one season received from the sale of strawberries, grown on three and one-half acres, $2,100 and a large portion of them were grown in his young orchard. The cultivation of this fruit does not require near the amount of care and labor that is required in the Eastern states.

The raspberry, especially the red variety, is perfectly at home here, even on our upland. They produce wonderful crops, but in our valleys they are simply immense. This fruit is patiently waiting for some enterprising person or firm to establish an institution that will prepare it for shipment abroad. I received a letter last year from a firm, not in the United States, that had received an order for nine tons of this fruit made into pulp to be shipped in large casks to England. The firm could not get the fruit in their own country, and we could not ship because there was 2 cents per pound duty. Had we had a firm doing that kind of a business in some one of our cities we could have filled the order with ease and realized a neat profit. I speak only of one case. The raspberry cannot be shipped East fresh. Blackberries are much the same as raspberries, are more at home on our low lands, where they bear luxuriant crops every year. The Evergreen blackberry does equally well on our upland; no fear of frost hurting the vines here. All varieties of currants do remarkably well, bearing large crops every year. This fruit, as well as the raspberry, blackberry and gooseberry, ask for a preserving institution on Puget Sound. Cherries are being planted more extensively, having proved themselves worthy, especially the late varieties, not because the early varieties do not do well, but because the demand is greater for the late ones, they being superior for canning purposes. There is no reason why an orchardist should not have fresh cherry pie from June 1 to November 1 every year. Plums, all kinds that I have seen, and this includes the leading varieties, do well. The trees are remarkably healthy and carry heavy crops each year. This fruit is now receiving more attention and will be more extensively planted, since it has been proved a good shipper to the East, where but little of such fruit is grown. Probably no other kind of fruit has been so extensively planted on Puget Sound the last few years as the prune. It also has proved itself worthy and has such a reputation and is so widely known the world over that there are but few families who do not use more or less of them every year. The prune does not have to be marketed when fresh, but when dried can be shipped anywhere at any time.

Peaches—This fruit is not claimed to be a perfect success on Puget Sound. The writer, however, has not been without peaches, grown on his trees, since 1886, and which were claimed by a reputable commission merchant in this city to be the finest peaches that came to this market the past two years.

Pears—There is one difficulty with this fruit. As with some other fruits, it generally bears too heavily, and is apt to break down the branches of the tree, unless its owner relieves it of some of its burden while the fruit is small. Size and flavor are equal to those grown anywhere. This brings me to the last of the fruits that I shall name in this paper, viz., the king of all fruits—the apple. I have carefully watched this noble fruit on Puget Sound for eleven years, being very much interested in its development, and now I am perfectly satisfied that the apple is all right. True, the red varieties do not attain the brilliancy of color that they do where the climate is warmer, but size and flavor are good, and during my residence on Puget Sound, without a single exception, choice winter apples have always commanded a good price.

THE BIG BEND COUNTRY.

Four Counties of Vast Grain Fields Grid-ironed With Railroads.

A. L. Rogers, of Waterville, read a paper on the resources and possibilities of the Big Bend country that was something of a revelation to the convention. Mr. Rogers was so much in earnest that he occasionally declaimed the rolling periods which here and there dotted his manuscript, and the facts he gave in relation to this not very well-known portion of this great state were enthusiastically received by the delegates who were strangers to the vast resources of the Big Bend on the Columbia. His paper read:

Skirting the foothills of the Cascade range of mountains on its way to the sea, the Columbia river describes a grand semi-circular sweep, over 400 miles in length, beginning at the mouth of the Spokane river and ending at the mouth of the Snake. This peculiar configuration of the river's course is known as the Big Bend of the Columbia, and gives name to that vast region embraced within it, called the Big Bend country, and which has been so aptly termed the Inland Empire.

With an area greater than that of either of the states of New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware or Maryland, with a soil of inexhaustible fertility, with a climate invigorating and healthful; and with proximity to that greatest of all the oceans which is destined to become the seat of the world's most important commerce, it would be strange indeed if the dwellers within this imperial domain were not filled with enthusiasm over its vast resources, and confidence in its great destiny, unruffled by the rise and fall of political parties; undismayed by the clash of monetary standards, and undaunted by financial crises and the derangements and the depressions of values that go therewith.

In the popular acceptation of the term the Big Bend country comprises the counties of Douglas, Lincoln, Franklin and Adams. Correctly stated, however, the Big Bend country consists of that portion of the Columbia plateau lying west of a line drawn from the mouth of the Spokane river to the vicinity of White Bluffs on the Columbia. This is the line adopted by Lieut. (now Capt.) Symons in his report on the upper Columbia, and thus defined the counties of Franklin, Adams and the major portion of Lincoln would be excluded, while Douglas, with an area almost as great as all three of the other counties, would be included in what is properly the Big Bend country. With this narrowing of the subject of my paper, it will be understood that what follows relates to the Big Bend country as above defined. It may not be amiss, however, to remind you that after all that is said that can be said about this great region, every statement and every figure must at least be doubled in order that you may get a correct conception of the magnitude and the possibilities of that portion of interior Washington lying between the Spokane, Palouse and Walla Walla countries on the east, and the Columbia river on the west.

Douglas is one of the newer counties of the state. It has within its boundaries almost 3,000,000 acres of land. It is nearly as large as the state of Connecticut, more than three times as large as Rhode Island, and covers a stretch of country greater in extent than the distance between New York and Philadelphia. In topography, soil, climate and production, it possesses the characteristics of both the counties of Whitman and Walla Walla. The fame of both those localities for the production of fruit and the cereals is world-wide; and the average of productiveness is greater than any like area in the United States.

Grid-ironed as they are with railroads, each recurring harvest, nevertheless, taxes beyond their capacity the various lines of transportation doing business in those counties.

