

Agricultural Matters.

FOODS—NUTRITIVE VALUE AND COST.

Excerpts from Farmers' Bulletin No. 23, United States Department of Agriculture, by Prof. W. O. Atwater.

(Continued from last week.)

THE DIGESTIBILITY OF FOOD.

"We live not upon what we eat, but upon what we digest." In other words, the value of food for nutriment depends not only on how much of nutrients it contains, but also upon how much of these the body digests and uses for its support.

By digestibility of food several different things are, or may be, meant. Some of these, as the ease with which a given food material is digested, the time required for the process, the influence of different substances and conditions on digestion, and the effects upon health and comfort are so dependent upon the peculiarities of different individuals, and are so difficult of measurement as to make the laying down of hard-and-fast rules impossible. For our present purpose, the most important factor is the amount digested. This, fortunately, is more easy to determine. Understanding by the digestibility of a food the proportions of each of the nutrients which can be actually digested by healthy persons, the question can be answered more or less accurately by experiment.

Briefly expressed, the method consists in weighing and analyzing both the food consumed and the solid excrement. Since the latter represents the amount of food undigested and unassimilated, the difference is taken as the amount digested. A large number of such tests of the digestion of feeding stuffs by domestic animals have been made in European, and of late in American experiment stations. The number of experiments upon the digestibility of food of man is small. Scarcely more than a hundred reliable series have been reported. The very large majority of them have been made in Germany, most of them with healthy men.

The results may be briefly summarized as follows:

(1) The protein of our ordinary meats, fish, and milk is very readily and completely digested. The protein of vegetable foods is much less completely digested than that of animal foods. Of that of potatoes, whole wheat, and rye flour one-fourth, or even one-third, may escape digestion, and thus be useless for nourishment. Roughly speaking, one-sixth or one-seventh of the protein of wheat flour, corn meal, beans, and peas may be assumed to be undigested when cooked and eaten in the usual way.

(2) Much of the fats of animal food may at times fail of digestion. This is presumably true of vegetable fats, but the quantities are in general so small that the determinations of the proportions digested are not very accurate. The experiments thus far made imply that perhaps 5 per cent of the fat of meats, eggs, milk, butter, oleomargarine and lard will escape digestion as they are ordinarily eaten.

(3) The carbohydrates, which make up a large part of vegetable food, are in general very completely digestible. The crude fiber, or cellulose, is an exception, but the quantities of this in the materials used for the food of man are too small to be of importance. Sugar is believed to be completely digested. This is assumed to be the case with the sugar of milk. The other carbohydrates of animal foods are very small in amount.

(4) The animal foods have in general the advantage of the vegetable foods in digestibility in that they contain more protein and that their protein is more digestible.

(5) The quantity digested appears to be less affected by flavor, flavoring materials, and food adjuncts, and to differ less with different persons than is commonly supposed.

One important thing to remember is that the food we digest is not always utilized to the best advantage. Different people differ greatly in this respect. One man may be able to do a large amount of work and another very little when both have the same diet and digest the same amounts of nutrients from it. One person will grow fat upon an amount of digested material with which another will not gain in weight at all. The getting of the most good from food is not so much a matter of digestion as of making use of what is digested.

THE FITTING OF FOOD TO THE NEEDS OF THE BODY.

In the adjusting of diet to the demands of the body, the important matter is to provide enough protein for the building and repair of tissue and enough energy

to keep it warm and do its work. Considering the body as a machine, there must be material to make it and keep it in repair and fuel to supply heat and power. If there is not food enough or the nutrients are not in the right proportions, the body will be weak in its structure and inefficient in its work. So, likewise, if there is too much, damage to health will result.

While this is true as a general principle, and while this principle is the fundamental one in food economy, there are many modifications in detail, not as many as there are different persons and different kinds of food to be fitted to their peculiarities of digestion and assimilation, but still very many.

Thus, people in poor health or with weak digestion or with certain peculiarities of the nutritive system, are often obliged to be very particular in the selection of their food. A man who can ordinarily "eat anything" may be forced, in illness, to live on gruel or beef tea. The numerous food preparations for people with weak digestion are made in response to an actual and pressing need of partially digested, or at least of easily digestible, nutriment. Of the meat extracts in the market some contain very little and others practically no material which builds tissue or yields energy. In other words they have little real nutriment and sometimes almost none. They are as much medicine as food, but often their value is inestimable.

There are people who, because of some peculiarity of the alimentary system, are debarred from using foods which for people in general are most wholesome and nutritious. Some persons can not endure eggs, others suffer if they take milk, others have to avoid certain kinds of meat, and others suffer nausea or severe pain if they eat fruits which are generally agreeable to the taste and

healthful in their effect. But these are exceptions.

In such matters we are apt to be impressed by the exception rather than the rule. It is nevertheless true for a great majority of people—for nearly every one who is in good health and uses the ordinary standard, wholesome foods—that a healthful diet is that which supplies the quantities of nutrients which the body requires.

Of course there is a great difference in the requirements of different people. The kinds and amounts of food best fitted for nourishment vary not only with sex, age, size, occupation, and climate, but also with the peculiarities of the individual. But it is possible in a general way to estimate the amounts of actual nutrients needed on the average by people of different classes and occupations.

DIETARIES AND DIETARY STANDARDS.

As the outcome of a great deal of observation and experiment, nearly all in Europe, standards have been proposed for the amounts of nutrients and energy in the daily food required by different classes of people. Those of Prof. Voit, of Munich, Germany, are most commonly accepted by specialists in Europe. Voit's standard for a laboring man at moderately hard muscular work calls for about 0.25 pound of protein and quantities of carbohydrates and fats sufficient, with the protein, to yield 3,050 calories of energy. Taking into account the more active life in the United States, and the fact that well-nourished people of the working classes here eat more and do more work than in Europe and in the belief that ample nourishment is necessary for doing the most and the best work, I have ventured to suggest a standard with 0.28 pound of protein and 3,500 calories of energy for the man at moderate muscular work.

TABLE 1.—American and European dietaries and dietary standards. (Quantities per man per day.)

Table with columns: DIETARIES, Nutrients (Protein, Fats, Carbohydrates), Fuel Value, and Nutritive Ratio. Rows include American (Massachusetts and Connecticut), European (English, German, Danish, and Swedish), and Dietary standards.

*The nutritive ratio is the ratio of the protein to the sum of all the other nutritive ingredients. The fuel value of the fat is two and a quarter times that of the protein and carbohydrates. In calculating the nutritive ratio the quantity of fats is multiplied by two and one-fourth. This product is added to the weight of the carbohydrates. The sum divided by the weight of the protein gives the nutritive ratio. Materials with large amounts of fats or carbohydrates and little protein, like fat meats or potatoes, have a "wide" nutritive ratio. Those with a large amount of protein as compared with the carbohydrates and fats, like lean meat, codfish, and beans, have a "narrow" nutritive ratio. In other words, the materials rich in tissue-forming substances have a narrow, and those with a large preponderance of fuel materials have a wide, nutritive ratio. This is an important matter in the adjusting of food to the demands of the body. A well-balanced diet is one which has the right ratio of protein to the fats and carbohydrates. A relative excess of the tissue formers makes the ratio narrow, while an excess of the fuel ingredients makes an overwide ratio in the diet. Either of these errors is disadvantageous. Our food materials and our diet are apt to have too wide a nutritive ratio. In other words, we consume on the whole relatively too little protein and too much of the carbohydrates and fats.

Just what compounds in food are needed for the nutriment of the brain physiological chemistry has yet to tell us, but it is certain that people with little muscular exercise require less food than those who labor. Well-to-do professional men and students in Europe with less muscular exercise than mechanics have been found to be well nourished with an average of 0.23 pound of protein and 2,700 calories of energy. In the cases observed in the United States the

fair in England; the American figures are by the writer and his associates; all are based upon the observations of actual dietaries.

The dietary standards of the same table are intended to represent the average needs as nearly as they can be estimated from the data now at hand. Much more inquiry will be necessary to make them as reliable as is to be desired.

CALCULATION OF DAILY DIETARIES.

On the basis of the standards for dietaries, various combinations of food materials for daily dietaries may be made by calculations from standard tables. Thus if a dietary for a man at moderately hard muscular work is to be made up of round beefsteak, butter, potatoes, and bread, it may be calculated as follows:

Table showing calculations for dietary standards. Columns: Protein (Lbs.), Calories, and Nutrient breakdown (Round steak, Butter, Potatoes, Wheat bread).

