Here's Outline of the Spavinaw Project

By H. A. FRESSEY.

Following is the outline of the Spavinaw project as given by H. A. Fressey, engineer, who made the survey for the city to determine the most practical water source. The address was made June 13 at the municipal auditorium before a mass meeting of citizens.

"Taking up the water problem again, it is a little difficult to know just what ground to cover because some of you are very, very familiar with every detail, and possibly some of you have not yet taken up the study at all.

"Outlining just for a moment the general plan: Spavinaw creek has a drainage area of slightly over 400 square miles. It flows into the Grand river from the east and drains the Ozark country where the rainfall is about 44 inches as a normal, that is, an average, 44 inches in a year. This is about eight inches more rainfall than we have at Tulsa and the region hereabout.

"We have the United States government rainfall record of Tulsa that has been maintained for some 25 or 30 years and we have like rainfall records over in the Spavinaw region both north, south and east, so that we have unusually good records upon which to base our estimate of fall.

Is an Unusual Stream.

"Spavinaw creek, I need not say, is a very unusual stream for Oklahoma. It carries practically no silt. It is clear the year round. It is so clear that I am sure that it would feel sorry of you as it has others recently in driving the car into the stream thinking that it was comparatively shallow. You can see the bottom even when the depth is several feet, counting the pebbles. You have, therefore, a clear water.

"Analysis shows that you also have a pure water. It is unusually good for any stream in this southwest country where hardness and alkalis are so common. Analyses have been made and have been submitted to various manufacturers and to the railroads and they all say that this water is entirely satisfactory to them in their use in boilers and various uses in factories and shops.

"As a potable water, that is as a drinkable water, it is as good as Tulsa or any other city could possibly desire. It is free from contamination, free from salt, practically free from color. It will not require treatment although it has been suggested in the report that it might be well to continue the chlorination just as you are doing now, merely as a precautionary method and because it is thought well to use chlorine in any water that is supplied to a city. If there is any water supply of this kind that would not require chlorination I am sure that we can get Spavinaw on the same basis.

No Filtration Necessary.

"No filtration will be required, no coagulants of chemicals would be required prior to filtration, so that the water would come to you just as it comes from the mountain stream except that you would use the chlorination.

"The plan is to build a dam on Spavinaw creek about three miles or three and a quarter above the mouth of Spavinaw and create there a reservoir. This reservoir is not necessary for the supply of the drinking water and potable water in the city, but merely to create power and to act as a surety you might say in case of extreme requirements of your city. There never has been a time as near as any of the records show when you would not have at least five or six times enough water to supply the city of Tulsa when you have reached the population of two hundred to two hundred fifty thousand. That is on a basis we will say of twenty million gallons per day or thirty second feet.

"The ordinary flow of Spavinaw, which I have measured time and time again, will run about five hundred second feet, which is sixteen times the water that would be required by a population of say a quarter of a million. So that there will always be sufficient water.

How Water Gets to Tulsa

"The water is carried by gravity from this dam down to the mouth of Spavinaw and is there raised to a reservoir on the hill south of Spavinaw creek. The power necessary for pumping is created by the hydro-electric plant at the dam. There will however be months and sometime two months in the driest years that you might be short of water for pumping—please note, for pumping not for drinking—and you have therefore an auxiliary plant by which the power is created to supply the demand at such a time.

"In order to make use of any spare powder that there may be in the city it is planned to carry the double transmission line directly to the city and connect it with the present electric plant here so that if at any time the city should be short of water for pumping and therefore short of electric power, the juice could be taken from any of the plants in the city, carried over the same line and used at the pumping stations.

"If the city does not care to make such a contract—and of course no such contract exists now—it would use its auxiliary plant which is included in the estimate and is located at the same point as the hydro-electric plant, using the same generators but different motive power. And this auxiliary plant, with the hydroelectric, assures absolutely twelve months' service, that is, pumping capacity for every day of the year.

