OGDEN DEPARTMENT

E. A. Enries Telephone 188

Circulator, . M. H. Thomas Telephone 637-x. MIT Grant Ave. The Daily and Saturday News de-livered by carrier. Any complaints as to mervice wil be promptly recti-fied by the circulator.

premises in Ogden, claimed by plaintif but held by defendant:

ORATORICAL RECITAL.

Vocal soloProf. Charles Kent Accompanied by Squire Coop. "What William Henry Dfd", May Wade. "Waiting by the Gate"........Bryant Bertha Stone.

Tickets for the recital may be ob-

BIGAMIST GETS DIVORCE.

J. L. Barkwell who, a few weeks ago, married one wife before he had been divorced from his first wife, was yes-terday afternoon granted a decree of

divorce by Judge Rolapp from Mar-garet Barkwell, wife number one; and

in order to make his marriage to Haze

Chase of this city valid and legal, he will now have to be married over again,

which, it is understood he intends do-ing. Barkwell secured his divorce

from wife number one on the ground of desertion, they had only been married a short time when she left him, he

claimed, without cause, and refused to

return to him again.

Harry Moss, who stabbed William

Stone in Ogden canyon a short time ago causing Stone's death, has through his

attorney, H. H. Henderson succeeded in having his ball reduced to \$500 from \$1,000, but he has been unable to fur-

show, but he has been unable to furnish bail in that amount, and is still held at the county jail.

In the matter of the guardianship of Orlin M. Ferrin, a minor, the court appointed John A. Taylor guardian, with \$1,500 bond.

TEACHERS ELECTED.

A number of new teachers were elected at last night's meeting of the board of education. They are Millicent Bing-

ham, as teacher of German in the high school, Charles E. Manning, Misses Spurgeon, Marion Reid, Lillian P. Dan-

spurgeon, Marion Reid, Lilian P. Dan-iels, Maude Naisbitt and Lois Peirce. On recommendation of the supply committee the Dinwoodey Furniture company and B. H. McMillan were granted the contracts for supplying the

new Twentieth street building with fur-

BRIEFS AND PERSONALS.

Prof. and Mrs. W. M. McKendrick

are home again, after a 10-days' so-

of the iron rods of the awning in front of the Ross bookstore. The rod struck the large plateglass window, breaking

, and the pieces of falling glass broke number of valuable pieces of cut-

glass and fancy chinaware that were in the window. The damage in all amounted to about \$300.

State Food Inspector Heiner of Morgan was in Ogden yesterday on busi-

Cashier Walter Bramwell of the Morgan City Bank returned home last

evening after attending to some busi-

Wm. H. Rich of Morgan City was an Ogden visitor yesterday on business. Sheriff James of Evanston is spending

journ at Provo.

.... Browning

lowing program will be given!

tained from the pupils.

OGDEN, UTAH, - JULY 16, 1994.

SALOON MAN SHOT THROUGH LUNGS.

lames Bothiner Takes Revenge on Pat Smythe for Supposed Grievances.

ORATORICAL RECITAL JULY 21

Bigsmist Gets Divorce - Harry Moss Inable to Raise Reduced Bail-Briefs and Personals.

Pat Smyth, proprietor of the Royal Erchange saloon, on Twenty-fifth treet, was shot about 5 o'clock last sight, the bullet entered just below peright breast and passed through his bdy, coming out just below the shouler blade. Smyth's assailant was lanes Bothiner, a laborer, who has been employed on the Ogden Lucin cut-off.

