south of Virginia

Table V.- Eighteen early potato state production in bushels and Virginia adjusted price per bushel
1919 - 1929

Year	Va. adj. price	Prod. 18 early states	Stocks on hand per capita	Index number
1919	.874	25,000,000	1.11	206
1920	1.274	29,500,000	.61	226
1921	.599	31,000,000	1.01	147
1922	.826	36,192,000	.83	149
1923	1.000	26,245,000	1.21	154
1924	.493	41,178,000	.99	150
1925	.880	30,870,000	1.05	159
1926	.874	36,624,000	.62	151
1927	.925	44,825,000	.72	147
1928	.281	55,368,000	.85	146
1929	.820	35,613,000	1.11	145

Statistics taken from U. S. D. A. Yearbooks 1924, pages 708, 1180; 1928, page 807.

Crops and Markets, December, 1929.

Chart 15

Early Potato Production 18 Early States In Relation With Va. Adjusted Average Price Per Bushel

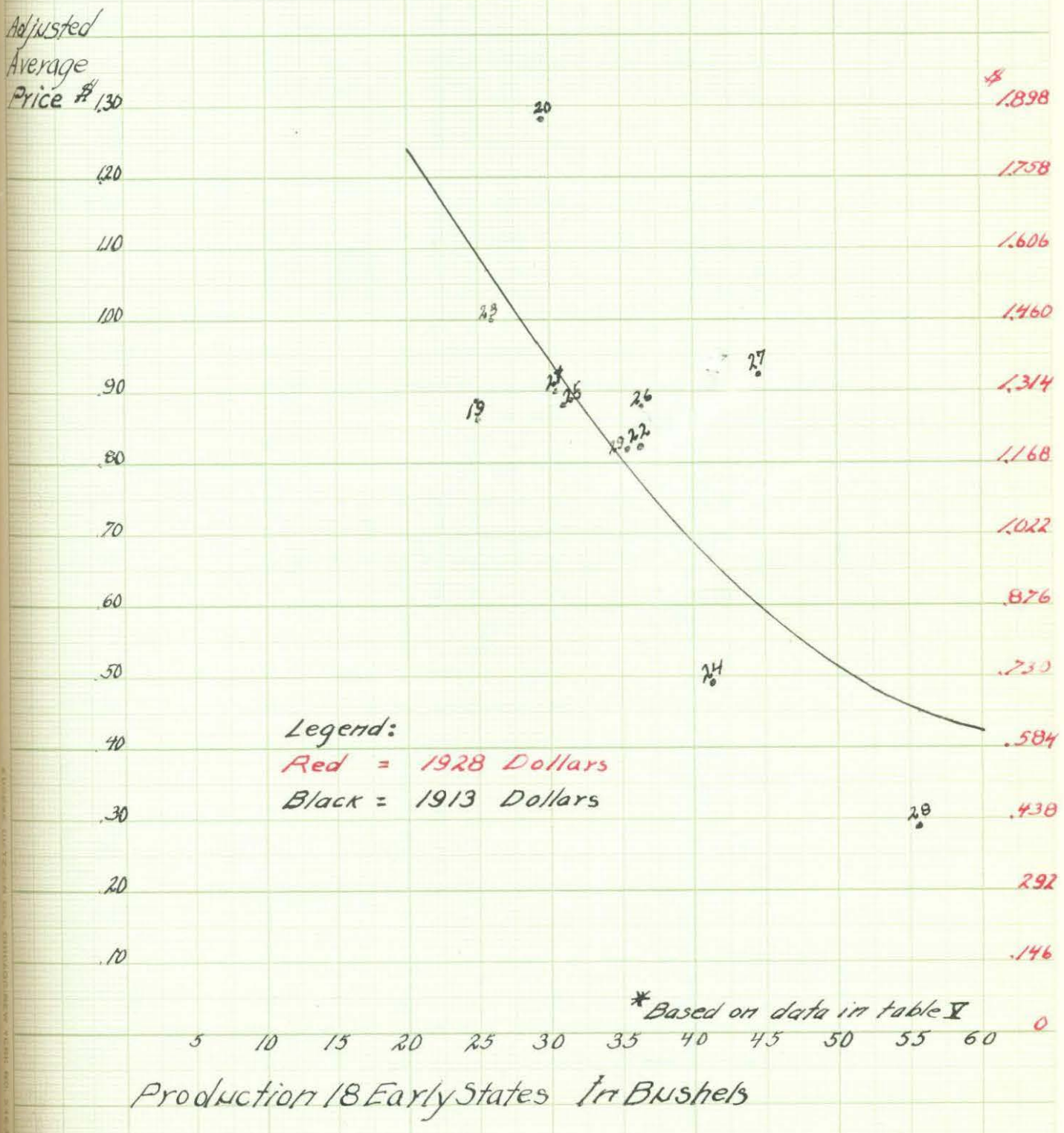
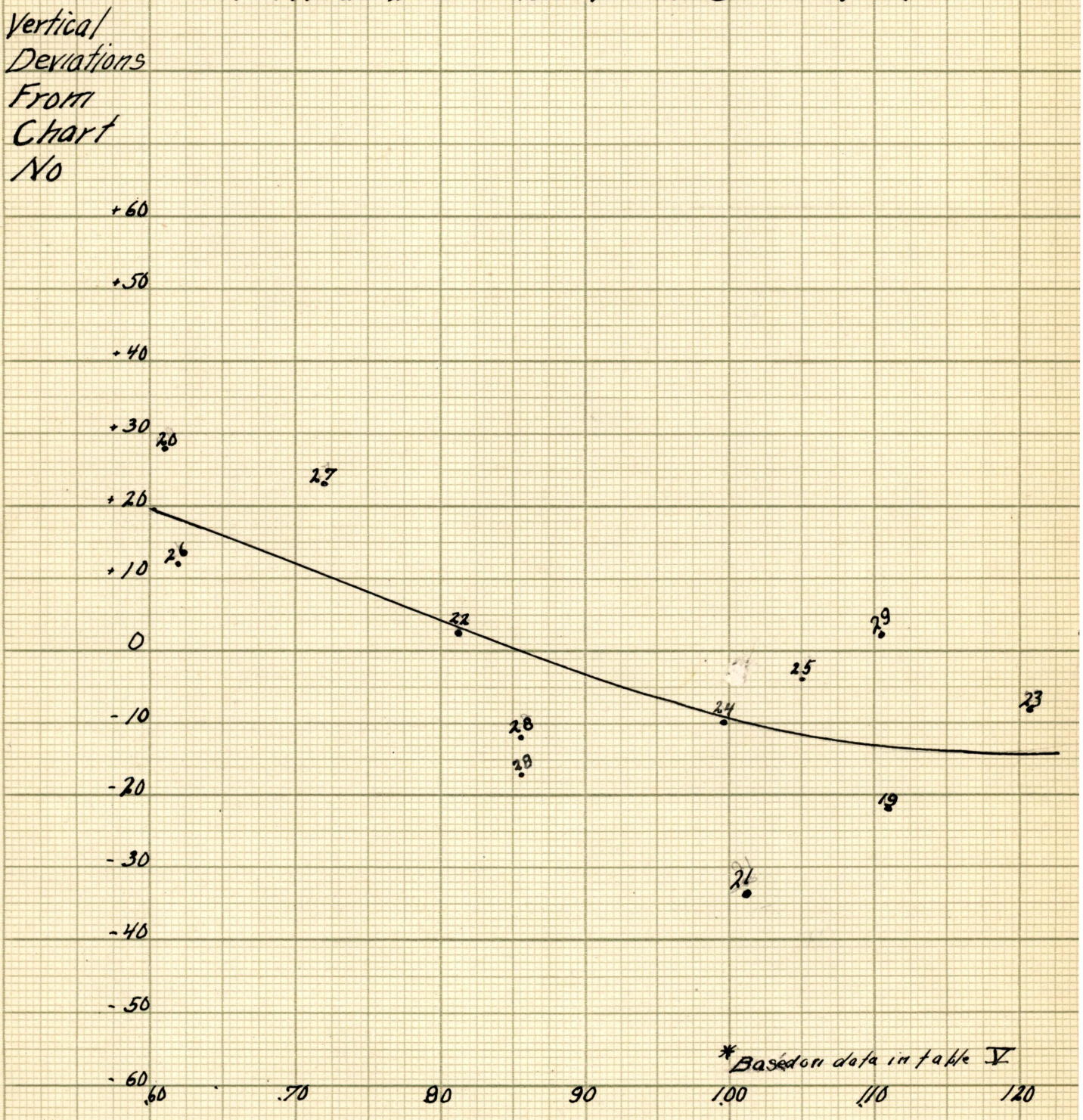


Chart 16

Stocks On Hand Per Capita Jan. 1st In The U.S.

In Relation With

Vertical Deviations From Chart No.



that come in competition with the potatoes marketed from Virginia in June

4. The production of early potatoes in the states north and west of Virginia that come in competition with the Virginia potatoes marketed in July

5. The stocks of old potatoes on hand January 1st in the United States

6. The element of time or the long-time trend.

The statistics of the above factors may be noted on Table 6.

The following factors are immeasurable:

1. The element of speculation

2. The delayed season

3. The business condition at the time of harvesting the Virginia potatoes.

The changes in the potato prices due to changes in the value of the dollar were first eliminated. The Virginia adjusted price of early potatoes and production of early potatoes were used as the price and production factors. The relation between the adjusted price and Virginia production is definitely noted on chart 17. The adjusted price per bushel is plotted on the vertical axis and the production in bushels on the horizontal axis of the chart. There is a slight correlation between the adjusted price and production. The years 1920, 1927 and 1928 show a considerable vertical deviation from the line which represents the price one would expect under average conditions. This deviation is caused by factors other than the production in Virginia.

The next factor used to show its influence on the Virginia early potato price is the southern competition. This competition comes mostly from North

Carolina. Table 6 gives the production of North Carolina in bushels. To show its influence on the Virginia price, the North Carolina production is plotted on the horizontal axis of chart 18 and the vertical deviations from the line representing the average relationship between the price and production on chart 17, is plotted on the vertical axis.

This reveals a correlation between the North Carolina production and the vertical deviations from the line on chart 17. The years 1920, 1927 and 1928 still show a considerable vertical deviation from the expected price. However, it can be seen that the North Carolina production of early potatoes has a definite effect on the Virginia price of early potatoes.

The north and western competition is the next factor that has a considerable influence on the Virginia early potato price. This competition comes principally from Maryland and Kaw Valley. Table 6 gives the combined production of these competing sections.

To show definitely the extent of the influence of the competition, there has been plotted on the horizontal axis of chart 19, the production of these two sections and on the vertical axis of this chart the vertical deviations from chart 18.

This chart also shows a slight correlation. The years 1920 and 1927 still show a considerable deviation from the line. The vertical deviation of 1928 has been somewhat lessened. The years 1919 and 1921 show a considerable vertical deviation from the line on this chart. This indicates that there is another factor that influences these years and causes the deviations.

On observing this chart, it will be noted that all the years having

Table VI.- Virginia Adjusted Price and Production Early Potatoes and North Carolina and Maryland and Kaw Valley Early Potato Production and Stocks on Hand, Per Capita - 1919-1929.