Surplus Power for Sale

"During much of the year there will be more power at the dam than is required for pumping, and this power if the city so desires, could be used for lighting the streets, or could be sold in a lump to any of the present companies here. In estimating the cost of operation we have not taken into account the income from the sale of this electric power, although it is very evident that such power would give the city a very appreciable return.

"Going back then to the conduit. The water is raised by this hydro-electric power at the banks of the Grand river to a reservoir and is carried from this reservoir by gravity through a forty-two-inch concrete conduit to a point west of Pryor Creek and there raised a second time by the same power, that is, by the hydro-electric power, to a reservoir, and then flows by gravity to a third reservoir and is raised in the like manner. That is, as far as the conduit is concerned the water flows by gravity; it is raised by this hydro-electric power to the reservoir to a sufficient elevation to allow it to flow by gravity. This prevents any pulsations on the pipe, any undue pressures, and brings the water as I say into the city by gravity. The only expense that is attached to this pumping is the first cost of the machinery and its maintenance, of course, and such power as may be required during perhaps a part of two or thre months of the dry years. There will be years when you will have sufficient power to carry the water without the aid of auxiliary steam.

"The water is carried to a reservoir near the city limits on the high ground, there a reservoir of 80,000,000 gallons capacity is planned, the object being that there shall be always sufficient water close to the city so that you may be protected against any undue accident or particularly that you may have always more than sufficient water for fire protection. Your present pumping plant can be used, the water carried from the large reservoir to this pumping plant by gravity and the power house, pumps and the entire present apparatus can be utilized in this layout.

Cost $4,800,000.

"The first cost of this plant will be $4,800,000 in round numbers. That figure is a little high. I am satisfied, both from the result of the estimate of the many engineers that have been over it, and also from the contractors who have examined the ground and the plans, that the plant can be built for a smaller sum.

"I will not attempt to give you unless you desire, the itemized statement here. It has been published and, of course, it is contained in the reports on file here in the city hall. Suffice it to say that the large item is the conduit, amounting to $2,000,000. This conduit, built, as I say, of reinforced concrete, will carry more than sufficient water for your purposes and will last indefinitely. I have records here, and they are on file with your city authorities, of conduits that have been built in a like manner and have been in service for over 30 years without failure, and even without repairs. It is sufficiently strong to more than carry the pressures that will come upon it, but as a precaution for safety we have allowed in the estimate that wherever the pressures shall be over 100 feet we shall use cast iron. Cast iron will also be used at all the river crossings and at all points, as at the pumping station, where there will be greater pressures due to pulsations of the pumps.

Can Be Easily Checked.

"If anyone has any question as to the safety and the durability of this type of construction it is a simple matter to check it, as there are hundreds of them in the United States at the present time, as well as in Canada and in Mexico. Such conduits have been built in varying temperatures and varying pressures. They have built at points where the temperature was hotter and colder than in Tulsa, and they have stood the test of time. As you know, concrete becomes stronger as time goes by; your contractor would give you a guarantee during the first period of its life, and having passed that first year or two the pipe has passed its critical period, if there is one. Your contractor, I am sure, will be perfectly willing, if he be the right kind, to guarantee you against cracks, breaks or leaks and any such difficulty that might occur would create an expense for him and not the city.

"The operation of the plant is certainly simple. There is no motive power that is any more simple than the hydro-electric. You have the water wheels and the generators. You have a man to look out for the plant and the gates. But there is no fuel and no expense that is attached to the handling of fuel.

Cost 1 2-3 Cents a Thousand.

"The cost of delivering the water to the city of Tulsa, estimating we will say on the basis of ten million gallons per day, which by the way is more than you are using now but is not much more anyway than you will be using when you have good water, on that basis the cost per thousand gallons of water delivered to the city, delivered to the customer in the city, will actually be less than the cost today. In other words you are paying about two cents a thousand gallons for the filtration of water. This water can be delivered from Spavinaw, including the power and all attendancy up-keep, depreciation and repairs on the ten million gallons basis for less than the two cents; that is, about one and two-thirds cents per thousand gallons.