With similar soil and conditions in Douglas county, and with an area great enough to equal two counties like Whitman and one-fifth of Walla Walla, or three counties like Walla Walla and one-quarter of Whitman, it is easy to see the immense possibilities of the Big Bend country, sparcely settled though it is, and until recently attracting but little attention from the outside world. Topographically and geologically considered the Big Bend country is a region of much interest. The northern part is a high, rolling plateau of fertile prairie land, broken here and there by canyons of greater or less size, the approaches to which are often covered with scattering timber, convenient to the settlers on the adjoining prairie. Many springs of the purest water abound in these localities, and the rough land in the immediate vicinities affords excellent pasturage for numerous bands of cattle and horses. If the walls of these canyons are perpendicular, as sometimes happen, they are then called coulees. The greatest of these is Grand Coulee. This great cleft in the face of the earth extends in a northeast and southwest direction, a distance of some sixty miles, and varies in width from one to four miles. The walls in many places rise perpendicular many hundred feet, and the question how this great freak of nature was formed remains yet to be answered.

The arable land which constitutes by far the greater portion of the county, is an undulating prairie, covered in its natural state with bunch grass. The soil consists of decomposed basalt, enriched with alluvial wash and underlain with a clay subsoil. The basaltic soils wherever found are highly productive; they are the characteristic soils of Italy and other countries bordering the Mediterranean. In Washington they have produced wonderful crops for many years without apparent exhaustion. Few countries enjoy such varieties of climate as are found within the limits of this section; that of the plateau is mild temperate, the elevation (which is approximately 2,500 feet above sea level), together with the prevailing winds, which are from the northwest across the snow-capped Cascades, freeing it from the blighting effects of hot wind in summer and the danger of early and late frosts. The winters are particularly enjoyable, snow lasting from sixty to ninety days, with a temperature seldom below zero. The heavy snowfall followed by the June rains always guaranteeing sufficient moisture for good crops. A few miles drive from the plateau to the river below takes one into an almost semi-tropical climate and a country requiring irrigation. Here the elevation is but 600 feet above sea level, which is 400 feet lower than the elevation of the renowned Yakima country. On the plateau wheat, oats and barley are the staple products: wheat yielding from 20 to 30 bushels per acre, oats from 30 to 50 bushels, and barley from 50 to 60 bushels, varying according to the style of farming and the nature of the season, more depending on the former than the latter. Up to two years ago the bulk of these products was threshed and shipped. Recently, however, our farmers have turned their atention more to diversified farming and stock raising; cutting the principal part of their crops for feed. At the present time carloads of cattle, hogs and poultry find a market on the Sound from this section.

Garden vegetables of all kinds and of the best quality are grown here in abundance. Favorable conditions of soil and climate and freedom from rains during the harvest season, tend to develop a bright, perfect seed, strong in germinating power. Free also from the insect pests, so common in the East, with comparatively little labor, the soil can be kept free from weeds and foul growth. Eastern seed houses discovering these facts are contracting for large quantities of seeds for Eastern use from this section. Potatoes of the Big Bend have a justly earned reputation. Sugar beet grown here has given wonderful returns. Diversifying his crops, the farmer has met with splendid success. In his experiments in fruit-growing, the results have been so flattering that now most of the well-appointed farms have thrifty young orchards. On the plateau apples, pears, prunes, plums, cherries and all small fruits do well.

In this connection I take the liberty of quoting from the article of N. H. Dunham, that recently appeared in the Spokesman-Review. Among other things concerning the Big Bend country he says: "This is a fine agricultural and fruit-growing region. All kinds of grain, including corn, do well. There has never been a failure of crops. Most of the wheat, oats and barley are so excellent in all respects that they are sold on the markets for seeding purposes. Waterville and the foot of Badger mountain are very prosperous, as their products for seed bring a premium over ordinary market prices. Taking it all in all, the Big Bend region is one of the most desirable for agricultural purposes in the Northwest. The climatic conditions are exceptionally fine. The temperature is remarkably even. There are no sudden changes, no blizzards, no cyclones. Spring, summer and autumn are fine. Winter always affords good sleighing. The melting snows added to the spring rains give plenty of moisture for the crops. The summers are usually dry and even in temperature. The nights are invariably cool and refreshing to all forms of life. The character of the soil is the same as that in the Palouse region, while in other characteristics the country is similar to the prairies of Iowa and Illinois. There are more than 1,500,000 acres now open to entry. Douglas county offers to the settler as good opportunities as can be found in the Northwest."

Fully developed the northern Big Bend country is capable of producing annually 10,000,000 bushels of wheat or its equivalent in other cereals. This does not include the bench lands of the Columbia, the fruit output of which will some day more than equal in value the total of all the hay, grain and cattle of the great plateau. That fruit raising on the Columbia is a most gratifying success has been shown so often by actual trial in widely separated localities that the fact needs no further demonstration. Hundreds of miles of the bench and bar lands of the Columbia await only the touch of energy, combined with capital, to make generous response with every variety of fruit grown in the temperate zone. Mr. Maxey, of the State Horticultural Society, has flattering things to say of this section. A great deal of money has been expended in irrigation ditches the past year. The Entiet Improvement Company, consisting of Waterville citizens, has built a large ditch seven miles long, which carries water to develop 500 horse-power on the banks of the Columbia and irrigates 800 acres of fruit land.

Hon. R. W. Starr, register of the United States land office at Waterville, has completed a ditch near the mouth of the Methow, seven miles in length, that covers several hundred acres. Hon. Charles Boynton has flumed water down Foster creek and covers about 700 acres. Many smaller ditches have been built, making a total of twenty-five to thirty miles of ditch completed last year. Time is not far distant when the Columbia valley, with its wonderful climate and beautiful homes, made possible by irrigation, will be to the cities of the Sound what Southern California is to San Francisco.