Year	Virginia Adjusted Price	Virginia Early Potato Production	North Carolina Potato Production	Maryland and Kaw Valley Early Potato Production	Stocks on Hand Per Capita	Index Numbers
1919	.874	8,733,000	1,747,000	2,309,000	1.11	2.06
1920	1.274	10,143,000	2,305,000	2,628,000	.61	2.26
1921	.599	11,606,000	2,201,000	2,849,000	1.01	1.47
1922	.826	10,362,000	2,447,000	3,286,000	.83	1.49
1923	1.000	9,230,000	1,765,000	3,117,000	1.21	1.54
1924	.493	15,983,000	3,640,000	4,431,000	.99	1.50
1925	.880	9,185,000	2,144,000	2,831,000	1.05	1.59
1926	.874	9,345,000	3,480,000	3,902,000	.62	1.51
1927	.925	14,087,000	4,320,000	4,663,000	.72	1.47
1928	.281	15,908,000	5,267,000	6,125,000	.85	1.46
1929	.821	11,961,000	3,300,000	3,249,000	1.11	1.45
Predicted 1930	---	15,000,000	3,440,000	3,777,000	.704	---

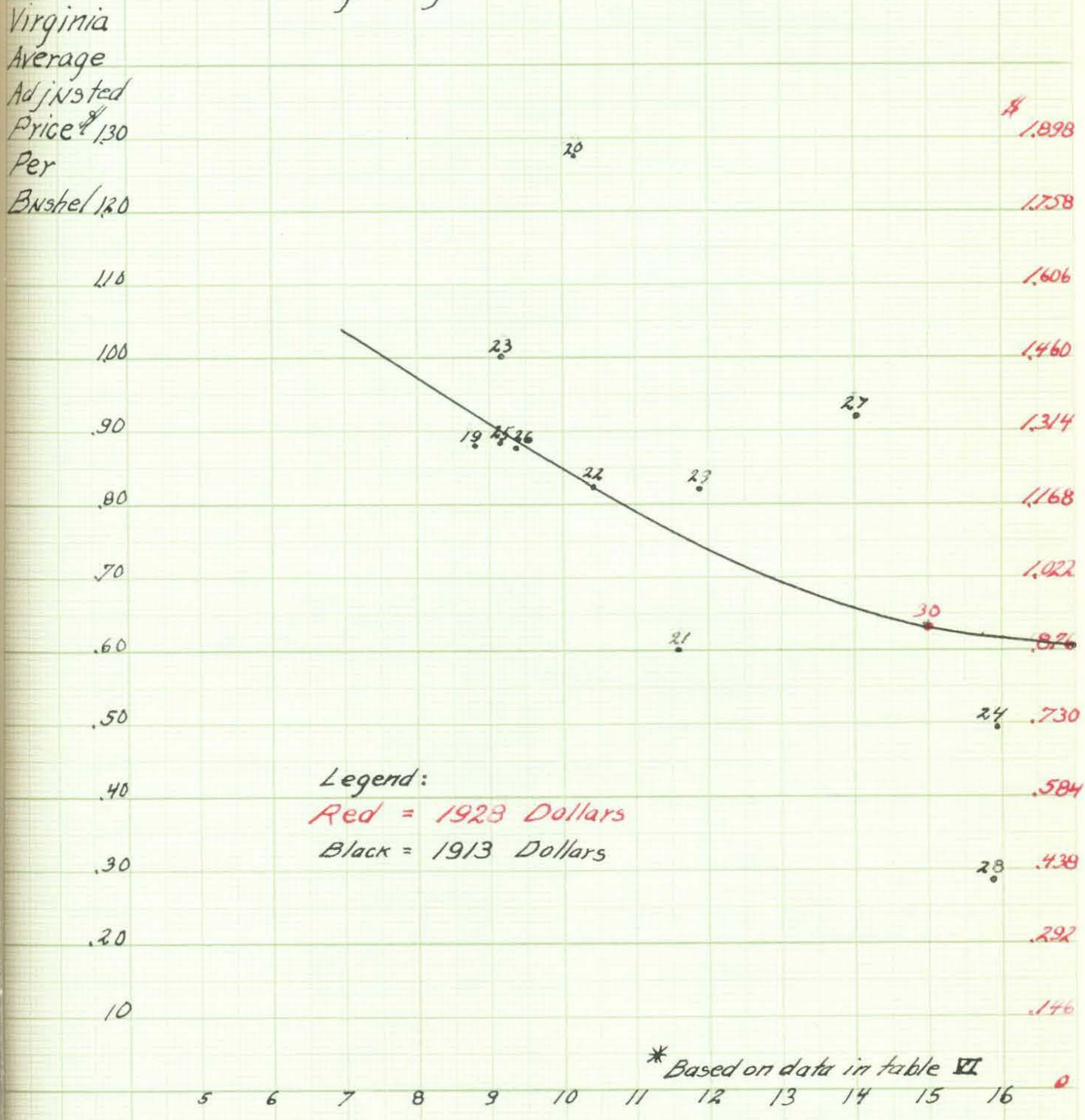
Statistics taken from U. S. D. A. Yearbooks: 1923, page 765; 1924, page 708; 1928, page 807; December 1929 Crops and Markets.

Chart 17

Va. Early Potato Production In Bushels

In Relation With

Va Average Adjusted Price Per Bushel



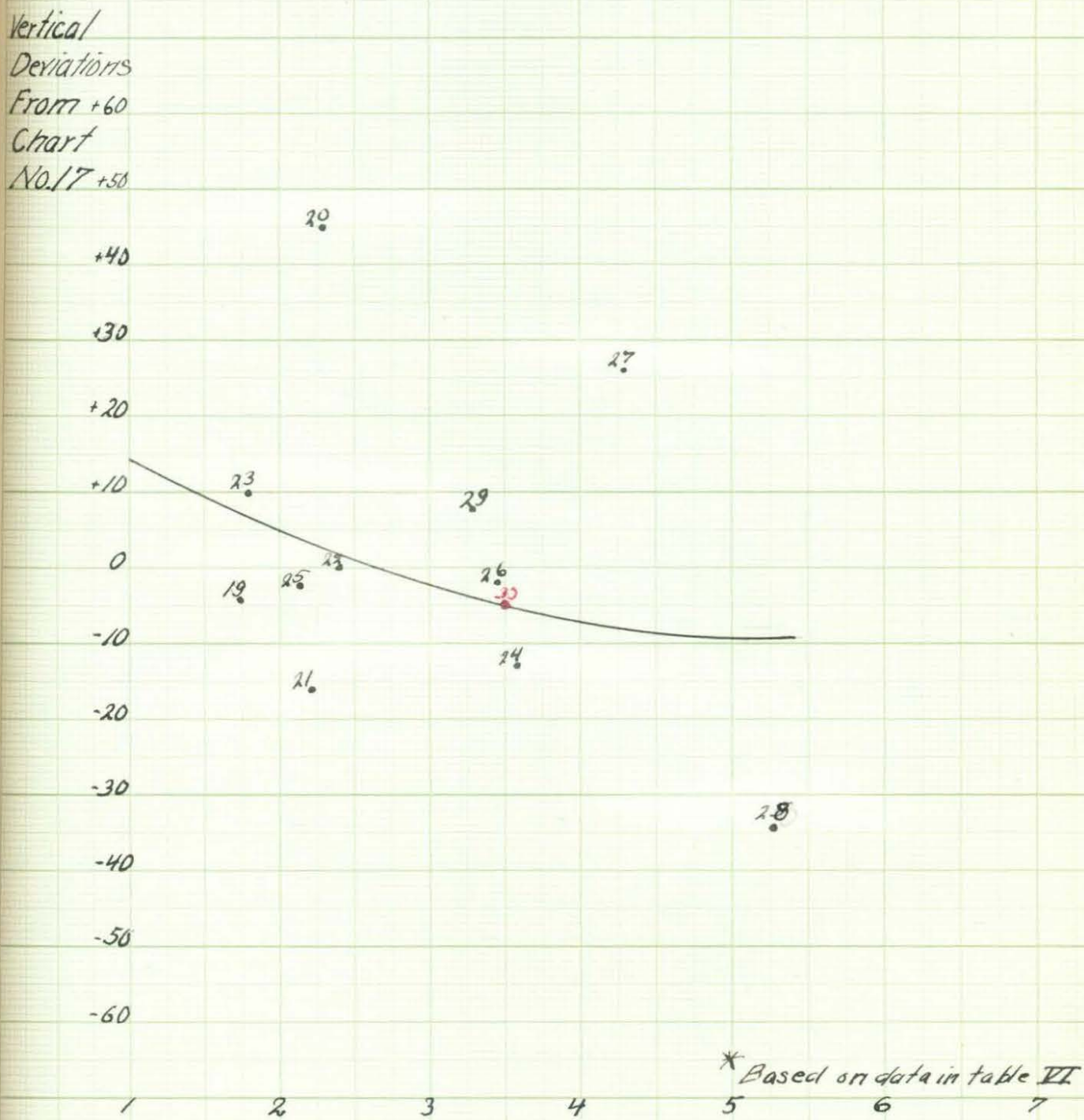
Va. Early Potato Production in Bushels.

Chart 18

Competition To Va. Potatoes From N.C.

In Relation With

Vertical Deviations From Chart No. 17



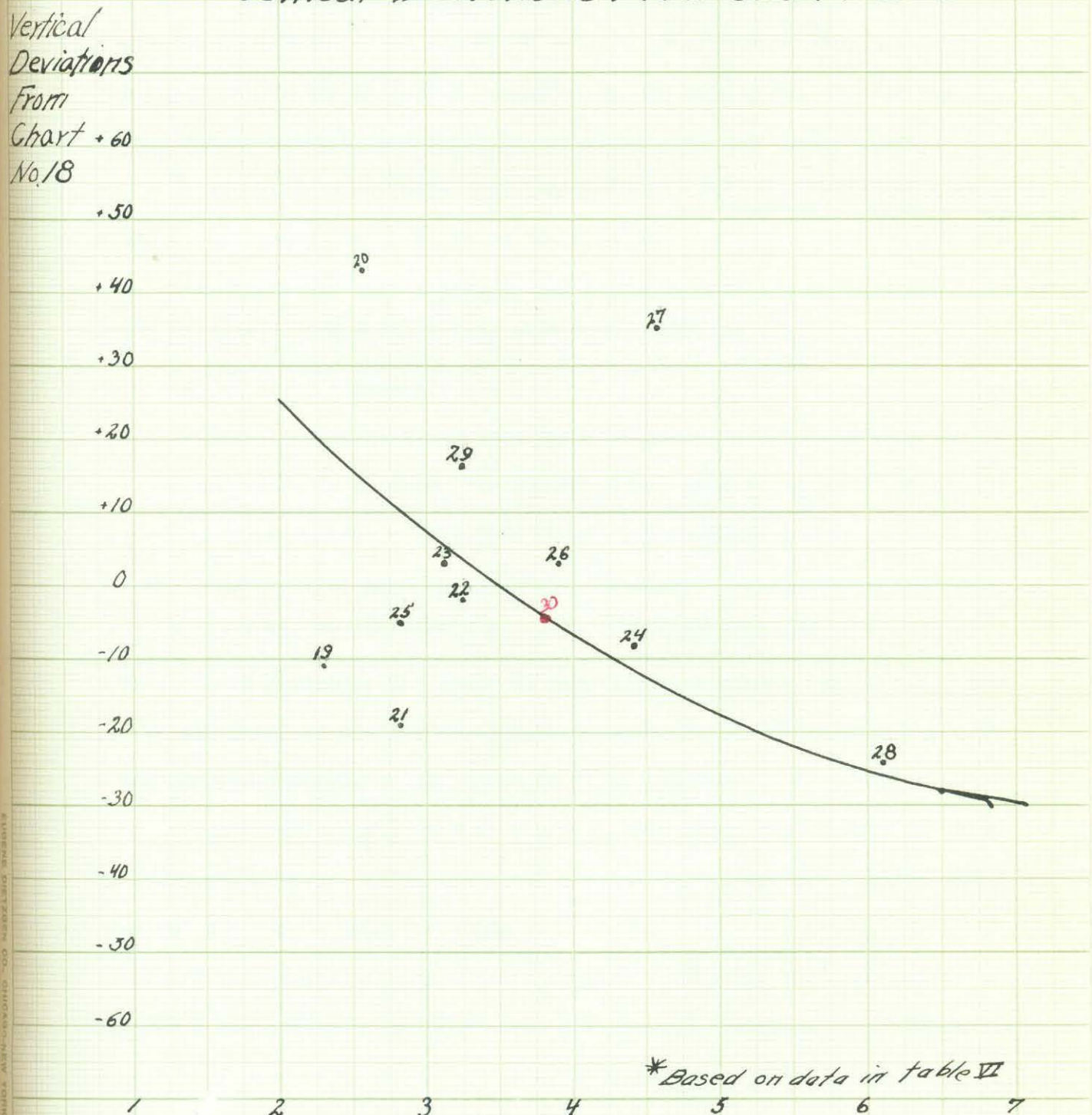
* Based on data in table VI

Chart 19

Competition To Va Potatoes From Md. and Kaw Valley

In Relation With

Vertical Deviations From Chart No. 18



a small quantity of stocks on hand are above the line, and all the years excepting 1929 that have a large quantity of stocks on hand are below the line. This would indicate that the stocks on hand would have a decided effect on the price of early potatoes in Virginia. To arrive at the degree of influence of the stocks on hand on the price of Virginia early potatoes, the stocks on hand are plotted on the horizontal axis of chart 20 and the deviations from chart 19 are plotted on the vertical axis.

This reveals a fairly good correlation. The price received each year is reasonably near what would be expected.

On observing this chart, it can be noted that the more recent years are above the line and the former years are below the line. This is true in the majority of instances.

Another adjustment has been made to naturalize the tendency for the more recent years to be above the former years. The adjustment may be called the time factor or long-time trend. This adjustment is a combination of small factors that have an increasing tendency to influence the prices of early potatoes in Virginia. It takes into consideration the trend of production in Virginia, the trend in competing shipments, the trend in the price, the trend in the consumption, and other minor factors that may have a cumulative influence on the price of early potatoes in Virginia.

On the horizontal axis of chart 21, the consecutive years of 1919 to 1929 are plotted. On the vertical axis of this chart are plotted the vertical deviations from chart 20.