"As time goes on and your consumption increases the cost per thousand gallons will correspondingly reduce, so that on the basis of twenty million gallons per day delivered to the consumer in Tulsa you will pay about a cent and a quarter to a cent and a third per thousand gallons. This you understand does not include the interest on the bonds but does include everything up to the interest on the bonds. I have made estimates covering the interest but as you have bankers here who are no doubt better prepared to handle that than I, I will keep off the subject entirely. But there is one thing that is dead sure, that on the basis of the estimates, the estimated interest as was read at the chamber of commerce directors' meeting today, the water delivered to the city of Tulsa will cost no more per thousand gallons than the present water that you are getting from the river, and I am sure that the Spavinaw water will be far more satisfactory to the citizens.

Collinsville Woman Dead.

Mrs. H. H. Maxwell of Collinsville died at 2 o'clock yesterday morning at a hospital as the result of an operation Friday night. Her body was removed to the Mitchell-Fleming undertaking establishment and sent to Collinsville at 1:45 o'clock yesterday afternoon. From Collinsville the body will be sent to Thayer, Kan., for burial. Mrs. Maxwell is survived by her husband, H. H. Makwell, of Collinsville.

Gregory Infant Buried.

Ethel L. Gregory, infant daughter of William and Mary Gregory, corner of Second and Francis streets, West Tulsa, who was born June 14, 1918, died June 27, and was buried yesterday afternoon in Oak Lawn cemetery. The body was prepared by Mowbray's.

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Summer Frocks---New in Style and at Most Attractive Prices at *Vandevers*

Practical individual and charming summer dresses are here in all manner of styles tomorrow, at prices of the most attractive kind.

Lots and lots of very smart people think there is nothing like having a number of smart gingham frocks such as we offer tomorrow. Voiles and Organdies have their votaries and with good reason too—for they are extremely cool and smart looking. We advise that you inspect these summer styles tomorrow while the sizes and styles are yet complete.

Third Floor—The prices range from a modest $6.50 and up to $35.00

Summer Skirts---Pleasing Styles in Silk and Wash Materials

We would like you to see these new skirts tomorrow because they are the kind it is hard to get enough of. Just as there are certain dressmakers and tailors who seem never to create anything but the artistic and correct, so here is a maker of skirts whose designs are never anything else but excellent. Not that the prices are high, but that the man is an artist. These skirts are of several styles for the occasion of summer, as the skirt occupies such an important place in outdoor styles this collection is very interesting. Some of the materials in wash skirts are gaberdine, organdie and voile, at prices ranging from **$4.50 up to $30.00.**

The silk skirts are fashioned of Georgette, Kumsi Kumsa, Fantasi, Baronet, Tricolette, Paulette, Faille and Pussy Willow Taffeta, at prices ranging from **$17.50 to $45.00.**

Monday Offerings from That Popular White Goods Section.

Fancy Imported Organdies; very fine and sheer, 40 inches wide; regularly $2.50. Special Monday **$1.98**

Colored Art Crash; 17 inches wide; all pure linen; regularly 59c. Special Monday **29c**

Fancy Bath Towels; extra large size; pink, yellow, blue and lavender borders; regularly 85c. Special **69c**

36-inch Cross Bar Nainsook of very fine quality; regularly 65c yard; put up in attractive box containing ten yards. Special, Monday, the box **$5.00**

We Have a Complete Line of New Sweater Styles.