(To be continued.)

Beardless Barley.

Editor Kansas Farmer:—I would like to know something of the experience of some one in our State with the raising of beardless barley. I am thinking some of sowing it next season, and, as I never handled it, and cannot find a farmer here who has had experience with it, I write to you in hopes of finding what I want. Will you please bring this matter to the attention of some one who can answer the following questions about it through the Farmer: Does beardless barley yield well here, I mean in southeastern Kansas? How much should be sown per acre? Do chinch bugs damage it as they do wheat or oats? M. L. SOMERS. Altoona, Kans.

Grass on the Plains.

Editor Kansas Farmer:—In reply to a question concerning Johnson grass, in your issue of the 8th inst., I will say that Johnson grass has been tried at Rainbelt Experiment Station. It makes a good growth as an annual, and occasionally a few roots live through the winter here, but not enough to amount to much during the second year. One ranchman near here tried it several years, but finally gave it up as worthless for this section. We do not know of anyone here who has tried pasturing Johnson grass the first year. I will say that some success has been attained in seeding eaten-out buffalo grass sod to grains and grasses without plowing the ground. The cutaway or disk harrow has been successfully used in preparing sod for millet and sorghum. J. E. PAYNE. Cheyenne Wells, Colo.

Students Returning Home

for holiday vacations can, upon presentation of proper credentials, obtain tickets via Nickel Plate road at a rate of a fare and one-third for the round trip. Tickets will be sold on date school closes and day following, with return limit to and including day school reconvenes. Full information cheerfully given at No. 111 Adams St., Chicago. Telephone Main 3389. 79

The Stock Interest.

GROWING BEEF IN MINNESOTA.

Editor Kansas Farmer:—This paper contains a summary of Bulletin No. 60, Section 1, which has just appeared under the above heading. Only a few years have gone since the opinion prevailed extensively in our State that beef could not be grown at a profit on our farms because of the competition of the ranges. This experiment was undertaken to demonstrate that beef could be grown on the average farm at a fair profit, providing that it were grown on correct principles.

Two Shorthorn grade calves were secured when but a few days old. They were presented to the station by Mr. H. F. Brown, of Minneapolis. They were the progeny of common cows, and were sired by a pure Shorthorn bull of the Brownsdale herd. They were fed on such foods as can be readily grown on the average farm. These foods were valued at the average market prices which they bring in the State. All the food fed from the day of birth to the day of slaughter was accurately weighed. The steers were kept in box stalls during winter and in these much of the time they were tied. In summer they were given green food carried to them, or were kept on pasture, as was convenient. It was the aim to keep them growing right along from birth until the fattening period without making them too fat, and then to finish them with a prudent haste, and put them on the market. The effort was made to rear them and to manage them in every way just as they may be reared and managed on the average farm in the State.

The two steers, named Jack and Prince, respectively, were dropped August 1 and September 28, 1895. The first was a good type of a Shorthorn grade, with plenty of bone and substance. The second was also fairly good, but was a little lacking in roundness of rib and a little long of limb. Both were good average feeders, hence they are to be taken as fairly representative types for beef-making.

During the milk period they were fed new milk for about two weeks, then they were fed skim-milk and adjuncts. The milk period covered about six months. One week was occupied in making the change from all new milk to all skim-milk. The skim-milk fed averaged 20 and 18 pounds, respectively. The meal adjuncts were bran, oats and oil cake. The bran and oats were fed in the proportions of 1 and 3 parts, and the average amount fed during the first year was about 3 pounds daily. The oil meal never exceeded one-fourth of a pound per day, and at the first only a very small quantity was fed. The other adjuncts during the first year were hay, green food and corn, ensilage when in season and mangels in the winter. The first summer the steers were not pastured as the facilities for pasturing them were not at hand.

The foods the second winter was much the same as the first winter, only more grain was fed and of course no milk was given; oil cake also was withheld. The average amount of meal fed per day, the second year was a little more than 5 pounds—an amount that was perhaps higher than was necessary. The average amount of mangels fed during the second winter was about 14 pounds.

The second summer the steers were kept on grass for about three months. They were not given grain while on the grass except for a short time after they were first turned out. They made very little progress while on the grass, although it was plentiful. The reasons are not clearly apparent. It may be that animals used to a grain ration from birth should have it continued, to some extent, at least, even when they are out on grass. This question will have to be further studied.

The finishing period began early in October, 1897, when the steers were about 24 to 26 months old, and it ended on January 31, 1898. Substantially the meal fed during the finishing period consisted of wheat bran, barley, corn, and oil cake, fed in the proportions by weight of 3, 3, 3 and 1 parts, respectively. Later the bran was reduced and the oil cake increased. Although they were given practically all the meal they would eat up clean, at no time could Jack be made to consume more than 15 pounds per day and Prince more than 13 pounds. This fact is significant when we remember that many feeders give from 25 to 30 pounds of corn to a cattle beast per day while they are feeding the same.

The cost of the food the first year was \$15.23 for Jack and \$14.81 for Prince.

The weight of the first was 670 pounds and of the second 693 pounds. The daily increase was 1.84 pounds and 1.90 pounds respectively. The cost of the food the second year was \$16.43 for Jack and \$14.84 for Prince. The total gain was 400 pounds for the former and 402 pounds for the latter. These gains were very low, amounting to only 1.09 and 1.1 pounds per day respectively, and they were caused chiefly by the peculiar behavior of the steers while on grass. During the finishing period the cost of the food was \$13.51 for Jack and \$10.56 for Prince. The gains were 365 and 228 pounds respectively or 2.03 and 1.81 pounds per day.

The steers were sold to the supply department of the School of Agriculture, and were slaughtered for the same by Mr. Andrew Boss, the instructor in dressing meats, that their carcasses could be compared in the dead form. Before being slaughtered they were valued by two experts from the St. Paul stock yards, one of these, Mr. C. Engemoen, the live stock salesman for E. M. Prouty & Co., and the other Mr. J. C. Crosby, live stock buyer for Swift & Co. They were requested to put the value on them which they would be willing to pay. They valued Jack at \$4.75 per 100 pounds and Prince at \$4.40. These values were certainly not high and they were of course made the basis of the financial computation. The total cost of food fed in growing Jack was \$45.17 and in growing Prince \$40.21. The shrunk weights with a shrinkage of 3 per cent were 1,392 and 1,280 pounds respectively when the steers were slaughtered early in February. The value of the first therefore was \$66.12 and of the second \$56.32. The net profit on the first was \$20.95 and on the second \$16.11. The manure made is supposed to offset the cost of labor and bedding, and also the interest on the capital invested. Such a value put upon the manure may seem high to a Western farmer, but it will seem low to a farmer in the Eastern States. And the fact should not be lost sight of that the food was charged at average market values. The market value of food is nearly always higher than the cost of growing the same. Now the cost of growing food would be the proper basis at which to charge it. But since it is almost impossible to estimate exactly the correct cost of growing food, conditions vary so, it has been thought best to take the market value as the basis of computation in all these experiments. But in doing so it represents the gain as being less than it really is.

From the results obtained in this experiment it is patent that the farmer need not be much concerned about range competition. If he can make \$16 to \$21 profit on a 28 or 30 months steer which he has grown, he is in good business. There is but little doubt in the mind of the writer but that the best way to grow steers for beef is to keep them growing right along from birth without any periods of stagnation, and to market them when not more than 30 months old. Steers thus grown, if they have been properly bred, make the very best class of beef, and if properly finished will bring top prices.

The dressed carcasses of the steers were cut up in the usual way at the request of Col. Liggett, the director of the station, and certain portions of the carcass were carefully compared. Photographs were taken of some of these, which appear in the bulletin. The meat in the loin, and, indeed, in other parts, was beautifully flecked. The flecks of fat intermingled with the lean were small and numerous, hence the meat was juicy and tender whether eaten in the warm or the cold form. Such meat is so entirely different from the common meat that is grown by the ordinary slow methods that one can hardly imagine that such a contrast could exist without having sampled both.

