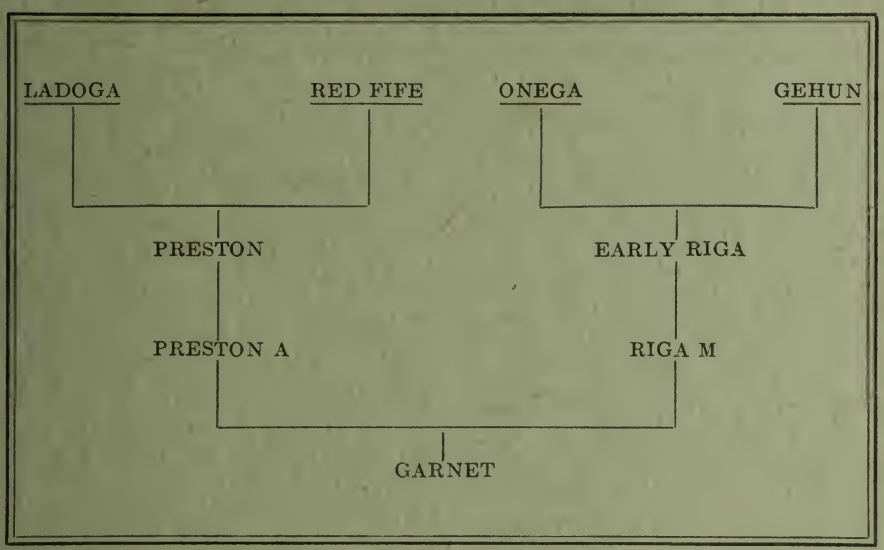
GARNET WHEAT

NEW PROMISING VARIETY OF EARLY MATURING SPRING WHEAT

By

L. H. NEWMAN AND A. G. O. WHITESIDE



PEDIGREE OF GARNET OTTAWA 652

CEREAL DIVISION
DOMINION EXPERIMENTAL FARMS

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DOMINION EXPERIMENTAL FARMS

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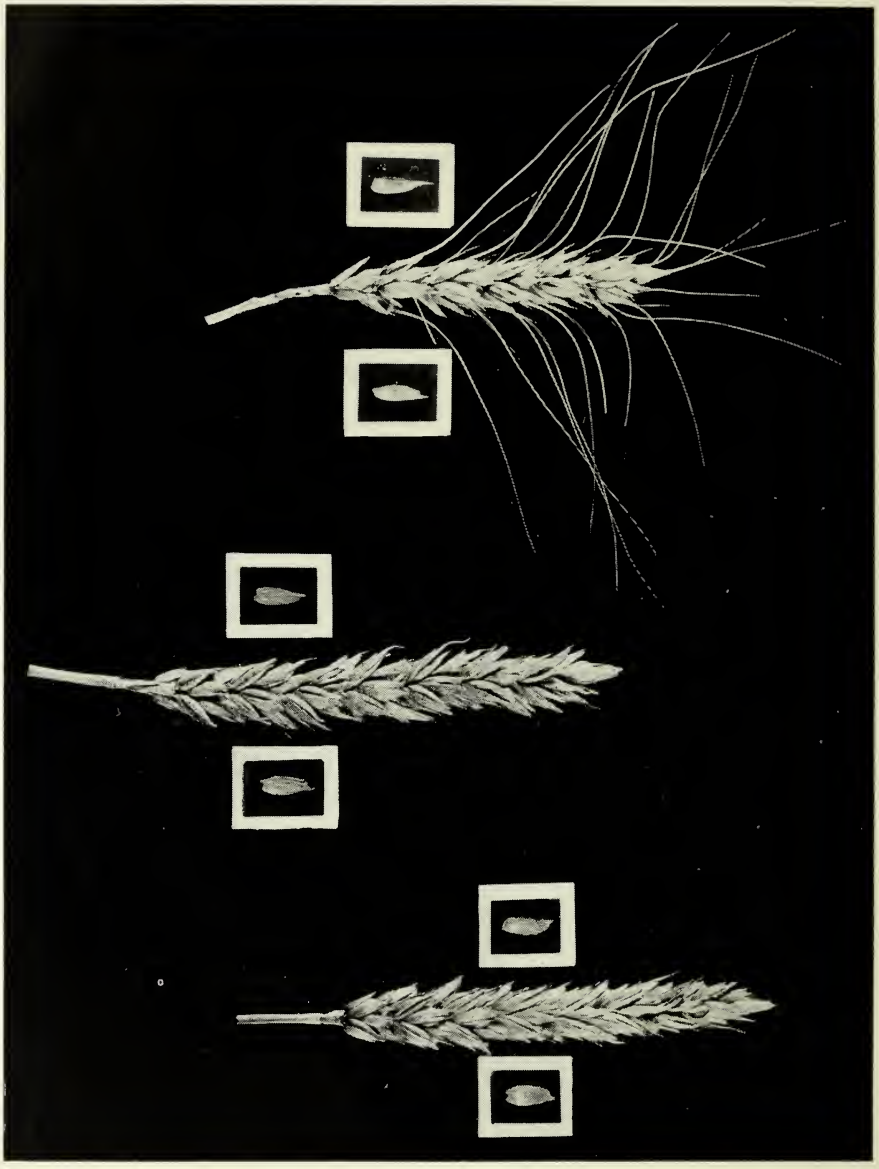

Preston Garnet Riga

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FOREWORD

Among the numerous new varieties of cereals originated and developed by the Cereal Division of the Dominion Experimental Farm, Ottawa, the variety of spring wheat known as Garnet is receiving the greatest attention at the present moment. Probably no variety within recent times has been more widely discussed or more extensively investigated, especially during the past year or two, than this variety. Like most new creations which appear particularly promising, Garnet has been given a reputation by certain enthusiastic journalists and others which it will find very difficult, if not impossible, to live up to. For instance, the claim has been made that this variety is rust resistant; which is not true. Others have stated that it may revolutionize wheat-growing over the whole of Western Canada. Such a statement obviously is quite premature and hardly probable. A true and unbiased statement of what actually is known regarding the performance and quality of Garnet in comparison with other varieties in widely scattered districts should be useful in indicating the place which this variety may be entitled to occupy among those now being propagated or under investigation. Such a statement is attempted in the present bulletin.

The conclusions which have been arrived at and which are summarized on page 74, are based on data accumulated from many sources. To all who have contributed, the authors are deeply grateful.

Garnet Wheat

PART I—DESCRIPTION AND HISTORY

DESCRIPTION OF GARNET

Garnet wheat as we now have it is not absolutely true to a common type, although a general type prevails which gives to the variety its characteristic appearance. This type may be described as one which is devoid of beards, except for a few very short and fine awns at the apex of the head. Types absolutely devoid of awns as well as certain other fairly well pronounced types are also found occasionally. The head is inclined to be fusiform in shape and of medium density. The chaff is smooth and white; glumes both empty and flowering (lemmas) are unusually long, giving the head a characteristic appearance. The beak and shoulder of the empty glumes are quite distinctive, the former being very fine, sharp and slightly inturned, while the latter is distinctly narrow. The kernels are very hard, dark red, rather long and usually below the average in size. When thoroughly matured the kernels toward the tip of the head are more or less exposed, suggesting an inclination to shatter easily. Experience with this variety to date, however, has not shown that the heads actually shell out unduly unless decidely overripe. The weight per measured bushel is usually quite high. The straw is rather fine, of good colour and fair strength. The length of straw does not appear to vary with extremes of moisture to the same extent as do many other sorts. Normally, this variety is noted for producing a high proportion of grain to straw; ripens, as a rule, a day or two ahead of Ruby and therefore from five to ten days or more ahead of Marquis.

A discussion of the milling and baking qualities of Garnet appears later.

