# Observer-United Press Scoops Many, And Big Ones

Emperors, stateman, warriors and a staff of newspaper correspondents circling the globe, have worked together in the colums of the Observer during the last twelve months to make 1915 the most wonderful year for news in the history of journalism.

Through the United Press, the Observer has been enabled to tap the European war areas, the foreign and domestic field for exclusive news throughout the year. The list of correspondents who have given this paper its stories of the war, is headed by Ed. L. Keen the European manager of the United Press. Among those associated with him have been William G. Shepard at early battle fronts; William Phillip Simms in Paris and W. Ackerman in Berlin. Henry Wood in Rome and Southwestern Europe, Wilbur S. Forrest in London, Charles P. Stewart with the Ford peace expedition and others.

The starting sheet of all these news reports last New Years day with the story of the destruction of the British battleship Formidable, the, Observer has received over the United Press wires during 1915 a continuous stream of similarly exclusive stories.

When the Russians were finally driven out of East Prussia last winter it was the United Press that had the story of the titanic struggle in the frozen snows. When Count Zeppelin felt the time had come to defend Germany's air raiding monsters he did so through the United Press and Observer Dr. Von Bethmann Hollweg, the German Chancellor, made the same selection to announce to the world after the fall of Warsaw, what Germany was still fighting for. The Prime Minister of Bulgaria, through the United Press proclaimed Bulgaria's final terms for intervention in the war just before German diplomacy won its victory at sofia.

The fall of the French ministery, the finding of the body of Daniel Frohman, the description of the first Zepplin raid over the heart of London, the story of the war's first battle between submarines and the Bulgarian attack on the American flag at Monastir are a few other events of through the United Press, was albe to give its readers in advance of its rivals.

Count Okuma, the Japanese Premier sent to the Observer over its United Press service exclusively its story of Japan's ultimatum to China concerning the readjustment of international relations in the Orient.

When Yuan Shi Kai was chosen Emperor of China he too made sole use of the United Press to announce the reasons for his acceptance of the office.

Nearer home, John D. Rockefeller told of his objections to the Anglo-French war loan in an exclusive United Press story to the Observer. Over the Washington wire of the United Press the Observer was informed of William J. Bryan's reasons for resigning as Secretary of state long before the news was known elsewhere.

So through the year the U. P. wires have brought to the Observer beat after beat and scoop succeeding scoop, among which have been the following:

Jan—1 Beat on the sinking of the British Battleship Formidable.

Jan—5 Beat on the sinking of the many of Cardinal Mercier of Belgium.

Jan—14 Beat on resignation of Governor Blease of South Carolina.

February —3 Exclusive story of first appeal of Polish Women for assistance for devasted Poland.

February—6 Exclusive interview with Prime Minister Pashitch of Servia on conditions in his country.

February—13 Beat on German Ambassador von Benstorff's announcement concerning Germany's submarine war zone.

February—15 Exclusive interview with the German Crown Princess Cecile about German women and the war.

February—23 Exclusive interview with Lord Charles Beresford predicting that Germany would engage in no submarine attacks that might lead to war with America.

February—24 First description of Russian defeat in the snows of East Prussia under the eye of the Kaiser

February—25 First interview granted by the French Prime Minister, M. Viviani, since the beginning of the war.

March—3 Exclusive interview with M. Augagneur, French Minister of Marine, declaring Allies would prevent all ships reaching Germany.

March—6 Ahead all day on the fire aboard the La Touraine.

March—10 Ahead on the news of

(Continued on page 11)

## DAM IS READY.

### History

April 19th to 22nd, 1915, a preliminary survey was made to determine the feasibility of a storage reservoir on Beaver Creek to augment the insufficient water supply of the City of La Grande. A contour was run around the so-called Beaver Meadows at an elevation of 25 feet above the low water level, at the narrow canyon at the lower end of the meadows, and as a result it was found that a dam of 25 feet high would store about 150 million gallons of water. It was also found that if a dam 30 or 40 feet high were built, it would permit the use of a natural depression, entirely removed from the dam, as a spillway, thereby simplifying the construction of the dam.

Acting upon the report of the Engineer, filed April 26th, 1915, the City Commission ordered that a permanent survey of the reservoir and dam site be made, and an estimate be prepared comparing the cost of different types of dams, suitable for the particular site in question.

Following out the instructions of the Commission, the permanent survey was made July 3rd to 19th 1915, and as a result, it was found that a dam 30 feet in height would flood an area of 47 acres, storing about 200 million gallons of water. The commission then acting upon the report of the Engineer, filed August 4th, 1915, decided to construct a masonry dam of the arch type, the construction camp having already been established July 25th.

