Construction began on our new lab and office facilities on October 3. The first task was to excavate and fill before actual construction could begin. Unfortunately, the soil type that makes the Grand Prairie excellent for rice production is not at all stable for construction. The clays in the subsoil have great shrink/swell variation depending on water availability.

This instability leads to shifting and cracking of structures. So the whole site was cut to at least 4 feet lower than grade and backfilled with a stable, engineered fill to a height 2 feet above grade. With a total of 6 feet of stable fill, our new facilities will be high, dry and well drained.

As I write this, the last of the breeding plots at RREC have just been harvested. It was a very long season. Chuck Wilson, Extension Agronomist gives his overview of the past year in this Winter 2009 issue of the RREC Newsletter (page 2). Early-planted rice did much better than rice that was planted late. An article by plant breeding M.S. student Alisha Stivers describes how she and Dr. James Gibbons are selecting for cold tolerance to allow for earlier planting (page 3).

In this issue we also feature activities at our neighboring research facility, the USDA/ARS Dale Bumpers National Rice Research Center (page 5). Many of you know that the USDA and UA have cooperated here at Stuttgart since the RREC’s earliest years. Beginning in 1930s USDA plant breeders have tested and developed new rice varieties. The breeding of varieties is now the responsibility of UA Division of Agriculture RREC scientists Karen Moldenhauer and James Gibbons, but the USDA continues to work closely with them, primarily on more basic genetics and germplasm evaluation. This collaboration will become increasingly valuable in breeding new varieties in the upcoming years.

Web cam shows construction progress

We have installed a Web camera that provides photos of the construction site for our new facilities. Click on the Web cam image on the right to go to the RREC Web site at http://aaes.uark.edu/rice.html.
Weather, markets and input costs frustrate rice producers

As harvest finally comes to a close, this may be the end of a rice production season many of us would like to forget. Challenges have abounded as the weather, the markets and input costs all contributed to a very frustrating year. And yet for some growers, this may end up being a positive year economically.

Although delayed, the rice acreage for 2008 increased over 2007 to 1.39 million acres, an increase of approximately 70,000 acres. Optimism in the commodity prices spurred this increase in acreage. Wells was the most widely planted variety, followed by Rice Tec CL XL729, CL 171 AR, Francis, and Rice Tec CL XL730. Yield estimated by the USDA at the time of this writing stands at 6,900 lbs/acre (153 bushels/acre), which is about 5 bushels/acre less than in 2007.

Spring rains delayed planting for growers by as much as 2 to 4 weeks compared to their desired planting time. Later-planted rice has consistently resulted in lower yields than early-planted rice. Therefore, obtaining great yields was going to be an uphill battle. Extreme heat in July followed by abnormally cool temperatures in August and September also contributed to less than ideal conditions. As the season came to an end, it was clear that the lower yields that were almost expected had become reality. In a year when rice commodity prices escalated to an all-time high, input costs followed suit, particularly fuel and fertilizer. Unfortunately, less than ideal growing conditions resulted in lower yields to take advantage of the high rice prices.

Cool temperatures during grain filling are not always a bad thing. However, early cool temperatures in a fall when the crop was planted later than normal generally cause a reduction in the length of the ideal growing season. Subsequently, the delay in crop development was compounded. Nighttime temperatures frequently dropped below 50°F during September and October and approached freezing many nights in October. These conditions contributed to reduced yields statewide.

Another problem with the late crop is that more than 90% of the crop was still in the field when Hurricanes Gustav and Ike blasted through. Normally over half of the crop would have been harvested during this time. This allowed more rice to be damaged than is normal. The hurricanes certainly took their share of the much-needed yield, and the shattering following Ike served as an in-your-face reminder. Lodging is bad enough but shattering losses are totally unrecoverable.

In spite of the challenges encountered during 2008, there were a few bright spots. Some growers have been able to make a profit by reducing input costs and maintaining moderate yields. The Rice Research Verification Program coordinated by Stewart Runsick and Ralph Mazzanti continues to demonstrate the benefits of careful scouting, economic thresholds and timeliness of applications. Although the average yields for this program are down from 2007, they continue to be 15-20 bushels above the state average, and inputs costs are typically less than the state average.

Charles E. Wilson Jr.
Professor/Extension Agronomist-Rice
Nov. 7, 2008

Arkansas hosts 2008 USA Rice Outlook Conference

The 2008 USA Rice Outlook Conference at the Statehouse Convention Center in Little Rock, Dec. 7-9, was attended by many producers as well as millers, marketers, researchers, and others in rice-related businesses. The annual conference is conducted by the USA Rice Federation.