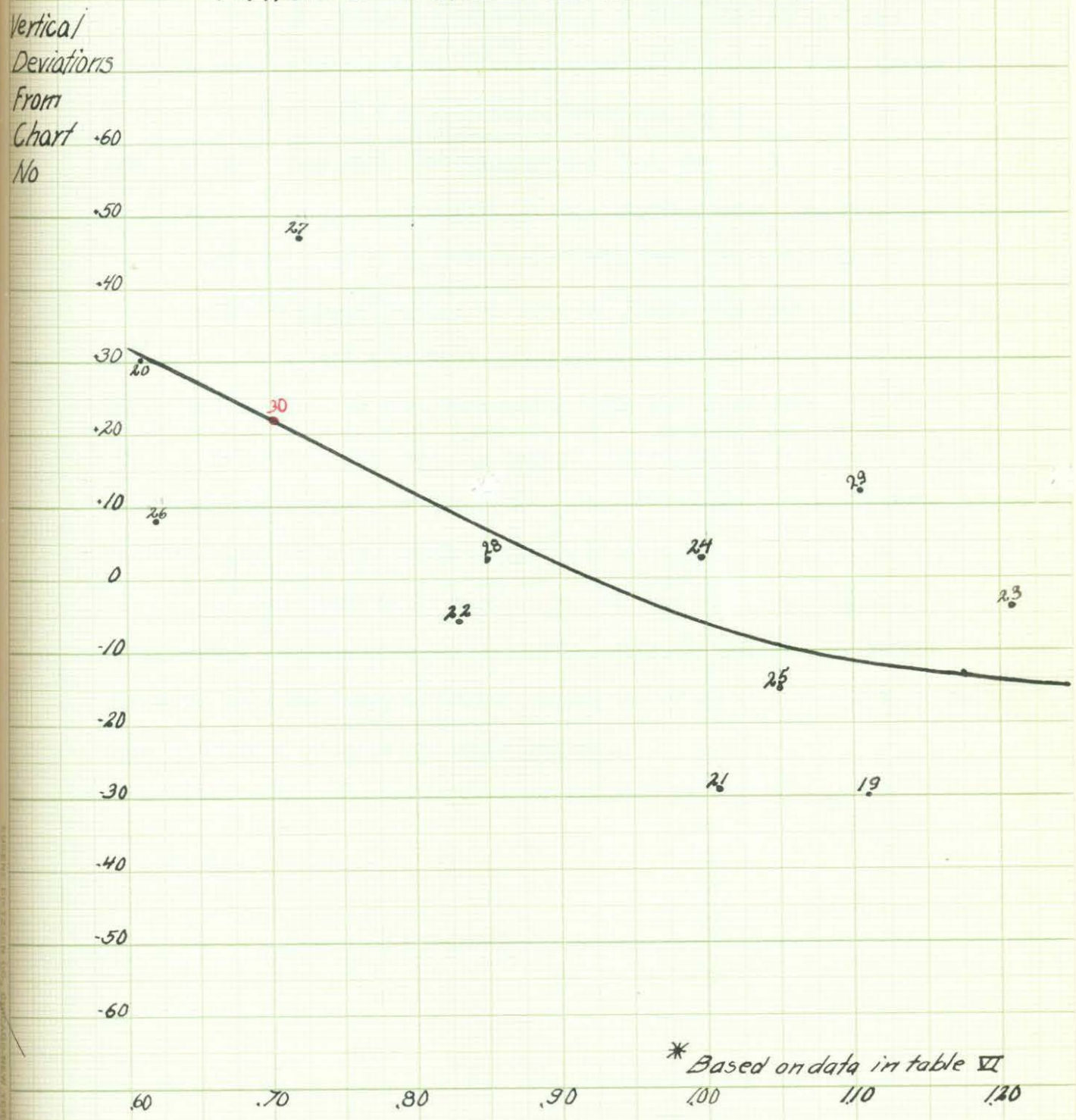
This reveals an upward trend represented by the line and this removes a considerable deviation from a number of the years. But there are a number of years that show a larger deviation than would be expected.

Chart 20

Stocks On Hand Per Capita Jan 1st In The U.S.

In Relation With

Vertical Deviations From Chart No. 19



These deviations are caused by immeasurable factors that exert an influence on the price of early potatoes.

On observing chart 21, it can be seen that the years 1923, 1924, 1926, 1927 and 1928 have a large deviation from the line.

There are different immeasurable factors that influenced the price in the different years. The years of 1923 and 1924 were the years of rapid recovery from the depression following the World War. During 1923 and 1924 there was less unemployment than there had been for several years, and the price would naturally be a little higher than normal.

The year 1926 is far below what would be expected. During 1926 the marketing organizations on the Eastern Shore were competing with one another to the extent that they were severely cutting each other's prices. This undue competition would naturally force the price down.

The year of 1927 was the year of successful price control by the marketing organization. Considering this, it is natural for the price to be higher than it would otherwise be expected to be.

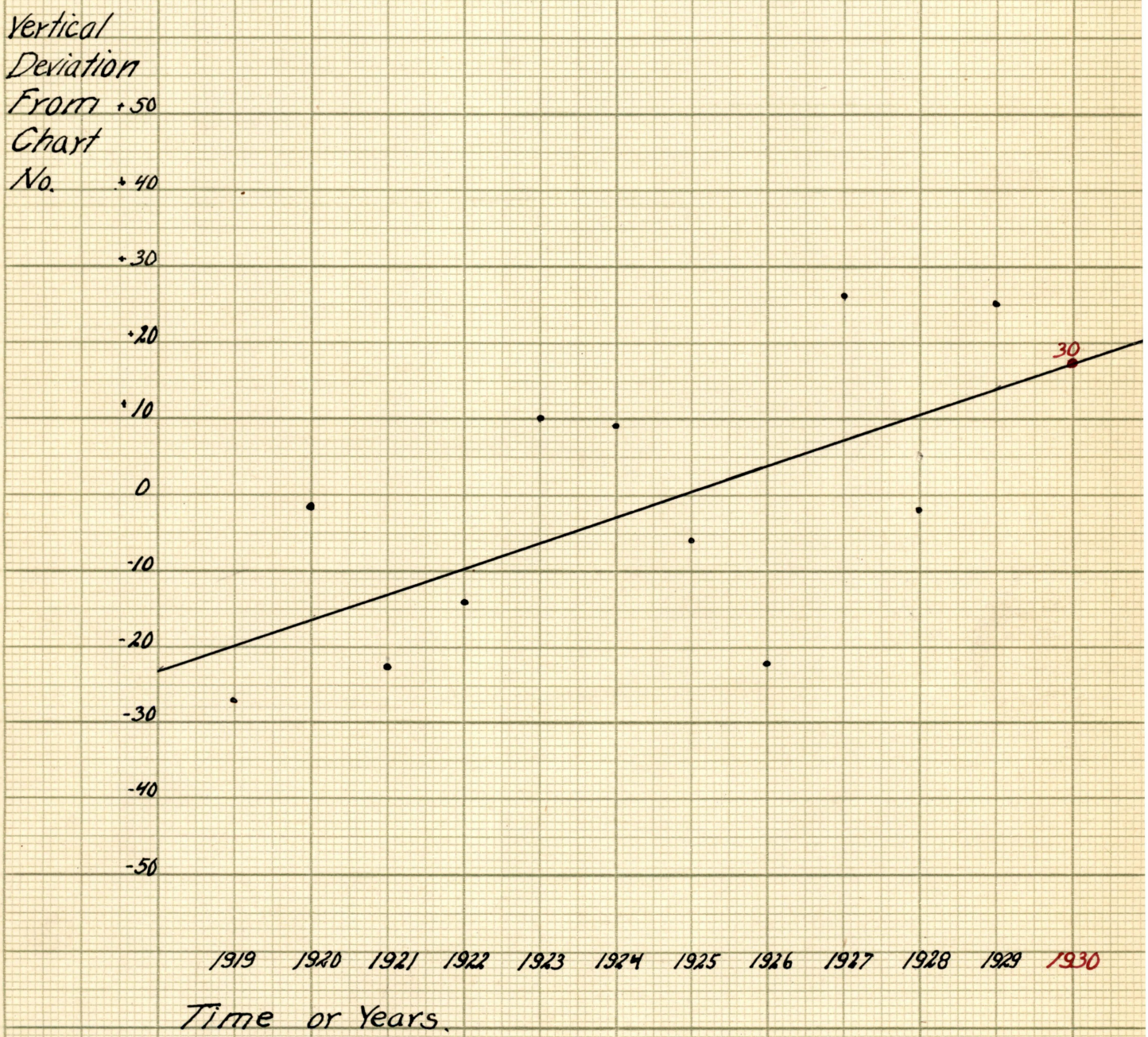
The year 1928 is the year of the failure of the marketing associations to control the price. This, with the exceedingly heavy shipments from competing sections, caused the price to be lower than the line of average relationship would indicate.

Chart 21

Vertical Deviations From Chart No. 20

In Relation With

Time



Simplified multiple correlation method used in forecasting Virginia June 15th price.- The simplified multiple correlation method gave fair results in forecasting an average price for early potatoes in Virginia. This method was used to forecast the price that the growers would expect to receive during the months of June and July. No attempt was made to forecast the Virginia August price, because as a rule a very small quantity of the Virginia early crop is marketed in August. In those years when there was a fair quantity marketed in August, it may be noted that the prices are abnormal. For instance, the harvesting of the crop was delayed because of over production or a late season, such as there was in 1928. In such years the price would naturally be adverse to what would be expected, and the probable error would be too large to justify the attempt to forecast a price.

In attempting to forecast the Virginia June price of early potatoes, some difficulty was encountered in obtaining measurements of early potato production that would influence the price in June and July. The supply eventually used was the number of cars of early potatoes shipped in June and July in the United States. The number of cars shipped in the United States during June and July and the Virginia June and July adjusted price are given in Table 7.

The number of cars shipped in June in the United States is plotted on the horizontal axis of chart 22 and the Virginia adjusted price is plotted on the vertical axis. This failed to reveal any correlation. The line was drawn in the position that it would most likely have been, had the other price-influencing factors been normal.

The years that are below the line can be noted to be those years that had a large supply of old stocks on hand, and those years that are above the line are those years that had a small supply of old stocks on hand.

Table VII.- Virginia actual and adjusted June and July prices received by producers and cars early potatoes shipped in June and July in the U. S. 1919 - 1929

	June			July		
Year	Actual price	Adjusted price	Cars shipped	Actual price	Adjusted price	Cars shipped
1919	1.34	.650	9.710	1.61	.782	13,680
1920	3.58	1.584	14,280	2.70	1.195	15,610
1921	.84	.571	15,300	.80	.544	16,980
1922	1.30	.872	17,270	1.13	.758	18,760
1923	1.19	.772	14,790	1.42	.922	16,440
1924	1.35	.901	17,650	1.15	.767	23,590
1925	1.23	.774	15,590	1.30	.818	17,430
1926	2.30	1.523	20,060	1.50	.993	20,160
1927	1.85	1.258	20,680	1.65	1.122	21.050
1928	1.10	.753	26,350	.75	.514	21,077
1929	.95	.655	19,500	1.05	.724	19,218
Predicted						
1930	1.94	1.340	22,000	1.94	1.03	23,000

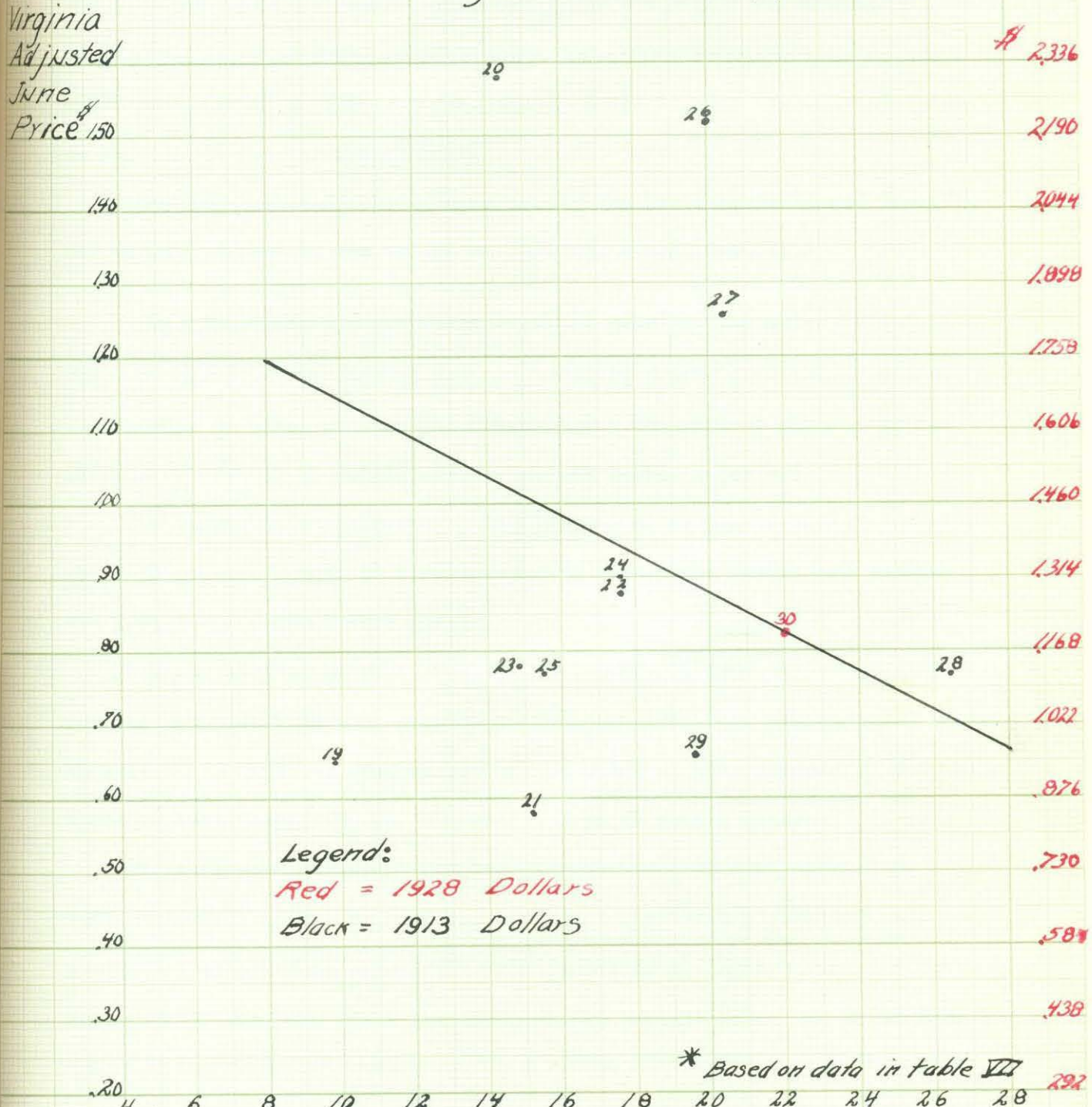
Statistics U. S. D. A. statistical bulletin No. 16, page 34; U. S. D. A. Yearbook 1923, page 716; 1926, page 940; 1923, page 813. Bureau Labor Statistics 284, page 131.