Many particulars are given in the bulletin which cannot be referred to in a paper of this character. But enough has been said to show what an immense field lies before the Minnesota farmer in the growing of beef. And it is a field that is likely to continue large through all time. The ranges are now pretty well filled up and our population is growing apace. The demand for beef, therefore, is likely to be more rather than less with the passing of the years. THOS. SHAW, Minnesota University Experiment Farm.

TO CURE A COLD IN ONE DAY
Take Laxative Bromo Quinine Tablets
All druggists refund the money if it fails to cure. 25c. The genuine has L. B. Q. on each tablet.

If trees are heeled in care must be taken to see that good drainage is provided.

Opportunities on the Plains.

Editor Kansas Farmer:—In your issue of the 8th inst. I notice an advertisement—"Wanted—A system of creameries and skimming stations in the best field in Kansas."

I am not in the real estate business and have no ax to grind, but I feel like putting in a similar advertisement reading:—"Wanted—Forty men under 30 years of age with from 50 to 200 head of cattle each to settle in Cheyenne county, Colorado, and make themselves homes."

This country is, in a great measure, unoccupied. A young man can take a homestead in almost any part of the county. The settlers are so far apart now that, in many places, neighbors are 15 miles away.

My acquaintance with the rent rates prevailing in central and eastern Kansas makes me think that a young man can do better here with stock than he can do for himself by farming rented farms. If he is able to farm a 160-acre farm he can put his capital into cattle here and in a few years be able to buy one of the choice farms in Kansas; this, providing the young man is a good hand with stock, and is willing to live as a stockman must live here, exposed to the weather, caring for stock and enduring the hardships encountered in such work.

To give some idea of the extent of unoccupied territory: Traveling south to Sheridan Lake, which is 25 miles from here, we find one settler with a small bunch of sheep. No settlers are found within 25 miles southwest from here. Two settlers live within 28 miles on the road northeast from town. In this county, which is 60 by 30 miles, are about 600 people, and 150 of these live in the town of Cheyenne Wells.

This lack of population is due mainly to the lack of surface water. If a man wants to keep stock he must dig for water for it, as only for a part of the year can the surface water be depended upon to supply water enough for stock. Water can be found at from a few feet to 300 feet below the surface, and there is usually enough water to run a windmill for raising the water to the surface.

A few years ago a great many settlers were in the country, but most of these have since left. Those who have stayed are now doing well. Since the country was first settled several varieties of sorghum have been introduced, so that now fodder is a sure crop and can be raised with very little labor. In some seasons native hay has been cut in large quantities. During the past four seasons, native hay, consisting of Colorado bluestem and tall gramma grass, has been cut every year. One kind of millet, known by several names as hirse, broomcorn millet, Manitoba millet, Japanese millet, hog millet, Prussian millet, etc., does well here. It has made a fair crop of seed and hay during each of the past three seasons. Brown Durra and Jerusalem corn can be depended upon to make a crop of seed every year. I have raised from 25 to 40 bushels of Brown Durra seed per acre during each of the past three seasons. Last season, 1898, I cut one ton of alfalfa hay per acre from a plot of ground where water is between 260 and 300 feet below the surface. There is a field of alfalfa 6 miles from here which yielded nearly 5 tons per acre during the season of 1898. It grows where water is from 5 to 12 feet below the surface. One variety of cow peas has been grown in this region for several years, making from 6 to 10 bushels per acre. Sweet potatoes have been successfully raised here. Irish potatoes do moderately well on carefully selected ground when the potato beetles are not too numerous. In 1897 we raised a fair crop of Irish potatoes, but in 1898 the beetles took nearly all our vines in spite of us, and we kept the vines covered with paris green throughout the season, making it the "suicide resort" for the beetles of the whole country.

Trees are growing here, making a slow growth each year. Black locusts, honey locusts, Russian mulberry and ash trees are almost sure to grow if planted and cared for properly. We have cherry trees which have been set out four years which are bearing small crops of fruit. The plum trees bore their first crop in 1898. Gooseberry bushes bore a good crop in 1897, and again in 1898. The apple trees planted in 1895 and 1897 are growing well. A few of them blossomed in 1898, but none of them set fruit. All trees have to be cultivated carefully during the growing season.

Those who intend to settle in this country should prospect for water before locating, and then settle where they find a good supply, no matter what are the other conditions. Men who settled

Was Never Well

But Hood's Sarsaparilla Has Given Her Permanent Health.

"I was a pale, puny, sickly woman, weighing less than 90 pounds. I was never well. I had female troubles and a bad throat trouble. I came across an advertisement of Hood's Sarsaparilla and had faith in the medicine at once. I began taking it and soon felt better. I kept on until I was cured. I now weigh 103 pounds, and never have any sickness. Hood's Sarsaparilla will not cure. My blood is pure, complexion good and face free from eruptions." MRS. LUNA FARNUM, Box 116, Hills Grove, Rhode Island.

Hood's Sarsaparilla

Is the best—in fact the One True Blood Purifier.

Hood's Pills are tasteless, mild, effective. All druggists. 25c.

a few years ago where there is water convenient are still in the country while the men who chose fine, level land, thus putting the water question aside, are all in some other place now. It is important that the men with small herds get into the country soon, as the boom in the cattle industry which is just beginning will soon put the country into the hands of large cattle companies who will hinder the development of the country until cattle-raising on a large scale ceases to be profitable. If small herds could occupy the country, better cattle could be raised, because each man could raise feed for the calves, and for the whole herd during the storms of winter while the large cattle company, considering feeding unprofitable, would allow their cattle to go through the winter without feeding. It has been the experience of feeders that steers that have been starved on the range after weaning are likely to cause loss to those handling them in the feed lot, so the calves of the small cattleman will be found more profitable because of his ability to feed them when necessary.

We write this to merely suggest what is possible, not what every one can do, as we are likely to find men failing on the best propositions. J. E. PAYNE, Cheyenne Wells, Colo.

Farmer's Handy Feed Cooker.

Reader's attention is called to this device, which is sold at \$12.50 for 50-gallon capacity. By feeding poultry and animals cooked food during winter at least



one-third of the feed is saved; also having stock in a healthy condition, preventing hog cholera among your hogs and insuring the hens laying freely during the winter months. On application to the Empire Manufacturing Co., Quincy, Ill., a catalogue giving full description, may be obtained. They are made in all sizes.

Cheap Rates for the Holidays, 1898-99.

The Missouri Pacific will sell tickets on December 24, 25, 26 and 31, 1898, and January 1 and 2, 1899, limited for return January 4, 1899, at rate of one fare for the round trip, between points within 200 miles distance. Minimum rate 50 cents.

Christmas is Coming

and the Union Pacific will sell tickets on its lines at greatly reduced rates. For dates of sale, limits and points to which tickets will be sold apply to F. A. Lewis, City Ticket Agent, or J. C. Fulton, Depot Agent, Topeka.

Reduced Rates for Christmas and New-years Holidays.

The Nickel Plate road will sell tickets December 23, 24, 25, 30, and 31, 1898, and January 1, at rate of a fare and a third for the round trip, to any point on their line, good returning to and including January 3, 1899. Address J. Y. Calahan, General Agent, 111 Adams St. 78

OUR FARMING.

Secretary of Agriculture James Wilson, in his annual report, made public December 1, in addition to discussing domestic problems, reviews our agricultural relations in foreign fields. He calls for an emergency appropriation of a lump sum for future requirements that cannot all be anticipated specifically. Exploration by scientists of territorial acquisitions and the sudden appearance of pests are some of the possible emergencies.

Discussing agricultural resources in our new island acquisitions, Secretary Wilson says:

IN "THE COLONIES."

"In the territories recently brought under the control of the United States government, agricultural interests urgently call for attention by this department. Hawaii and the West India islands depend almost exclusively for their prosperity upon their agricultural products. It behooves the department, therefore, to place itself, at the earliest moment possible, in a position to extend to the agriculturists of those territories which have or may come under the United States flag the services and benefits which it renders to the farmers of the United States. The increased trade relations which may be looked for between the United States and its insular dependencies, moreover, render the conditions of agriculture in the latter and the character and extent of their productions matters of profound interest to the people of the United States. In the interest of

farmer is now selling cheap grains and mill feeds to European dairymen, who meet us in European markets with products made from raw material furnished by us. But there is reason to believe that there is a growing tendency toward the consumption of grains and mill feeds at home and exporting the products of skill and intelligence.

AGENCIES.