The mineral resources of this section are varied. Lime of the best quality is made, and large deposits of mineral paint exist; also fine quarries of building granite. Pottery, brick and fire clays are common. Coal has been discovered in the southern part, near Moses coulee. A number of silver prospects have been found along the breaks of the Columbia.

The gravel bars on the Columbia and its branches have been worked for gold for the past twenty years. This section has no great amount of timber, but Badger mountain in the western part and the timber along the breaks of the Columbia river will furnish fuel and building material for some years to come. At present the principal settlements are northeast from Coulee City in the eastern part of the Big Bend country, back of Bridgeport, in the northern part, and about Waterville in the western part. The latter is the principal town of the Big Bend, is the seat of the United States land office, the county seat of Douglas county and a place of remarkable vigor and enterprise. Between the settlements above mentioned lie great stretches of country, much of which is yet open to the homesteader. A sure indication of the enlightened public sentiment of the people is found in the large number of neatly painted, well appointed school houses that are scattered all over the settled portions of the territory. Another evidence of intelligent enterprise is found in the attention given by them in grading their live stock. Registered horses, cattle, hogs and poultry are becoming the hobbies of the Big Bend farmer. Of late much attention is being given to dairying, and the creamery and cheese-making business promises to become one of the important resources of the country. The southern half of the Big Bend country differs much from the portion described above. Considerably lower in altitude, it has a warmer climate. The soil is a sandy loam and possesses many of the characteristics of the bench lands of the Columbia, so prolific in fruit growing. There can be no doubt that with proper irrigation facilities the southern Big Bend country will become one of the greatest fruit producing regions in the world. To date nothing has been done in this direction, and the country is utilized as a great winter range for horses and cattle. Occasionally we hear of a project to conduct the waters of some river in Idaho onto these lands. Preliminary surveys have demonstrated the practicability of the plan, but it is too early to carry it out yet. It is an immense proposition and requires a corresponding investment of capital.

Some day it will be done, however, and then will be demonstrated the greatest of all possibilities of the Big Bend country.

Washington will stand amazed at her own fruitfulness, and a country neglected and forbidding will then be recognized as consisting of hundreds of square miles of the finest fruit lands on the Pacific coast.

IRRIGATION.

A Concise History—Its Possibilities in This State.

Lieut. A. B. Wyckoff has for the last few years been a resident of Yakima, in the heart of the state's irrigation district, and perhaps there is nobody in the state better qualified to speak on the subject. His paper follows:

Irrigation antedates authentic history. This is proven by the great ruins in Asia and Africa of reservoirs, canals and aqueducts, of the construction and use of which only the most indefinite and unsatisfactory traditions exist. These great monuments of hydraulic engineering have excited the wonder and admiration of all modern scientists. In fact, until within a generation of the present no practical advance had been made in the science of irrigation for three thousand years. Many of the great irrigation works of antiquity were destroyed or abandoned as the results of wars or the convulsions of nature, and the ancient local civilization disappeared, the lands again became desert, and the small remnants of the nations sank into savagery and barbarism.

The extent of some of these great irrigation works can be conjectured from the ruins remaining. Leake Maeris, in Egypt, was constructed at least 2,000 years before Christ. Its dimensions were sufficient to regulate the annual inundation of the Nile, receiving the surplus waters when there was danger of a flood, and supplying the needed deficiency when the river reached a stage which would not irrigate the crops. This, with other large reservoirs of flood waters, enabled a population of 20,000,000 to exist in the valley of the Nile, while it now supports hardly one-fourth of that number.

In ancient times the valleys of the Euphrates and Tigris, now almost a desert, were densely populated. Four thousand years ago the rulers of Assyria had converted those sterile plains and valleys into gardens of extreme productiveness by the construction of immense artificial lakes for the conservation of the flood waters of the rivers, and great distributing canals for irrigation. One of these canals supplied by the Tigris was over 400 miles long, and from 200 to 400 feet broad, with sufficient depth for the navigation of the vessels of that time. Throughout Judea the ancient Jews constructed many pools, tanks and wells for the irrigation of their fields. The Greeks of that age also understood the science of hydraulics, as is shown by the remains of great aqueducts. The Phoenicians converted a portion of Northern Africa into fields and gardens by extensive irrigation works. The Romans thoroughly mastered this science and drained the Pontine marshes, supplied Rome with the purest water and developed the agricultural resources of Italy. In France, Spain and Portugal they built aqueducts to supply the cities with water, and canals to irrigate the valleys. In India tanks, reservoirs and irrigating canals were constructed many centuries before the Christian era, and a great part of that country was kept in the highest state of cultivation. Some of the tanks or artificial lakes covered many square miles, and were often fifty feet in depth. The English government in recent years has reopened the ancient irrigating canals, and has built thousands of miles of new ones, to prevent the recurrence of the dreadful famines formerly experienced in that densely populated country. About $200,000,000 has been expended on these works, which pay a good interest on the investment through water rentals, besides the enormously increased revenue from the land taxes. In addition to the millions of acres reclaimed by the government works, each village has its tank, built of masonry and concrete, for domestic and irrigation purposes. The English also found extensive irrigation works in Ceylon, which they have greatly improved and amplified during the last thirty years, thereby enormously increasing the population and revenues.

Most of the canals of China probably antedate the Christian era. They intersect the country in every direction, and are used for navigation, as well as irrigation. The water is lifted from the canals by primitive pumps, or wheels, worked by men or oxen. There is no extensive storage of water, although the country is well suited for it. While there are no ancient works in Japan, the entire arable lands, even to the tops of the hills, are most highly cultivated by small community irrigation systems, which conserve all the water from the numerous springs and streams.

America is not without ancient irrigation systems, as is proven by the ruins of lengthy canals and large reservoirs found in Peru, Bolivia, Chile and the Argentine Republic. Some of these have been renewed, and new works constructed, especially in the Argentine Republic. Evidences exist in New Mexico and Arizona that a race, now extinct, in prehistoric times had extensive irrigation works and cultivated large areas. Some of the Indians in New Mexico, and the Moqui, Maricopa and Pima tribes in Arizona, have lived upon the same lands for hundreds of years by means of primitive systems of irrigation.