The shooting affray took place in Smyth's saloon, with a number of men the place. Bothiner entered the alson about 5 o'clock and without any warning pulled a 38 caliber revolver and shot Smyth, but before he could fire again bystanders interfered, who took the pistol from him, and telephoned for the police. Capt. Brown and Detective Pender quickly responded, and Sheriff Balley was soon on the scene. Bothiner was standing in the doorway of the saloon with another man, who held the gun he had used, and made no resistance when the officers arrived and placed him under arrest. When asked by the officers if he did the shooting he replied with an oath, "Yes, I shot to kill. He robbed me of several hundred He doped me and got my

When seen at the jail last evening by "News" representative, Bothiner out the following statement: March he came to Ogden with nt identification checks each worth ut \$47, that he placed the checks on posit with Smyth at his saloon, but hen he called for them Smyth refused give them up. Bothiner then em-oyed Atty. Joseph Chez, who succeed-in getting back the checks for hiner, who had to discount them at bank \$20 to pay Mr. Chez \$25 for his He says that Smyth also ran things which he did not owe, thad to pay before he could get his kks back. These alleged injustices the part of Smyth bore so heavily his mind, that he came to Ogden sin a few days ago and decided to which he fully intended g last night.

Souther had a bank deposit check fli5 and \$75.50 in cash in his pock-when searched at the station, which was him to be a careful man with his y. Bothiner further stated that he entered the saloon last evens Smyth came towards him as he posed either to strike him or put sout, and Smyth being a much largman, the assailant pulled his gun yth was placed in a closed carriage

taken to his home where Drs. Dick-and Conroy attended him. They and that the bullet had passed und that the bullet had passed would his right lung, making a bad wand which the physicians probed and smed as best they could and Smyth steed quite easily all night, and his swelans have every hope for his revery, should blood poison not set in. Smyth gets along all right then Botzer will be charged with assault with deadly weapon with intent to kill, if should the wound prove fatal he ill be charged with murder in the first gree. bullet had passed

Bothiner has no family. He is 85 an of age and has worked around goes in the railroad camps for a umber of years and has a number of riana.

sends. The man is in a critical condition but it physician stated this morning that thought with proper treatment he said pull through all right. James sained Joseph Chez to defend him. C. M. Brown, who was arrested in St. suis on the charge of abducting Glars Christensen from her home in ache county, appeared before Judge lowell this morning and, at his own equest, had his case continued for 10 ays.

LIVER DUE UNDER \$2,000 BONDS. Captain of Police C. C. Brown and effective Fender returned yesterday iteracon from a trip to Callente, ringing Oliver Due with them, who is ranked on the charge of manislaughter, seing one of the parties responsible for ng one of the parties responsible for plosion of fireworks on the Fourth at Glenwood.

lly at Gienwood.

An Cain was sentenced by Judge
ha Cain was sentenced by Judge
ha Cain was sentenced by Judge
ha Cain was sentenced by Judge
pt his morning to 18 months in
state prison, and was taken to Salt
this afternoon by Sheriff Bailey.

man pleaded guilty to housebreakthat of entering the Smith lodging
se, from which he stole \$3.50.
he officers arrested Due at Moapa.

", a small town about 40 miles west
Callente, where he had gone immetely after the explosion. He was small town about 40 miles west ente, where he had gone immelente, where he had gone immeafter the explosion. He was it is as increased when the officers placed of the result of the inquest. Due sidered the chief one involved in a plosion, as he, it is understood, he man who put the bomb in the fr. which caused the terrible acciHe was arraigned before Judge if yesterday afternoon at 2 o'clock for of Mr. Shupe, and one on the gone of causing the diff. His bond was fixed at \$1,000 on of the charges, and his preliminaring set for Wednesday, July 10 a. m., the same time as O. P. Frson and Oliver Austin come up rial. Due had nothing to say on maiter, stating he would rather with his attorney before making any sment.

SUIT IN EJECTMENT.

As action has been filed in the Second strict court by Hugo L. White against L.J. Foster to get possession of certain

STOP ||| HUSLER'S

3

Is the flour that makes GOOD BREAD. Isn't That All You Want?

LOGAN.