HISTORY OF GARNET

The history of Garnet wheat is almost an epic in the realm of scientific achievement. It reveals a story of almost half a century of patient but determined effort, replete with discouragements and disappointments but rewarded ultimately by definite and indisputable gains. It epitomises the history of wheat-breeding work as conducted at the Central Experimental Farm, Ottawa, during the past forty years and compels an appreciation of the man who conceived the program of procedure which has meant so much to Canada. To Dr. William Saunders, the first Director of the Federal System and the man to whom we refer, Canada owes a debt she can never repay. To him is due, in large measure, the credit for such epoch making contributions as Marquis wheat and for the lesser though valuable wheat introductions bearing the names Preston, Huron, and Early Riga. Even such subsequent productions as Prelude, Ruby, and Garnet are all founded in part at least upon the former varieties which occupy an important place in their ancestry.

The pedigree of Garnet, the subject of our present sketch, is illustrated graphically on the cover of this bulletin. This variety, it will be noted, originated from a cross between two other Ottawa-bred varieties known as Preston A and Riga M. This cross was made at Ottawa in 1905 by Dr. Charles Saunders, then Dominion Cerealist. Preston A was a pure line selection from Preston. Riga M was a pure line selection from Early Riga. Preston came from a cross

made in 1888 between Ladoga, an early maturing variety obtained from the Lake Ladoga region of Russia, 600 miles north by latitude of the city of Winnipeg, and Red Fife. Early Riga originated from a cross made at Ottawa in 1891 between the varieties known as Onega and Gehun. Onega was obtained in 1888 near Archangel, one of the most northerly wheat-growing districts of Russia. Gehun was obtained from the Himalayan mountains of East Indian at an elevation of about 11,000 feet.

LADOGA

Ladoga was at first considered to be a wheat of high quality comparing very favourably with Red Fife. Indeed this view seemed amply supported by analysis made in 1888 by the Dominion Chemist, who concluded " that as far as gluten is concerned the Red Fife and the Ladoga are almost equal in value, with a small balance in favour of the latter "[1]. Later it was learned, however, " that the gluten in different varieties of wheat, although responding alike to chemical tests, varies in physical properties of toughness and elasticity and that in these particulars the gluten in Red Fife is superior to that in most other wheats." These conclusions followed the results of large commercial milling and baking tests made in Toronto with Ladoga wheat (600 bushels) obtained from near Prince Albert in 1892. In every one of these tests the strength of the flour proved deficient, while the crumb was very yellow in colour and coarse in texture[2].

PRESTON

While Ladoga was discredited on account of its poor quality, it still possessed the ability to ripen a week or more ahead of Red Fife. It was hoped, therefore, that this early ripening habit might be combined with the good milling qualities of Red Fife, so numerous crossings were made in 1888 between these two varieties. Among the resulting progeny the variety which came to be known as Preston proved to be one of the most promising. This variety ripens from four to six days earlier than Red Fife and on the average of many years' tests has proven generally more productive.

Investigations of the quality of the flour of Preston, Red Fife and two other varieties were made in 1902 by F. T. Shutt, the Dominion Chemist, and by J. H. Julicher, the well-known wheat expert of the Pillsbury-Washburn Flour Mills Co., Minneapolis, Minn. Samples were also examined and reported on by Wm. Halliwell, Technical Editor of *The Miller,* and who is said to have had twenty-five years experience in practical flour-milling and wheat-buying. The reports of these three experts on these wheats show that the latter were all considered at that time to be of good quality.[3] Subsequent tests conducted with Preston on the other hand, showed this variety to be relatively inferior in baking strength, texture and colour of crumb.[4] In view of its ability to ripen earlier than Red Fife, however, Preston had become fairly widely distributed throughout parts of Western Canada when Marquis appeared. The latter variety being able to mature still earlier than Preston and also being stronger in the straw and of better baking quality, very quickly superseded this variety until to-day one finds Preston confined chiefly to a few northern districts which usually are more or less lacking in moisture and for which reason this variety appears to yield relatively well.

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[1]*Ladoga wheat,* Part I by Wm. Saunders; Part II, *Report on the Chemical composition and Physical characters of Ladoga, Red Fife and other varieties* by F. T. Shutt, Central Experimental Farm, Ottawa, Bulletin No. 4, 1889.

[2]Wm. Saunders, Ladoga Wheat, Bulletin No. 18, Central Experimental Farm, Ottawa, 1893.

[3]Experimental Farms Report, Ottawa, 1903. P. 15.

[4]*Quality in Wheat;* Part I by C. E. Saunders; Part II, *The relationship of composition to breadmaking value,* by F. T. Shutt, Central Experimental Farm, Ottawa, Bulletin 57, 1907.

EARLY RIGA

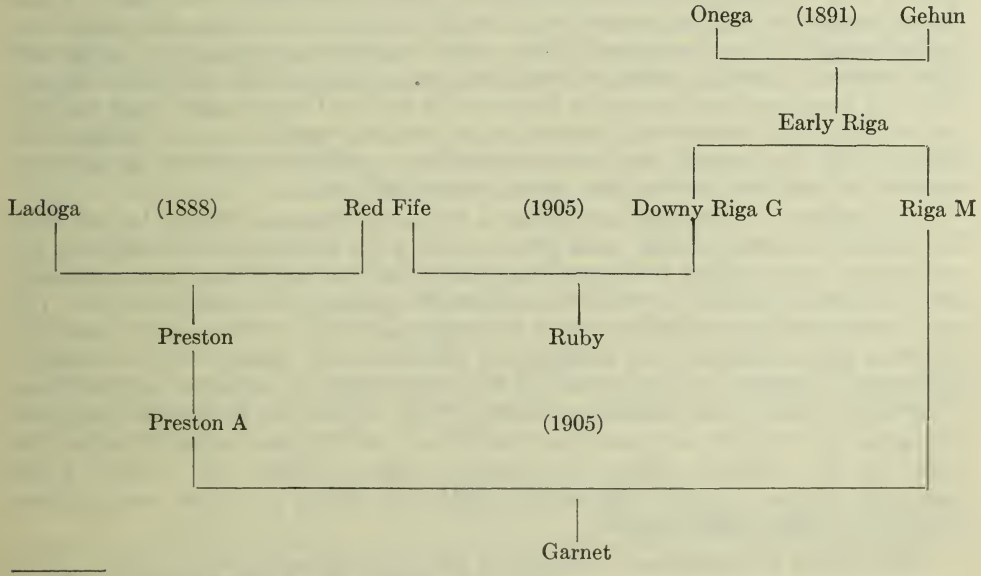
In the meantime another cross-bred sort, called Early Riga, had appeared on the scene and demanded attention. This, as already indicated, came from a cross between Onega and Gehun, two very early but relatively unproductive varieties. The Early Riga was considered the best sort produced from this cross and proved to be one of the earliest ripening wheats known. In yield, however, it did not prove as productive as Red Fife, for which reason, chiefly, it was never grown to any great extent.

Investigations conducted in 1902 by the Dominion Chemist as well as by Mr. Julicher of Minneapolis, indicated that Early Riga produced a quality of flour which at that time was considered to be particularly high. Mr. Julicher rated this variety in point of quality higher even than Red Fife, except that he describes the dough of the former variety as "creamy white" instead of "white" as in the case of Red Fife. He also found that the percentage gluten was higher in Early Riga than in Red Fife.[5]

The report of the Dominion Chemist on Early Riga grown at Indian Head in 1902 supports the findings of Mr. Julicher. The former official says: "Not only is the gluten satisfactory as to quantity but also as to quality. In noting the character of the gluten it was found to be slightly creamy in colour, firm, elastic, and of uniform texture—denoting a strong flour and one eminently suitable for bread-making purposes"[5]

Riga M did not make a particularly good showing in the milling and baking tests first conducted,[6] but in investigations made later (unpublished) was found to compare quite closely with the parent variety.