The importance of this subject is shown by the fact that, more than half the human race exist upon the products of irrigated lands. To a resident of the humid regions this statement is no doubt startling, but even a cursory investigation will convince him of its truth. The rice eaters outnumber the wheat eaters more than two to one, and all rice is grown by irrigation. The hundreds of millions in China, Japan and India live almost entirely on rice.

It is only recently that irrigation has become an important factor in our political economy. As long as the surplus population of the older states could obtain homes on the public domain in the humid regions, no thought of the reclamation of the arid lands was entertained. The insatiable craving for 160-acre farms even led to the settlement of the semi-arid regions of Western Kansas and Nebraska, where the rainfall was known to be insufficient and unreliable. The result has been years of suffering and lost efforts, and even appeals to older communities for food. Had the past history of the world been rightly studied by our political economists, these hardy and intelligent pioneers might have been directed to the arid valleys of the great West, where prosperous and independent communities would now exist. However, the time has arrived when the problem of our arid lands has become one of the most important before our legislators. The tide which has been setting toward cities so long must be turned to suburban life, if we are to escape social convulsions.

The country must be educated before the congested East will be relieved of its surplus population, and the arid lands of the West be settled. No more important practical and social question confronts us. On account of the limited supply of water only a small proportion of our desert lands can ever be reclaimed. But that does not proportionately diminish their economic value in comparison with the much greater area of the humid regions, for, as acre to acre they are as three or four to one. That is, an industrious family on a forty-acre farm under an irrigation ditch will attain a more certain and secure prosperity than on the usual quarter section of land in the humid regions. In addition to the security of an independent livelihood the arid regions offer other advantages. The larger amount of sunshine and dryness of the atmosphere conduce to greater healthfulness, and more optimistic views of life. The small farm means intensified cultivation, more intelligence, nearer neighbors, less loneliness, greater social advantages, more churches, schools, telephones, electric lights, graded roads—in fact, a new rural civilization with better homes and greater enjoyments than has been known in the older agricultural regions.

In the arid and sub-humid regions the government still owns 570,000,000 acres. A large percentage of this is mountainous and not arable, and a still larger portion must remain desert and grazing lands from the absence of any known water supply. The most careful estimates of the reclaimable lands, without increasing their cost beyond a profitable figure by expensive reservoirs and canals, is 60,000,000 acres. About 25,000,000 acres of land are under ditch, and half of that is being cultivated by irrigation. One result of the reclamation and utilization of large bodies of the arid lands will probably be the increase of the rainfall in the sub-humid regions adjoining, to an extent to render them far more valuable for the cultivation of the cereal crops.

Statistics gathered by the government experts in the last census make the average expense of reclamation of desert lands $8.15 an acre. The first ditches were built close along streams, and the cost was merely nominal, but in some of the later projects in California it has reached over $100 per acre. The reclaimable lands remaining will necessitate much more difficult engineering, which will raise the average price of reclamation very considerably. According to the census the average return annually from irrigated lands is $14.87 per acre. This is lower than it should be, as grass and pasture lands are included in the estimate. The value of irrigated lands in the near future will become so great that the large ranches will be cut up into small holdings, when intensified farming will more than double the annual productiveness.

This lengthy review has been necessary to show the extreme value of irrigation, and the place it has filled in the economic history of the world. There are many phases of the subject regarding the industrial development of the United States, which I would like to discuss, but the time allotted me will not permit. I hope that I have shown that irrigated districts offer happy and prosperous homes, and are an exceedingly valuable factor in the development and wealth of a country, but a local application to the conditions existing in this state is necessary to bring it within the purviews of the objects of this convention.

At a rough estimate there are about 2,000,000 acres of irrigable arid lands in Washington, one-half of which are in the Yakima valley. I am comparatively familiar with the results of irrigation in Yakima county, but have not the same intimate personal knowledge of the other arid sections. But as the soils, climates, etc., are very similar what I shall say of Yakima county is largely applicable to Walla Walla, Kittitas and the other counties where the necessity for irrigation exists.

The soil consists mostly of sedimentary materials deposited at the bottoms of the lakes which covered these valleys for centuries. It is largely disintegrated basaltic rock, and contains all the chemical elements necessary for great productiveness. It is especially rich in lime, potash and phosphoric acid, the three constituents most essential to plant life. The climatic conditions are exceptionally good. The winters are mild and short, with little wind and almost constant sunshine. The summers are long and warm, but with cool nights, and the autumns are very pleasant. The frost leaves the ground early, and farming begins in March. Farmers work in the fields the hottest days, sunstrokes are unknown, and the cool nights give refreshing sleep. Eastern Washington possesses a great advantage over most of the arid regions of the United States, in that the cold winters restore enervated vitality and impart a quality and flavor to the deciduous fruits that make them the finest in the world. The comparative low altitude and dry atmosphere should make this section a sanitarium for all asthmatic, pulmonary, bronchitic, neuralgic and rheumatic affections. All the products of the temperate zone thrive luxuriantly. The fine quality of the variegated fruits should make the orchards as valuable as the far-famed orange groves. Small fruits are extremely productive, and melons excel in quantity and quality. Any vegetable grown in the United States can be cultivated successfully. Asparagus, celery and cauliflower are especially fine, while the Yakima potato bids fair to make that valley famous. Wheat, rye, barley, corn, broomcorn, sorghum and even tobacco are grown. I see no reason why tea and cotton should not be. Both clover and alfalfa thrive to perfection, and yield three and four crops a year. In consequence, there will be many dairies and creameries, and a great production of butter and cheese. Thousands of cattle and sheep, which are grazed on the mountains and bunch grass hills, are brought into the valleys in the winter to feed. The hog industry is developing rapidly, as it is found that they can be fattened on alfalfa and potatoes. Hops can be raised as cheaply and of as good quality as any place in the world.