The trade in American farm products is growing in the China seas, and, in order that markets may be opened up in Japan, China and other countries of the Pacific ocean, an agent is now in that region establishing agencies, to which the department will make trial shipments and gather all information possible for the American producer.

INSPECTION.

The Secretary recommends the extension and adoption of the provisions of the law regarding the inspection and certification of meats and meat products for export, so as to make them apply to butter and cheese. The brands, "pure butter" and "full cream cheese" should then be affixed by United States inspectors to such products as come up to the required standard of quality. This would place the good butter and cheese of this country on foreign markets under the identifying label and guaranty of the United States government.

The dairy products of Denmark and Canada, which are the chief competitors of the United States in the markets of Great Britain, bear the inspection certificate and guaranty of quality from their respective governments.

would enable him to control conditions, produce more from an acre and contribute more to the general welfare.

With the exception of the very few persons who have found their way into our agricultural colleges, the education of our people has not been designed to prepare them for producing from the soil. Nothing is being done in most of the common schools of the States to cultivate a taste and lead the mind to inquire into and store up facts regarding nature, so that the young farmer may be directed into the path that leads to education concerning his future lifework. The teacher should be educated for this work.

The report suggests that the greatest difficulties are to overcome the conservatism of the local boards managing country schools and to get competent teachers. This scientific educational subject is exhaustively discussed, and while there is no university where young farmers may pursue post-graduate studies in all the sciences relating to production, the scientific divisions of the department of agriculture, it is urged, to some extent can provide post-graduate facilities.

The capacity of the department is limited, but assistants are often tempted to accept higher salaries in State institutions and the opening of the laboratories to post-graduate work would provide an eligible list to fill vacancies as they occur, supply temporary agents and also furnish scientific assistants in State institutions. The distribution of young plants to various parts of the country reached a total for the year of 190,000, including bulbs. This experimental garden

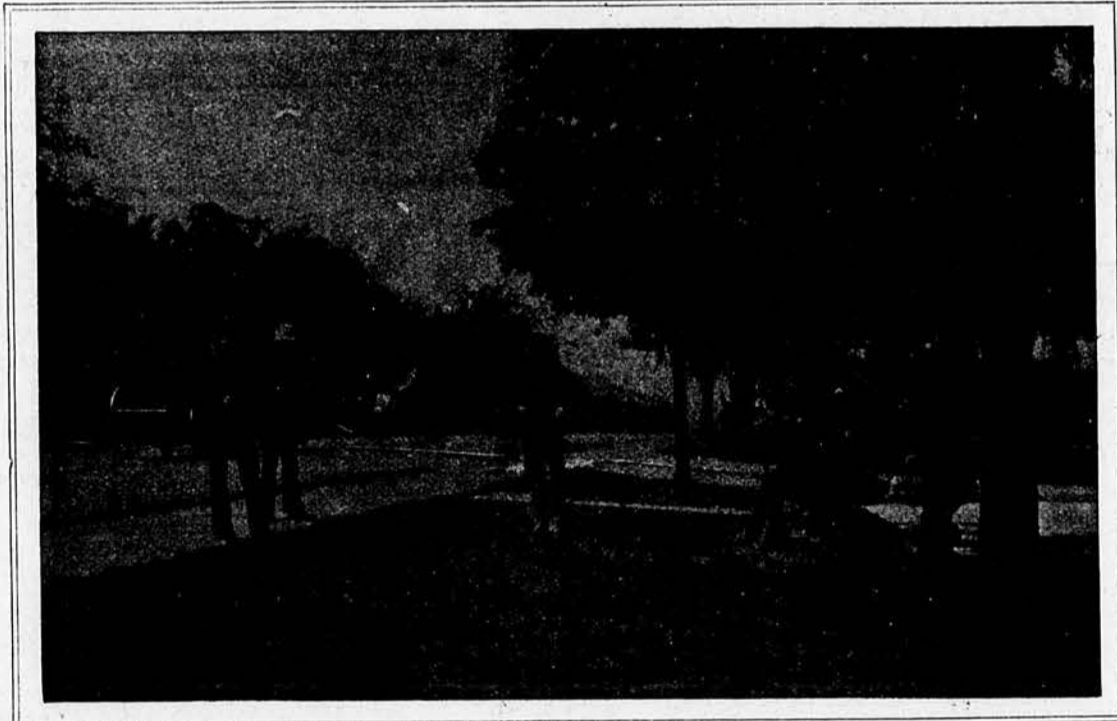


The Giant Despair.

One of the most horrible things about the nervous diseases to which women are peculiarly subject is the sense of overwhelming despair which they bring upon the mind. A woman's mental condition is directly and powerfully affected by any ailment of the delicate, special organs of her sex. Such a difficulty not only racks her body with pain and suffering but burdens her with mental anguish which words can hardly describe.

Thousands of women have had a similar experience to that of Mrs. Eurath A. Williams, of Westport, Oldham Co., Ky., in which the use of Dr. Pierce's wonderful "Favorite Prescription," by imparting health and strength to the feminine organism, has not only restored complete vigor and capacity to the bodily powers but has also given renewed brightness and buoyancy of spirit.

"I suffered for over a year," says Mrs. Williams, "with indigestion and nervous prostration. I was unable to eat or sleep. I tried several physicians, but they only helped me for a short time. A friend advised me to take Dr. Pierce's Favorite Prescription, Dr. Pierce's Golden Medical Discovery and 'Pellets.' I commenced taking the medicines last May. Took three bottles of the 'Favorite Prescription,' three of the 'Golden Medical Discovery,' and three vials of the 'Pellets,' and am now feeling better than I have for two years. Have a good appetite, sleep well, and do not suffer from indigestion or nervousness. I have gained seven and a half pounds since taking these medicines. I have recommended Dr. Pierce's medicine to several ladies, one of whom is now taking it and is being greatly benefited."



VIEW IN FORT LEAVENWORTH, LEAVENWORTH, KAN.

From a photographic view taken along the line of the Missouri Pacific Railway.

our own agriculture, not only must the agricultural resources of these islands then be studied closely and intelligently, but the dangers which threaten agriculture in these territories in the form of plant diseases or insect pests must be made the subject of special investigation, with a view to providing agriculture there with preventive or remedial agencies, and also to securing our own agriculture from the possibility of their introduction into this country. It is urgently necessary, therefore, that Congress should, as speedily as possible, provide a sufficient fund for the use of this department in making such investigations as may be necessary to the agricultural resources and conditions in Hawaii, Porto Rico, Cuba and the Philippines."

EXPORTING DAIRY PRODUCTS.

On the practicability of exporting dairy products the Secretary says that, owing to a better home demand, it is not commercially profitable to send butter to Europe just now, as the home demand at present absorbs the supply. For the purpose of obtaining the dairymen all the facts relating to the exports of this product, the department sent an agent to Paris to ascertain what encouragement there would be to ship butter to that port, and an agent to Hamburg to ascertain the facts regarding customs duties, as well as prohibitions and other difficulties that might meet exporters of butter to Germany. It was found that no line of steamers sailing to French ports direct could furnish refrigerator space, so shipments could not be made during hot weather. Whenever our home supply exceeds our home demand, the Secretary says, it can be profitably sent to both France and Germany. The American

"There is an evident necessity," the report says, "for the inspection of many articles imported from foreign countries that contain substances injurious to the public health. The department chemists are doing work along this line that suggests a more comprehensive inquiry. The department now buys samples for analysis in the open market. It may be necessary, however, where there is ground for suspicion and a necessity for the identification of source, to open packages at ports of entry, as it is proposed in foreign countries to do with our exports in certain cases."

This brief statement is the only reference the Secretary makes to restrictive measures adopted by certain foreign governments respecting our products.

The experimental exports of butter by the agricultural department to Great Britain were resumed at the opening of the season of 1898 on an enlarged scale, and Secretary Wilson says a decided gain is evident in the favorable impression made by butter of the first quality from the United States creameries on the better class of butter trade in London and Manchester.

TEACHING.

Lack of proper attention to economic chemistry is complained of, and the report says that we pay foreign countries large sums for coal tar products, for example, while we have skilled chemists, capital and raw material at home.

The Secretary enlarges upon the need of nature teaching in the common schools. He says there is a growing interest in education that relates to production, and all classes of intelligent people favor it. More knowledge by the farmer of what he deals with every day

work is expected to reap material general benefit.