Although Riga M, like Early Riga, was not a good yielder yet its ability to mature very early, together with its good milling qualities, caused it to be used extensively at Ottawa for crossing with such varieties as Preston, which at that time was one of the highest-yielding sorts. The Riga-Preston cross which produced Garnet was the most noteworthy of any of this series, although it is interesting to note that a sister sort of Riga M bearing the name Downy Riga G, when crossed with Red Fife D in 1905, produced the well-known, high quality variety Ruby.



[5]Experimental Farms Report, Ottawa, 1903, p. 21.

[6]*Quality in Wheat:* Part I, by C. E. Saunders; Part II *On the relationship of composition to breadmaking value* by F. T. Shutt.

FIRST TESTS OF GARNET

While the crossing which gave Garnet its birth was made in 1905, it was not until 1914 that this variety came to be included in the regular variety test-plots at the Central Farm, Ottawa. Here it quickly demonstrated its early maturing qualities, while in due time its yielding ability also became apparent.

In 1919 it was included for the first time in the variety tests at a number of the branch Farms in the Prairie Provinces, the results of which tests are summarized later (see page 13).

GARNET ATTRACTS ATTENTION

When the senior author assumed his duties as Dominion Cerealist in the spring of 1923 one of the first tasks to which he directed his attention was that of "taking stock" of the excellent material left by his esteemed predecessor Dr. Chas. Saunders. The performance records of all varieties then extant were carefully scrutinized with the hope that some of the newer and relatively unknown creations might reveal virtues worthy of special investigation. Among this material the variety which had only recently received the name Garnet, seemed to be especially promising; so this variety, along with two or three others, was singled out for special consideration. The coöperation of twenty-eight selected farmers, most of whom were known to the above official, was obtained in seeking information *re* the performance of the above variety in comparison with Marquis and five or six other sorts in districts remote from our Branch Farms*. These "local test-plots", many of which were visited, provided information of very considerable value, confirming as they did the apparent virtues of this new aspirant for recognition.

DECISION TO INCREASE SEED OF GARNET

By the spring of 1925 it had become quite clear that Garnet was at least as early as Ruby and evidently capable of producing much larger yields. Its milling and baking qualities also seemed at least reasonably satisfactory. Under these circumstances there seemed ample justification for believing that the former variety might at least supersede Ruby, which variety had obtained a fairly wide distribution in districts where an early maturing wheat is desirable if not imperative. It was therefore decided to increase the seed of Garnet sufficiently not only to permit a large number of farmers to try out the variety on an acreage basis, should such be desired, but also to provide a sufficient quantity of grain to conduct milling and baking tests on a commercial scale.

In addition to the seed available on the several branch Farms of the West, a well-known and reliable seed-grower living in northern Saskatchewan had multiplied a test sample obtained from one of our Stations three years previously until he had available for sale a considerable quantity of excellent seed. This the department purchased in order to supplement its own supply and thus insure a larger quantity for distribution the following spring. By producing a substantial quantity at the outset it was also hoped to prevent any one man, or group of men, from obtaining control of the variety in its initial stages and charging the farmers an exorbitant price, as was the case when Marquis first came on the market. With the quantity thus available the branch Farms were able to sow a total of 320 acres in 1925 from which area there was produced a total of about 9,700 bushels.

*The number of co-operators in 1925 and in 1926 was much greater than in 1924.

MILLING AND BAKING TESTS

When it was first decided that Garnet seemed worthy of special consideration and of extensive investigation, plans were made at once to subject its milling and baking qualities to the severest sort of test. For this purpose five-pound samples of grain of Garnet as well as of Marquis and certain other varieties (for comparison) were obtained from the different Experimental Farms in the Prairie Provinces in 1924 and again in 1925. Samples were tested by the Western Canada Flour Mills Co., Winnipeg, Man., the Ogilvie Flour Mills Co., Montreal, P.Q., and the Lake of the Woods Milling Co., Keewatin, Ont. The Reports obtained from these companies are submitted later (see page 60-62).

After the 1925 crop was harvested there was available for the first time a sufficient quantity of grain to permit a milling and baking test to be made on a commercial scale. Negotiations were then entered into with the State Testing Mill of Minneapolis, Minn., where special facilities exist for conducting such tests, to have 100 bushels each of Garnet and Marquis subjected to a thorough investigation. Dr. Sherwood, the Director of the institution, gladly agreed to undertake this work, so arrangements were made at once to ship the grain from our branch Farm at Scott, Sask. By special arrangement 20 bushels from each of the 100-bushel lots were handed over to the Pillsbury Milling Co. of Minneapolis, Minn., in order to enable that firm also to make a comparison of the two sorts.

In the early spring of 1926 reports of the most thorough and comprehensive character on both the milling and baking qualities of the two wheats were received from Dr. Sherwood, while an excellent report covering some of the more important features only was received from Mr. M. A. Gray, Chemist for the Pillsbury Company. To these gentlemen, whose reports in their entirety are printed later (pages 56, 60), we are indeed deeply indebted.

After examining carefully the data accumulated as a result of these investigations, it seemed apparent that Garnet was entitled to be classed among the good milling and baking wheats. It was therefore decided definitely to allow farmers a sufficient quantity of seed to prove the agronomic qualities of the variety in field areas.

GARNET'S FIRST APPEARANCE ON THE MARKET

After reserving sufficient seed for their own requirements, the Experimental Farms on the prairies were able to offer a total of 6,954 bushels of Garnet seed in the spring of 1926, which date marked the first appearance of this variety on the open market.

Owing to the unusual interest taken in the variety it was decided, early in the season, to impose a limit of 4 bushels per person, with the result that 1,964 farmers obtained either 4 bushels or 2 bushels each. In addition to this number 862 soldier settlers, operating under the Soldier Settlement Board, obtained a total of 1,044 bushels. In other words, a total of 2,826 farmers obtained 6,954 bushels of Garnet from our Experimental Farms last spring.

In addition to the above quantity distributed from the branch Farms direct, the seed-grower already referred to, along with two or three other private farmers who had had the foresight to increase test samples they had been experimenting with, sold approximately 7,200 bushels of Garnet, thus making a grand total of about 14,000 bushels of this variety distributed to farmers for seeding purposes in the spring of 1926.

AREA SOWN TO GARNET IN 1926

This quantity of seed, it is estimated, seeded approximately 12,000 acres, about one-half of it being sown at 1 bushel per acre and the remaining half at about the usual rate of 1½ bushels per acre.

The area devoted to Garnet on, or under the direction of, our Experimental Farms in the West in 1926 amounted to 541.5 acres, distributed as follows: Morden, Man., 180 acres; Brandon, Man., 17 acres; Indian Head, Sask., 40 acres; Swift Current, Sask., 50 acres; Lethbridge, Alta., 60 acres; Lacombe, Alta., 61.5 acres; Beaverlodge, Alta., 6 acres; Scott, Sask., 78 acres; Rosthern, Sask., 49 acres.

The area sown to this variety in the spring of 1926 by the private parties referred to approximated 385 acres. A grand total therefore of about 12,900 acres was devoted to the production of Garnet wheat in 1926 in Western Canada. The results realized from this crop are given in the following pages.

PART II—GARNET IN THE FIELD

BEHAVIOUR OF GARNET AT EXPERIMENTAL FARMS AND STATIONS AS REPORTED BY THE SUPERINTENDENTS

AT THE EXPERIMENTAL FARM, BRANDON, MAN.

"This early maturing variety is worthy of trial on Manitoba farms. It has consistently outyielded Ruby which has hitherto been the standard early sort. The places where it is most likely to fit in are where Marquis cannot be ripened owing to rust, and where the Durum varieties cannot be grown profitably due to the crop lodging and being too costly to harvest. Maturing in this district about eight days earlier than Marquis, it may in many years escape the severity of rust attacks, especially if it be sown early.