The total area of irrigable lands in Yakima county, which can be reclaimed at reasonable cost, is about 600,000 acres. One-fifth of this amount is already under ditch, and about 40,000 acres are actually cultivated. Nearly all the irrigation canals are community ditches; that is, the farmers under them have stock in proportion to the number of acres which they own and the service of water is gauged accordingly. Thus the farmers elect their own officers and have complete charge of the ditches, which are sustained by small annual assessments. The Sunnyside canal, which is one of the largest in the United States, is the principal exception. Notwithstanding the unfavorable opinions of geologists, an artesian basin of considerable extent has been found in the Moxee valley a few miles from North Yakima. There are already nine flowing wells, which cover several hundred acres. Good flows of water were found at from 300 to 900 feet, and as there has been no apparent decrease of the cubic capacity of the wells, it seems certain that the artesian basin is a live one.

Col. Howlett, our arid land commissioner, has recently withdrawn some 80,000 acres in the county under the provisions of the Carey act. As the Northern Pacific railroad has an equal amount of land under the proposed ditch, there will be homes for thousands of settlers when it is completed. It is also hoped that favorable legislation at the present session of congress will throw open the Yakima Indian reservation, where there are over 100,000 acres of fine land that can be cheaply irrigated. The Yakima valley has only about 25,000 inhabitants, while it can readily support ten times that number. There is plenty of land for sale on easy terms, with good water rights. It is perhaps the only arid region of the world where there is more water than is needed for the irrigable lands which can be brought under ditch. With its many manifest advantages it must become a very prosperous and populous section of the state. Industrious immigrants with small means are almost sure to succeed in making comfortable homes. Crop failures are quite unknown, but uncertain markets and high rates of transportation militate somewhat against the rapid development of the valley. Time, however, will probably obviate both of these difficulties.

My remarks must not be taken as derogatory of the agricultural advantages of other sections of the state. I was assigned the subject of irrigation, and have endeavored to elucidate it to the best of my ability, knowing that other speakers would portray the merits of the humid regions. It is one of the wonderful facts of our wonderful state that we have climates, soils and other conditions to suit all comers, so that none need go away dissatisfied. These manifest conditions must appeal to the intelligent resident of less favored localities when he is seeking to better his circumstances. It is true that we ourselves have somewhat detracted from the natural inducements by our heedlessness and extravagance in incurring debts, necessitating a high rate of taxation. Our mistakes may delay the fruition of our hopes, but the sure realization of a wonderful development is sure to come. When I think of the immense natural resources of forest, mine and farm; the splendid climatic conditions, the beautiful scenery, the tributary fisheries, and the grand strategic geographic situation—the very keystone of the converging lines of trade between the Occident and the Orient—it seems impossible that this development can be long delayed. The great name of Washington, peerless on the pages of history, was fittingly reserved for this star on our flag, which is to be perhaps the very highest in the constellation of the states.

ABOUT IRRIGATED LANDS.

They Produce the Finest Potatoes and Are Good for Fruit.

E. F. Benson, of North Yakima, produced a paper which showed his practical acquaintance with Farming and Fruit Raising on Irrigated Lands." It read as follows:

This topic, which was assigned to me by your committee on programme, for a brief discussion, suggests naturally many comparisons with other methods of farming. The cost of production, the quality and quantity of product, the certainty or uncertainty of crops, the desirability of irrigated lands for homes, in short the general advantages and disadvantages of an irrigated country or district for homes.

First let us consider some of the adverse criticisms of irrigation. Perhaps the most silly objection is that "irrigation is a method devised by man," that "if God had intended crops to be grown in any certain place, he would have furnished the rainfall," that "irrigation being in contravention of nature's laws is something to be avoided." While such an objection is plainly too ridiculous to need a serious answer, it is frequently advanced by people supposed to have some common sense; and shows the kind of argument often adopted to convince one's own self. And yet it is on a plane with many of the stereotyped objections which are based upon false premises and maintained largely through prejudice.

The most common objection is the one heard so often that it makes us tired, for we know what is coming even before the objector has said three words, and yet he will usually elaborate upon it as though he was giving you something that the world had not known before, and something which he had acquired through deep scientific research and a wide field of observation. He will tell you that irrigated fruits look beautiful but they lack flavor and are watery, and in the same breath will compare California peaches and apples—which by the way are generally not irrigated at all—with the apples and peaches of New York and Delaware. He will tell you that irrigated potatoes are watery and will explain in detail why they are so, telling you that so much water has to be put into the ground that the potatoes cannot be dry and mealy.

Now, the facts are these: That with even a small amount of common sense and experience, potatoes can be grown and are grown of a better quality on irrigated lands than on any other lands. Why? Because the farmer can have the soil just as moist or just as dry as he pleases, and he does not depend on the uncertainty of too much or too little rainfall. It is true he can ruin the quality of a potato crop by too much water, but it is not true that irrigation farmers do this, except in rare instances from lack of experience.

The irrigated potatoes from Greely, Col., outrank any others that are put upon the market of Chicago, St. Louis and the other great cities. "Greely" potatoes in Chicago are like "Yakima" potatoes in Seattle and Tacoma. They rank first and are the standard as to excellence and price. Ask any commission man in Seattle or Tacoma what are the best quality potatoes on the market and he will tell you instantly "Yakima." Three years ago when the non-irrigated potatoes were selling in your markets at $14 to $19 a ton, Yakima potatoes were bringing $26 to $32 a ton. Not that Yakima potatoes were any better than any other irrigated potatoes, but because of its large acreage it rather preempted this market. The average yield being about 300 bushels (five tons) per acre and average cost of production delivered on board the cars being about $4 per ton, and the railroad freight $3.60, every farmer thought his potato patch a gold mine.