KILLS TEXAS FEVER TICKS.

The report announces that the Bureau of Animal Industry has perfected a dip which takes the fever ticks from cattle, so that they can be moved north at any season, that it has continued experiments with anti-toxin serum to prevent and cure hog cholera, and it is recommended that this discovery, having been made by public officials at public expense, should not be diverted to private cost, and that the serum manufacture should be continued under government control, at least for some years to come. The Texas fever dipping stations will be established at convenient points before the next quarantine season. The results from the black-leg vaccine indicate the percentage of loss in herds has been reduced from 10 to 20 per cent. to less than 1 per cent. This indicates that if generally used it will tend to eradicate the disease completely. Detailed figures as to microscopic inspection of meat are submitted.

BRIEFLY MENTIONED.

Other features of the report briefly follow:

Quick and timely information has been gained of foreign markets, under the direction of Chief Hitchcock, and our knowledge of the islands of the Caribbean and China seas largely increased. Our foreign trade in agricultural products is shown to be over two-thirds of our domestic exports and is steadily growing, while the production of field products introduced from foreign countries is rapidly increasing, causing a corresponding decrease in agricultural imports. Good work has been done in hybridizing the orange and other citrus

plants and in the crossing of pineapples, increasing the size and vigor, and greatly improving the flavor.

Observation and forecast weather stations have been extended around the Caribbean sea and increased through the interior of this country, especially in the Mountain States. The natural life zones of the United States are being surveyed and the areas best adapted to various crops determined. Four scientific explorers of the department are abroad getting seeds and plants in Russia, the Mediterranean region, the China sea and South America. Strenuous efforts are making to perfect crop statistics, and Statistician Hyde has successful measures to preclude accurate premature statements of the official figures. The Alaskan interior will be explored next summer to learn its capacity to support population, while coastal resources already have been determined.

Steel rails are stated to be the coming material for good roads where hard rock is not convenient.

Regarding forestry, species adapted to dry regions are now being introduced, better methods of handling forest lands in public and private ownership are being introduced by government agents and fire prevention and fire fighting are being studied. The report also refers to the value and popularity of the official farmers' bulletins and to soil and tobacco resources.

Catarrh Cannot Be Cured

with LOCAL APPLICATIONS, as they cannot reach the seat of the disease. Catarrh is a blood or constitutional disease, and in order to cure it you must take internal remedies. Hall's Catarrh Cure is taken internally, and acts directly on the blood and mucous surfaces. Hall's Catarrh Cure is not a quack medicine. It was prescribed by one of the best physicians in this country for years, and is a regular prescription. It is composed of the best tonics known, combined with the best blood purifiers, acting directly on the mucous surfaces. The perfect combination of the two ingredients is what produces such wonderful results in curing Catarrh. Send for testimonials, free.

F. J. CHENEY & CO., Props.,
Toledo, O.

Sold by druggists, price 75 cents.

Cheap Rates for the Holidays, 1898-99.

The Missouri Pacific will sell tickets on December 24, 25, 26 and 31, 1898, and January 1 and 2, 1899, limited for return January 4, 1899, at rate of one fare for the round trip, between points within 200 miles distance. Minimum rate 50 cents.

Horse Owners! Use GONBAULT'S Caustic Balsam

A Safe Speedy and Positive Cure
The Safest, Best BLISTER ever used. Takes the place of all liniments for mild or severe action. Removes all Bunches or Blemishes from Horses and Cattle. SUPERSEDES ALL CAUTERY OR FIRING. Impossible to produce scar or blemish. Every bottle sold is warranted to give satisfaction. Price \$1.50 per bottle. Sold by druggists, or sent by express, charges paid, with full directions for its use. Send for descriptive circulars. THE LAWRENCE-WILLIAMS CO., Cleveland O.

Hatching Ducks.

Mr. and Mrs. A. Clark, of Clay Center, Neb., had been having big luck hatching hen's eggs, and thought to try some ducks' eggs. They filled the machine half full of ducks' eggs. The result was a machine chock full of little ducks. Ducks are very much bigger out of the shell than it is, and if they had filled the machine with eggs there would have been some duck squeezing. The Sure Hatch Incubator with thermostatic heat governor is the lowest-priced and most successful machine on the market. The new catalogue contains a new theory on artificial incubation that meets the approval of all poultry raisers. Whether you own an incubator or want to buy one, this book is worth several times the

is to be congratulated. Mr. Good, the manager, felt as though the general average of up-to-date Hereford character possessed by the offerings merited a little better average, yet he stated that, it being their first public sale and following all the others, he was very well satisfied, and returned his thanks to the patrons and visitors at the sale.

The Kansas buyers were in evidence at this sale, as is shown by the following list of purchasers: J. M. Crouse, Medicine Lodge; A. W. Whitmer, McLouth; F. H. C. Hampson, Hillsdale; R. Stinson, Phillipsburg; H. A. Nabor, Wallula; B. F. Dickson, Everest; A. H. Bird, Axtell; J. E. Conroy, Manhattan; Wm. Moss, Alma; W. E. Campbell, Kiowa; J. R. Smith, Doniphan; Geo. Hupfer, Bunker Hill; C. Delahunt, Olathe; James Stone, Cedarvale; W. C. Miller, Medicine Lodge; Burt Shaver, Cedarvale; and P. C. Parker, Waterville.

SUMMARY OF TWO DAYS' SALE.

69 bulls brought.....	\$10,260.00
Average	148.69
26 cows and heifers brought.....	4,860.00
Average	186.15
95 head brought	15,120.00
General average	159.05

Gossip About Stock.

The seventh annual meeting of the National Duroc-Jersey Record Association will be held in the Clifton House, Chicago, Thursday, January 12, 1899. All breeders of Duroc-Jersey swine and representatives of the stock and agricultural papers will be welcomed. Members are especially urged to attend. Robt. J. Evans, Secretary, El Paso, Ill.

Any breeder of improved stock who fails to be present at the annual meeting of the Kansas Improved Breeders' Association and the Kansas Swine Breeders' Associa-

From Various Sources.

A census was lately taken in Algeria, and it was found that the youngest Arab married man was 12 years old, and that there were very many boys who were married at 13 and 14, while some at 15 had several wives. There is a youthful Algerian widower of 15 and a divorced husband of the same age. Girls are still more precocious, and are sometimes married when only 11 years old, though 12 is the more usual age. There are 189 widows of 15 and 1,176 divorcees of the same age.

A story which, if not true, is not badly told, appears in the Boston Transcript, to the effect that while the bark Cape City was at Hong Kong a Chinaman was engaged to paint the necessary name on each bow.

He produced on one bow the legend "Capecity," without a space between the two words. Then he noted that the "y" was nearest the ship's stern, and remembering this fact, he afforded an excellent example of how severely logical his race can be; for in a little while he had painted on the other bow the striking permutation, "yticepaC," to his own delight and the crew's amazement.

An Iowa Judge was telling stories in a hotel lobby, and he related an amusing incident which had occurred in his court when a colored man was brought up for some petty offense. The charge was read, and as the statement "The State of Iowa against John Jones" was read in a loud voice, the colored man's



cost. The cost is only a 2-cent stamp. Look up their "ad." elsewhere and send for the catalogue. Mention the Kansas Farmer.

SURE HATCH INCUBATOR CO.,
Clay Center, Neb.

The Comstock Hereford Sale.

The two days' sale of registered Herefords, bred and owned by C. G. Comstock, of Albany, Gentry county, Missouri, at the stock yards sale barn, at Kansas City, December 15 and 16, was well attended. Buyers and breeders were out from Illinois, Iowa, South Dakota, Nebraska, Colorado, Oklahoma, Indian Territory, Kansas and Missouri. While the prices realized were not phenomenal ones, they were, as the reader will note, strongly indicative of the esteem held by the beef cattle breeding public for the Hereford. Several of the better bulls hardly brought enough. This, in part, may be accounted for from the fact that the offerings had not been specially fitted for the sales ring, yet they were in good breeding condition and as richly bred as one could wish. The bull, lot 50, John L. 70911, topped the sale at \$350. He is a son of the premier herd bull, Captain Grove 2d 51325 and out of Moonlight 29743, a granddaughter of Tredegar 3383. Individually John L. is above the average good ones, and J. H. Fellows, of Fairfax, Mo., may consider himself lucky in getting him for \$350, as many rated him fully worth an even \$500. Lots 28, 42 and 65 brought \$250, \$200 and \$220, respectively, and the writer considers that each of them should have brought more money, comparing their breeding and individuality with others that have passed through the sales ring here during the year.