The “Domestic and International Rice Situation and Outlook” report by Nathan Childs, USDA Economic Research Service, included this chart on the price of rice. All reports, including those by U of A Division of Agriculture faculty, can be viewed online at http://www.usarice.com/industry/meetings/presentations_2008.html
Research on planting cold-tolerant varieties may lead to water savings

Rice production takes 43% of the total water used in Arkansas. Irrigation of the rice crop helps to control weeds and plant diseases. Our research indicates that we may be able to use 10% less irrigation water by planting early, with minimal adverse impact due to weeds and diseases; however, at the earliest planting date a significant yield reduction was observed. Also, we found that by planting during the early spring, when rain is normally abundant, we can capture an average of 61% more rainfall, which means less groundwater will be needed to germinate seeds and prevent crusting of the soil.

Currently, some of the possible risks and trade-offs that accompany planting early include stand reduction, damage to seedlings and increased production costs due to increased herbicide applications. The potential for increased yields has been seen in date of planting studies by the Division of Agriculture’s Cooperative Extension Service from 2002 to 2005, which showed the earliest planting dates (March 21 and April 1) produced the highest yields compared to the other planting dates.

The Cooperative Extension Service recommends, for the Grand Prairie region, optimum rice planting dates to begin April 1 and continue through May 20, and planting before March 25 is not recommended. We do not advise rice producers to plant outside the current Extension Service recommendations. We are in the process of developing varieties better suited for an early-planting production system.

In an ongoing Agricultural Experiment Station study at RREC that we started in 2005, we began field-testing of rice planted as early as March 2 to see if our varieties would tolerate the cool temperatures at that time of year. By cool temperatures, we mean temperatures below 54°F. We found that average rice yields were lower at the first planting date due to stunted plant growth and weed problems. But at the second planting date of March 14, yields were higher when compared to the recommended optimum planting date of April 21 for the Grand Prairie. The average soil temperature during germination for the two early planting dates was a high of 55°F and low of 46°F. These temperatures are normal for that time of year, and varieties need to be able to tolerate these temperatures to germinate and survive.

We found that some of the varieties typically grown in Arkansas (Wells, Drew, Cybonnet, Spring and Medark) are able to tolerate cool temperatures to some degree.

RU0701124 (a cross between Drew and a South American tropically adapted variety), Spring and PI560243 (cold tolerant line of rice bred for Chile) performed the best of all varieties tested; their yields did not change at the different planting dates.

Cybonnet, Wells, Drew and Medark produced lower yields in the first planting date; however, they each produced the same rough rice yields at the March 14 planting date compared to the April 21 planting date. By combining traits such as good tillering ability and germination tolerance to cold temperatures, improved cultivars can help make early planting less risky.

In continuation of this research, our project has teamed with USDA-ARS scientists Dr. Anna McClung and Dr. Wengui Yan to study rice germination ability under suboptimum soil temperatures (<54°F). This project was awarded funding by the USA Rice Foundation. Our efforts are aimed at identifying lines of rice that are suited for germination under cool soil temperatures and developing genetically diverse varieties for Arkansas producers.

Alisha Stivers, Graduate Research Assistant, and J.W. Gibbons, Assistant Professor (Rice Breeder)
Potential carbon credit income could increase no-till

Rice is a major cash crop in eastern Arkansas, but most rice acres are intensively cultivated and grown on rented land. Approximately 9% of Arkansas rice production is grown with no-till management. No-till production has been researched at the Rice Research and Extension Center for nearly a decade. The economic results indicate that no-till can increase yields over time or at least equal conventional tillage, lower input and machinery costs, and increase profitability for producers.

No-till is an effective means of sequestering soil carbon and reducing greenhouse gas emissions, and economic incentives exist for no-till in the form of carbon credits. Currently, the United States has a voluntary carbon sequestration program. The Chicago Climate Exchange (CCX) opened carbon credit trading in 2003 with 13 charter members in an attempt to reduce greenhouse gases. Today it has over 300 members participating in the market. Sellers of carbon credits such as agricultural landowners can receive annual payments from buyers on a per metric ton of carbon sequestered for land devoted to no-till management. Contracts to sequester carbon are for a five-year period and can be renewed indefinitely. In 2007, the average CCX carbon credit was $3.18/MT. The net carbon credit would equal $1.36/acre assuming a carbon sequestration rate of 0.6 MT/acre, an aggregation fee of 8% of the CCX price, a registration and trading fee of $0.20/MT and a verification fee of $0.12/MT.