"Garnet holds its colour well under adverse weather conditions, but the kernels are relatively small and consequently in years when the size of the kernel has been reduced by unfavourable conditions, the grade of the grain may be more seriously affected than in the case of varieties that have larger sized kernels. From a farm management standpoint, the use of an early maturing variety is worthy of consideration, as an eight day earlier harvest will mean a better opportunity to get the fall work done."

AT THE EXPERIMENTAL FARM, MORDEN, MAN.

"Garnet wheat is not making an especially good showing in comparison with the other varieties under test here. There are a number of farmers hereabouts, however, who seem to think quite highly of Garnet. There are a number on the other hand who consider it an unattractive variety. Time may reveal that Garnet is not fully appreciated according to its merits here as yet. Marquis, in recent times, has been starchy, while Garnet has been comparatively clear coloured, so that Garnet is really a better prospect than Marquis in this district.

"Most people seem to be convinced that it is at least due to replace Ruby.

"On the McAulay farm in 1925 a 20-acre field of Garnet on corn and potato land yielded 41 bushels per acre, while a 25-acre field of Marquis, on bare summer-fallow, alongside, averaged 28 bushels per acre. The latter was starchy and graded No. 2, while the Garnet had good colour and was worthy of a No. 1 grade.

"In 1926 a 20-acre field of second crop Garnet yielded 22 bushels per acre of grade 2. An adjacent piece of Marquis on second-crop land yielded similarly, but graded 3, on account of starchiness. The Garnet had excellent colour.

"In 1926 Marquis though a plump sample in this district was very starchy and the grade was from 3 down. All the Garnet grown on this Station and under contract on neighbouring farms had an excellent colour and withstood wet weather well in that respect though it sprouted readily. Ruby is reported to have sprouted more readily than Garnet."

AT THE EXPERIMENTAL FARM, INDIAN HEAD, SASK.

"In the test plots for the past six years Garnet has practically equalled Marquis. However, when grown under field conditions in comparison with Marquis we do not find it quite equal to this variety under our conditions at Indian Head. On account of being at least eight days earlier than Marquis, I am of the opinion that Garnet is to be preferred in districts where frost and rust are to be contended with. On the heavier lands adjacent to Indian Head and Regina, Marquis appears to be superior to Garnet."

AT EXPERIMENTAL FARM, SWIFT CURRENT, SASK.

"While our figures for Swift Current indicate that Garnet slightly outyields Marquis, I doubt whether it can be claimed that it has any superiority in that respect when taken over a period of years. It is shorter in the straw and probably has more tendency to shatter before harvest than Marquis, although Garnet certainly is not bad in this respect.

"The only advantage I can see in growing Garnet in this part of Saskatchewan is to spread the risk by growing both an early and a later variety.

"Comments of farmers in the drier parts of this district are generally not favourable to Garnet. These comments, it must be remembered, are more frequently based on the appearance of the crop than on actual tests, so that they may not mean very much. In any case, I am not now inclined to recommend Garnet generally in this part of the West. If it is to be used here at all, I think it should be limited to a part of the summer-fallow acreage."

AT EXPERIMENTAL FARM, LETHBRIDGE, ALTA.

"In our opinion the only place Garnet wheat has on irrigated land is for fields where, due to presence of wild oats, it is necessary to cultivate two or more times in the spring, which practice necessitates late seeding. In southern Alberta nearer the mountains where the altitude is higher, and the growing season consequently shorter, making it hazardous to depend upon Marquis, Garnet undoubtedly has a place.

"The character of the season apparently has so much to do with the yield that a few more years' trial is necessary in order to determine the real value of Garnet under average dry-land conditions in the Lethbridge district. In seasons with a good supply of moisture in the early part, but followed by drought, Garnet would show up better for the reason that it would be farther advanced and consequently would suffer less than Marquis from the drought. In 1925, when such conditions prevailed here, Garnet slightly out-yielded Marquis."

AT EXPERIMENTAL FARM, LACOMBE, ALTA.

"Garnet has been grown in the variety test plots at the Experimental Station, Lacombe, since 1919. During that period it required an average of 113 days to mature and gave an average yield of 45 bushels per acre. During the same period, Marquis Ottawa 15 wheat required an average of 122 days to mature and gave an average yield of 46.5 bushels per acre.

"In the rod-row plots during the past two seasons, Garnet has matured in about eight days less time than Marquis and yielded slightly less than Marquis.

"In actual field trials in 1926 at this Station, Garnet gave an average yield per acre of 40½ bushels per acre over an area of 61½ acres, while Marquis gave a yield of 34½ bushels per acre on an area of 18½ acres. Sixty-two per cent of the land in Marquis was summer-fallowed the previous year while only fifteen per cent of the land in Garnet was summer-fallowed the preceding year. The highest yield produced by any of the Garnet blocks was 46 bushels per acre on a 34-acre field used for annual pasture in 1925; the highest yield from Marquis was 37 bushels per acre grown on land summer-fallowed the preceding year.

"Very unusual weather prevailed during the harvest season of 1926. All of the Marquis and 30 acres of the Garnet was uncut during a period of severe storms. During this period, two snowfalls of 6 and 7 inches respectively occurred, with three heavy rains, and temperatures down to 26.5 degrees of frost. The total precipitation for this period was approximately five inches. Both these varieties came through these storms surprisingly well. Because of its immaturity, Marquis had the bran loosened and graded No. 5 while Garnet, because of its greater maturity, graded No. 4.

"When cut, Marquis shattered slightly while Garnet did not shatter over 2 per cent.

"From results at this Station and from numerous reports from many parts of Alberta, we believe that Garnet will largely replace all other varieties now in the seed trade in districts where Marquis and varieties of similar periods of maturity are subject to injury from early fall frosts. In addition to this, it is possible that Garnet might be used to advantage even in districts where Marquis will mature. If used in conjunction with Marquis or other later maturing sorts, it would extend harvesting operations over a longer season."

AT THE EXPERIMENTAL STATION, BEAVERLODGE, NORTHERN ALBERTA

"Garnet wheat, tested pretty thoroughly at Beaverlodge in the five years 1922-1926, there being twenty-nine plots of it in 1925 and thirty-two in 1926, has proven as early as Ruby, which ordinarily ripens a week or ten days ahead of Marquis. Its average yield has been within a bushel per acre of the latter variety, except in certain cultural experiments where wireworms affected the stands. From the accumulation of recent evidence by the Station it would seem that this variety is particularly prone to wireworm injury and I would not at present advise sowing it in fields seriously infested with the Northern Prairie wireworm.

"The straw is not stiff enough for a season of rank growth, and in the past summer considerable trouble from lodging was experienced.

"Nevertheless, for the very large number of Peace River district farmers who need an earlier wheat than Marquis and desire a heavier yielder than Ruby, with greater resistance to shattering than the latter manifests, Garnet is one of the several new varieties presenting strong claims to attention. Though by no means a perfect wheat, it marks a distinct step forward in the evolution of a variety suited to northern conditions.

"In 1926, when a large proportion of the Grande Prairie crop graded tough or damp at the elevator, resulting in a grave reduction in price, many farmers had borne in upon them the very great advantage of a variety that would mature from the middle to the latter half of August, thus greatly increasing the chances of a safe crop and a good grade, while permitting harvesting and threshing when the days are longer.

"Then again, there is much to be gained by cleaning the fields a week or two sooner, thus getting some of the land ploughed in time to store moisture and soluble plant food for the next crop, besides increasing decidedly the area that may be blackened before freeze-up. This alone might easily increase next year's crop by considerably more than the trifling difference in yield between Marquis and Garnet, to say nothing of the frequent advantage from a higher grade on the earlier sort.

"A district where nature will produce anywhere from 20 up to 61½ bushels of Garnet wheat per acre (the latter having been done on an acre basis in 1926) should not complain because it cannot always mature Marquis well. Playing safe with an earlier variety is likely to prove sound policy at this stage of settlement for all except, perhaps, those on the very safest lands."