Two years ago many car loads were sent to St. Paul, and last spring over 200 car loads of Yakima Burbanks went to St. Paul and St. Louis at very profitable prices to the grower. They are now being used by your merchants with which to open a trade in Central America. As soon as some enterprising man or company gets around to starting a starch factory in this state you will find that it will be located where an abundance of dry, mealy, starchy, irrigated potatoes can be easily obtained, and where there will be no danger of too little rainfall to spoil a crop, or too much rainfall to spoil the quality.

Now as to fruit. The criticiser of irrigation is as far away from the truth as before, and for the same reasons. An orchard can be irrigated too much or too little, and the crop injured the same as it can be injured by lack of care in pruning or cultivating. But it is only justice to our farmers to say that as a rule they use as much common sense in this matter, as the farmer in a non-irrigated country uses in the handling of his crops and orchards. The people in Spokane know what kind of peaches they get from the irrigated orchards along the Snake river and the Columbia, and the people of Tacoma and Seattle know the peaches they get from Yakima and Wenatchee. The earliest orchards set out in these valleys were mostly seedlings, and of course are poor in any country, but the orchards that have come into bearing within the last three or four years are of the very best varieties, and the big lucious peaches you get from them are not for one minute to be compared to the California peach, which whether it be good or bad at home is certainly very insipid when it gets up here.

As for apples nobody thinks of comparing ours with our southern neighbors, and even the Californians themselves do not pretend to raise good apples.

An illustration showing the superiority of [...] prunes is furnished by C. P. Wilcox, of North Yakima, who is one of the best authorities in the state on prune drying. His French prunes after evaporation amounted to 46 per cent. of the green fruit in 1894, and 43 1-6 per cent. in 1895. Italians dried 33 per cent. each year. Silver about 39 per cent. The usual percentage in non-irrigated districts is, French prunes 35 per cent. to 40 per cent., and 25 per cent. to 30 per cent. for the Italians. Thus the irrigated prunes contain about 5 per cent. more substance than the prunes raised without irrigation in a humid atmosphere.

The quality of fruit is always affected by the climate and soil. But whether the moisture required by the fruit runs into the orchard in open trenches along the ground by a gravity flow from rivers or artesian wells, or whether it is pumped into a tank and sprayed on the trees as they are obliged to do down in Florida, and for the market gardens of the Eastern cities, or whether it comes in the form of rain, it matters little; except that the rainfall is often so insufficient that the fruit withers and dries up, dropping from the trees before maturity, or if it has life to hang on till harvest is, under such circumstances, a sorry specimen.

In this connection I wish to mention a few things seen in Niagara county, New York, in September, 1893, a county with an international reputation for its fruit. I drove through dozens of the best orchards in the best part of that county (along the Niagara river and below Lewiston), and in company with as good an authority on fruit as there was in New York state, a man of middle age who had been buying and shipping fruit in large quantities for over twenty years, and who was living on a farm that his grandfather had taken up in 1804. He claimed to know every orchard in that county that had shipped a barrel of apples in twenty years, and he introduced me to a score of the large apple growers in that section. The story of every one of them was the same lamentable experience, that the best thing a man could do with an apple orchard in that country was to cut it down. Many apple orchards that had been set out twenty-five years had not in all that time borne as much fruit as a Washington irrigated orchard of one-half the size, and one-half the age bears every year. However extravagant this statement may seem it is based on the best evidence I was able to obtain.

In speaking of certain poorly cultivated orchards my informant said: "These men are fairly good farmers, but we had such a wet spring they could not get in with teams to cultivate early, and when the wet weather let up it came hot, and baked the ground, which contains considerable clay, so that good cultivation was impossible. A year ago," he continued, "it was too dry in the early spring, and our fruit dropped off just as it was forming. We once raised good crops here, but of late years it seems impossible. When it isn't one thing it is another, and when we have a small crop we cannot afford to spray the trees to keep off the pests, then the pests take it all and we get no benefit from the short crop and the pests get such a start that it is almost impossible to exterminate them when we do have a fair crop."

Mark you, that was in a country where they do not irrigate, but where they depend upon rainfall and the "dews of heaven."

The great importance of the "fruit pest" question to the entire fruit growing world entitles it to mention at this time. If eternal vigilance is the price of liberty, it is also the price of a fruit crop wherever any pests have been introduced. The fact that we have in our country only a few of the many pests infesting the Eastern orchards should not relieve us from taking all precautionary steps, both in the way of legislation and in the enforcement of our laws. For us to assume that we would always be free from pests would be to imitate the ostrich, which puts its head under its wing in the presence of danger, and then imagines it is safe.

Experience of Eastern horticulturists has taught us that the most effective method for exterminating pests is to spray with certain solutions. For example, the wormy apple is nearly always caused by the codling moth depositing an egg in the calyx or blossom end of the fruit after the blossom has dropped off. When this egg is hatched the worm eats its way into the center of the apple. To spray with a weak solution of paris green or arsenic puts a drop containing an infinitesimal quantity of poison just in the place where the codling moth when hatched out begins to eat, then the first bite it takes kills it.

In an irrigated country, where every day is sunshine and every night is dry, one spraying answers for the whole season, as the little poison is not washed away by falling moisture; while in a rainfall country there is practically no end to this labor, for it must be repeated as often as you get a rain. It requires but little discernment, then, to see that the greatest burden of the horticulturist is practically lifted from his shoulders by our dry climate.