Second Floor

The sweater is a practical garment, a fashion garment and a garment indispensable for its appearance and the remarkable service one may obtain from its use. We have all the new sweater styles from the plain V-neck (good old standbys year in and year out) to the very stylish and vastly becoming silk knitted ones. Prices range from **$6.50 up to $35.**

Bargain News From the Shoe Department

Second Floor

Women's White Repp Boots; welt soles, concave leather heels, long lasts, all sizes, regularly $7.50. Special **$4.45**

Women's Black Kid Oxfords; turned soles, high concave leather heels, long vamp, regularly $6.50. Special **$4.45**

Women's Black Patent Kid Pumps; high leather concave heels, turned soles, medium vamp, all sizes, regularly $6.50. Special **$4.45**

Women's and Misses' Black Kid Pumps; military heel, welt soles, an extra good value at the regular price of $6.00. Special **$4.45**

Women's and Misses' Black Kid Pumps; military heels, welt soles, medium vamp, all sizes, regularly $6.50. Special **$4.45**

Women's Patent Kid Colonial Pumps; neat buckles, covered Louis heels, turned soles, regular $8.50. Special **$5.95**

Women's Black Kid Colonial Pumps; finished with pretty buckle, covered heels, turned soles, regularly $8.50. Special **$5.95**

Women's Light Weight Brown Calf Pumps; covered Louis heels, turned soles, long vamp, regularly $8.50. Special **$5.95**

Women's Patent Kid Colonial Pumps; large Grecian buckles, covered Louis heels, turned soles, long vamp, regularly $10. Special **$6.65**

Women's Patent Kid Oxfords; long, slender vamp, high covered Louis heels, turned soles, all sizes, regularly $10. Special **$6.65**

Children's Patent Kid, Dull Kid and White Canvas Strap Pumps; all sizes and widths, regularly $3.50. Special ... **$2.75**

Children's Dull Kid, White Buck and Brown Oxfords; all sizes and widths, regularly $4. Special **$3.15**

Children's Dresses for Play Time or Any Other Time

Only a mother knows and fully appreciates a combination of well chosen materials, good sewing and finish and truly childish lines. That is why we have established this children's business in the confidence of the mother. They know that every dollar brings a maximum of return. The children's section has some very good offers to make for tomorrow, indicated in this list following:

Children's Gingham Dresses in plaids, stripes, checks and plain colors; sizes from 6 to 16 years; regular prices from $2.50 up to $12.50. Choose Monday at **20 PER CENT OFF**

Children's Wool Coats; about 30 coats in this special lot; sizes from 3 to 14 years; prices regularly from $7.50 to $25.00. Choose Monday at **HALF PRICE.**

You Will Enjoy and Profit By a Visit Among the Waists

These are the days when the waist is queen of the outdoor fashions—that is, for informal wear.

We are offering every day many desirable waists at prices that will make them the most attractive purchases because they are but a part of the higher priced figures at which waists of exactly equal quality were priced at only a week or so ago. One of the lines which is an exceptional bargain is advertised special tomorrow.

One Table of Children's Summer Hats

Fancy Straws and Milans; all colors and shapes; regularly up to $6.50. Monday special **$1.98**

$8.50 and $6.50 Georgette Waists for $4.75.

Both plain and fancy georgette, in flesh, white, lavender, maize, sunset, red, green, blue, gray and pink and endless variety of styles and trimmings. Not a blouse in the lot selling for less than $6.50 and up to $8.50 regularly.

Third Floor

A Well Selected Stock of Parasols

The best from parasoldom, and fullest possible selections of the moderate priced styles—all being reliable as to materails and strongly built as to frames.

This is a terse but truthful statement of the advantages of buying your parasol here among these big selections, some splendidly good examples ready for tomorrow's buyers.

Children's, from $1 up to $4
Women's, from $4 up to $15

The Suits for the Briny Dip!

We offer for your approval and selection tomorrow an unusual collection of Bathing Suits for children and women.

These suits are from a manufacturer who does not merely "make bathing suits," but who interprets the style lines with unerring correctness and a high degree of skill. Suits in wool and cotton.

For Children, from $1.75 up to $2.50
For Women, from $3.50 up to $14.50

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Merchandise charged the remainder of this month will be on August 1st statement.