FLOUR

The agent of the Descret News in Logan is C. B. Robbins, 199 North Main St. to whom all payments of accounts should be made. Daily News 75 cents per month, Saturday and Semi-Weekly News 25.98 per year Complaints, changes of address, orders for advertisements and church works will be given prompt attention. Misses May Warde, Bertha Stone, Cora Kensey, Marion Belnap and Louie Bywater, pupils of Miss Mercy Raehel Baker of the Baker School of Oratory, assisted by Prof. Chas. Kent and Prof. Squire Coop, will give a re-cital at Ogden Tabernacle Thursday evening, July 31, at 8 o'clock: The fol-laying program will be given!

HELD TO DISTRICT COURT.

Bankhead-Rock Nuptials-Dispute Over Water-Educational Lecture.

Special Correspondence. Logan, Cache Co., July 14.-The examnation of John Andrews charged with assault was concluded in Justice Smith's court today and defendant was placed under \$1,000 bends pending trial in the district court.

DISPUTE OVER WATER.

cora Kensey, Cora Kensey, Charles Kent Chris Beratson and Julius Trelson slight misunderstanding over the right to use an irrigating stream. In the wrangle Berntson made use of a piece of board to enforce his argument, as a result Justice Cardon assessed him \$5 and costs. Bertha Stone,
SelectionLouie Bywater
"A Judith of 1864"Covanoght "Christ and the Earth", O. F. Whitney
May Wade.

Tickets for the

BANKHEAD-ROCK NUPTIALS. Frank Rock and Nellie Bankhead of

Avon came to town today with matri-monial intent, Clerk Larson issued the ermit, performed the ceremony and ent the young couple away happy. Mis Geneve Smith, daughter of Or-Smith, underwent an operation, for the removal of a small tu-from her face near the left eye. The operation was performed by Drs. Budge and Calderwood.

Prof. Seward delivered a very interesting lecture this evening before the summer institute on Stanford university. The lecture was profusely illustrated by beautiful lantern views and was very interesting throughout.

The residents of the Logan island are incorporating an irrigation district to

protect their rights to water from Lo-

LOGAN AND CACHE VALLEY REAL ESTATE FOR SALE.

We have fine Schools and Colleges, a Healthy Climate, the best Water Sup-ply in Utah, Sugar Factories, Cheap ply in Utah, Sugar Factories, Cheap Farms, Residence and Business prop-erties, an ideal place for a home. We buy, sell and exchange real estate. Ap-ply or write to J. Z. Stewart, Logan,

ST. GEORGE.

HOT AND DRY IN DIXIE.

School Election-Serious Break in Canal -Cannon Family Reunion. Special Correspondence.

St. George, Washington Co., July 12: The weather is extremely warm and dry and a good rain would be very wel-The second crop of hay is about p. The grain is all in the stack, threshing began this morning. also began today on the new at the Southern Utah Experibarn

off quietly. There being no oppositio but a light vote was cast, Hon. I. C. Macfarlane being elected to succeed

Notwithstanding the dry hot weather, the water is out of Washington-St. George Field. A huge break occurred in the canal which will take \$1,000 to

repair. A large force is now busy re-pairing the same. We had the best Fourth of July celebration in years. A good program was rendered in the morning, at the taber-nacle, and young and old joined in the sports in the afternoon. Nn accidents occurred to mar the peace and enjoy-

President David H. Cannon held a family reunion at his home, 43 of his decendants being present.

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ments in the

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Laconomicanomicanomicano

Everything POSITIVE

LY GUARANTEED.

buying.

Sheriff James of Evanston is spending a few days in Ogden.
The contract for the plumbing of this building was let to A. W. Meek for \$782. For the heating and ventilating plant there was but one bidder. Newman Brothers, whose bid was \$1,400. The matter was left to a committee to award them the contract after seeing that their plant is un to requirements. that their plant is up to requirements. Mason & Hamlin, The savings department of the Pin-gree National bank will remain open Saturday's until 8 p. m. for the purpose of accommodating those desirous of Steck, Kimball, making savings deposits.

PROVO.

The Daily News is delivered by carrier in Provo early every evening (Sundays excepted) on the same terms as in Sait Lake—75 cents per month. All complaints, requests for chances of address and payments of accounts should be made to R. J. Dugdale, 372 west 4th North St. Provo. Advertisements and orders for church works also received. works also received.