A great bugaboo is sometimes made—by those who know nothing about it—of the labor required to irrigate lands. As a matter of fact, one man can irrigate from forty to 160 acres of land, depending upon the crops to be watered, the lay of the land—that is, whether smooth or uneven—and the disposition of the irrigator to get around. Charge up that extra expense to the irrigated crop; but you must also credit the irrigated land with enormous yields, and no crop failures, at least seven tons of alfalfa hay each season, at three cuttings, besides four to six weeks' pasture in the fall; not quite as much red clover, and only about four or five tons of timothy at two cuttings. We think the extra labor for irrigating pays well. Not only is the quantity, but the quality of the hay, like other irrigated crops, is superior, for it has a plenty of both water and sunshine to grow in, and perfect weather in which to be cured.

The idea of fattening cattle or sheep on hay alone is something unheard of by Eastern stockmen. In all Central states winter feeding of cattle for the purpose of fattening them requires corn or other grain. The same is true of dairy cattle, if any returns are expected during the winter months. With us no one ever pretends to feed a pound of grain, to either beef or dairy stock, at any time in the year. Either the common red clover or alfalfa—a variety of clover—answers with us every purpose. These facts are proven by the experience of every stockman or dairyman in the West.

We don't make all this claim of superiority for our irrigated crop alone, as a part of these advantages can be credited to our milder climate.

Alfalfa is the king of all forage plants; nothing has yet been found that will yield such a quantity of fodder and produce such results. One of the largest dealers and consumers of beef cattle has experimented in the matter of feeding for the past three years, and, taking cattle at the same time and under the same conditions from the ranges, and putting them up to feed for beef, they have fed one portion of the herd on grain, with wild hay as roughness, and the other part on alfalfa hay alone. As a result of the experiment, the cattle which were fed on alfalfa hay dressed out a larger percentage of net weight and turned off 20 per cent. more tallow than those which were fed upon grain and wild hay, and the cost of the alfalfa feeding was 25 per cent. less. Both lots were put on feed at the same time, and slaughtered at the same time.

The limit of time allowed for this article prevents further examples as to fattening sheep and feeding hogs on alfalfa hay alone. But no person not familiar with the results will ever imagine the real value of it. Alfalfa is not grown successfully anywhere except on irrigated land. It may be produced in non-irrigated districts, but it grows tough and woody, and as compared with the genuine article is practically worthless, and the yield is not one-third as much.

In view of the extraordinary dairying advantages of the irrigated regions in this state, and in view of the fact that the Chinese as a people are developing a great taste for condensed milk and are importing it into China from Switzerland, Denmark and America, we think that in the near future condensed milk factories on a most extensive scale will be in operation in our dairy districts.

Just a word as to hops. For the past two seasons this business has become very unpopular the world over, owing to the low price of hops. The fortunes that were made a few years ago in this business give it a speculative interest. There are about 3,000 acres of fully equipped hop yards in Yakima county alone, all irrigated, of course. We do not advise any one to engage in the business, but should a person desire to do so, he can buy yards for the cost of the equipment alone, land thrown in. If a hop yard is valuable in any part of the world it is in this state on the irrigated lands, for the dry, warm season prevents the hop louse from damaging the blossom and creating any mildew. The growers do not have to spray or spend any money or time on that pest. The hot weather just cooks the hop louse and it drops off the vines like the dust.

Farming by irrigation is scientific agriculture. As compared with non-irrigated districts, the farms are smaller and neighbors are nearer together, school districts are not as large and usually better cared for, the roads are more improved, the lands are higher in price, but as a rule a more intelligent class of people occupies it and the general social atmosphere is much more like a village or suburban town. Twenty acres is enough for any average family, for, well cultivated, it will produce a wonderful amount of crops, and it is far better to work that amount well than to attempt too much.

Celery, egg plant, and particularly asparagus, are crops to be grown with good profit by the new settler while his orchard is coming into bearing. Corn matures in all the irrigated valleys of this state, the yield running from twenty to fifty bushels per acre. While it can hardly be considered as a commercial crop, yet it is a great help to the small farmer. Sorghum and broom corn both do remarkably well and should be raised in commercial quantities.

Assuming now that the great desirability of irrigated lands for homes is undisputed, the most important questions for this convention are: How much of such lands have we in the state of Washington? Have our irrigated lands been farmed long enough to fully demonstrate their character and ascertain the climatic conditions surrounding them? Some of the earliest settlements of the Northwest were upon these irrigated lands. The bars or low benches along the Snake river, around Lewiston, and also along the Columbia at various points from the British line, to The Dalles, and along the Wenatchee river near its confluence with the Columbia, and in the Walla Walla and Yakima valleys. In fact, wherever there was a tract of irrigable land easily watered the pioneers, realizing its advantages, located upon such land at once. We find orchards and cultivated farms in all these different localities that are from 25 to 30 years old.

The northern latitude of this state, the well marked seasons of all irrigated districts, even though the winters are short, gives to all fruit grown here that perfection of flavor and quality that can never be realized in a southern climate. These facts have been demonstrated by many years' experience, and today there are many thousands of acres of irrigated orchards in the state of Washington.

A very careful canvass is being made of Yakima county by the Commercial Club and 3,400 acres of orchards—about half of which is in full bearing, being over five years old, and the rest being under five years old—has already been reported, and Mr. Medill, the gentleman in charge of the work, expects the total acreage will amount to nearly 5,000 acres.

Opportunities for securing irrigated lands are found all over the state between the Cascades and Rocky mountains, and the climatic conditions are similar in the various localities. Several small ditches are now being taken out of the Wenatchee river and streams that run into it. There is some railroad land and some government land that can be easily and cheaply watered there. A ditch to cover 10,000 acres is being taken out of the Walla Walla river and is expected to be in operation the coming season. Various kinds of water wheels and water elevators are at work along the Columbia and Snake rivers and their tributaries, lifting water to irrigate the low benches, and there are many opportunities for more of these appliances.