Studies evaluating the economic potential of carbon credits focus on producers only and do not take into consideration the landlord’s perspective. According to the United States Department of Agriculture, more than 70% of eastern Arkansas farmland is rented. Since no-till economic benefits are generally on the costs side, most landlords are indifferent about the adoption of no-till. Income from carbon credits could change a landlord’s perception of no-till since it could create another income stream. Results from studying carbon credits and no-till rice production indicate that a landlord would favor no-till if the value of carbon ranged from $0.54/MT to $3.99/MT depending on the lease arrangement and assuming the landlord received the entire carbon credit. If the carbon credit is split with the tenant proportional to the share rent, carbon value would need to range from $1.30/MT to $10.76/MT depending on the lease arrangement. These results are comparable to the 2007 average CCX carbon credit value of $3.18/MT.

Carbon regulation was one of the main presidential campaign issues until the economic downturn became forefront in political discussion. It is reasonable to conclude that carbon regulation will once again be a key issue when the economy strengthens. Carbon credits on the European Climate Exchange are selling at around $20/MT due to the fact that many European countries have stricter carbon emission policies than the U.S. If the U.S. adopts policies to regulate carbon emissions, demand for carbon offsets will increase and have upward pressure on the value of carbon credits. Current U.S. carbon prices give little economic incentive to adopt no-till for the purpose of carbon sequestration, however this may change. Tenants and landowners should be aware of the potential to capitalize on any upward price movement in the carbon market either from free market forces or federal and state regulations.

Brad Watkins, Associate Professor of Agricultural Economics, and Jeffrey Hignight, Program Associate
Rice Research and Extension Center
The new five-year rice research program for USDA–ARS

The Dale Bumpers National Rice Research Center (DBNRRC) at Stuttgart is operated by the U.S. Department of Agriculture’s Agricultural Research Service (USDA-ARS). The mission of the center is to conduct research on the genetic improvement of rice and the biology of pest interactions to help the U.S. rice industry remain competitive in the global marketplace.

A new five-year research plan was established in 2008 for DBNRRC, which outlines milestones for accomplishing major research goals by 2013. For the first time, research conducted at DBNRRC was linked with that of the ARS Rice Research Unit in Beaumont, Texas. Federal funding for these two research centers totals $4.9 million and supports 12 scientists from an array of disciplines that include genetics, breeding, cytogenetics, physiology, genomics, agronomy, pathology, cereal chemistry and molecular biology.

Collaborative research projects are developed with university colleagues, which are funded internally or through competitive grants. The primary research emphasis is on understanding the genetic control of economically important traits including yield; disease resistance; tolerance to weed pressure and environmental stresses; and milling, cooking and nutritional qualities. This is achieved through exploring the rich genetic natural diversity that is found in the 18,000 cultivars that have been collected from all over the world and are maintained by ARS.

Genetic resources are characterized for numerous agronomic, morphological and cereal quality traits along with their response to stresses caused by diseases, reduced water, weeds, extreme temperatures and different cropping systems.

Genetic diversity is determined at a DNA level using molecular markers. Fundamental knowledge is gained regarding the function of specific genes and their impact on plant physiological processes. The linkage between genetic markers and the presence of beneficial traits allows DNA markers to be used by breeders to more efficiently and effectively develop new rice cultivars that can be grown in the U.S.

Improved cultivars deliver new combinations of traits that will ultimately benefit farmers, millers, processors and consumers. Currently, there are several collaborative projects with University of Arkansas System’s Division of Agriculture scientists that have been funded through competitive grants from USDA NRI RiceCAP, U.S. Rice Foundation and Arkansas Rice Research and Promotion Board. This strong partnership with university researchers provides a critical mass of scientific expertise to address a broad range of issues that are important to the U.S. rice industry.

Anna McClung, Research Leader/Center Director
USDA-ARS Dale Bumpers National Rice Research Center
Rice comes to Arkansas

W.H. Fuller was born in Ohio, went as a young man to farm in Nebraska, and came to Arkansas in the mid 1890s. He settled near Carlisle and farmed. In 1896, he took his historic trip with his neighbor, Hewit Puryear, that ultimately began rice farming in Arkansas. It’s interesting to note that Crowley, La., was where Fuller first encountered rice, and that we still have strong contacts there now with the LSU Rice Research Station. (Punctuation and other errors were not corrected to preserve the “voice” of the author.)

Also, on pages 7-11, a chapter on the rice industry is copied from the book, “Arkansas,” by John Gould Fletcher, first published in 1947. The book was reissued in 1989 by the University of Arkansas Press.

August 25, 1896, I, W.H. Fuller in company with Hewit Puryear, left Lonoke with a team and wagon to go to the gulf coast through Louisiana. When we got in about eight miles of Crowley, La., we came to the first rice either of us had ever seen grow, 8 of September 1896 owned and operated by the Abbot boys of Crowley. We stopped there half a day viewing the rice fields and pumping plant.