AT THE EXPERIMENTAL FARM, SCOTT, SASK.

"There is little doubt that Garnet will displace Ruby in the northerly districts on account of its earliness and higher-yielding qualities. In the same area Garnet will probably take the place of Marquis on account of its earliness.

"For farms in the same latitude as Scott and to the south of Scott we hesitate to recommend Garnet until more information is gathered from farmers who have tested it; especially is this the case if combines come into more general use. There is no doubt but that Garnet shatters more easily than Marquis but not as easily as the Fifes. We find both Red Fife and Early Red Fife have to be cut before they are ripe to avoid shattering, whereas Garnet may be allowed to get ripe before cutting, with practically no shelling. On the other hand if Garnet is allowed to stand for any length of time after ripening it shells considerably which may exclude its use in areas where combines have come to stay."

AT EXPERIMENTAL FARM, ROSTHERN, SASK.

"We believe that the greatest value of Garnet wheat lies in its ability to mature about ten days earlier than Marquis. In some of the more northerly or humid parts of this province, the old standard varieties are frozen quite often while if they ripened ten days earlier, they would escape in most cases. Garnet will prove a decided benefit in such areas and should move the wheat line further north. Ripening earlier than Marquis should enable it to escape rust epidemics frequently."

BEHAVIOUR OF GARNET AT PROVINCIAL INSTITUTIONS

ON THE UNIVERSITY OF ALBERTA FARM

"We have not sufficient data available on which to base a reliable judgment as to the probable value of this wheat in northern Alberta. However, our figures seem to leave no doubt of its distinct earliness and at least fair productivity."

AT THE UNIVERSITY OF SASKATCHEWAN, SASKATOON

(By Professor Champlin)

"Garnet wheat has been grown at Saskatoon in comparison with other varieties since 1922. The average yield for four years, 1922, 1923, 1925 and 1926 is 39.5, as compared with 39.3 for Marquis Sask. 7 and 33.1 bushels per acre for Ruby. It has matured from a week to ten days earlier than Marquis Sask. 7, and in about the same period as Ruby. It has fairly good strength of straw, standing up well on summer-fallow, under normal conditions. It is somewhat weaker than Marquis in this respect. It is also considerably more inclined to shatter than is Marquis. A field of 7 acres on the University of Saskatchewan Seed Farm showed a considerable tendency toward shattering. The field referred to was harvested when mature. By harvesting the crop in the stiff dough stage, before it is fully mature, most of the shelling can be avoided.

"The grain is of the hard red spring type and owing to the fact that we were able to thresh it before the fall rains set in, the colour and grade were excellent each season since we have grown it.

"Our milling tests for two crops previous to 1926 have indicated that it produced a flour of yellowish tinge. Whether this can be remedied by modern bleaching processes or not is a point on which we do not have complete information. We have submitted a sample of the 1926 crop to the Robin Hood Mills for testing. It is to be hoped that this difficulty can be overcome as the variety is excellent in yield and earliness, as above stated."

AT THE UNIVERSITY OF MANITOBA, WINNIPEG, MAN.

(By Professor Wiener)

"It would appear from our trials with Garnet wheat that the variety is decidedly early, and a reasonably good yielding sort.

"The behaviour of the variety in the northern areas of the province, where fall frosts are a menace, has been most encouraging. Our co-operative tests this year with farmers in northern sections of Manitoba indicate that Garnet has made there a considerably better showing than on those Stations located in the central areas. Our observations would indicate that Garnet like Red Fife, is quite spring hardy, and withstands freezing temperatures even better than Marquis."

AT THE AGRICULTURAL SCHOOL, OLDS, ALTA.

(By F. S. Grisdale, Principal)

"We have grown Garnet wheat to quite a considerable extent during the last two years, and have found that under field conditions it has had a more marked advantage over the other leading varieties than the results from our plots on the School Experimental area indicate. The experience we have had with Garnet under field conditions have been more satisfactory than with any other wheat we have ever observed growing in this part of Alberta.

"In my observation, the Garnet has in field conditions invariably yielded heavier than Marquis and ripened slightly earlier than Ruby. It also has an advantage over both of these varieties in grading."

SUMMARY OF RESULTS WITH LEADING VARIETIES OF WHEAT ON THE DOMINION EXPERIMENTAL FARMS OR STATIONS

Experimental Farm	Period of years	Number of days maturing						Strength of Straw		
		Marquis Ottawa 15	Garnet Ottawa 652	Red Fife Ottawa 17	Kitchener	Early Triumph	Ruby Ottawa 623	Marquis Ottawa 15	Garnet Ottawa 652	Red Fife Ottawa 17
Ottawa	1914–18	97·6	89·4	102·0	.....	.....	91·2	9·0	8·6	8·4
Ottawa	1919–26	99·1	90·4	104·6	.....	.....	92·9	9·4	8·5	9·5
Morden	1924–26	112·0	104·0	.....	.....	.....	105·0	9·2	9·0	.....
Brandon	1919–26	101·3	93·8	.....	.....	.....	95·1	9·5	8·6	.....
Indian Head[1]—Fallow	1919–26	108·1	99·6	113·8	110·9	.....	.....	8·6	8·1	8·0
" Stubble	1920–26	108·1	99·7	113·6	111·4	.....	.....	7·7	7·4	8·2
Scott	1919–26	117·1	107·1	121·2	117·1	.....	.....	9·6	9·7	9·6
Swift Current	1924–26	103·0	97·0	.....	107·0	100·7	98·7	.....	.....	.....
Rosthern	1921–26	117·3	108·0	120·8	120·7	112·8	108·3	9·0	9·0	9·2
Lethbridge—Irrigated	1924–26	109·7	105·3	115·3	.....	108·2	104·0	9·5	9·5	9·0
" Dry Land	1924–26	98·8	95·5	102·2	104·3	99·2	95·0	9·3	9·5	9·7
Lacombe[1]	1919–26	121·9	112·5	.....	109·7	.....	113·9	9·8	9·1	.....
Beaverlodge	1922–25	118·3	112·8	.....	119·3	115·5	112·6	9·6	9·1	.....
Fort Vermilion	1924–25	103·0	96·0	110·0	107·0	.....	95·5	10·0	10·0	10·0
Rust Research Laboratory, Winnipeg	1925–26	101·0	96·0	106·0	102·0	.....	97·0	.....	.....	.....

Experimental Farm	Period of years	Strength of Straw—*Con.*			Yield per Acre. (Bush.)					
		Kitchener	Early Triumph	Ruby Ottawa 623	Marquis Ottawa 15	Garnet Ottawa 652	Red Fife Ottawa 17	Kitchener	Early Triumph	Ruby Ottawa 623
Ottawa	1914–18	.....	.....	8·4	32·5	34·2	25·4	.....	.....	32·4
Ottawa	1919–26	.....	.....	9·2	38·5	41·5	31·4	.....	.....	34·4
Morden	1924–26	.....	.....	8·4	35·8	33·3	.....	.....	.....	35·1
Brandon	1919–26	.....	.....	8·3	34·4	32·9	.....	.....	.....	27·5
Indian Head[1]—Fallow	1919–26	8·5	.....	.....	40·0	40·6	33·2	39·6	.....	.....
" Stubble	1920–26	9·1	.....	.....	27·4	26·4	26·7	28·6	.....	.....
Scott	1919–26	9·6	.....	.....	24·0	23·2	24·6	26·2	.....	.....
Swift Current	1924–26	.....	.....	.....	24·6	25·6	.....	27·0	24·6	23·8
Rosthern	1921–26	9·5	9·3	8·7	34·0	31·6	32·0	32·3	29·1	26·4
Lethbridge—Irrigated	1924–26	.....	9·7	9·2	48·2	40·7	38·8	.....	46·4	37·6
" Dry Land	1924–26	9·7	9·7	9·2	25·0	19·9	26·4	26·8	23·9	18·5
Lacombe[1]	1919–26	9·9	.....	9·5	46·5	45·0	.....	49·7	.....	35·0
Beaverlodge	1922–25	9·6	9·6	9·2	25·4	24·8	.....	30·1	25·9	20·8
Fort Vermilion	1924–25	10·0	.....	10·0	40·5	33·5	46·0	45·5	.....	33·5
Rust Research Laboratory, Winnipeg	1925–26	.....	.....	.....	29·6	32·7	20·7	23·1	.....	29·4

[1] Yields for 1924 omitted at Lacombe and Indian Head owing to crop failure on experimental area.