POSTMASTERS' CONVENTION

Wedding Bells-Delicate Surgical Opera tions-News Briefs Special Correspondence.

Provo, Utah Co., July 16 .- The first annual convention of the Utah State Postmasters' association will be held in this city July 20 and 21. A large number of delegates from all parts of the state are expected to be in attendance, and an enjoyable social time, as well as

and an enjoyable social time, as well as a profitable discussion of the troubles of the country postmaster, is expected.

On the afternoon of the 20th an excursion will be made to the Upper Falls of Provo canyon, which will be well worth attending. The special train which will carry the visitors to the resort will stop long enough at Olmsted, the Telluride Power company's beautiful village at the mouth of the canyon, to enable the visitor to inspect the big power plant.

WEDDING BELLS.

A marriage license has been issued to Charles E. Davidson, 28, of American Fork, and Clara A. Bramble, 23, of A.

pine.
Job Butler, 58, and Katherine Thorlof-son, 49, both of Spanish Fork, were married here yesterday by Elder H. F. Thomas. GARDEN CITY NOTES.

The quarterly stake conference of the Utah stake opened this morning and will continue in session today.

This evening the Thirty-fourth quorum of Seventy will give a sociable in the First ward social hall in honor of Edder M. I. Bushman, who is about to go on a mission.

Erastus Lamb of Wallsbury was operated on yesterday at the Provo hospital for appendicitis and Mrs. Wilmirth White of Proyo underwent an operation for an abdominal trouble, both patients are progressing favorably.

Murray Department.

The News is delivered in Murray and vicinity from the branch office every night. J. S. Barlow, agent.. Orders for Church Works and advertisements

MURRAY NEWS.

The school elections in all the sur-rounding districts went off smoothly except in one district, where a slight riffle occurred. This was occasioned by the discussion of the proposition to the discussion of the proposition to build a new and up-to-date schoolhouse. "It is surprising to see what a small interest the people of Murray manifest in the school airairs," said James Godfrey, one of the trustees in this district to the correspondent of the "News." On the day set for the reading of the financial report for the past year there were only seven taxpayers present out of the whole district. This report showed the manner of handling of the engrapous sum of \$18,000. enormous sum of \$16,000.

SUNDAY MORNING'S FIRE. About 1 o'clock Sunday morning the people of Murray were startied by four shots and four long blasts from the smelter whistle, which is the only fire alarm the city has. Sam Wambolt's saloen, formerly owned by Paul Blinn, was in flames. As the frame building was dry it took but a short time to reduce it to ashes. The loss is covered

A man by the name of Nelson was found dead near the Bingham copper smelter Wednesday morning. Foul play s suspected.

The Primary association gave a pleasing entertainment in the opera house last Monday afternoon. Ice cream and other refreshments were served, and the children greatly enjoyed themselves. A fine program was rendered, which was followed by a dance. CITY COUNCIL SESSION.

The regular session of the city counsiderable time was taken up in the reading of bills which had accumulated for a month past. The quarterly report of city justice was rend, which showed there had been \$277.90 taken in fines and forfeitures. It also showed there had been an average arrest of one person a day made during June. The city dumping ground question came up and was referred to the street committee with power to act. Mr. James Freeze has some low bottom

which will probably be consi-The estray pound ordinance was read for the first time.

ATTEMPTED BURGLARY. An attempt was made to burglarize Mr. E. Carlson's place of business Tues-

dnay morning early. The would-be thief was trying to effect an entrance through the glass door and had already removed a pane of glass when the own-er, who was aroused by the noise, relieved his pain by letting out a deafening yell from the second story window, which was directly above the door. This it seems, scared the fellow so badly that he dropped the pane of glass and ran through the back way, making good his escape in the darkness.
Several young men and some married

men have disappeared from Murray this last week, among them the son of Mr. and Mrs. Myers. They drew their checks on pay day and that is the last seen of them. It is rumored there was some gambling engaged in and on loseing their money the boys were ashamed to face their people. Some of the familles are in straightened circumstances.