“From there we went to Crowley. Stayed at night with L.H. Thompson stopped there one day and a half. In that time I visited with W.W. Dusen rice plant, going over and getting all the information I could. I found the circumstances for raising rice about the same as would be here. It convinced me we had a good rice country if we had the water. At that time there were no wells there but they were talking of making wells, which gave me the idea of wells here.

“We went as near the gulf as we could drive a team for the marsh. Hewit went hunting 12 of Sept., 1896. We started home; arrive home the 30th of Sept. at 11 O’clock a.m., having traveled one thousand miles in a wagon. This is where the first idea came from of growing rice on the prairie of Arkansas.

“I talked to people of the rice and the prospects of growing it here, this same fall 1896 I prepared to experiment with rice. I put down 2 four inch wells to pump with a double crank drum. I bought my machinery off Bill Daniels of Lonoke, Ark., that runs the Cotton Gin now in the spring of 1897. I planted 3 acres of rice on my farm N.W. ¼ sect 8 in. 7W on the prairie and I partly watered it with same little plant. Some of the rice grew and done well until I pulled my pump to pieces then I gave it up for that year.

“My seed I bought one bu off Jack Novel who lives south of Seeton for $2.00 the rest of the seed I got from L.H. Thompson, Crowley, La. — there had been rice raised here in the timber country for several years (I learned about this time) by Eli Moses and Jack Noble but not on the prairie, while this crop was a failure it was the beginning of rice culture on the prairie of Lonoke Co Ark.

“This little plant cost me near four hundred dollars. The industry of rice here has sprung from that.”

“In 1898 I moved to Louisiana and engaged in the rice culture 4 seasons. I learned how to raise the rice put down the wells and how to manage it thoroughly.”

“While I was away Bro. John Moris wrote me they had formed a company here to raise rice and wanted me to take stock in it, I refused, I was up here in the winter after the company had failed and Bro. John Moris said he was going to raise rice, I give him $50.00 to help him in the experiment which they never gave me credit for, that being the year he raised the 5 acres I have $50.00 in it which ought to cover about 2/5 of the expense.

“It is a mistake my being here and seeing that crop as published by E.L. Moris, M.G. Moris, Mrs. E. Moris and others in the Arkansas State rice journal Sept. 15, 1909, as I was not here that year, also a mistake I did not sow my first crop in 1903 sowed in 1904 also a mistake as to the beginning of the rice culture the small plant in 1897 was the beginning, as for gathering information from Bro. John Moris as stated in the Journal I did not need any it was the other way, in the fall of 1903 I returned to Lonoke county for the purpose of putting down some rice wells the business being dead nobody wanted any wells, I went to Lonoke across the country to Carlisle. J.S. Savage took me to Hazen, we called a meeting of the business men of Hazen, John Sims of Hazen said I W.H. Fuller was the man to raise the rice, the good people of Hazen Carlisle and vicinity agreed to give me $1000 to raise a crop [on] acres if I did not succeed that year I was to have the year of rice in 1904 such crop not less than 35 bu. to the acre on 70 [acres] 1905 if I failed I was to have nothing.

“I went to Louisiana bought a well rig seed rice well materials I loaded a car came back to Lonoke county the fall of 1903. The winter of 1903-4 I put down the well installed by machinery, I raised or caused to have raised 5225 bu off Jack Novel who lives south of Seeton for $2.00 the rest of the seed I got from L.H. Thompson, Crowley, La. — there had been rice raised here in the timber country for several years (I learned about this time) by Eli Moses and Jack Noble but not on the prairie, while this crop was a failure it was the beginning of rice culture on the prairie of Lonoke Co Ark.

“This is a correct statement of the rice industry up to the end of 1904.”
Rice enriches the prairie

Chapter 21, from “Arkansas,” by John Gould Fletcher, first published in 1947 and reissued in 1989 by the University of Arkansas Press.

In the second week of October, 1940, two travelers proceeding by automobile from Memphis to Little Rock, halted within a few miles of Brinkley — halfway on that route — to observe what was to them an unusual sight. Neither of these travelers, though native to Arkansas and resident for many years in the state, had ever actually seen this sight before. At the edge of one of the great rice fields that begin at about this point, a mechanical threshing-rig was standing, similar in all respects to the rigs used in the Middle West to thresh the wheat harvest. Two white laborers, standing on top of a mule-driven wagon, were feeding into it alternate forkfuls of the harvested rice stalks. A stream of brownish-yellow grain was running out steadily into the bed of another unhitched wagon. Another stream of chaff and straw was steadily blown out into the air. More wagons, waiting to be unloaded, were standing near by; and their drivers, like everyone else in that field, were white. The rice farmer himself, a big-boned, sun-tanned figure of a man in checkered shirt, khaki trousers, with rough straw hat perched well back on his freckled forehead, was sitting on a piebald pony, surveying the scene. To him the two travelers addressed themselves. What they had to ask — as well as his answers — was at last made audible above the steady roar of the thresher.