Chart 22

Va. June Adjusted Price Per Bushel

In Relation With

U.S. Cars Early Potatoes Shipped In June



The vertical deviations from the line were plotted on the vertical axis of chart 23 and the stocks on hand were plotted on the horizontal axis. This gave a very good correlation.

On observing this chart it can be noted that the earlier years are below the line and the more recent years are above the line. To correct this time factor or long-time trend, the vertical deviations from the line on this chart are plotted on the vertical axis of chart 24, and the time or years is plotted on the horizontal axis.

From this chart it can be seen that there has been an upward trend in the price received by the grower in June for early potatoes.

Simplified multiple correlation method used in forecasting Virginia July 15th price.- The actual and the adjusted prices that were received by the growers of early potatoes in Virginia and the cars of early potatoes shipped in July in the United States may be noted in Table 7.

The Virginia July adjusted price is plotted on the vertical axis of chart 25 and the number of cars shipped in the United States are plotted on the horizontal axis of this chart.

The correlation on this chart is more definite than the correlation between the number of cars shipped in June and the June 15th adjusted price. This is to be expected because as the old stock on hand decreases, they will exert a less depressing influence on the early potato prices.

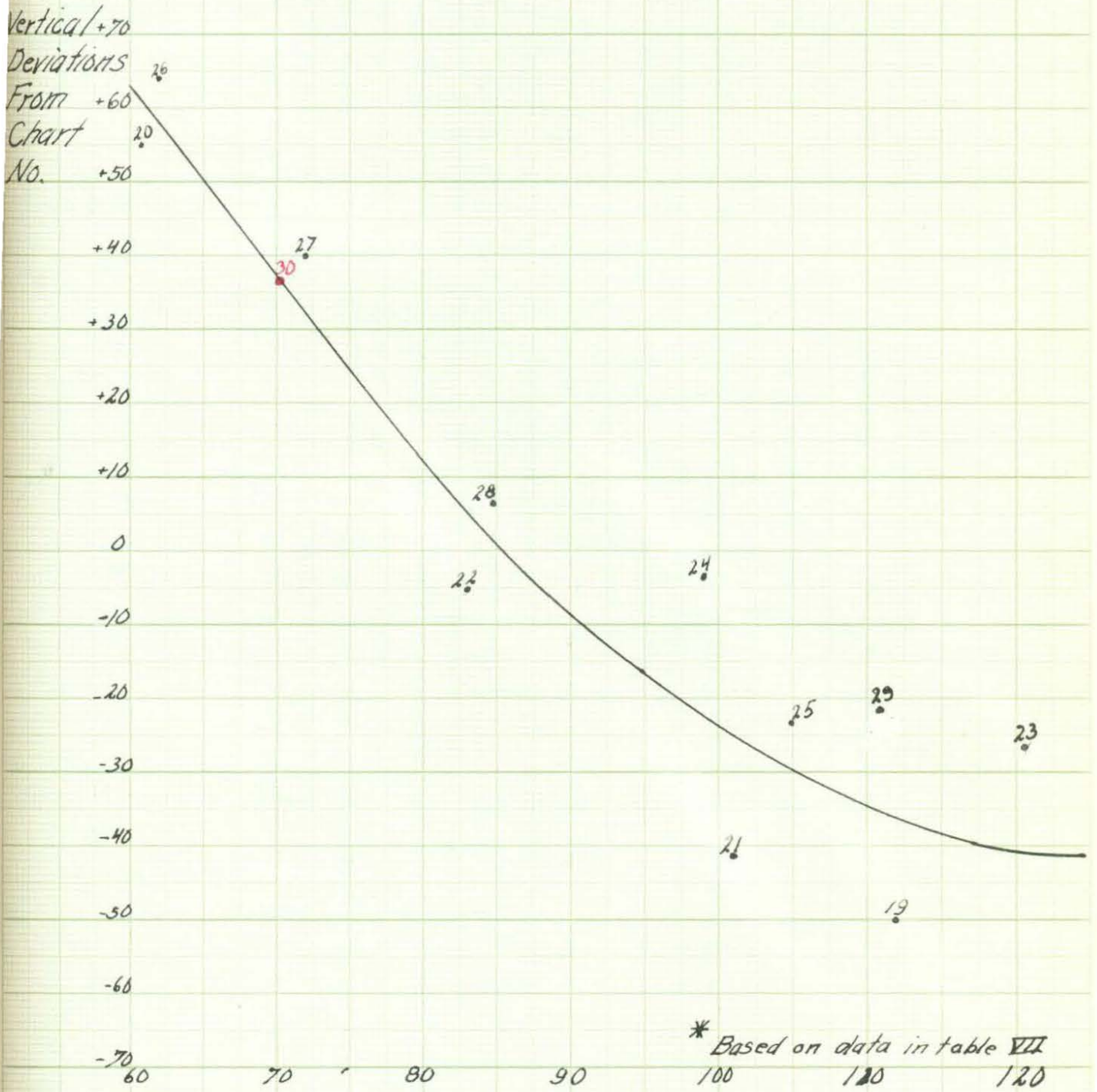
The vertical deviations from the line on chart 25 were plotted on the vertical axis on chart 26, and the stocks on hand were plotted on the horizontal axis. This revealed a fair correlation. Except for 1928, the more recent years are above the line and the earlier years are below the line. This factor was eliminated by the long-time trend as illustrated by chart 27. This gave a fair correlation. The years 1923, 1924, 1927, and 1928 show considerable deviation from what would be expected.

Chart 23

Stocks On Hand Per Capita Jan 1st In The U.S.

In Relation With

Vertical Deviations From Chart No. 22



* Based on data in table VII

Chart 24

Vertical Deviations From Chart No. 23

In Relation With

Time

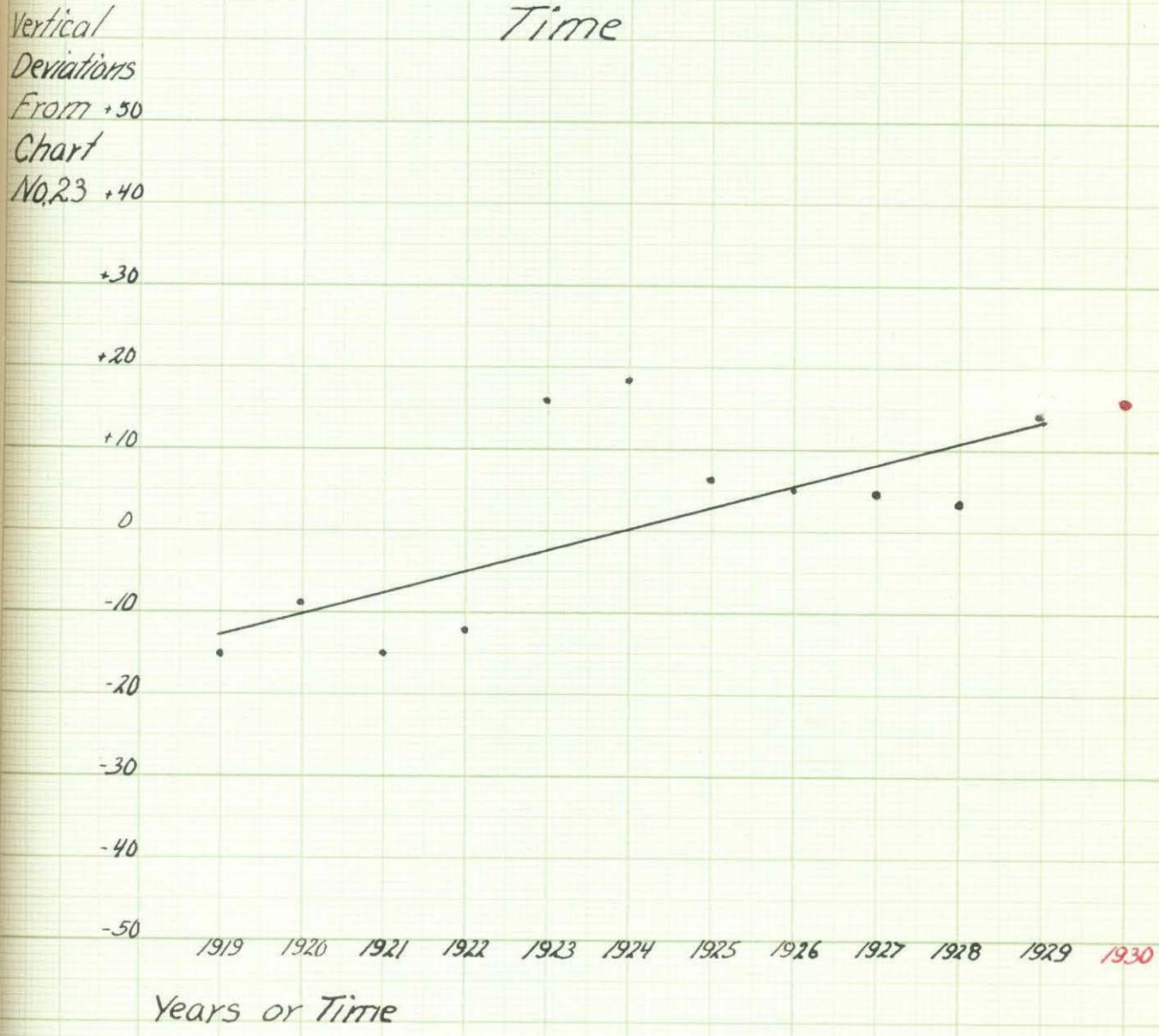


Chart 25

Cars Shipped During July In The U.S.