SOCIAL AND PERSONAL. Miss Annie Haseldine and Cora Booth

of Bingham Junction and a number of Salt Lake friends are spending a few days' outing at Silver Lake. Hyrum Nielson and folks of Holliday for the Brighton resort on Thurs

City Attorney Haigh has moved his office from the Murray State bank building to the new Waverley block.
Mr. E. T. Walter of Fourteenth South street celebrated the opening of his new by a display of fireworks la atore by a di Monday night.

Monday night.

Eph Hicks and family are preparing for their departure to Canada.

Miss Virginia Knox is visiting with Mrs. D. W. Phelan.

The new business block recently built.

The new business block recently built at Bingham Junction by Dan Phelan is now occupied by an up-to-date barber shop, confectionery store, restaurant, shoe store and saloon.

The Junction is growing fast and will soon be one of the leading places for business in Sait Lake county.

The death of Mrs. Warner of Bingham Junction occurred at the Murray hospital Saturday last.

Mr. James H. Gilbert and Miss Louisa Wright were united in the bonds of ma-trimony at the residence of the groom's parents, Mr. and Mrs. James Gilbert, Thursday last. After the ceremony a grand reception was given.

The Sandy baseball team defeated the machinist team of Murray Saturday

Mr. Orson Dyer of Gilbert's Mercantile Co, and Miss Britt of Z. C. M.

I. were married last week.

A large celebration is planned for Pioneer day, to take place at Hill's Park. Mr. Robert Hover was treated to a

pleasant surprise Thursday evening, the fist anniversary of his birthday. The Highland Boy people are prepar-ing for an outing at Lagoon. Mrs. Nellie E. Olsen, daughter of Dr. Olsen, has returned from Vernal. Walter Jakeman has returned to Highland Boy from a trip to Juab

Mrs. Slack has returned from a trip

Mrs. Orlie Baker and family are visit-ing her parents, Mr. and Mrs. William Hunter and sister left for their

home in Tennessee last week.

Jno. Conners of the Highland Bey is confined to his bed with sickness.

George Tingley, manager of the Hub. left for the east Tuesday to purchase The Murray hospital management has

received the services of a professional nurse who is a graduate of one of the Philadelphia colleges.
A Salt Lake man lost a purse con-A Salt Lake man lost a purse con-taining \$400 last week on a Murray

Mrs. White, the milliner, will leave Mrs. White, the milliner, will leave in a few days for one month's vacation in the country.

Miss Birdie Olsen, who had typhoid fever in Sacramento, Cal., is now at home in Marray.

W. H. Boundy of Nevada has been visiting his sister, Mrs. Draper.

Robert Glase, a student of the Rush Medical college, Chicago, is spending the summer vacation at his home in Murray.

Murray.

Call at The Palace for McDonald's hocolates and Specialties. Franklin's Ice Cream superior to all

WHEN IN MURRAY

others.

We make a specialty of supplying to command candles for parties and so ables. All orders promptly delivered GEORGE BROCKBANK, Prop.

Why? Do Travelers Stop at "The Beck." BECAUSE. It is the only up-to-date hotel in Murray. Hot and cold baths in con-

MRS. M. E. GRAHAM, Prop.

FRED. WACH, Hardware, Fishing Tackie, Notions,

"WAVERLY" BLOCK,
Murray, Utah.
Office rooms for rent in the new
"Waverly" Block, at reasonable rates,
to desirable tenants.

TAILOR SHOP.

The oldest reliable tailor of Murray, You know him. Clothes cleaned and pressed.

DAVID M. HAIGH, LAWYER. City Attorney. Office: Waverley Blk, Murray.

MURRAY'S NEW SHOE SHOP.

All Kinds of Repairing Neatly Done. H. NILSEN, Murray Street,

HELD IN RESERVE Choicest Lots in Murray City.