He had some eighty acres here, all planted in rice of the Early Prolific variety. There were other varieties, especially the Blue Rose, that were popular, but those took longer to grow. This particular field had been planted on the first of May. After about three weeks, water had been put on it, and had been allowed to stand, six inches deep, for seventy-five days. Along in August, the field had been left to dry out, and it had been reaped — by a McCormick harvester, exactly like wheat — only three weeks before the travelers’ causal visit. Now the threshing was being done, employing the farmer’s own rig — this last was mentioned with a touch of honest pride — and the drooping yellow stalks were producing no less than one hundred bushels to the acre. This compared well with the sixty bushels produced per acre the year before. The farmer was getting sixty-five cents per bushel for his yield. His eighty acres of planting would bring in, accordingly, over five thousand dollars.

The story of the Arkansas rice field, occupying the region comprised, in whole or in part, by Lonoke, Prairie, Arkansas, Monroe counties — and recently spreading north beyond Woodruff County as well as south to the Louisiana border — is the outstanding “success story” of Arkansas agriculture. Most of the Arkansawyers, unless they happen to live within the borders of the field itself, or at the rice-milling towns of Carlisle, Hazen, De Witt, or Stuttgart, seem almost unaware of its existence, except in so far as it provides them every fall with a “sportsman’s paradise,” where they may find ample opportunity for their favorite sport of wild-duck shooting. The reason, or rather, reasons, for this are two: the Arkansas rice field came late into the picture of state agricultural development; and when it did come, it grew rapidly because of the native energy and scientific farming knowledge possessed by a people who had been grain farmers in Illinois and Iowa before they came to Arkansas — or in other words, it was cultivated largely by “foreigners” and Republicans. For these reasons, the older sections of the state have looked askance at it up to now; and they still know, unfortunately, too little of its life and its ways.

They have no good reason to ignore it. The Grand Prairie, roughly ninety miles north and south and forty miles wide, first observed by Nuttall in 1819 and recognized by generations of travelers since as affording a forest-free route of access from Arkansas Post at its southern tip to the interior of the state, broke the backs and the hearts of its settlers for seventy-five years before one man discovered that rice would grow there; but it now produces the astonishing harvest of a crop which, in 1940, netted 9,741,000 bushels of rice, valued at $6,466,000, and which rose, by 1945, to 14,612,000 bushels, valued at $26,155,000. And all this has happened since 1904, to be exact — in the short space of forty-two years.

(Continued on page 8)
Rice enriches the prairie
(Cont. from page 7)

Such a result contrasts vividly enough with the conditions prevailing in the past. Arkansas County, in the very heart of the rice district, is nearly the largest county in the state; Prairie County, north of it, is almost equally large. But all this region, though easy of access, attracted but few settlers of any sort until the present century. Let us take, for an example, the case of the Hazen family, after whom the rice-milling town of Hazen now takes its name. Its founder, William Cogswell Hazen, born at Charlottesville, Virginia, in 1806, migrated to Arkansas in the late thirties after spending his young manhood in Tennessee, where he had married and had fathered two sons in 1830 and 1831. He was a practicing physician, a devout Methodist and, in Tennessee, a landowner of substance; in Arkansas he purchased many acres of the Grand Prairie land at the prevailing rate of a dollar and a quarter an acre; and seems to have managed somehow to live on it up to the Civil War. It was then, because of the wild grass that grew upon it, fairly good breeding-ground for cattle. Otherwise nothing was raised.

But when Federal armies swarmed in to Eastern Arkansas to run the cattle off and to devour them, Dr. Hazen, with his neighbors, his Negro slaves, and dependents, refugees to Texas, leaving his two sons behind, both serving the Confederacy. One of them managed to obtain leave from the army for a time and come to Texas, too, shortly after this migration, to see his own mother die — for Dr. Hazen’s wife did not long survive the ordeals of the Texas journey undertaken in the summer heat of 1863. In 1865, with the Confederacy utterly gone, Dr. Hazen spent his last thousand dollars — which had been carefully hoarded up in gold — to bring himself and his Negroes back into Arkansas. But all efforts to make his land again productive of anything but an almost worthless hay crop failed; and Dr. Hazen attempted to begin life anew as a storekeeper at Des Arc. This resulted in bankruptcy; and, since he was now past sixty, the pioneer founder of the Hazens divided his land between his two sons and retired. His sons, finding the land equally unproductive, moved into what is now the town of Hazen, putting up the first house there and slowly selling off all their lands at low prices. The father died there in 1872; and the elder son, Alexander Richard Hazen, became the first public school teacher in Prairie County and the first rural-route mail carrier out of the town of Hazen, when rural free delivery was established in 1901. It is said that on his first trips as mail carrier he was able to hold all the mail, letters and papers, in one hand. Nevertheless, despite the obvious handicap of grinding poverty throughout his middle manhood, Alexander Richard Hazen managed to hold his own, becoming the most prominent Methodist in the slowly growing small town, marrying the daughter of a neighboring farmer, and leaving being good and useful children and grandchildren to honor his breed and name.