AVERAGE RESULTS AT WESTERN AGRICULTURAL SCHOOLS AND COLLEGES—1925 AND 1926

Institution	Period of years	Marquis Ott. 15		Garnet Ott. 652		Ruby Ott. 623		Kitchener		Early Triumph	
		Days to mature	Yield	Days to mature	Yield	Days to mature	Yield	Days to mature	Yield	Days to mature	Yield
			bush.		bush.		bush.		bush.		bush.
Manitoba Agricultural College, Winnipeg, Man.	1925–26	.....	46·9	.....	47·2	.....	43·4	.....	.....	.....	.....
University of Saskatchewan, Saskatoon, Sask.[1]	1922–26	.....	39·3	.....	39·5	.....	33·1	.....	43·1	.....	47·9
University of Alberta, Edmonton, Alta.	1926	115	33·7	106	45·0	106	40·1	118	40·6	108	50·1
School of Agriculture, Olds, Alta.	1925–26	126	66·4	114	70·7	115	57·0	129	70·7	123	71·8[2]

[1] Yields for 1924 at Saskatoon are omitted owing to loss of material by fire.
[2] Red Bobs; very similar to Early Triumph.

RESULTS OBTAINED IN LOCAL TESTS

As intimated already the co-operation of a select number of farmers was secured in an attempt to obtain data regarding the behaviour of Garnet in comparison with that of other varieties in districts remote from our branch Farms. The seed of from five to eight varieties was put up at Ottawa during each of the three past years in sufficient quantity to sow small plots one rod in length and consisting of five drills each. At maturity the heads were severed from the straw and forwarded to Ottawa for threshing and weighing. From the grain obtained during a given year the next year's seed supply was taken in order to reduce the danger of acclimatization operating as a factor in influencing yields. In nearly all cases the grower's own home-grown seed was included in the test, the variety in almost all cases being Marquis.

While this method of obtaining data may be open to criticism from a scientific standpoint, yet it is interesting to note that the results obtained coincide to a remarkable degree with those secured from the more exacting methods followed on our branch Farms.

CO-OPERATIVE TESTS IN MANITOBA

Yield in pounds per acre

Where tested	Own seed		Marquis O. 15		Garnet		Parker's	
	1925	1926	1925	1926	1925	1926	1925	1926
Group 1								
Gilbert Plains	1,797	1,768	2,060	1,617	2,003	1,895	1,797	1,768
Elkhorn	1,827	2,850	1,903	3,890	1,617	2,680	1,867	2,393
Waskada	1,643	1,860	1,857	1,303	1,597	1,673	1,800	1,352
Dauphin	533	2,073	970	2,043	987	2,114	870	1,488
Clandeboye	1,503	1,005	1,440	971	1,493	1,410	1,053	1,890
Pleasant Home	1,923	963	2,077	1,023	2,170	1,300	2,220	1,253
Katrime	2,963	1,683	3,303	1,680	3,360	1,326	2,887	2,560
Warren	2,530	2,308	2,900	2,027	2,933	2,283	2,813	2,215
Roseisle	2,020	2,923	2,437	2,580	1,037	2,488	2,293	2,550
Deloraine	2,260	2,057	1,510	1,458	1,470	1,340	1,760	1,168
Manitou	1,623	1,427	1,910	2,767	1,917	2,623	2,247	1,897
Benito	2,883	1,080	2,670	1,087	2,630	1,270	2,266	917
Portage la Prairie	1,797	1,503	1,823	1,793	2,420	2,070	1,930	1,817
Average Group 1	1,946	1,808	2,066	1,865	1,972	1,882	1,985	1,790
Group 2								
Helston	.....	.....	2,747	4,100	2,580	3,552	2,727	4,208
Miami	.....	.....	1,933	3,076	2,120	3,050	1,980	3,100
Macdonald	.....	.....	1,953	2,297	2,513	2,672	2,313	1,780
Dunallen	.....	.....	800	2,355	1,320	2,332	960	2,160
Notre Dame de Lourdes	.....	.....	1,990	2,643	2,060	1,275	2,323	2,320
Average Group 2	.....	.....	1,885	2,894	2,119	2,568	2,061	2,714
Group 3								
Treesbank	1,713	.....	1,563	.....	1,447	.....	1,660	.....
Sandridge	843	.....	927	.....	1,000	.....	807	.....
Gunton	1,230	.....	1,400	.....	1,565	.....	1,550	.....
Ste. Agathe	1,730	.....	2,070	.....	2,877	.....	2,113	.....
Miami	2,117	.....	1,870	.....	2,313	.....	2,050	.....
Miami	2,407	.....	2,830	.....	3,233	.....	2,430	.....
Baldur	1,243	.....	1,113	.....	1,020	.....	1,137	.....
Teulon	2,650	.....	2,480	.....	2,993	.....	3,297	.....
Dropmore	1,827	.....	2,210	.....	2,927	.....	2,237	.....
Fisher Branch	747	.....	1,056	.....	1,937	.....	857	.....
Average Group 3	1,651	.....	1,752	.....	2,131	.....	1,814	.....
Group 4								
Ste. Amelie	.....	1,280	.....	1,617	.....	1,155	.....	1,823
Deloraine	.....	1,558	.....	1,101	.....	788	.....	1,015
Killarney	.....	1,542	.....	2,100	.....	2,123	.....	1,587
Dugald	.....	2,028	.....	2,313	.....	1,307	.....	2,208
Boissevain	.....	638	.....	772	.....	442	.....	637
Swan River	.....	1,748	.....	1,816	.....	2,213	.....	1,840
Thornhill	.....	1,292	.....	1,930	.....	3,187	.....	1,412
Average Group 4	.....	1,441	.....	1,664	.....	1,602	.....	1,503
Averages								
Groups 1 and 2	.....	.....	2,016	2,151	2,013	2,073	2,006	2,047
" 1 and 3	1,818	.....	1,930	.....	2,041	.....	1,910	.....
" 1 and 4	.....	1,679	.....	1,794	.....	1,784	.....	1,689
" 1, 2 and 3	.....	.....	1,922	.....	2,055	.....	1,937	.....