The work of clearing the site was begun at once, and on Aug. 9th, excavation was started for the foundation of the dam. From this time on, work progressed as rapidly as equipment and accomodations for men and teams would permit. The last of the concrete was poured Nov. 5th, the spillway completed Nov. 8th, and the morning of Nov. 9th camp was broken and all the remaining supplies and equipment, other than those left at the camp for future use, were loaded and started on the way to town.

### Catchment

The catchment to the dam has an area of 16 square miles, is roughly rectangular in form, with an extreme length of about 5 and 1-2 miles and a width of 3 and 1-2 miles. It is a mountainous area, entirely within the U. S. Forest Reserve and broken by numerous water courses. Some of the slopes leading down to the channels are steep, others gradual, practically all being covered with more or less heavy growths of Fir, Tamarack, Spruce and Pine. Most of the area is also covered with a thick second growth and only under the rarest of conditions will the storm discharge be of a torrential character. In this connection it is interesting to note that he catchment area is enirely free from the habitation of human beings. Neither is stock allowed to graze thereon, hunting and fishing even being forbidden. It is, therefore, impossible to conceive of a more pure natural water supply, and in this regard the City of La Grande is unexcelled.

### Rainfall

Government records give the average rainfall at La Grande as 19 inches annually and that at the head waters of the Grande Ronde probably 35 inches. It is therefore safe to assume the average annual rainfall on the Beaver Creek water shed to be 30 inches. No effort however will be made to compute the probable run-off from the rainfall data, it being considered more accurate to use as a basis the discharge of the Grande Ronde River at Hilgard. U. S. G. S records are available, giving the discharge of this station for the past 12 years.

### Run-off

Dams are sometimes built and later it develops that the run-off is some years insufficient to fill the reservoir or supply the needs for which the dam was built. We have an example of this very close at hand, in the Willow River Dam in Malheur County, near Brogan, Ore.. Here a large dam was constructed based upon the record of discharge for one year only, 1910. To date the dam has been only about one-third full. Much suffering, privation, anxiety and loss has resulted, both to capitalists and settlers on the land below the dam.

This incident is cited to show the importance of making a thorough investigation of the water resources whenever a storage or water supply proposition is considered.

Records are available as stated above, giving the discharge of the Grande Ronde River at Hilgard, from 1903 to 1915. This station being only a few miles from the mouth of Beaver Creek, and only about 18 miles from the dam site, any error that may occur in figuring the run-off per square mile of catchment area above the dam to be equal to that computed from the records of the Hilgard station, will be on the side of safety. For not only will the run-off be greater as the altitude increases but the variation in run-off will be less.

The lowest run-off during all the period for which records are available occurred in 1914 and 1915, and was only 55 million gallons per square mile for a period of 12 months. This for an area of 16 square miles gives a total run-off of 880 million gallons. The City's yearly consumption does not exceed 350 million gallons, so even during the dryest period of 12 months occuring in 12 years there was more than double the water necessary for the present city consumption. It remains then only to show that a storage of 200 million gallons is sufficient to over come the deficiency occuring during a portion of the year. Based upon the records of 1915, the dryest year on record, and assuming a daily consumption of 1 million gallons, it is found that a storage of 80,000,000 gal. is enough to overcome the shortage occurring during a period of 12 months. There has not been a year since the establishing of the gauging station at Hilgard in 1903, when this amount of water could not have been stored, in addition to the current consumption, during the month of June alone.

### Reservoir and Dam Site

In outline the reservoir is oblong, with an average width of about 500 feet and an extreme length of 2800 feet. The capacity of the reservoir at the level of the crest of the spillway is 200 million gallons, covering a surface area of 47 acres. At the point selected for the dam the canyon had in its natural state a bottom width of 20 to 30 ft. and at 30 ft above the bottom a width of 140 ft. Out croppings of bed rock occurred on both sides of the canyon and solid rock was encountered at depths varying from 2 feet to 8 feet below the surface. Directly under the stream bed at a distance of about 4 feet a hard mineralized material was encountered, and in this material excavation was carried on to a depth of nearly 26 feet before a suitable foundation was obtained. This peculiar material was absolutely impervious to water, and no water entered the trench during the entire period of construction, except at the seam between this material and the loose rock gravel of the stream bed. Even here the seepage was so slight that a small hand pump, in operation only a few minutes twice daily, sufficed to take care of all the water that came into the trench.