In Relation With

Average Adjusted Va. Price Early Potatoes

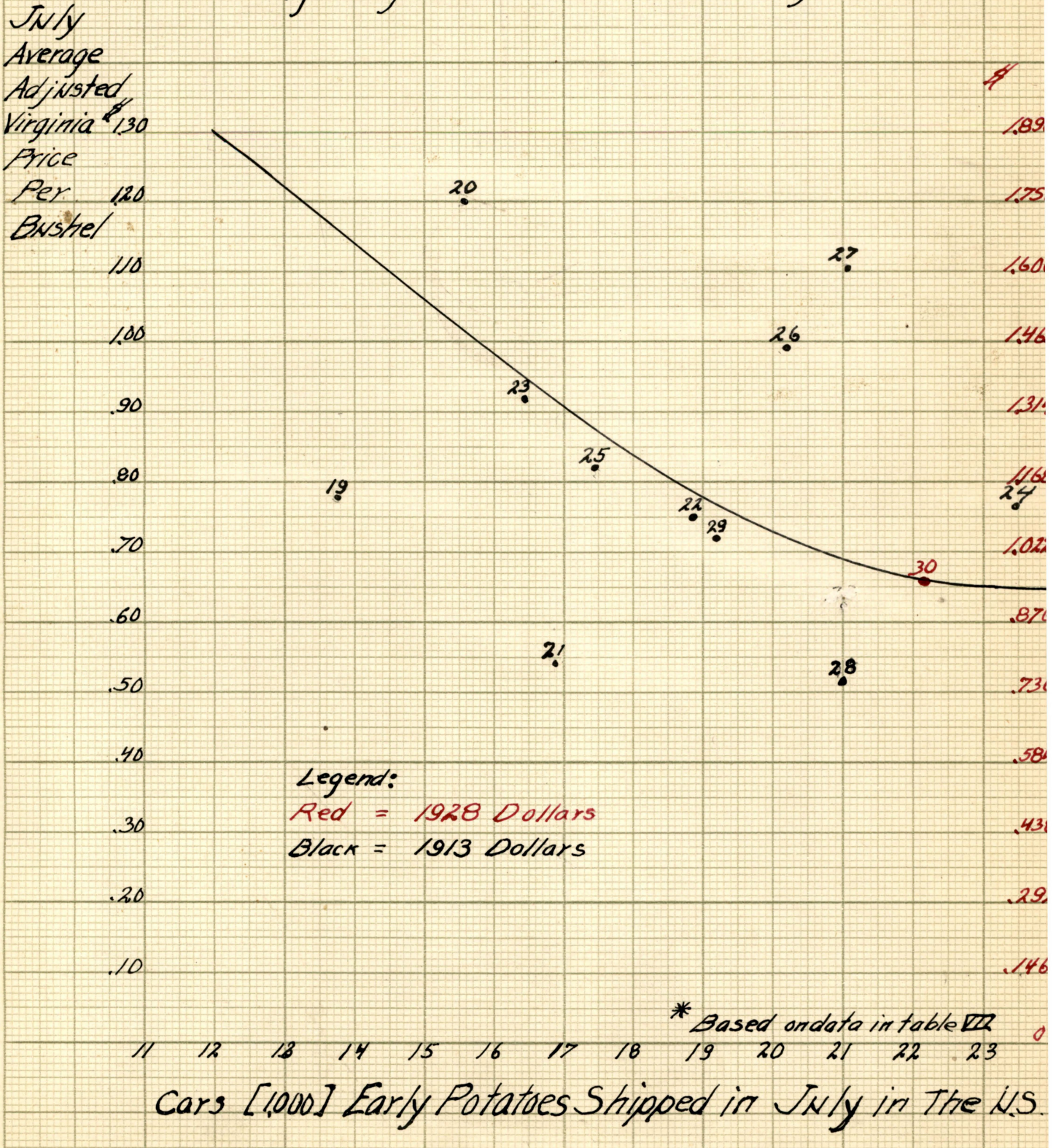
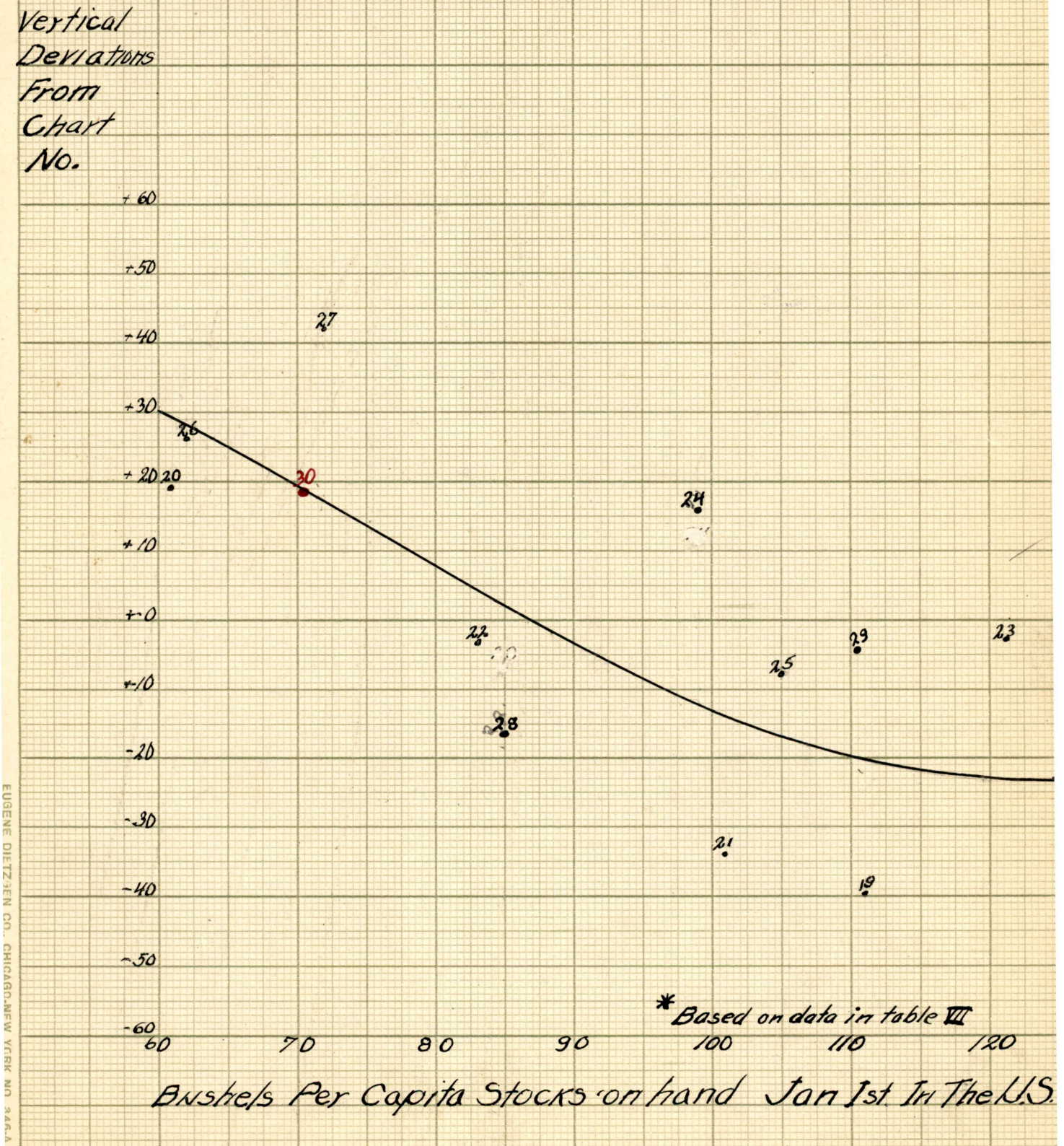


Chart 26

Stocks On Hand Per Capita Jan. 1st. In The U.S.

In Relation With

Vertical Deviations From Chart No. 25



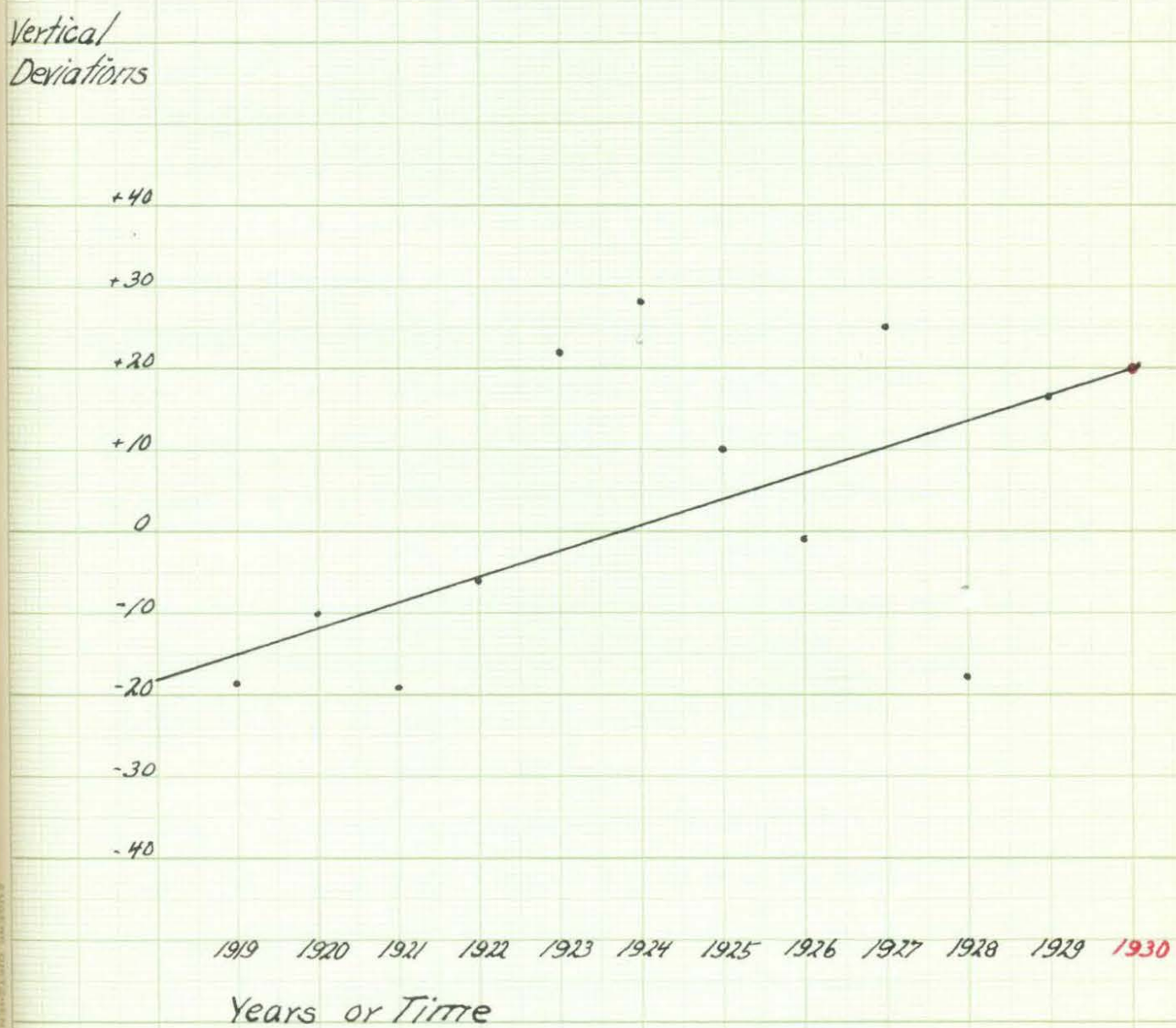
* Based on data in table VII

Chart 27

Vertical Deviations From Chart No. 26

In Relation To

Time



METHOD OF FORECASTING PRODUCTION

The probable production of the early potato crop in Virginia, North Carolina, Maryland, and Kaw Valley is difficult to estimate in advance with any degree of accuracy. The acreage of early potatoes may be obtained with some degree of accuracy, but the yield per acre is an influencing factor in determining the total production.

The number of acres planted, multiplied by the ten year average yield per acre will give, as a rule, a fairly accurate estimate of the total production. This method will be used for estimating the probable production of Maryland, North Carolina, and Kaw Valley, but as the Virginia production is a more important factor in influencing the price of Virginia potatoes than the production of North Carolina, Maryland,and Kaw Valley, a more definite and accurate method of forecasting this production must be relied upon.

The production per acre on land of equal fertility and texture is known to be determined to a large degree by the elements and climatic conditions. For instance, should a drought occur just as the potatoes are beginning to form, the yield per acre would be below normal.

The precipitation during the growing season is the most important of the variable factors that influence the yield per acre. The growing season of early potatoes in Virginia may be said to be in the months of April, May, and June. The rainfall in these months and the yield per acre of early potatoes for the years 1920 to 1929 may be noted on Table [8].

It can be seen from this table that the years having the more equal distribution of rainfall had the highest yield.

As the simplified multiple correlation method was rather successful in forecasting the price from the known production of early potatoes,

Table VIII.- Virginia* rainfall in inches and Virginia early potato yield per acre in bushels
1919 - 1929

Year	April		May		June		Early potato yield per acre
	Normal	Actual	Normal	Actual	Normal	Actual	
1919	3.23	1.61	3.81	3.63	4.22	3.48	123
1920	3.23	4.25	3.81	1.99	4.22	5.05	111
1921	3.23	3.02	3.81	4.72	4.22	1.05	123
1922	3.23	1.88	3.81	3.42	4.22	9.78	111
1923	3.23	3.59	3.81	1.90	4.22	1.43	99
1924	3.23	2.89	3.81	7.47	4.22	6.46	159
1925	3.23	1.74	3.81	1.72	4.22	2.60	102
1926	3.23	2.45	3.81	1.89	4.22	2.69	105
1927	3.23	4.87	3.81	3.57	4.22	4.68	180
1928	3.23	4.24	3.81	2.14	4.22	7.84	174
1929	3.23	1.06	3.81	7.90	4.22	3.35	153

* Rainfall at Norfolk, Virginia.

Statistics obtained from Virginia weather reports and U. S. D. A. Yearbooks 1925, pages 1502, 1503, 1504; 1926, page 1270; 1927, page 207; 1928, page 1114. Virginia April, May and June, 1929, Weather Reports.

this method will be used in forecasting the production of early potatoes in Virginia.

The yield per acre is plotted on the vertical axis of chart 28, and the April rainfall at Norfolk, Virginia, is plotted on the horizontal axis.

The vertical deviations from the line of average relationship on chart 28 that represents the probable yield at a certain April rainfall, were plotted on the vertical axis of chart 29 and the May rainfall was plotted on the horizontal axis.

The vertical deviations from the line on chart 29 that represent the average relationship between the vertical deviations from chart 29 and the May rainfall was plotted on the vertical axis of chart 30, and the June rainfall was plotted on the horizontal axis. It can be noted on this chart that the more recent years are above the line and the former years are below the line.