The results of second day's sale of Herefords averaged better than the first day. Fourteen head, it will be observed, brought \$200 or better. Taking into consideration that the offerings were mainly yearlings and without any special sale ring fittings, the sale was a success and Mr. Comstock

tion, January 9-11, 1899, will regret it every day of the new year, when, after these important conventions, he finds what he has missed. Remember, that during the same week the Kansas State Board of Agriculture meets and the Kansas Poultry Show will be on. Let every breeder come and bring his friends.

The Richland herd of Poland-Chinas, property of F. W. Baker, Council Grove, Morris county, Kansas, is one of the foremost herds of Polands in the State, both in point of breeding and in individual merit. It is headed by the great boars, Klever's 1st Model 18245 S. and What's Wanted Jr. 2d 18534 S. These hogs are too well known to need description here. Mr. Baker's sows are of the most fashionable strains and are first-class individuals. He has been culling closely and using the knife freely on male pigs, and of course has not hurt the appearance of his herd by that means. The writer can say that he has never seen a blacker herd of hogs than the Richland herd. At present there are for sale a few spring boars and about twenty sows and gilts. Write Mr. Baker for prices and information.

A Farmer representative last week visited the Silver Spring herd of Poland-Chinas, owned by Mr. Walter Roswurm, Beman, Morris county, Kansas, and found the herd in good working trim. The herd at present numbers about sixty head, all young hogs, headed by the grand young boar, Hadley Model T., a son of Hadley Jr. and out of Klever's Model Tecumseh by Klever Model. Hadley Model T. is as black as ink, with good markings, extra good in head and ear, shoulder, back and quarter, stands straight on his legs, has plenty of bone, and should give a good account of himself. Mr. Roswurm's sows are principally of the Model and Corwin strains. They are all black and are a very uniform lot of good quality. At present he is offering several head of bred sows, a few gilts, and five head of spring boars. Parties wanting anything of that kind will do well to correspond with Mr. Roswurm. His Breeders' card appears in this issue.

eyes bulged nearly out of their sockets, and he seemed perfectly overcome with terror and astonishment. When he was asked if he had anything to say, or pleaded guilty or not guilty, he gasped out:

"Well, yo' honah, ef de whole State o' Iowa is agin this one pore nigger, I'se gwine to give up right now."—Chicago Journal.

This penny Mauritius stamp was issued, together with a twopenny of similar design, in 1847, its extreme rarity being due not only to the time which has elapsed since its appearance, but also to the very small number printed. It is the rarest stamp in the world, and has been recently purchased by an Englishman for over \$5,000, which is the highest sum ever given for a single stamp in England. Only one other copy on the original envelope is known, and that is in the British museum.

It is believed that nearly all these stamps were used up on the day of issue in franking invitations to an official ball, and, as the envelope is small and suitable only for inclosing a card or single sheet of paper, and also as the date of the postmark and the handwriting on the envelope are precisely similar to that of the only other known copy, a certain amount of probability on these grounds alone is attached to the above theory.—Kansas City Journal.

J. F. True & Son have purchased of L. L. Gregg, of Hicks City, Mo., the Cruickshank yearling bull, Golden Victor Jr. He is out of 16th Linwood Victoria, by Galahad, out of a dam by Imp. Baron Victor and was sired by Crown Victor 114899. This sire, Crown Victor, was out of Victoria Rose 2d, by Imp. Scotland's Hero, this old bull being out



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WINCHESTER REPEATING ARMS CO.,
188 Winchester Ave., NEW HAVEN, CONN.

of the dam of the great young Abotsburn. This youngster goes to Rocky Hill to compete for premier place with Waterloo Duke of Hazelhurst 11th.

Dr. Bull's Cough Syrup helps consumptives and cures incipient consumption; it loosens the phlegm and heals. It is without doubt the best cough medicine. Price 25c.

Pancakes and Honey Are Now in Order.

Comb honey is rather expensive for general use, and from this time on it is liable to be more or less granulated. Pure extracted or liquid alfalfa honey is the best, and if ordered direct from the bee-keeper it can be had as fresh and good as ever the year around, and in quantities to suit, at wholesale prices. Write for delivered prices to Oliver Foster, proprietor of "The Arkansas Valley Apiaries," Las Animas, Colo.



YOU CAN MAKE \$10 TO \$30 Per day exhibiting our Panoramic Cuban War Exhibition Outfit.

Everybody is enthused over the brilliant victories of our Army and Navy and the exhibitions have only to be advertised to bring crowded houses at good prices for admission. We furnish the complete outfit, including 53 Cuban War Views, High Grade Stereopticon, large (14x21) Advertising Posters, Admission Tickets, etc. for a little money. Cut this ad. out and send for circulars with full particulars and copies of testimonials from exhibitors who are making big money with our outfit. Address, Sears, Roebuck & Co., Inc., Chicago, Ill.

NEXT TO A DAILY.

The Semi-Weekly Capital

FOR THE FARMERS OF KANSAS.

The war with Spain has emphasized the fact that a weekly newspaper, for general news, is too slow for the up-to-date, progressive farmer. Thousands who could not take a daily have secured in

The Semi-Weekly Capital

a complete summary of the news of the war, besides all the other news of the world, especially everything happening within the borders of Kansas. The settlement of the controversy with Spain and the introduction of American government in the newly acquired territory will afford a great fund of interesting news and information. Subscribers to the Semi-Weekly Capital will receive it all at the same cost as an ordinary weekly paper. Sample copy free upon request.

\$1.00 per Yr.

THE LEGISLATURE.

A subscription to the SEMI-WEEKLY CAPITAL now will secure the best and most complete report of the proceedings of the coming Kansas Legislature which will appear in any paper published in or out of the state.

The Semi-Weekly Capital

and
The Kansas Farmer

Will be sent to any address for one year for

\$1.50.

ADDRESS

The Kansas Farmer,
Topeka, Kas.

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houses will, as usual, be reasonable, and accommodations can readily be secured suited to the purses of the poor, "the comfortably well off," or the plutocratic.

WATER IN THE UNITED STATES.

The literature of water supply in the United States consists very largely of reports of the Division of Hydrography of the United States Geological Survey. In a recent circular Mr. F. H. Newell summarizes these and outlines the work undertaken by his division as follows:

ANNUAL REPORTS.

The progress reports of the Division of Hydrography cover the results of the operations of each calendar year, bringing together available data concerning the water resources of the United States. These reports are now printed as separate volumes of the annual reports of the Geological Survey. Organized in the winter of 1888, the results of the hydrographic investigations for the first full calendar year, 1889, were printed as Part II of the Eleventh Annual Report. The latest volume issued is that relating to the operations of the eighth field season, calendar year of 1896, printed as Part IV of the Eighteenth annual report.

1896.—This volume, Part I, of the Eighteenth Annual, contains first a "Report of Progress of River Measurements for the Calendar Year 1896," by Arthur P. Davis. This is accompanied by the following papers: "The Water Resources of Ohio and Indiana," by Frank Leverett; "New Developments in Well Boring and Irrigation in South Dakota," by N. H. Darton; and "Reservoirs for Irrigation," by J. D. Schuyler, the last paper being illustrated by a large number of views of important dams.

1897.—The next progress report, that for the year 1897, covers the results of operations for the ninth season of field work, and includes with the data thus obtained supplemental information brought together from various sources. This volume, Part IV of the Nineteenth Annual, is now in the hands of the printer and will be bound and distributed within a short time.

1898.—The report for 1898, to be printed as a portion of the Twentieth Annual, is now in preparation. It contains the results obtained by field work during the tenth field season of the division, supplemented by related data. It has been found desirable to publish something more than the bare results of measurements, and it is believed that the value and utility of the annual reports can be greatly increased by inserting with the statements of observations facts obtained from field assistants and correspondents regarding the recent or prospective developments of the water resources for irrigation, power, and other uses.

INFORMATION DESIRED.