We will build your house and furnish ground, on easy payments.

MILLER-CAHOON CO.

MURRAY CITY, UTAH.

COAL LUMBER, FARM IMPLEMENTS, STOVES AND HARD-L. C. MILLER, Manager,

The____ ARTICLES

BY DR. JAMES E.

of FAITH

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Deseret News Book Store.

THE PROBLEMS OF IRRIGATION.

In the July issue of the Irrigation Age appears the first of a series of articles by Prof. John A. Widtsoe, director of the Utah Agricultaural Experiment Station, on the irrigation investigations of that station. This article is of special interest to all western is of special interest to all western farmers, as showing the numerous and intricate problems that confront the irrigation farmer. The article is a fitting introduction to Utah Ex-periment Station bulletins. Nos. 80 and 86, on "The Right Way to Irri-ate," which every Utah farmer should read and study. Dr. Widtsoe says: THE PROBLEMS OF IRRIGATION.

To many who have given this sublittle thought, it seems stange anything needs to be discovered about irrigation. They say, "If we have good soil and the water in the right position and the right kind of seed, all that needs to be done is to let the water flow over the ground and nature does the rest." In view of the neglect which the art of irrigation has suffered at the hands of scientific investigators, such reply is only to be expected, yet it s an emphatic fact that the problems that irrigation offers for solution are numerous and most intricate in heir nature,

Irrigation problems may be grouped nto these great classes: First. The great problems pertain-ng to the storing of the mountain wat-

ers in large reservoirs, to be led to the arms during the growing season when he plants most require moisture. These oblems are almost wholly of an engineering nature, though some of them concern themselves directly with ques-tions regarding the maintenance of the forest and range growth upon the mountains.

Second. Following the building of reservoirs, is the construction of the canals through which water may be carried to the farms. Here again numerous problems are involved, but these are also almost exclusively of an en-

gineering nature.
Third. The farmer who receives
water from the canal to be applied upon his farm also finds himself confronton his farm also made nimself confront-ed by numerous problems of the most vital nature, so far as the profitable-ness of his operations is concerned. These problems are, in complexity and difficulty of solution, no whit behind those of the first two classes, The problems of the first two di-visions are much better understood

risions are much better understood han those of the third. This is due argely to the fact that dams, reseroirs and canals have been built in all ountries and in all ages for purposes ther than those involved in the art of of irrigation,

SOME SOIL PROBLEMS OF IRRI-GATION.

It is to the problems that confront the farmer in the actual application of the farmer in the actual application of water on the farm that the investigations undertaken by the Utah Experiment Station in 1900 have concerned themselves. In the experiments it has been clearly kept in mind that, in an arid region, the land itself has little value unless accompanied by a water right; and, moreover, that the amout of available water even when all possible avallable water, even when all possible reservoirs shall fraction of the arable eservoirs shall have been built, will be ufficient to cover only a small fraction f the arable land. Water has been studied, thesefore in its relation to both soils and crops.

The water applied to different soilssandy, loamy, clayey and calcareous has been followed in its downward movement and it has been shown that by proper precautions drainage may be avoided and the danger of forming alkali in the lower lands diminished or altogether eliminated. The lateral investigated to determine to what ex-tent the water applied to a field dis-appears by the lateral flow of soil moisture. The upward movement of soil water, after an irrigation, has been d, with reference to the nature of found in the arid regions, the total moisture in the soil and the kind of crop growing on the soil. It has been found that the rate of loss of water from bare solls depends upon the na-ture of the soil, the depth of the soil, the hardpan or gravel bottom, the per cent of moisture in the soil, the meteo-rological factors, including tempera-ture, sunshine and showers, the time after irrigation, the condition of the top soil, and the method of irrigation.
The rate of loss from soil on which crops are growing has been found to depend upon the same factors, and in addition, upon the kind of crop grown and the age of the crop. In studying all these conditions it has been found that there is a method of treatment which is better than all others in the conservation of soil moisture.