The spillway is located about 300 feet from the West end of the dam and was made by deepening a natural depression in the rocky ridge which serves as the West abutment for the dam. It has a bottom width of 40 feet, a maxium depth of 11 feet with sides sloping one to one. The same material was encountered here as under the bed of the stream and its nature was such that it was not thought necessary to pave with rock or concrete. This, however, can be done later should the action of the water be found to wear the surface of the spillway to an appreciable degree, which is not deemed likely.

### Design of Dam

The narrowness of the canyon and outcroppings of bed rock on either side suggested an arch dam as an economic type for the location. Comparative studies with an earth fill dam as a practical alternative, confirmed the selection of the arch type. A rubble masonry structure was first decided upon, but because of the poor quality of sand available this plan was abandoned and a reinforced concrete design adopted.

The requisite cross-section of the dam was determined by the well-known formula,—T equals R. P. over S. in which 'T' is thickness at depth "D" and "P" is the unit pressure at depth "D" and "S" is the allowable unit stress in the concrete. The values finally adopted in the design of the dam were: Stress 16.5 tons per Sq.Ft., radius 100 feet. With these values the equation for thickness became,—"T" equals .189 D.

With these values the theoretical triangular dam section has a vertical front face, and a back face on a batter of 2 1-4 inches to the foot. As actually built, however, all that portion above the ground was widened to meet the practical necessities which govern a dam top.

That the stress per square foot on the Beaver Creek dam is considerably less than many other well known dams of this sort is proven by engineering figures. Here, for instance are some accurate data from authentic engineering records:

At Bear Valley, Cal., the depth of water against the dam is 48 feet as compared to 30 at Beaver Creek; the stress per square foot at Bear Valley is 61 tons. At Beaver Creek it is 14.5.

The depth of water at Upper Otay, Cal., is 75 feet with a stress per square foot of 61 tons.

Crowley Creek has a water depth of 63 feet compared to the local depth of 30, and has a stress of 26.6 tons. Other stresses that might be inummerated are: Goodwin dam, Cal., 21.4; Winchester, Ky., 35.8; Lewiston, Idaho, 34.2; Triunfo Creek, Cal., 27; Cheyenne, Why., 9.1; U. S. R. S., Cal., 16.5 tons per square foot.

The Meer Allum dam in India furnishes an interesting example of arch dam construction Although constructed prior to 1800, of brick masonery, 39 feet high, and only eight and half feet thick at the base, so far as it is known is still standing

### Spillway

No stream discharge records being available, the determination of the spillway capacity necessary for safety became largely speculative. However from records of the U. S. G. S. it appears that the maxium discharge of streams in this locality does not exceed 12 to 15 second feet per square mile of drainage, area. Thus a discharge of 200 to 300 second feet is to be expected from an area of 16 square miles. The spillway is designed with a capacity of 400 second feet before overtopping the dam will occur. The 30 inch sluice-gate also has a capacity of 200 second feet with reservoir full, making a total of 600 second feet spillway capacity which is considered to be ample.

### Outlet System

The discharge of water from the reservoir is effected by pipes controlled by standard sluice-gates, the outlet to the city also having a standard screw valve. The outlet to the city is protected by two sets of screens, removable for cleaning. In the bottom of the screen well a 4 inch outlet is provided for flushing.

The gravel used was that found in small deposits along the stream bed, from one-quarter to one and one-half miles distant. It varied greatly in size and quality and all had to be washed. A deposit of fine white sand was found at a distance of one and one-half miles from the dam, and this was used in varying quantities as was needed to increase the density of the mixture. The appearance and feel of the sand were not reasuring, but its use in but a small diversion dam constructed a year prior, showed satisfactory results, and on the strength of this practical test its use was considered safe.

About 200 yards from the dam site was found a large rock slide and this rock in sizes convenient for one man to handle was hauled and placed in the dam as "Plums."

### Concrete

The concrete was mixed in the proportion of 1 to 8, and in the upper portion of the dam 10 to 15 percent of Hydrated Lime was added with the idea of increasing the density of the concrete. Endeavor was made to obtain a sufficient surplus of mortar to coat thoroughly the "plum" stones which were introduced as liberally as practicable. The "plums," first well wetted were dropped into the mush concrete and worked around to insure liberation of any imprisoned air. The "plums" probably constituted about 20 percent of the entire mass.

### Plant

For the lower portion of the dam the sand and gravel were piled on the right side of the canyon just above the dam, and were wheeled in barrows to a hand mixer which was placed on top of the forms and moved back and forth, the concrete being discharged directly into place. For the last 12 feet of the dam the mixer was set stationary on the left side of the canyon and the concrete wheeled to place.