CO-OPERATIVE TESTS IN SASKATCHEWAN

Yield in pounds per acre

Place tested	Own seed		Marquis O. 15		Garnet		Early Red Fife		Ruby	
	1925	1926	1925	1926	1925	1926	1925	1926	1925	1926
Group 1										
Meota	1,440	2,503	1,327	2,445	1,617	2,108	1,420	2,756	1,450	2,115
Kelso	2,847	3,706	2,660	2,926	2,324	2,830	2,790	3,170	2,346	2,113
Belisle	2,677	1,210	2,253	1,180	1,650	1,403	2,887	1,673	1,877	1,140
Paynton	1,843	2,290	1,843	2,290	1,640	2,160	1,947	2,226	1,423	1,850
Lac Vert	1,416	1,756	1,662	1,883	1,960	1,970	1,443	2,336	893	1,400
Richlea	3,213	4,220	3,270	3,763	3,280	2,490	2,990	4,030	2,580	2,696
Elstow	2,807	1,658	2,853	1,637	2,797	1,558	2,167	1,698	2,487	1,558
Average Group 1	2,320	2,478	2,267	2,303	2,181	2,074	2,249	2,556	1,865	1,839
Group 2										
Kindersley	1,323	2,308	1,880	2,645	1,650	2,170	1,570	2,322	.....	.....
Luseland	3,563	2,720	2,603	2,380	2,927	2,306	2,683	2,463	.....	.....
Wild Rose	2,147	2,995	2,253	2,415	2,443	3,318	2,493	3,285	.....	.....
Mazenod	1,443	2,405	1,213	2,263	1,160	2,597	1,563	2,185	.....	.....
Average Group 2	2,119	2,607	1,987	2,426	2,045	2,598	2,077	2,564	.....	.....
Group 3										
Morse	1,980	2,968	1,570	3,228	2,067	2,543	.....	.....	.....	.....
Gravelbourg	3,097	1,375	3,350	1,315	3,040	1,553	.....	.....	.....	.....
Rosthern	3,527	3,720	3,823	3,640	4,173	3,540	.....	.....	.....	.....
Wawota	2,060	2,673	1,900	2,338	1,953	1,383	.....	.....	.....	.....
Maryfield	1,617	3,630	1,430	3,500	2,160	2,866	.....	.....	.....	.....
Average Group 3	2,456	2,873	2,415	2,804	2,679	2,377	.....	.....	.....	.....
Group 4										
Richard	.....	1,696	.....	1,426	.....	1,120	.....	1,023	.....	.....
Marysburg	.....	4,598	.....	4,733	.....	4,215	.....	4,616	.....	.....
Hughton	.....	1,703	.....	2,093	.....	3,060	.....	1,810	.....	.....
Loverna	.....	817	.....	605	.....	682	.....	612	.....	.....
Spruce Lake	.....	2,183	.....	2,045	.....	1,370	.....	2,183	.....	.....
Spruce Lake	.....	2,392	.....	1,662	.....	1,733	.....	1,447	.....	.....
Adanac	.....	1,442	.....	1,137	.....	968	.....	1,570	.....	.....
Birsay	.....	2,115	.....	2,055	.....	1,820	.....	1,665	.....	.....
Average Group 4	.....	2,118	.....	1,970	.....	1,871	.....	1,866	.....	.....
Group 5										
Kamsack	.....	.....	.....	2,346	.....	2,530	.....	2,016	.....	.....
Norbury	.....	.....	.....	1,488	.....	960	.....	1,836	.....	.....
Madison	.....	.....	.....	960	.....	1,083	.....	962	.....	.....
Dundurn	.....	.....	.....	2,150	.....	2,243	.....	2,140	.....	.....
Muscow	.....	.....	.....	2,419	.....	2,148	.....	2,725	.....	.....
Average Group 5	.....	.....	.....	1,873	.....	1,793	.....	1,936	.....	.....
Averages										
Groups 1 and 2	2,247	2,525	2,165	2,348	2,132	2,265	2,187	2,558	.....	.....
" 1, 2 and 3	2,313	2,634	2,243	2,490	2,303	2,300	.....	.....	.....	.....
" 1, 2, 3 and 4	.....	2,462	.....	2,317	.....	2,157	.....	.....	.....	.....
" 1, 2, 3, 4 and 5	.....	.....	.....	2,240	.....	2,091	.....	.....	.....	.....

CO-OPERATIVE TESTS IN ALBERTA

Yield in pounds per acre

Place tested	Own seed		Marquis O. 15		Garnet		Early Red Fife		Renfrew		Ruby	
	1925	1926	1925	1926	1925	1926	1925	1926	1925	1926	1925	1926
Group 1												
Islay	2,027	1,210	1,713	1,478	883	1,537	1,037	1,457	1,000	1,827	1,677	1,125
Sedalia	2,373	1,570	2,893	1,630	2,250	730	2,570	1,835	2,007	1,445	2,267	1,325
Vegreville	2,607	1,705	2,480	2,588	2,536	2,877	2,387	1,877	2,190	1,442	1,287	1,925
Eldorena	2,320	1,558	2,440	1,753	2,575	1,662	2,283	1,912	2,107	1,913	2,320	1,558
Average Group 1	2,332	1,511	2,382	1,862	2,061	1,702	2,069	1,770	1,826	1,657	1,888	1,483
Group 2												
Morin	1,823	1,015	1,603	848	1,777	860	1,853	883	1,743	975	.....	.....
Raymond	1,993	1,510	2,203	1,753	1,766	1,513	2,103	1,905	2,190	2,105	.....	.....
Fenn	1,220	1,485	1,117	2,257	907	1,493	1,350	2,290	1,293	2,490	.....	.....
Fort Vermilion	1,313	1,340	1,440	1,210	1,470	1,540	983	1,136	.....	.....	1,313	1,340
Linfield	5,380	2,310	4,210	2,807	3,883	2,470	3,623	2,710	.....	.....	3,730	2,062
Minburn	2,657	2,735	1,500	2,073	2,020	2,165	2,083	2,633	.....	.....	.....	.....
Foreman	1,317	1,595	1,610	1,358	907	1,817	1,260	1,698	.....	.....	.....	.....
Average Group 2	2,243	1,713	1,955	1,758	1,819	1,694	1,894	1,894	.....	.....	.....	.....
Group 3												
Fort Saskatchewan	.....	.....	3,873	1,540	3,373	795	3,552	983	3,740	1,453	3,067	957
Spirit River	.....	.....	1,597	3,000	1,103	2,443	1,733	3,176	1,927	3,653	1,513	2,620
Average Group 3	.....	.....	2,735	2,270	2,238	1,619	2,643	2,080	2,833	2,554	2,290	1,789
Group 4												
Wetaskiwin	.....	3,675	.....	3,568	.....	3,393	.....	3,820	.....	.....	.....	.....
Edmonton South	.....	3,522	.....	4,173	.....	2,920	.....	3,838	.....	.....	.....	.....
Forestburg	.....	5,003	.....	4,543	.....	4,240	.....	4,650	.....	.....	.....	.....
Tees	.....	3,690	.....	3,446	.....	2,790	.....	3,571	.....	.....	.....	.....
Nanton	.....	5,280	.....	5,193	.....	4,923	.....	4,780	.....	.....	.....	.....
Howie	.....	1,192	.....	1,008	.....	1,130	.....	1,078	.....	.....	.....	.....
Average Group 4	.....	3,727	.....	3,655	.....	3,233	.....	3,623	.....	.....	.....	.....
Group 5												
Mannville	2,615	.....	3,070	.....	3,170	.....	3,080	.....	.....	.....	.....	.....
Provost	1,577	.....	1,910	.....	2,403	.....	1,993	.....	.....	.....	.....	.....
Ohaton	2,480	.....	2,250	.....	2,616	.....	2,757	.....	.....	.....	.....	.....
Hayter	1,788	.....	1,778	.....	2,023	.....	2,160	.....	.....	.....	.....	.....
Vegreville	4,093	.....	3,878	.....	3,853	.....	4,320	.....	.....	.....	.....	.....
Clyde	4,116	.....	4,293	.....	4,000	.....	4,147	.....	.....	.....	.....	.....
Cayley	1,943	.....	1,951	.....	2,003	.....	2,223	.....	.....	.....	.....	.....
Average Group 5	2,659	.....	2,733	.....	2,867	.....	2,954	.....	.....	.....	.....	.....
Group 6												
Monitor	.....	.....	.....	4,128	.....	4,440	.....	4,422	.....	4,658	.....	.....
Gibbons	.....	.....	.....	2,100	.....	2,982	.....	2,258	.....	2,940	.....	.....
Millet	.....	.....	1,947	.....	2,040	.....	1,970	.....	2,187	.....	.....	.....
Red Deer	.....	.....	2,950	.....	2,513	.....	2,880	.....	3,773	.....	.....	.....
Average Group 6	.....	.....	2,449	3,114	2,277	3,711	2,425	3,340	2,980	3,799	.....	.....
Averages												
Groups 1 and 2	2,275	1,639	2,110	1,796	1,907	1,697	1,957	1,849	.....	.....	.....	.....
" 1, 2 and 3	2,346	1,736	2,130	1,769	2,020	1,756	2,092	1,957	.....	.....	.....	.....
" 1, 2 and 4	.....	2,376	.....	2,452	.....	2,239	.....	2,475	.....	.....	.....	.....
" 1, 2 and 5	2,425	.....	2,352	.....	2,280	.....	2,345	.....	.....	.....	.....	.....
" 1, 2, 3, 5 and 6	.....	.....	.....	2,355	.....	2,276	.....	2,379	.....	.....	.....	.....
" 1, 2, 3, 4 and 6	.....	.....	2,498	.....	2,320	.....	2,520	.....	.....	.....	.....	.....