The relations of soil fertility to irri-The relations of soil fertility to irrigation has also been studied with reference to the composition of the irrigation water, the nature of the soil, the addition of various natural and commercial fertilizers and artificial drainage. The results of this branch of the work have branch of the work have also been very interesting in showing that there is a mutual dependence be-tween soil fertility and use of water by ants. In connection with the question soil fertility, the reclamation of alof soll fertility, the reclamation of al-kail lands by means of under-drainage has been investigated briefly, with the result that it seems probable that al-kail lands may be reclaimed by under-drainage, and yet, by proper methods of irrigation, they need not again be subjected to alkail conditions. The conservation of the moisture, al-ready in the soil, has been studied with reference to the stirring of the top toil, the addition or removal of soluble salts, the quantity of water to be added at each irrigation, subirrigation, standing

each irrigation, subirrigation, standing water near the surface, and the crops. The consideration of these problems has ed to conclusions which, if applied by the farmer, may lead to the saving of one-third to one-half of the water now one-third to one-half of the water now ordinarily used for the production of the common field crops.

The various methods of irrigation, flooding, furrowing and sub-irrigation, have been tested with results that in-

dicate plainly the relative merits of these methods of supplying water to

THE CROP PROBLEMS OF IRRIGA-TION.

The relation of water to crops has The relation of water to crops has also been investigated systematically and exhaustively. The total yield of crops has been found to depend not only upon the total amount of water, but also upon the time of application, the frequency of application and the manner of application. The results of this investigation have been of a noise surprising nature and show the a more surprising nature, and show the way to an economical use of water in the arid regions. However, there is in the arid regions. However, there is much to be considered by the farmer besides the actual yield of crops obtained. For instance, with certain crops it may be very desirable to be able to hasten the maturity and the question of being able to delay or hasten the ripening of crops has been studied with most theorem, results. most important results.

In another investigation, the relative proportion of the different plant parts— leaves, stalks and roots—as affected by irrigation has been determined, and it has been found possible to produce plants at will with a larger or smaller proportion of any one of these parts than is ordinarily found.

Of prime importance, also, have been the results obtained in the study of the quality of various crops as influenced by irrigation. It has been discovered that the various constituents of plant parts, suck as gluten in wheat, starch in potatoes and sugar in beets, may be increased or diminished at will by suitable methods of irrigation. Incidentally the milling quality of grains grown with different amounts of water, and the cooking quality of potatees, cabbage, carrots and other vegetables as

depending upon irrigation, have been

Of even greater interest than the questions already mentioned are the attempts to breed certain characteristics into plants by controlling irrigation. For instance, the best four for human food is that which contains a high percent of gluten, and by irrigation it is possible to increase or diminish this per cent. The attempt has been made to produce grain so rich in glutan that when grown in countries of ahundant rainfall where irrigation is not practiced it will yield seed that is also rich in gluten. Can this be done in the case of wheat and other crops, and is seeme empts to breed certain characteristics of wheat and other crops, and is seems of wheat and other crops, and is seems very probable that is can be, it will undoubtedly mean that the arid irrigat-ed districts of the world will become the great seed producing centers for those parts of the world where irrigation is

These are some of the problems that have been studied at this institution during the last four years and show the general tenor of the investigations. The crops investigated so far have the general tenor of the flyestar have not been very many, but include wheat, oats, barley, corn, lucern, brome grass, timothy, italian rye grass, orchard grass, potatoes, sugar beets, peas, onlons, cabbage, carrots, hemp, tomatoes and apples. As opportunity allows, other crops will be studied in a similar other crops will be studied in a similar exhaustive manner.

INCREASING THE IRRIGATED AREA.