To offset this factor, the vertical deviations from the line on this chart were plotted on the vertical axis of chart 31 and the time or years was plotted on the horizontal axis.

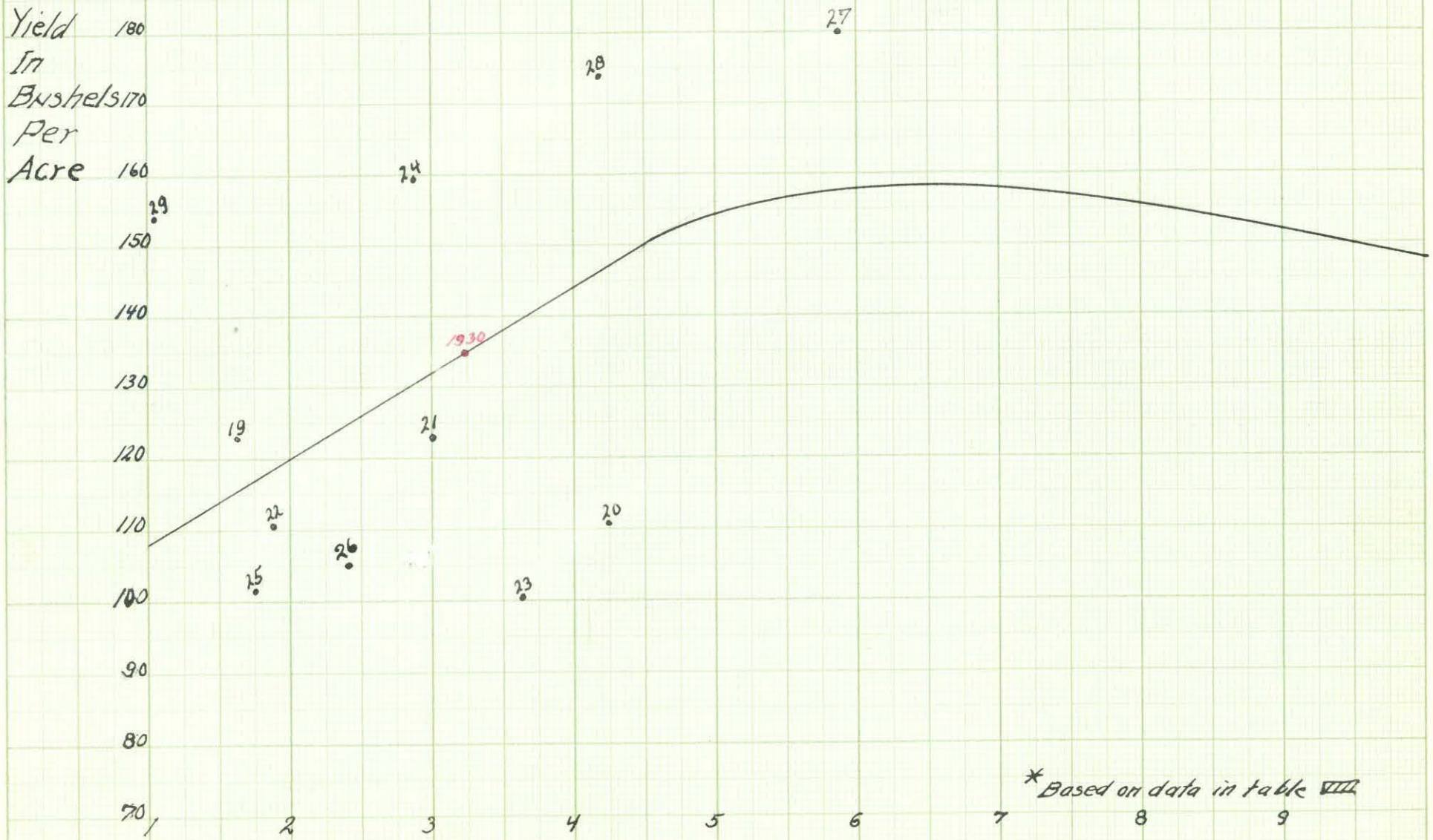
This reveals a good correlation with an upward trend in the yield per acre for the last ten years. This upward trend in the yield per acre may be attributed to a general increase in the application of fertilizer per acre, better cultural methods, and other similar improvements in scientific production.

The upward trend in yield per acre will not continue to increase at its present rate, because the growers will reach a point where the returns from the increase in the yield per acre will not pay them for the expense incurred in the production of this increase.

With this in mind, we can expect the line to flatten out in the near future years.

Chart 28

April Rainfall In Relation To The Va. Early Potato Yield Per Acre



*Based on data in table VIII

Chart 29

May Rainfall In Relation To The Vertical Deviations From Chart No 28

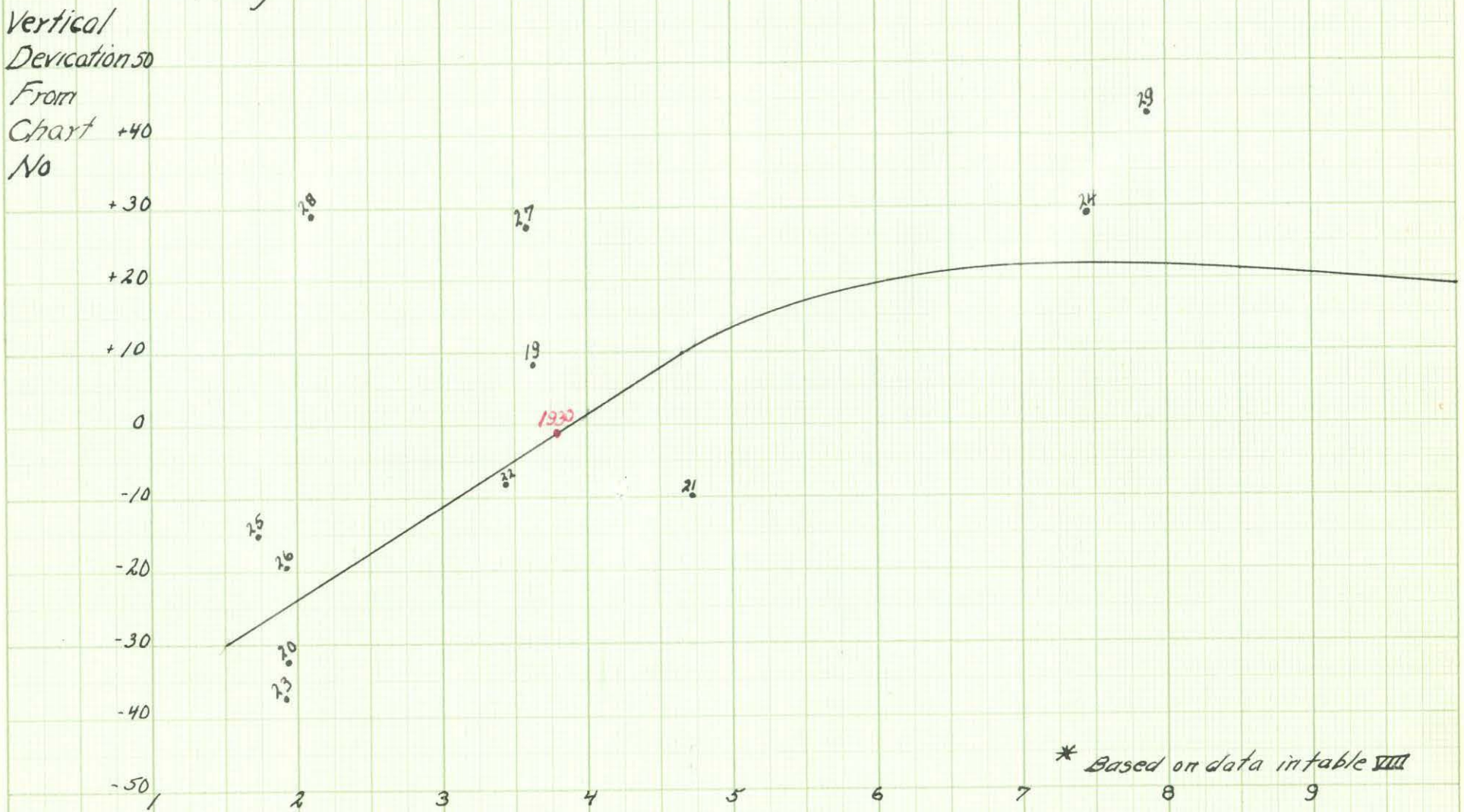
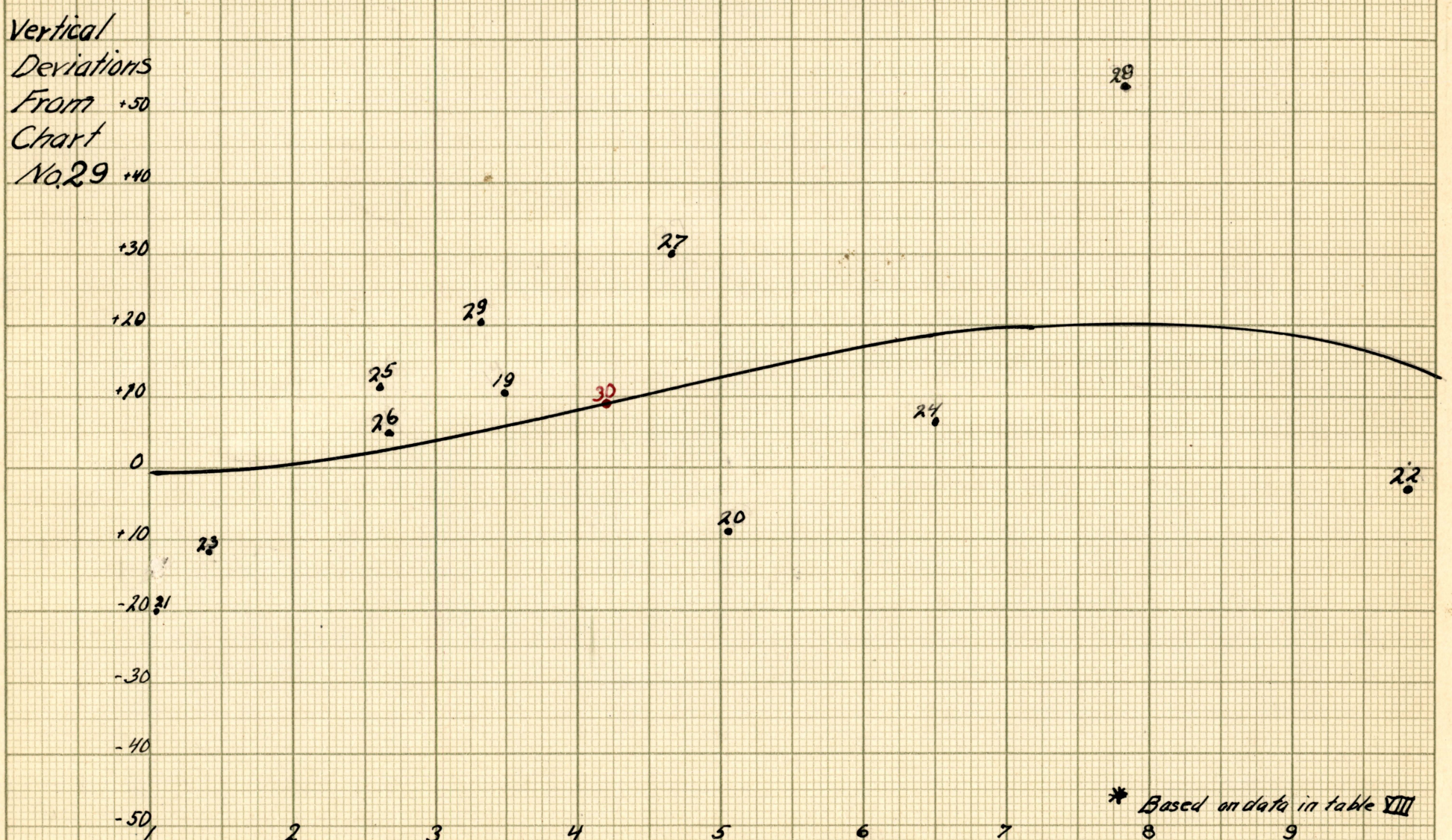