All this contrasts vividly enough with the German-American wheat farmers from the Danville district of Illinois and the Davenport district of Iowa, who came down to Arkansas in droves between 1905 and 1910 to fill up the empty spaces of Prairie and Arkansas counties and to found the existing towns of Stuttgart and Ulm. During those years and on up to 1920, there took place the largest immigration into Arkansas that had ever been seen since the first great swarmings of 1820-1830 and of 1846-1850; and these newcomers, hundreds of families strong, were all men of substance long before they came. They had been induced to migrate — with money enough in their pockets to buy the rigs and pumping equipment necessary — through clever publicity pamphlets broadcast in Illinois and Iowa by the Rock Island Railroad, which had just recently invaded the great Arkansas prairie region. The coming of the Rock Island and the great migration of the Midwestern farmers happened to coincide with a resounding agricultural success, the first cultivation of rice in the state, which came about through the knowledge and persistence of one man.

William H. Fuller, of Carlisle, Lonoke County, had been born, so far as I can ascertain, in Ohio in 1843. He had come to Arkansas as a young man to engage in what, no doubt, was sufficiently unproductive farming. With this he continued till in 1896 he went for a hunting trip down to Crowley in South Louisiana, in the famed Evangeline country. There he saw rice farming successfully practiced and determined to attempt it in Arkansas for himself. Accordingly, without adequate or reliable pumping equipment, he planted three acres in rice in the spring of 1897. Halfway through the summer his small, inadequate pump broke down, and the crop was practically a total failure. Nevertheless, Fuller had seen enough to convince him that rice cultivation in Arkansas was not altogether impossible.

The next year he boldly moved to Louisiana, where he remained till 1903 — learning by working under the direction of others the correct methods to apply in the matter of rice cultivation. In 1903 he returned to his prairie land near Carlisle. He had now talked and had written to various neighbors about his plans, and it is said that they pooled their resources and succeeded in raising a thousand dollars to enable him to put in a hundred-and-fifty-foot artesian well and to buy a good pump for his field. The thousand dollars invested was offered to Fuller as a bonus, provided he could make good on his claim of being able to produce thirty-five bushels of rice per acre. In the spring of 1904, he planted seventy acres. The yield of 5,225 bushels — nearly seventy-five bushels per acre — amazed everyone. It established Fuller as a true prophet: in a single year, thanks to his tenacity

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and persistence, rice was seen as the answer to an agricultural problem which had not yet been solved.

It is good to know that this last and greatest of Arkansas’s agricultural pioneers did not die until 1922, when, two years before, the rice culture he had started had netted to Arkansas the amazing output of 8,575,000 bushels of grain from 175,000 acres. Form that peak — attained mainly because, after the war of 1917-1918, rice, for a time, sold at three dollars a bushel — the production had already fallen off over a million bushels before Fuller died. Yet by 1940 the harvest had again risen to 9,741,000 bushels, selling at prices ranging from sixty-five cents to over a dollar. The yield of 1945 had already been mentioned; in the midsummer of 1946, rice was fetching a dollar and seventy-five cents a bushel.

In the preceding paragraph, the first post-war peak production year of 1920 was mentioned. Up to that time the rice farmer, hauling off his crop to the milling company’s plant — established near his own fields from the start — had paid a toll, or bonus, to get his grain milled. Now the growers were faced with a big crop and a falling market. Their solution was typical, but utterly non-Arkansan. They decided to form themselves into a cooperative marketing association, to fight the millers on their own ground and to pay no more tolls. And they succeeded, thanks to backing from the American Farm Bureau, to the support of local banks, and, finally, to a million-dollar loan — it is said, form the War Finance Corporation. Since then, rice farming has been closely cooperative throughout.

Truly, the story of rice farming in Arkansas has been a series of lucky miracles, as compared with the alternate booms and depressions — the lack of any prevailing system — common in the adjacent cotton fields. And still more of a miracle is the story of how closely fitted are the soil and climate to the development of the plant.