As already remarked, back of all these more or less scientific problems lies the greater problem of using the water at our disposal in the most economical manner, and the results obtained show, beyond doubt that the application of scientific principles to the art of irrigation will do for irrigation what such appliances have done for the great science of agriculture. Specifically, the results of our investigations lead us to assert that even under present conditions without building one new reservoir or adding to the present irrigation. voir or adding to the present irrigation canals, the irrigated area may be increased one-third or one-fourth or one-haif. With such results the elaborate investigations carried on here for several years past are amply justified. When, in addition it is recalled that there is a strong probability of raising the quality of crops by rational methods of irrigation, far above the quality of crops in humid districts, it follows that all such investigations as those outlined can not be supported too heartily. can not be supported too heartfly.

EQUIPMENT. It is evident that such work as has

been outlined requires a large and spec-ial equipment. In fact, the amount and quality of the work that can be done depends almost altogether upon the means which may be placed at the dis-posal of the investigators. Three farms have been and are being used in this work—the college farm containing one hundred plats, one-twentieth of an acre each, the Greenville farm containing one hundred plats, one-twenty-fifth of an acre each, and the Frankhausen farm containing 80 plats one-twenty-fifth of an acre each. These farms have been laid off into plats so far removed from each other that the water applied to one plat does not effect the soil water of the adjoining plats. Large main and lateral flumes have been built so that the water may be conveyed at will that the water may be conveyed at will to any portion of the farm and to any one of the plats. A large Cippoletti weir, of the very best construction, is built for each farm to enable the measurement of the water to be made in the most accurate manner. The clock work recording divices for water measurement have been found to be unsatirated water and the most accurate manner. isfactory and have been discarded. Men are now employed to attend to the weirs and to measure the water at frequent intervals with micrometer gauges. All the plats are so ridged that gauges. All the plats are so ridged that all the water applied to one plat is compelled to soak into the soil of that plat. As far as the means at the disposal of the investigators will allow, the conditions under which the water is applied to these plats are possessed of almost mathematical certainty.

In addition to the three farms, a large vegetation house has been built, containing seventy-eight pots each one twenty-four inches in diameter and two and one-half feet high. These pots are filled with various kinds of soils in which different plants are grown with varying amounts of water. The vegetation house experiments serve to check the work done in the field, and to furnish date concerning problems that can not data concerning problems that can not well be solved directly on the farm. These pots are placed on small, specially constructed cars, and are specially constructed cars, and are kept in the open air day and night, except on rainy days when they are sheltered under a glass roof. Weighing contrivances have been constructed whereby the pots may be weighed at stated intervals and the loss of water upder different conditions may be de-

termined. Then several laboratories are in operation for the chemical, physical and other studies of the soils and crops used in the investigation. Beyond ques tion, the experimental plant for the study of irrigation at the Utah Experi-ment Station is the only one of its kind in the world.

THE WORKERS.

Such elaborate experiments can not be conducted successfully by one man. The problems are so widely different that various specialists are necessary to handle them all. Three of the departments of the station are therefore ngaged in the co-operative study of he principles underlying the art of irrigation. The seeding and harvesting of crops and all the field work are under the direction of the agronomist, Prof. L. A. Merrill. The application and prop-er measurement of water and all relaer measurement of water and all relative work were under the direction, during the first two seasons, of Prof. G. L. Swendsen, now of the United States Reclamation Service, who was succeeded by Prof. W. W. McLaughlin, the present irrigation engineer. The soil moisture work and the chemical studies of the soils and crops are under the direction of the writer, who also has general oversight of the work. In addition to the heads of the different departments, numerous assistants and laborers are emplyoed to look after

departments, numerous assistants and laborers are emplyoed to look after the details of the work.

Beginning with 1904 these investigations will be carried on in co-operation with the trrigation investigations of the Office of Experiment Stations under the direction of Prof. Elwood Mead, With the support thus given the investigations by the Washington office, it is expected that future investigations will be even richer and more valuable than in the past.

The field is so vast that many investigators must give many years to its study before the art of irrigation can be said to rest on a rational basis.

its study before the art of irrigation can be said to rest on a rational basis. The report of the work done during the season of 1901, only, has been published (Bulletins 80 and 84). The report for 1902 will soon appear, and the report for 1903 will be published as soon as the mass of data can be systematized and digested.

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