Chart 30

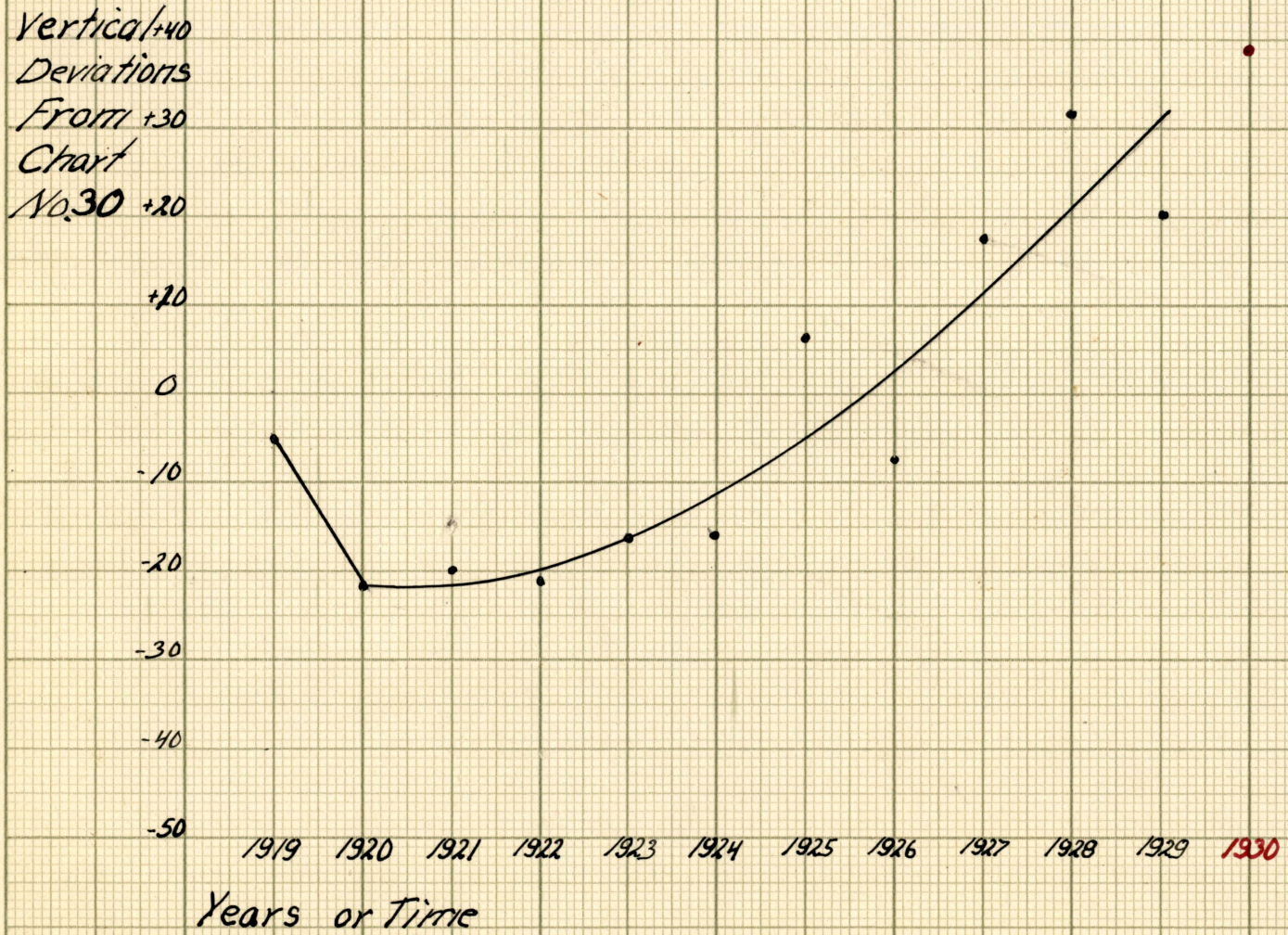
June Rainfall In Relation To The Vertical Deviations From Chart No. 29



* Based on data in table XIII

Chart 31

Vertical Deviations From Chart No. 30 In Relation To Time



Forecasting

From the eleven observations, including the years 1919 to 1929, the factors, and the extent that each influences the production and price of early potatoes in Virginia, have been shown and plotted on charts. The following predictions will be made from the knowledge gathered from these observations and from the use of the charts:

1. The Virginia production of early potatoes in 1930, assuming normal rainfall
2. The Virginia average price for early potatoes in 1930
3. The Virginia June 15th price of early potatoes in 1930
4. The Virginia July 15th price of early potatoes in 1930.

Forecasting the Virginia production in early potatoes

In forecasting the Virginia production of early potatoes, it will be necessary first to obtain the number of acres planted in Virginia and multiply this by the expected yield per acre. The number of acres is noted in Table 9.

To obtain the yield per acre, it will be necessary to use the production forecasting charts. The amount of rainfall that the Eastern Shore and Norfolk sections will have is not known. In this forecast, it will be assumed that there will be normal rainfall for each month.

The normal rainfall for April is 3.23 inches.

The normal rainfall for April is projected from the point 3.23 on the horizontal axis of chart 28 to the intersection with the line representing the average relationship between the April rainfall and the production per acre.

Table IX.- Early potatoes: Virginia expected production in relation to rainfall 1919 - 1929

Year	Corrections: Based on April rain	Corrections: For May	Corrections: For June	Corrections: For time	Expected Yield	Actual Yield	Error	Acres	Expected production	Actual production
1919	115.5	-3.0	+6.5	-5.0	114	123	-9.0	71,000	8,094,000	8,733,000
1920	147.0	-24.5	+13.5	-22.0	114	111	+3.0	91,400	10,410,000	10,143,000
1921	132.0	+10.0	-1.0	-22.0	119	123	-4	94,300	11,220,000	11,606,000
1922	118.5	-6.0	+15.0	-20.0	107.5	111	-3.5	94,200	10,126,000	10,362,000
1923	140.0	-25.0	-0.5	-16.5	98.0	99	-1.0	92,300	9,045,000	9,230,000
1924	131.5	+22.0	+20.0	-11.0	162.5	159	+3.5	100,520	15,700,000	15,983,000
1925	117.0	-27.0	+3.0	-5.0	88.0	102	-14.0	90,050	7,920,000	9,185,000
1926	125.0	-25.0	+3.0	+3.0	106.0	105	+1.0	89,000	9,434,000	9,345,000
1927	153.0	-3.0	+12.0	+12.0	174.0	180	-6.0	78,700	13,690,000	14,087,000
1928	146.5	-22.0	+21.0	+21.5	167	174	-7.0	90,900	15,180,000	15,908,000
1929	108.5	+22.0	+6.0	+31.0	167.5	153	+14.5	77,900	13,048,000	11,961,000
1930	155.0	-1.0	+9.0	+39.0	182.0			83,200	15,000,000	

The intersection is noted on the chart by a red dot. On the vertical axis opposite the dot is the yield of 135 bushels per acre, representing the yield to be expected considering the April rainfall alone.

The normal rainfall for May is 3.81 inches. The normal rainfall for May is projected from the point 3.81 on the horizontal axis of chart 29 to its intersection with the line representing the average relationship between the vertical deviations from chart 28 and the May rainfall. This intersection is noted by a red dot. Opposite the dot on the vertical axis there is revealed a negative correction of one bushel per acre.

The normal rainfall for June is 4.24 inches. The normal rainfall for June is projected from the point 4.22 on the horizontal axis of chart 30 to its intersection with the line representing the average relationship between the vertical deviations from chart 29 and the June rainfall. This intersection is noted by a red dot. Opposite the red dot on the vertical axis there may be read a positive correction of nine bushels per acre.

This gives a total positive correction of eight bushels per acre due to rainfall in May and June.

As there has been a natural tendency for the yield to increase in the last ten years because of factors other than rainfall, it has been assumed that the increase in 1930 will be in the same proportion as in the past.

The intersection between 1930 on the horizontal axis of chart 31 and the line representing the assumed natural increase is noted by a red dot. Opposite the red dot on the vertical axis is a positive correction of thirty-nine bushels per acre.

The total positive correction of forty-seven bushels per acre plus the one hundred and thirty-five bushels per acre, representing the yield per acre

when considering the April rainfall alone, gives an expected yield of one hundred and eighty-two bushels per acre, for 1930.

These corrections are noted in Table 9.

The yield of one hindred and eighty-two bushels per acre multiplied by 83,200, or the number of acres of early potatoes planted in Virginia, gives a total production of 15,142,400 bushels.

The production of 15,142,000 bushels is based on normal rainfall. Should the rainfall be below normal the yield and production can be expected to be below this production. Should the rainfall be above the normal precipitation, the opposite may be expected.

The following factors also influence the yield, but the extent cannot be determined:

1. Adverse climatic conditions
2. Harvesting the potatoes before they mature
3. Insects.

Predicting Virginia average price

To be able to forecast the price of early potatoes in Virginia for 1930, the following factors must be known:

1. The probable value of the dollar
2. The expected Virginia early potato production
3. The expected North Carolina early potato production
4. The expected Maryland and Kaw Valley early potato production
5. The stocks on hand January 1st, 1930
6. The upward trend in the price of early potatoes.

The last two factors mentioned above may be determined with some degree of accuracy. The first four are difficult to estimate. It is impossible to be able to determine at just what figure these factors will be. The value of the dollar, as a rule, varies very little from year to year, but in certain years it varies considerably. For instance, the value of the dollar in 1921 increased 65% over the previous year. In this instance had the price of early potatoes been forecasted in 1921 using the 1920 index, a considerable error would have been made. In this thesis the value of the dollar for 1930 will be assumed to have the same relation to the 1913 average as the year 1928.

The expected Virginia production may be obtained from the production forecasting charts. These charts under average conditions predict a Virginia production of approximately 15,000,000 bushels for 1930.

The expected production is plotted at the intersection between 15,000,000 bushels on the horizontal axis of chart 17 and the line representing the average relationship between the Virginia production and price. The intersection is noted by a red dot. Opposite this dot on the vertical axis is $0.64, representing the price per bushel when considering the Virginia production alone.

The North Carolina production is obtained by myltiplying the average yield per acre for the last ten years by the number of acres planted in 1930.

The ten year average yield per acre, the number of acres planted and the production given in Table 10.

The average yield per acre as given by Table 10 is 123 bushels per acre. The number of acres planted in North Carolina for 1930 is 28000 acres. From this we may calculate the expected production to be 3,500,000 bushels in 1930.

On chart 18 the expected production is plotted on the intersection between 3.5 million bushels on the horizontal axis and the line that represents the average relationship between the deviation from chart 17 and the North Carolina production. The intersection is noted by a red dot. Opposite this red dot on the vertical axis is a negative correction of $0.05 per bushel.

The production of Maryland and Kaw Valley are obtained by multiplying the ten year average yield per acre by the number of acres of early potatoes planted. The average yield per acre, the production and the number of acres planted are presented in Table 11.

The aggregate expected production of Maryland and Kaw Valleys may be expected to be approximately 3,777,000 bushels in 1930.

On chart 19 the expected Maryland and Kaw Valleys production at the intersection between 3.77 million bushels on the horizontal axis and the line that represents the average relationship between the vertical deviation from chart 18 and Maryland and Kaw Valleys production.

The red dot notes the intersection.

Opposite the red dot on the vertical axis is a negative correction of $0.05 per bushel.

The stocks on hand per capita for January 1, 1930, may be obtained by dividing the stocks on hand by the population in the United States. Table 6 presents the stocks on hand per capita.

Table X.- Early potatoes: North Carolina production, yield per acre and acreage
1920 - 1929

Year	Production	Production per acre	Acres
1920	2,305,000	124	18,500
1921	2,201,000	124	17,742
1922	2,447,000	124	19,734
1923	1,765,000	108	16,342
1924	3,640,000	140	26,000
1925	2,144,000	97	22,100
1926	3,480,000	120	29,000
1927	4,320,000	120	36,000
1928	5,267,000	138	46,400
1929	3,300,000	132	25,000
1930	3,440,000	123	28,000

Statistics obtained from U. S. D. A. Yearbook 1923, page 759; 1928, page 806. New York Packer, March 22, 1930.

Table XI.- Early potatoes: Maryland and Kaw Valley production, yields per acre and acreage
1920 - 1929

Year	Maryland production	Kaw Valley production	Combined production	Maryland yield per acre	Kaw Valley yield per acre	Maryland acres	Kaw Valley acres
1920	1,628,000	1,000,000	2,628,000	138	138	11,800	7,246
1921	1,499,000	1,350,000	2,849,000	124	96	12,000	14,000
1922	1,856,000	1,420,000	3,286,000	138	91	13,500	15,600
1923	1,469,000	1,648,000	3,117,000	96	105	15,300	15,695
1924	1,518,000	2,813,000	4,430,000	95	168	15,980	17,100
1925	1,151,000	1,700,000	2,831,000	86	103	13,150	16,500
1926	1,421,000	2,481,000	3,902,000	96	157	14,800	15,800
1927	2,155,000	2,508,000	4,663,000	140	145	15,390	17,300
1928	2,620,000	3,505,000	6,125,000	152	195	17,240	18,160
1929	1,831,000	1,418,000	3,249,000	125	110	14,650	12,890
Predicted:							
1930	2,000,000	1,777,000	3,777,000	119	131	16,850	13,530

Statistics obtained from U. S. D. A. Yearbooks 1924, page 708; 1928, page 806.
New York Packer, March 22, 1930.

The stocks on hand per capita for 1930 are .70 bushels.

On chart 20 the stocks on hand are plotted at the intersection between .70 bushels on the horizontal axis and the line that represents the average relationship between the vertical deviation from chart 19 and the stocks on hand per capita.