### Reinforcement

The up-stream face of the dam is reinforced vertically and horizontally against temperature stresses. One half inch bars were used spaced 1 foot horizontally and 2 feet vertically. The top of the dam has 1-2 inch reinforcing rods placed 2 feet centers radially and tied at both ends to circumferential rods of the same size. The projections supporting the floor stands were liberally reinforced with old buggy axles. Twelve 25 pound R. R. Rails were also placed in the dam as an additional reinforcement.

The dam facing South, it was not considered necessary to reinforce the down-stream face, it never being exposed to the direct action of the sun.

### Clearing Dam and Reservoir Site

Most of the 46 acres comprising the reservoir and dam site was covered with a thick growth of pole-pine, spruce, fir and tamarack. This timber was first cut close to the ground piled and later burned. In this way practically all the vegetation was destroyed and the stumps so thoroughly charred that it was not thought necessary to pull them. A strip 60 feet wide and cleared outside of the water line of the reservoir with the idea of preventing trees and the evergreen needles from falling into the water.

### Cost

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| Clearing Reservoir and Dam Site:— | |
| Labor and teams | $ 3150.51 |
| Commissary | 305.88 |
| Over-head expenses * | 1017.19 |
| Engineering and Superintendence | 375.00 |
| Total | $ 4848.58 |

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| Construction of Dam:— | |
| Building roads | $ 117.53 |
| Diverting river | 25.00 |
| Building cement house | 5.00 |
| Gravel | 2343.40 |
| Excavation for dam | 749.00 |
| Cribbing trench | 10.00 |
| Pouring concrete | 877.07 |
| Building forms | 145.93 |
| Reinforcing steel | 298.68 |
| Carpenter work | 395.39 |
| Hauling and placing rock | 251.00 |
| Concrete finisher | 16.00 |
| Over-time | 117.08 |
| Sand | 134.56 |
| Cement, including hauling | 3535.34 |
| Lime | 423.38 |
| Valves | 855.22 |
| Lumber | 199.59 |
| 30 in. pipe | 13.50 |
| Railing | 21.60 |
| Commissary | 611.75 |
| Over-head expenses * | 2034.38 |
| Engineering and Superintendence | 750.00 |
| Total | $13930.34 |

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| Construction of Spillway:— | |
| Labor and teams | $ 1048.86 |
| Commissary | 101.96 |
| Over-head expenses * | 339.06 |
| Engineering and Superintendence | 125.00 |
| Total | $ 1614.88 |

Grand total, $20,393.80

* Over-head expenses which include commissary and engineering, are apportioned to the clearing, the dam and the spillway in the proportion of 30,60 and 10 per cent. The over-head expenses include the following items:

Camp, cook house, meat house, cess pools, warehouse and barns. Miscellaneous team work, hauling machinery, tools, supplies and general euqipment, gasoline for pump, auto hire for trips of inspection on surveys, road, cement hauling and the main work. Blacksmith, supplies, tools, pumps, general equipment. Medicine, telephone, surveying, general miscellaneous.

The increased cost over that given in the preliminary estimate is due largely to the change from a masonry to a roinforced concrete structure. The preliminary estimate was for the dam only, and did not include the cost of the clearing or spillway. Taking these facts into consideration the preliminary estimate was remarkably close, giving an estimated cost of $13,100,00 as against an actual cost of $13,930.34.

Another condition resulting in a material increase in the total cost over that of the estimate is shown by the following comparison:

Height, above ground—Estimate, 30 feet; as actually built, 33 feet.

Length of arc—Estimate, 176 feet; as actually built, 186 feet.

Average thickness—Estimate 4.5 feet; as actually built, 5 feet.

Excavation—Estimate, 250 cubic yards; as actually built, 545 cubic yards.

Total yardage in dam—Estimate, 740 cubic yards; as actually built, 968 cubic yards.

The increase in yardage of excavation and volume of dam was caused by the necessity of having to go to an unusual depth, 26 feet, to secure a suitable foundation.

The unit cost per cubic yard of $14.39 compares very favorably with other similar structures, a few of which are as follows:

Unit cost per cubic yard for other dams:—

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| Unit cost per cubic yard | $14.39. |
| Cheyenne | $ 13.00 |
| Bear Valley | 18.00 |
| Hume Lake | 20.80 |
| Les Verjels | 15.80 |
| Hucal | 23.00 |