The land comprising the Arkansas rice fields is, for the most part, a stiff blue clay, well adapted to holding water. As the Arkansawyers say, it is “hard pan” — that is to say, it does not break easily under the ordinary plow, and is cultivated altogether by multiple disk cultivators. Before cultivation takes place, it has to be diked up, with four to six-inch dikes wandering lazily across it; this job alone is done with ordinary plows; but so tenacious is the soil that the dikes do not have to be renewed except about once every three years. Under the land — in reality an immense flat delta-plain formed long ago between the Arkansas and White rivers — lies the water used on the fields. This is usually found at a depth ranging from seventy-five to eighty feet; but the artesian wells employed generally go down to one hundred and twenty feet, and even lower. The well is drilled at the top of the field, for on this endless plain the land tilts and varies slightly. An electrically operated pump, established in a small wooden shed, jets the water out in a steady stream through an iron pipe jutting up into the air, and it falls into a small earth-reservoir. From this it is conducted through wooden sluice-gates dug in the dikes all over the field. At the end of the flooding period, always estimated as being about seventy-five days long, the field is drained off through wooden gates at the lower edge. Thus the ditches bordering on the highways in the rice-field district have gradually become small, shallow swamps, full of cattails and other aquatic plants, supported by the overflow from the adjoining fields, and much frequented by frogs and by the prevailing red winged blackbirds of the region.

Almost all of the operations connected with rice growing are carried out by a population overwhelmingly Midwestern and white. In 1935, according to an agricultural census, the population of Arkansas County, always the foremost of the rice-producing counties, showed a little over twenty-five percent colored. In Jefferson County to the west, formed out of the rich delta mud of the lower Arkansas, the population in the same year was eighty-two percent Negro; in Phillips County to the east, formed out of the delta mud of the Mississippi, the population was Negro by seventy-six percent. The rice field is also free from the unstable economy of sharecropping. The great plain, empty of anything except small clumps of trees, displays nothing akin to the rows of badly painted, decrepit cabins, the sagging board churches, the well-kept riding-boss houses, the dismal-looking commissary stores. Here are low, one-storyed, neat, newly-painted houses, with deep screened porches running all around under overhanging eaves. Nearby is usually a large barn for cattle in the midwestern style; close to it is a huge yellow heap of rice straw for the cattle to eat at, for every part of the plant is good for something, and most rice farmers keep excellent small herds. The homes have usually well-tended flower gardens in front; but, since it is so difficult to grow trees on this prairie, they often stand shadeless. Their inhabitants are prosperous and active, despite the terrific heat of the Grand Prairie from June to October; and in Stuttgart, the largest town of the entire rice region, they have been very successfully governed by able Republican mayors throughout recent years. Quite recently the “Flying Farmers of Arkansas” has been organized, mainly among these rice farmers; here, if anywhere, it is possible to sow one’s fields, inspect levees, and control irrigation from the air.

Altogether the great rice field is not without its own peculiar charm. It has much the same sense of openness and of breathtaking scale as have the great plains of central Kansas. It is perhaps in early June, when the young rice, about four or five inches high, is first flooded to the depth of an inch that the plain is most beautiful, because of the delicate tender green of the plant and the frequently seen reflections of midsummer clouds caught in some shallow unplanted pool. It is beautiful also in fall, when flooding is altogether over, and the light yellow, heavily drooping, seeded head hang heavily, ready for the reaper; it is,

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from spring to fall, the favorite haunt of great flocks of red-winged blackbirds with their swift, darting flight and their delicately sweet song. But the rice country is quite monotonous in aspect, like Kansas again, in late summer, under the heavy rolling thunderclouds of the Delta; and in mid-winter. In winter especially, with the stubble covering the fields with a peculiar tint of ashen grey, and with stray herds of cattle wandering over its empty surface under a sky laden with unshed rain, it has a dreary austerity, unlike anything else in the state, and not soon to be forgotten.

The seed is put into the ground at any time from the first of April to the fifteenth of May. Around the first of May is the usual date; as rice, being essentially a tropical variety of grass, requires warm weather if it is to germinate quickly. After about three weeks’ growth, the water is pumped on, and is gradually increased in volume till the plant stands in about six inches of water. Repeated fertilizations of the soil, which have become increasingly necessary in the case of the adjoining cotton belt, are practically unnecessary in the case of the rice field; but there is a common practice of letting a field rest every third year without cultivation. Such fields are sometimes sown in oats or rye in the fall, and are then ready to be reaped when the rice-growing fields are being seeded. The rice farmer usually conducts his operations far more scientifically than the cotton farmer, and the rice fields have as yet shown no signs of exhaustion. The area that the main fields fill is approximately some fifty miles east and west, from five miles east of Brinkley to Bayou Meto beyond Lonoke; and some hundred miles north and south, from the site of Arkansas Post to Augusta in Woodruff County. Approximately, they fill the exact location and dimension of Nuttall’s “Grand Prairie,” with a little added over. Here, and in areas beyond which have grown increasingly important, twenty-two and six-tenths percent of the entire United States production of rice is annually harvested, an amount surpassed only by Louisiana and, more recently, by the Texas Gulf lowlands.