In order to round out the general information upon the subjects above mentioned, it has been found expedient to bring together as complete a list as possible of persons interested in the subject. This list includes civil, hydraulic, and sanitary engineers, instructors in these subjects, members of boards of health, and biologists and chemists interested in water supply. Many of these individuals in the course of professional work acquire data upon the quantity or quality of river, lake, or well waters. It is desired to obtain all such results of original observations and make brief reference to them in the annual report of the Division of Hydrography, where they amplify or relate to the topics there presented.

The matters concerning which an attempt is being made to obtain facts by co-operation or correspondence are as follows:

Quantity of Stream Flow.—All measurements of flowing streams, or even a single observation, may have value and should be recorded and preserved in print. It is desirable, therefore, to have notice called to examinations that may have been made of various streams, whether large or small, and whether the results of the examinations are applicable to questions of irrigation, of power, or of municipal supply. This is particularly the case where the water resources are yet to be developed or where a supply exists for use in agriculture or for manufacturing purposes.

Quality of Water.—The amount and character of the material in solution or suspension are of importance not only in geologic and sanitary investigations, but also in many industrial undertakings. Examinations more or less complete have been and are being made by a number of persons, and although it may be impracticable to assemble all of these, it is believed that a considerable

body of useful information can be brought together by correspondence. The Division of Hydrography is attempting to collect typical samples of river and other waters for examination and to make measurements of the material carried in suspension or rolled along the bottom of the streams. These results have practical application in questions of erosion and of the filling of storage reservoirs. The chemist and biologist can often contribute information concerning the quality of ordinary water in different parts of the country, and especially regarding the gradually increasing pollution of the streams.

Lakes and Ponds.—Besides a knowledge of the streams of the country, it is desirable to have information concerning the natural lakes and ponds, their origin, general distribution, size, depth and fluctuations in volume, and possibly of the changes of temperature.

Irrigation Canals and Ditches.—Recent progress in the development of irrigation, especially by structures of considerable size, is noted in the annual report. It is, of course, impracticable to list all of the irrigation ditches, but the attempt is made to make mention of those of importance or whose construction bears upon the utilization of the vacant public lands.

Water Power.—The utilization of the streams of the country for power and the means adopted for the transmission of this are topics which are discussed, as briefly as possible, in the annual reports. It is desired to obtain information concerning the degree to which

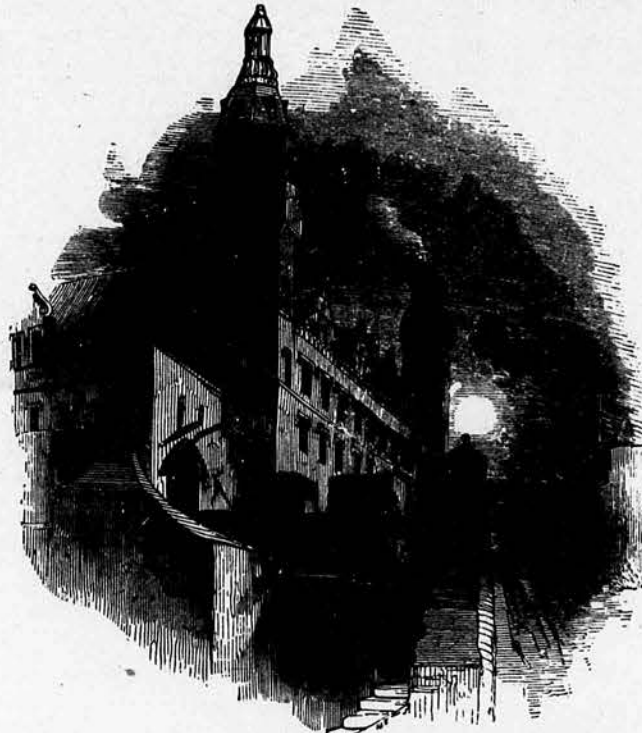
priety be introduced in the annual report.

Pollution of Streams.—With the increase of population and the development of industries a new problem arises—that of disposing of refuse water and of preserving the purity of the streams, so that their waters may continue to be of value. In the course of the hydrographic surveys examinations are being made of various drainage basins and note taken of the character and amount of pollution. Any items of general public interest which bear upon this matter may well be noted.

Wells.—The construction of ordinary wells, and particularly of the deep or artesian borings, is largely a geologic question. Special attention is given to the occurrence of water underground, as to both its quantity and its quality. Maps are being prepared which show not only the topography of the surface but at the same time the conditions underground and the depth to water at various points. Particular attention is called to the maps of the vicinity of Pueblo, Colo., prepared by Mr. G. K. Gilbert, and printed in Folio 36 of the Geologic Atlas of the United States. A considerable part of the annual report is devoted to descriptions of wells of certain sections, and an attempt is made to put on file all of the important facts concerning these. At the same time the temperature of deep borings is being obtained.

SCHEDULES OF INQUIRY.

This circular has been prepared as ex-



From "Rolle's Shakespeare's Tragedy of Hamlet."—Copyright, 1878, by Harper & Brothers.

HAMLET'S CASTLE, ELSINORE.

(See page 7.)

the water power of various streams is now employed and facts which bear upon the more complete utilization of this power, and particularly of opportunities not yet taken advantage of, so that public attention may be drawn to sources of water power which as yet are little known.

Storing Water.—The development of the water resources by storage of floods is an important problem whose solution depends in part upon knowledge of the quantity of flowing water as well as upon the topography of the country and methods of constructing dams. The annual report on hydrography includes a description of the reservoirs surveyed and reference to projects recently constructed or under consideration. It is desired to assemble all facts which bear upon the storage of water, especially in reservoirs whose size renders them of public importance. Not only the quantity of water should be considered, but, wherever possible, the quality and the effect of storage upon this.

Pumping Water.—The raising of water, especially in considerable quantities, a small height is of fundamental importance in a consideration of the utilization of the water supply for irrigation as well as for drainage of swamp lands. The development of a large part of the public lands can take place only as cheap and efficient methods of pumping are introduced. The utilization of the wind for this purpose has been a topic to which considerable attention has been given, and it is desirable to obtain results of practical operation of various motors and pumps. Information bearing upon this subject may with pro-

planatory of different schedules of inquiry calling for addresses of persons or for information along various lines. It is hoped that the person to whom a schedule is sent will fill out the blanks as completely as may be practicable, or, if the questions do not cover the particular case in hand, will write a brief description giving the more important related facts.

A Leak.

By A. C. Shinn, Ottawa, Kans., read before the Franklin County Farmers' Institute.

Stop! Look at that field! Twelve feet out to the first row. One, two, three rows, with scarcely a sign of a nubbin. Four, five, six rows—these will make less than half an average yield of the field, and a few more rows seriously damaged. Room for eight rows of corn gone, and six of these to plow, plant and cultivate, just the same as for a full crop, and yet less than one-quarter of a yield of corn. And there is the leak, caused by that nuisance of a hedge fence. Is the field next to timber? Then the waste ground is much more, as the trees are higher than the hedge.

We should all adapt ourselves to present and future conditions, and not go blindly forward in the ruts of the past. On this view, when the customs and laws of this State encouraged the setting out of forest trees and hedges, the conditions then may have justified that course. But conditions have now so changed that to follow that course is a positive loss.

Away back in Illinois, before the war, while working in the timber lot with my father, he taught me to be careful not to

 You Can
 Pay Off
 Your Mortgage

This winter by working evenings for

THE LADIES' HOME JOURNAL

500 best agents get
\$11,500 divided
 among them in addition to good pay for work done.

The Curtis
 Publishing Company
 Philadelphia, Pa.

cut down or in any way injure any of the young saplings; so when working in the timber here in Kansas I have, almost instinctively, pursued the same course, using a crooked limb for a handspike to avoid cutting a standing stick suitable for the work; in driving around in the timber to put on the load, crooking here and there to avoid injuring the young saplings; in cutting for use, unless for some special purpose, selecting the crooked and injured trees, so as to save the good, sound ones to grow; and in every way to save as much as possible of the timber. While that was the teaching of my father, and has been my practice, it has also been the teaching and practice of the greater part of the people settled in the prairie States. What has been the reward that we have received for this care and self-denial?