The intersection is noted by a red dot.

Opposite the red dot on the vertical axis is a positive correction of $0.22 per bushel.

From chart 21 it has been observed that there has been an upward trend in the price of early potatoes. It has been assumed that for 1930, the upward trend will continue to increase at its same rate, thus giving a positive correction of $0.18 per bushel. Table 12 presents the corrections and expected and actual prices.

The sum of the positive and negative corrections gives a positive correction of $0.30 per bushel. Thus by adding the positive correction of $0.30 to the $0.64 that represents the price to be expected when considering the Virginia production alone, an expected Virginia adjusted price of $0.94 per bushel or $2.82 per barrel is given. Expressing this in 1928 dollars the price may be expected to be $4.08 a barrel.

It must be remembered that the above forecast was predicted from production estimates, while the former years were based on actual data. Should there be any variation in the estimated production the present prediction would be affected. Not considering this, it may be said that there is a 50 - 50 chance of the prediction being within $0.10 per bushel or $0.30 per barrel of the Virginia adjusted price for 1930, or a 3 - 1 chance the actual adjusted price will be within $0.45 per barrel of the present forecast. Expressing the prediction in 1928 dollars, it may be said that the chances of the price being

Table XII.- Early potatoes: expected Virginia average price.

1919 - 1929

Year	Corrections					Expected Price		Actual Price		Error
Year	Based on: Va. prod.	For N. C. prod.	For Md. & Kaw Valley prod.	For stock on hand	For Time	1913 dollars	1928 dollars	1913 dollars	1929 dollars	1913 dollars
1919	$-.92	+.07	+.19	-.12	-.20	$ .86	1.26	$ .87	1.27	$-.01
1920	.84	+.03	+.15	+.31	-.16	1.17	1.71	1.27	1.85	-.10
1921	.76	+.03	+.10	-.08	-.13	.68	.99	.60	.88	+.08
1922	.82	+.02	+.03	+.07	-.09	.85	1.24	.83	1.21	+.02
1923	.90	+.07	+.05	-.15	-.06	.81	1.18	1.00	1.46	-.19
1924	.62	-.05	-.12	-.07	-.03	.35	.51	.49	.72	-.14
1925	.90	-.04	+.09	-.10	+.01	.94	1.37	.88	1.28	+.06
1926	.88	+.05	-.06	+.30	+.04	1.11	1.62	.87	1.27	+.24
1927	.66	-.08	-.13	+.19	+.08	.72	1.05	.93	1.36	-.21
1928	.62	-.10	-.27	+.05	+.11	.41	.60	.28	.41	+.13
1929	.74	-.04	+.03	-.12	+.15	.76	1.11	.82	1.20	-.06
Predicted 1930	.64	-.05	-.05	+.22	+.18	.94	1.37			

between $3.63 and $4.53 are even.

If the present business depression continues through the early potato marketing season, the above prices may be expected to be below the present forecast.

Predicting Virginia June 15th price

Before the 1930 Virginia June 15th price can be forecasted, the following facts must be known:

1. The number of cars to be shipped in June, 1930
2. The stocks on hand per capita January 1, 1930
3. The upward trend in the Virginia June price

The number of cars to be shipped in June, 1930, may be obtained with fair accuracy by multiplying the number of cars shipped the preceding year by the percentage of increase in production for those states that ship early potatoes in June.

There were 19,500 cars of early potatoes shipped in June of 1929.

There is a probable 10% increase in the production in the states that ship in June. Thus there can be expected to be approximately 22,000 cars shipped in June of 1930.

The cars shipped in June may be obtained from Table 7.

The expected June car shipments are plotted on the intersection between 22,000 on the horizontal axis of chart 22 and the line that represents the average relationship between the Virginia June 15th price and the cars shipped in June in the United States.

Opposite the red dot that represents the intersection, on the vertical axis is $0.82 representing the price to be expected in Virginia, when

considering alone the cars shipped in June in the United States.

The stocks on hand per capita January 1, 1930, were .70 bushels.

The stocks on hand per capita are plotted at the intersection between $0.70 on the horizontal axis of chart 23 and the line that represents the average relationship between the vertical deviations from chart 22 and the stocks on hand.

A positive correction of $0.36 per bushel is noted opposite the red dot representing the intersection.

The upward trend in the price of early potatoes on chart 24 presents a positive correction of $0.16 per bushels for 1930.

The sum of the positive corrections is $0.52 per bushel.

The sum of the positive corrections and $0.82 representing the expected price when considering the cars shipped in the United States alone is $1.34 per bushel. Table 14 presents the corrections, actual and predicted prices.

The price of early potatoes in Virginia on June 15th may be expected to be $1.34 per bushel, expressed in terms of 1913 dollars.

The price on June 15th expressed in 1928 dollars may be expected to be $1.94 per bushel or $5.82 per barrel.

These predictions are forecasted from estimations of production. Should the original estimations be incorrect, the forecast would be wrong in the same proportion. Granting that the production estimations are correct, it can be said that the chances are 8 out of 10 that the price will be between $5.37 to $6.27 per barrel on June 15, 1930.

Should the present business depression continue through June the June 15th actual price may be expected to be below the present forecast.

Attention Patron:

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Table XIV.- Early potatoes: expected Virginia June 15th price

1919 - 1929

Year	Corrections: Based on U.S. June cars	Corrections: For stocks on hand	Corrections: For time	Expected price: 1913 dollars	Expected price: 1928 dollars	Actual price: 1913 dollars	Actual price: 1928 dollars	Error: 1913 dollars
1919	$1.15	-.35	-.13	.67	.93	.65	.95	+.02
1920	1.03	+.59	-.10	1.52	2.22	1.58	2.31	-.06
1921	1.00	-.25	-.07	.68	.98	.57	.83	+.11
1922	.94	+.04	-.05	.93	1.36	.87	1.27	-.06
1923	1.01	-.42	-.02	.57	.83	.77	1.12	-.20
1924	.94	-.22	-.0	.72	1.05	.90	1.31	-.18
1925	.99	-.30	+.03	.72	1.05	.77	1.12	-.05
1926	.88	+.56	+.06	1.50	2.19	1.52	2.22	-.02
1927	.86	+.31	+.08	1.25	1.82	1.26	1.84	-.01
1928	.70	+-.0	+.11	.81	1.18	.75	1.10	+.06
1929	.89	-.35	+.13	.67	.92	.67	.98	.0
Predicted:								
1930	.82	+.36	+.16	1.34	1.94			

Predicting Virginia July 15th price of early potatoes

The following facts must be known before the Virginia 1930 July 15th price of early potatoes can be predicted:

1. The number of cars to be shipped in July, 1930
2. The stocks on hand per capita January 1, 1930
3. The upward trend in the Virginia July 15th price

The number of cars to be shipped in July, 1930, can be determined fairly accurately by multiplying the number of cars shipped in 1929 by the percentage increase in production by the states that ship in July.

There were 19,200 cars shipped in the United States in July, 1929. There is expected to be a 15% increase in the production of the states that ship in July.

The total number of cars to be shipped in the United States in July, 1930, may be expected to be approximately 22,100 cars. The number of cars shipped in July may be obtained from Table 7.

The expected number of cars to be shipped in the United States in July, 1930, are plotted on the intersection between 22.1 thousand on the horizontal axis of chart 25, and the line that represents the average relationship between the Virginia July 15th price and the cars shipped in July in the United States.

Opposite this intersection on the vertical axis is $0.65, representing the price to be expected when considering the cars shipped in the United States as influencing the Virginia price.

The stocks on hand per capita January 1, 1930, were .70 bushels.

The stocks on hand per capita are plotted at the intersection between .70 bushels per capita on the horizontal axis of chart 26 and the line representing the average relationship between the vertical deviations from chart 25 and the

Table XV.- Early potatoes: expected Virginia July 15th price, 1919 - 1929

Year	Corrections: Based on U.S. cars	Corrections: For stocks on hand	Corrections: For time	Expected price: 1913 dollars	Expected price: 1928 dollars	Actual price: 1913 dollars	Actual price: 1928 dollars	Error: 1913 dollars
1919	$1.16	-.22	-.15	$0.79	$1.15	$0.78	$1.14	+.01
1920	1.02	+.28	-.12	1.18	1.72	1.19	1.74	-.01
1921	.92	-.16	-.09	.67	.98	.54	.79	+.13
1922	.79	+.03	-.06	.76	1.11	.76	1.11	+ -.00
1923	.95	-.25	-.03	.67	.98	.92	1.34	-.25
1924	.64	-.14	+.01	.51	.74	.77	1.12	-.26
1925	.88	-.19	+.04	.73	1.07	.82	1.20	-.09
1926	.72	+.27	+.07	1.06	1.55	.99	1.44	+.07
1927	.69	+.16	+.10	.95	1.39	1.11	1.62	-.16
1928	.69	+.01	+.14	.84	1.23	.62	.90	+.22
1929	.77	-.22	+.17	.72	1.05	.72	1.05	00
Predicted 1930	.65	+.18	+.20	1.03	1.49			

stocks on hand per capita. The vertical axis opposite this intersection presents a positive correction of $0.17 per bushel for July 15, 1930.

In observing chart 27 it can be observed that the upward trend gives a positive correction of $0.19 per bushel for July 15, 1930.

The sum of the positive corrections is $0.36 per bushel.

The sum of the positive corrections and the $0.65 representing the Virginia July 15th price when considering alone the cars shipped in July in the United States is $1.03 per bushel.

These corrections may be noted on Table 15.

The price on July 15th of early potatoes in Virginia when expressed in 1913 dollars, may be expected to be $1.01 per bushel.

The price on July 15th expressed in 1928 dollars may be expected to be $1.49 per bushel, or $4.38 per barrel.

The above predictions are based upon the assumption that the production estimate will be correct. There is a 50 - 50 chance that the above predictions will be within $0.30 per barrel of the actual adjusted July 15th price, or expressed in 1928 dollars, the chances are even that the price of early potatoes will be between $3.93 and $4.83 a barrel on July 15, 1930.

There is at present a business depression that is exerting a depressing influence on the price of all commodities. Should this depression continue through the period of Virginia early potato marketing, the above prediction can be expected to be above the actual July 15th price.

CONCLUSIONS

I. Late potatoes:

1. The price received by the growers is influenced by:
   a. The value of the dollar
   b. The production per acre
   c. The change in the demand for potatoes
   d. The quality of the crop
2. The price of potatoes in the years of over production is dependent on the cost of harvesting and marketing
3. In years of over production and a low wage scale, larger quantities of potatoes will be eaten than if the opposite conditions existed
4. The price of potatoes is more sensitive to an under production than it is to an over production
5. The demand for potatoes is becoming more inelastic in recent years
6. The demand for potatoes changes with the habits and customs of the people

II. Early potatoes:

The multiple weighting method of forecasting presented only fair results in forecasting the Virginia early potato price.

The 9 to 1 ratio gave the best results in using the multiple weighting method.

The following factors were shown to have influenced the price of early potatoes in Virginia by the simplified multiple correlation methods:

a. The value of the dollar
b. The Virginia production
c. The North Carolina production
d. The Maryland and Kaw Valley production
e. The upward trend in the price

f. The cars of early potatoes shipped in June in the United States

g. The cars of early potatoes shipped in July in the United States

h. The stocks on hand January 1st in the United States

The simplified multiple correlation method was not a success in using it with the production of the eighteen early states in forecasting the Virginia price of early potatoes.

The simplified multiple correlation method presented good results in forecasting an average Virginia price when used against the following:

1. The production of early potatoes in Virginia
2. The production of North Carolina
3. The production of Maryland and Kaw Valley
4. The stocks on hand per capita
5. The trend upward

The simplified multiple correlation method presented good results in forecasting a June 15th price when used against the following:

1. The cars of early potatoes shipped in June in the United States
2. The stocks on hand per capita January 1st
3. The upward trend in price

The simplified multiple correlation method presented good results in forecasting the Virginia July 15th price, when the following factors were used:

1. The number of cars shipped in July in the United States
2. The stocks on hand per capita January 1st in the United States
3. The upward trend in price

The influence of the following factors cannot be determined by the simplified multiple correlation method:

1. The influence of speculation
2. The influence of the delayed season
3. The influence of the quality of the crop
4. The influence of the business conditions at the time of harvesting the early crop

Assuming average conditions, the following early potato production may be expected: in 1930

1. Virginia, 15,000,000 bushels
2. North Carolina, 3,500,000 bushels
3. Maryland and Kaw Valley, 3,777,000 bushels

Assuming average conditions, the following Virginia price and price expected as expressed in 1928 dollars:

1. Average price of approximately $4.08 per barrel, with a 50-50 possibility of the price being between $3.63 and $4.53 per barrel

2. June 15th price of approximately $5.82 per barrel, with an 8-out of 10 possibility of the price being between $5.35 and $6.25 per barrel

3. The July 15th price of approximately $4.38 per barrel with a 50-50 possibility of the price being between $3.93 and $4.83 per barrel

Should the present business depression continue through the marketing season of the Virginia early potatoes, the present price prediction will be higher than actual prices of 1930.

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