The varieties favored by Arkansas farmers are, for ninety percent of the area, Blue Rose or Early Prolific; of these two, Blue Rose is usually planted earlier, as taking longer to ripen. Some sixteen varieties have been tried out at the Branch Experiment Station maintained by the University, between Stuttgart and De Witt, since 1926. No variety, when planted, requires much attention beyond that of keeping the fields under water. Rice does not carry a large population of dependents, like cotton. Prices have recently, in the summer of 1946, as already stated, risen to a dollar and seventy-five cents a bushel. Like the fruit growers of the northern and western part of the state, the rice farmers have made Arkansas prosperous beyond anyone’s earlier dream.

Since the continuance of successful farming in this area depends entirely on the supplies of water still underground, there have been from time to time reports that these supplies were in imminent danger of being exhausted. In the spring of 1934, after three years of steady drought, an investigation was made, and the state geologist reported that a loss of ten and a third inches of underground water had taken place since 1929. This estimate has frequently since then been questioned as being too low; in fact, a recent official report brought out by the U.S. Army Engineers, has stated that, for the past thirty years, the rice area has lost a foot of water every year. Some attempts have been made to remedy the situation by the building of storage reservoirs; and the project of a canal, connecting the Arkansas and the White, across the Grand Prairie, has been publicly discussed. The years since 1936 have been generally wet, and no remedy has as yet been seriously attempted.

The establishment of a great grain-growing area in this region, which harvests its crop usually from the last weeks of September onward, began early to attract many wild ducks which commonly use the Mississippi Valley flyway every fall, on their way from the Canada swamps to the Gulf coast. Since the winter in Arkansas is usually mild up to the New Year at least, thousands of ducks now spend most of the winter season in the lakes and swamps adjoining the rice-field region, where feeding is easy. Thus the town of Stuttgart became not only the rice capital of Arkansas, but also, as it now boasts, the “Sportsmen’s Paradise” par excellence of the state. The third week in October Stuttgart celebrates its Rice Carnival; this is followed early in November by another annual festival, which in the fall of 1940 was celebrated for the fourth time: the National Duck-Calling Contest. This is the only local celebration, as far as I know, apart from baseball and football games and horse races at Hot Springs, which is always broadcast in the state. I have never had the pleasure of being in Stuttgart on this occasion, but for some years I have heard over the radio as many as thirty duck-callers give through human lips their versions of the three chief calls of the wild duck: the “flying call,” the “feeding call,” and the “matting call.” There is a wildness in these sounds, especially when heard on a dark November night, with the temperature around freezing and the sky threatening unshed snow. The duck-callers, men who make a living by guiding city-bred hunters to spots in the nearby swamps and bayous where the ducks frequent, and who the call the ducks up to the guns — shooting from a blind, formerly practiced, being now forbidden — must be interesting men to know. The callers, as they have come to me over the radio, have frequently had their efforts interspersed with the loud whistles and whoops of the spectators; it is obvious that Stuttgart knows and admires its skilled duck-callers and is thrilled by a superlative performance. I recall one occasion, indeed, in which it was announced beforehand that, on the afternoon of the contest

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day, a wild duck had been shot by bow and arrow at the big reservoir south of the rice city. This announcement was received with wild cheers.

It has been stated that there are now annually over seventy million ducks wintering in Arkansas. With summer breeding-grounds in Ontario and Manitoba drained and brought under cultivation in the early thirties, the breed once seemed about to face extinction; but the sportsmen of the United States seem at last, by buying up these grounds, to have restored the wild duck to much of his former glory. It is good that this should be so and that the Arkansas rice field should provide the wild duck with so rich and so perpetual a feeding ground. It is good to think that the Federal government has now established, just east of the rice field along the swamps bordering the White River from Clarendon southward to Saint Charles, the largest game refuge in the entire state, where one may fish but not hunt the year around. The ducks may still go there if they want to escape the hunters. There is reason to think that the fate of the passenger pigeon, still remembered by some of the oldest men in the Ozarks, will not be repeated in the case of the wild duck. By the protection of this species, by the determination to have and to keep “ducks, unlimited,” the natives of the state have proved that Arkansas will always be Arkansas. The descendants of Davy Crockett, the “half-horse, half-alligator men,” will always seek the swamps adjoining the rice fields at sunrise, the long, brown shotguns held steady in their hands.