A year or so ago I was in this same timber in Illinois, with some of the neighbors—prospective buyers of the land. There was the soil, as before the war, and a fine growth of trees, smooth and tall, many cords more on an acre than when I had worked there, and what was it worth—this wood, this timber, so carefully preserved, and taxes regularly paid for over a third of a century? The buyers said they would give more for the land stripped root and branch of its timber than they would for it as it stood with all that splendid growth of trees on. In Kansas, I know of farms on which were planted acres of forest trees that have grown for over thirty years. The labor of preparing and planting the ground, these long years without the use of the land, and all the time the expense of keeping up the fences and paying the taxes, and now at the end of this time the land would be worth more, even here, if some giant hand would pull up the trees, beat the dirt out of the roots and cast them aside as one does the weeds in a garden bed.

This course of setting out forest trees and hedges is all wrong, and the sooner it is stopped the better for all. Why, many of our cities have altogether too many forest trees, keeping the streets from drying and making the air damp and unhealthy. Even some of our schools and colleges have entirely too many shade trees, and are already, in some cases, removing them. With this leak constantly draining, to say nothing of the dangerous and continuous labor demanded by hedges, let public sentiment on this question of trees and hedges be changed and Arbor day done away with.

And now comes the Kansas Farmer with another indictment of great force against the hedges, saying, "Where Osage orange hedges prevail, some investigators have found that three-quarters of all the chinch bugs that live over live in the accumulated trash of the hedge rows." Now, how to get rid of these groves and hedges, and what to substitute for the hedges, are questions of great moment; but whatever the right answer may be, the constant, expensive and perpetual leak caused by trees and hedges is all the time with us.

BLOCKS OF THREE.—Two new subscriptions for one year for \$2, and, in addition, a renewal for one year free to any old subscriber who sends two new subscriptions and \$2 in one order. Kansas Farmer Co., Topeka, Kas.

Horticulture.

THE ESTABLISHMENT OF NEW PLANT INDUSTRIES.

DAVID G. FAIRCHILD.

The first and most evident reason for the introduction of economic plants into any country, and that to which the ordinary mind at once refers, is the building up of new plant industries.

THE ARTICHOKE.

According to Schubler, the artichoke has always been cultivated in Norway as far north as the sixty-third parallel, and has long been grown in Louisiana

That such popular education in the use of food materials is legitimate work for a department of agriculture can scarcely be questioned, inasmuch as it fosters industries which without its aid could not well be built up.

THE IRISH POTATO

When it is recollected that the Irish potato, upon the cultivation of which millions depend for subsistence, was the discovery of an uncivilized race of Indians in the mountains of Chile, Peru, or Argentina, and that even after these years of amelioration a variety has only recently been produced by careful breeding

as valuable food-producing plants as this tuber-bearing species of Solanum.

GRAPES AND PLUMS

The development of the American varieties of grape and plum is an example of discovery and improvement by a civilized race, and it can scarcely be doubted that the modern methods of extensive plant breeding will open the door for a rapidly increasing number of new food plants.

GOVERNMENT WORK.

That such work has been done, is now being done, and is in contemplation by governments of foreign countries may be judged by the following brief accounts.

"The article is first lauded as a most useful thing, and its acclimatization declared to be most desirable. Then there is a lull. A little later some official or perhaps some nonofficial gentleman, with a taste for these matters, sees the plant growing in some favorable locality, is struck with its appearance, introduces it with more or less success, and then leaves the district or the country, and the subject drops out of sight with him.

CORK OAKS.

The history of the introduction of cork oaks into the Southern States illustrates the need of continuity of experiments. In 1858 cork-oak acorns were secured and distributed by this Department throughout the Southern States and California, and from occasional trees still found scattered through the region it is evident that the plant will grow and thrive, but, owing to lack of early records and in the absence of reintroductions, no progress has been made toward the establishment of the cork industry.

QUININE.

The history of cinchona culture on the Island of Java, which small island now furnishes two-thirds of the quinine on the markets of the world, is an example of what government support of a plant industry has done. For thirty years the Dutch Government was urged to undertake the introduction of this valuable medicinal plant from Peru, and finally in 1852 the Dutch minister of colonies was authorized to employ the botanist Hasskarl, who explored the cinchona forests of Peru, bringing back twenty Wardian cases of different species of cinchona.

The efforts of Clements R. Markham, engaged by the Indian government to introduce the cinchona culture into India, were crowned with success, and the cinchona plantations and factories of that region have assisted in the production of their share of the 600,000 pounds or more which are placed on the mar-

ket annually. The price of the quinine is now so low that it may be counted one of the inexpensive drugs, and this cheapening has been brought about by the introduction of the industry into India and Java.

GRAPES.

The Colonial government of Cape Colony established in 1884 a government wine farm of 300 acres, with competent wine makers, for the purpose of stimulating the cultivation of the European grape and the building up of the wine industry. Imported pure selected yeasts have here been experimented with in the fermentation of the wine must and, although as yet apparently not with the success which attends their use in the Rhine region, a perceptible acceleration of the fermentation process and production of uniformity of product have been demonstrated.

BRITISH GOVERNMENT.

The Royal West Indian Commission, sent out by the British Government in 1896 to investigate the causes of agricultural depression in the British West Indies, recommended the expenditure of £17,000, or more than \$81,000, annually for ten years, ostensibly for the purpose of establishing new plant industries in the islands. These grants were made by the last Parliament, and nine botanic stations on the various islands, with a head office in the Barbados, for the investigation of tropical agriculture and the introduction of economic plants will soon be established.

Hardy Ornamental Shrubs.

Press Bulletin Kansas Experiment Station.

The person who is expecting to add any new features of beauty to his home grounds in the coming spring should begin now, if he has not begun already, by perfecting the plan by which he is to proceed. If one does not plan he is sure not to execute, or to execute improperly.

It is not enough to adopt a plan in time. It is essential also to order in due time the stock you wish to plant. Nurserymen cannot, and most of them do not, claim to guarantee their late shipments as they do their early ones.

The question of soils is scarcely to be considered, since almost any soil to be found in the State is capable of supporting the best of our handsome bloomers. However, the physical condition of the soil may be such as to require some treatment before committing a valuable shrub to it.

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shape severe pruning is not desirable. The soil should be packed firmly around and over the roots to the level of the ground, but if dry weather is expected, leave the soil around the plant lower than the surrounding surface.

PIRUS JAPONICA (Japan Quince).—An upright bush bearing scarlet flowers very early in the spring before the leaves are out.

SPIRAEA PRUNIFOLIA (Bridal-wreath).—A small spreading shrub, five feet high, bearing small white double flowers in great profusion.

SPIRAEA VAN HOUTII.—A very graceful shrub, six feet high, spreading, bearing a wealth of white blossoms in early spring, about a week later than S. prunifolia.

LONICERA TATARICA (Bush Honeysuckle).—An upright shrub, eight feet to ten feet high, bearing handsome pink or white flowers in rather early spring.

PHILADELPHUS CORONARIUS (Mock Orange).—An upright shrub, resembling in habit the one described next above.

VIBURNUM OPULIS STERILIS (Snowball).—Well known; excelled by none in its grand white clusters in rather late spring.

CARAGANA ARBORESCENS (Siberian Pea).—A legume of beautiful upright habit and dense, soft foliage, bearing small yellow flowers in late spring.

TAMARIX JUMPERINUS.—A tall, graceful shrub, with foliage resembling the cedar. Bears small pink blossoms in spikes in late spring and early summer.

SPIREA BUMALDA.—Small, one to one and one-half feet high. Bears pink blossoms in corymbs in June and July.

HIBISCUS SYRIACUS (Althea).—Small shrub, four to five feet high, bearing brilliant white flowers in July.

HYDRANGEA PANICULATA GRANDIFLORA.—This shrub opens its grand clusters of blossoms in July and holds them till August. Unsurpassed in beauty.

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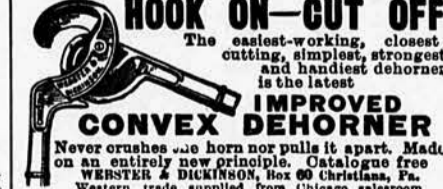
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2. Also the e. hf. of nw. qr. of said sec. 26, 80 acres. About 40 acres first-class plow land and about 40 acres hay land. Well and separately fenced. Price, \$3,200. Terms same as above.
3. Also about 101 acres of pasture land in one body, well fenced and well watered, being nw. qr. of ne. qr. frl. and sw. qr. of ne. qr. frl. of said sec. 27, and about 34 acres off the east side of the nw. qr. frl. of said sec. 27. Price, \$20 per acre. Terms same as above.
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