But the greatest of all irrigating opportunities, not only in this state, but in the United States, is found in the Yakima valley. Already there is in this valley over 140,000 acres reclaimed by irrigation, only 60,000 acres being in actual cultivation at this time. Last week the arid land commissioner of this state, Col. L. S. Howlett, had 77,189 acres of government land withdrawn under the Carey act. The line of proposed canal covers altogether, including this government land, school lands and land selected by the state under other acts, 285,000 acres of arable land. The line is what has heretofore been known as the "Sunnyside high line" project.

The following newspaper clipping relating to this withdrawal is so well expressed that I will read it in conclusion. "This is the first withdrawal made under the arid land law in this state, or in any of the states so far as has been reported. It includes much of the best land in the Yakima valley, or more properly between the Yakima and Columbia rivers, all carefully selected and classified, with an abundant water supply and a preliminary line for irrigation canal, which will be one of the largest in the world and larger than any now constructed in the United States. It presents an investment for capital more favorable than has ever before been offered in an irrigation scheme. The lands can be watered and sold to purchasers at a much lower figure than any irrigated lands that have ever before been put on the market, and the acreage included will furnish farms for, in round numbers, 40,000 people, allowing each family twenty acres, which is a generous estimate for irrigated land. It is confidently hoped in view of negotiations already begun that these lands will be irrigated without much delay and be made the homes of immense colonies, whose agents are now looking to the Pacific coast for locations large enough and cheap enough to accommodate them.

"It is without doubt the most important land project ever inaugurated in the state of Washington or the Northwest, looking to the furnishing of cheap homes for prospective emigrants."

PROUD OF HER ROADS.

How the State Government Helps to Make Them.

J. Hannum Jones, the editor of the Nooksack Reporter, had a pride in his story of the large amount Whatcom county had judiciously expended in making good roads, and he ably pointed out the encouragement to settlers that well-kept roads always assured. His paper on the subject read as follows:

The emigrant cares very little about the roads he leaves behind him, but it is a vital matter to the immigrant to find a good road ahead of him. Even if he finds a road surveyed, planned and its building agreed upon, the intelligent immigrant will consider it an attraction added to the land he wants to buy; but if the road is already there, it means dollars and cents added to the useable value of his purchase.

If he is a man of family he locates the church, the school and the market, and the character of the roads between his home site and these points becomes to him a question of cool deliberation. The land itself—its topographic surroundings—may incline him favorably to a dicker, but add quick connection with all these by good roads and you inspire his judgment to believe he has found what he is looking for.

Washington, if I understand her desire, is not inviting the rags, tags and bob-tails of creation to drop down upon her soil. She wants men, prudent men, strong men, industrious men, reasonably intelligent men, altogether honest men, to come here, look over her domain and be convinced by their own sound judgment that it is a good state to come to, settle in, rear a family in, and secure a prosperous, happy life. One such man is worth a dozen shiftless, happy-go-lucky drones. Why? The one will add something to the stability he finds here, while the dozen would only eat the honey that others hive. Now, if we tell the immigrant the cold truth that he can get a handsome competency out of forty acres of Washington land, according as he spends his energies to deserve it; a competency moreover greater than he could possibly get out of one hundred acres in many other states and at least ten years sooner, we offer an attraction to the pushing and energetic class of men that will honor the state, and we at the same time put a damper on the migratory birds who would abide with us for a season and leave us poorer than they found us. But, gentlemen, this very desirable class of immigrants will look sharply at the condition of your roads.

Speaking in general terms, the legislation of our state has shown a determined purpose—since 1895—to make road building mandatory in a small degree, but permissible in the broadest possible sense. The state herself is now committed, in a small measure, to take her share of this duty. It must become, and I believe it will, her defined policy to widen her interest in proper state roads, and find the money to build them.

Nineteen of the states of this Union are already in this upper platform, each one of which is gradually increasing her annual appropriations. Our young Washington will follow suit, because the sentiment of her people is mightily trending that way. The immigrant can confidently be told that state participation in road building is an assured fact in Washington.

There are seventeen road laws covering the needs of villages, townships and counties in force in this state, and seven auxiliary acts partially in force, with a township organization law in embryo, and there is no square mile in the whole state that cannot find its way through this maze of legislation to build the road it wants. Time will not permit us to note the conditions provided by these laws, but particular reference is advisable to the acts of 1893 and 1895.

The Donahoe act, for the first time in Washington history, permitted progressives to take mossbacks by their suspenders and compel them to go forward. Thank God, the day is dead when a handful of mudwumps can check the righteous movements of men of mettle, for this law honestly explained and decently respected leaves no room to oppress or retard them.

Under this wise law Whatcom county, one of whose representatives I am, had directed me to tell you her graphic story as an evidence of what can be done by a willing people. Obeying the desire of her county commissioners, I ask your attention to a few facts of her road history. Within the three last years she has constructed a system of trunk lines from the county seat as the starting point, which practically makes the whole country tributary to tide water. Most of these are completed and all will be, by July next. The cost of these roads are as follows:

Northwest diagonal	$[illegible]
Guide meridian	[illegible]
Northeast diagonal	[illegible]
Fairhaven, Samish and Skagit border	[illegible]
Everson-Goshen	[illegible]
Ferndale and Mountain View	[illegible]
Whatcom-Lummi	[illegible]
Six bridges	[illegible]
At a total cost of	[illegible]

Fifty miles of good roads and durable bridges traversing thousands of acres of the richest lands under the sunlight, with fifty more miles of extensions, cross roads, feeders and local links that will be practically completed two years hence. Thousands of twenty, forty, sixty, eighty and one hundred and sixty acre tracts of land, directly accessible to these good roads, are for sale, bidding the immigrant come and till.

If he has a passion for fruit, this is the land he wants. If he wants diversified farming the land is waiting for him. If he wants to build creameries or starch factories, this is the land where he can find pasture eleven months in the year, and get 10,000 tons of potatoes and plenty of good water to make prime starch, that will capture the trade of a dozen states. He can grow sugar beets that have a higher co-