BEHAVIOUR OF GARNET ON ORDINARY FARMS

As previously mentioned, a large number of farmers in the spring of 1926 obtained seed of Garnet from the Dominion Experimental Farms in sufficient quantity to sow from 2 to 4 acres each. In the case of soldier settlers each man was allowed to purchase enough to sow as small an area as 1 acre if he so desired. Others again secured larger quantities from the private growers already referred to, and thus were able to test the variety on quite a large scale.

The results of these tests, as reported by several hundred farmers to whom we sent special forms for the purpose, are included in the following tables. Only those reports which permit fair comparisons to be made between the two varieties grown have been considered. Reports received after January 1, 1927, have also been omitted in the tabulation, as these came too late to be included.

While the forms called for information regarding such matters as prevalence of rust, early frosts, drought, yield, strength of straw and days to mature in the case both of Garnet and the main crop, only the last three items, which are the more important ones are tabulated.

When submitting their reports many farmers included some rather striking and significant statements. A few of these are printed here.

From W. V. Newson, Edmonton, Alta.

"I desire to report to you particulars as to the success met with in connection with the 4 bushels of Garnet wheat obtained from your Branch last Spring.

"The 4 bushels were sown on 3 acres of summer-fallow on May 10. This was ready to cut on August 24, but weather conditions necessitated our leaving it until September 8. It produced 55 bushels per acre. The straw is fine, but stands up better than Marquis. Our yield of Marquis wheat on the same land was 35 bushels. Our Marquis was sown on the same date, but we estimate the Garnet was ripe two weeks earlier. Our land is a black clay loam. The sample was at least three grades better than my Marquis.

"I may say it is by far the best wheat I have ever grown in my district, and is exactly the variety suited to us here, since wheat grows so rank on summer-fallow in a slightly wet year, that it is difficult to ripen it before the frost comes.

"One of my neighbours, who had a considerable acreage of Garnet wheat, had a yield of about 45 bushels. His experience was that it out-yielded Marquis both on summer-fallow and spring ploughing.

"Next year I am sowing all my land with Garnet wheat."

From E. B. Cay, Beatty, Sask. (E. district of Melfort.)

"I had 90 acres under Garnet wheat the past season. The average yield was 34 bushels per acre. The wheat on summer-fallow was badly damaged by drifting in the spring, owing to the prevalence of unusually strong winds. During June and July no rain penetrated the soil at all. The Garnet appeared to withstand the drought better than Marquis."

From A. M. Moir, Sedgewick, Alta. (E. district of Camrose.)

"There is no doubt but that the straw is slightly weaker than Marquis, but to offset this disadvantage, I would say that it has several advantages. It is a very economical wheat on twine, less bulky to handle at harvest and threshing. Garnet is fully a week earlier in this district than is Marquis, and I am sure it is the heavier yielder. While our other wheat is tough this year Garnet appears to be hard. There is no doubt but that Garnet will become a widely grown wheat. I have enough confidence in it now that I intend seeding this variety on all of our summer-fallow, on a few acres of breaking, and on one-half of our spring ploughing in 1927. The remainder of the spring ploughing will be seeded to Marquis for further comparison."

From Thos. A. Bain, Henribourg, Sask. (E. district of Prince Albert.)

"I had 12 acres of Garnet sown at 1 bushel per acre from which I harvested 780 bushels or an average of 65 bushels per acre. It retained its colour after three days of continuous rain, while in the stook. I had a much heavier crop of straw from 10 acres of Early Red Fife in 1923, but this averaged only 42 bushels per acre."

From George Logan, Spruce Lake, Sask. (E. district of North Battleford.)

"My Garnet yielded 33 bushels per acre after coming through six and one-half weeks of very hot weather without any rain. After standing in the stook for two months of very wet and stormy weather the local elevators graded this wheat a good No. 2 Northern. All my other wheat graded No. 3 Northern."

From W. H. Ritchie, Carragana, Sask. (E. district of Melfort.)

"Garnet has beaten Marquis here by a large margin. Nearly all the settlers here intend growing Garnet this year."

From S. D. Weese, Leroy, Sask. (E. district of Humboldt.)

"I am very well satisfied with Garnet except for its tendency to sprout easily. I have found that under the same conditions it sprouted about 20 per cent while the Marquis showed no signs of sprouting. This is rather a bad fault for this district, as we usually have a lot of damp rainy weather in the threshing season. Out of a total of 500 acres which I expect to sow next spring, I plan to sow 100 acres of Garnet."

From James Savage, Stettler, Alta. (E. district of Camrose.)

"I had 8 acres of summer-fallow which I divided, sowing 4 acres to Garnet and 4 to Marquis on the same day. The Garnet was cut August 27, and would grade No. 1. The Marquis was cut on September 9, and graded feed. It was frozen very badly. The soil was sandy loam and seemed to be uniform throughout."

From R. C. Smith, Oak Lake, Man. (E. district of Brandon.)

"Although my Garnet was cut in August, it was left in the stook until October 15. The colour of the former is excellent in comparison with that of Marquis, but the kernel is longer and thinner."

From J. G. Ramsay, Killarney, Man. (E. district of Souris.)

"I believe Garnet is a good early wheat. It did very well with me this year, although we had no rain until the middle of June, which caused a poor germination, yet when the rain came the grain stooled out well and produced a good crop. This was cut on August 5."

From H. R. Reynolds, Otterburne, Man. (E. district of Provencher.)

"For growing on summer-fallow I believe Garnet is better than Marquis in this district as it does not produce so much straw. It sprouts worse during the wet weather, however."

From Robt. Nisbet, Cameron, Man. (E. district of Souris).

"My Garnet was not threshed until after some very heavy rains which sprouted the grain. My Ruby sprouted worse than the Garnet, but the Garnet was worse than Marquis. Garnet, however, retained its colour much the best."

From Peter A. Funk, Rosenfeld, Man. (E. district of Lisgar).

"The Garnet wheat was a very fine sample, red in colour and weighing 62 pounds to the bushel. We think Garnet will be alright in our locality."

From H. G. Brownell, Rapid City, Man. (E. district of Marquette)

"Garnet sprouted more freely than Marquis in the stock, but retained its colour better."

From J. D. McGregor, Brandon, Man. (E. district of Brandon).

"I can tell you frankly that the wheat is very much better than I thought, and I can also tell you that every one I have spoken to is enthusiastic about the yield, and intends sowing all the seed they have produced this year, next spring. The only fault I can see with it is that it is thin chaffed, and rather open in the head, and for this reason I presume should be cut a little on the green side to keep it from wasting. It also appeared to me that during the wet weather it sprouted a little more than the Marquis, but not as much as the Quality; but it seems to me that all these early wheats sprout quite badly if they get the right kind of weather. For instance, we had some Red Bobs No. 222 wheat and it sprouted about the worst of any, not excepting the Quality. It is just possible that on account of it being cut early the stooks become more compact, and are in better condition for sprouting than the later-cut varieties of wheat. Up here this year, conditions were the worst I ever saw, and wheat which was not cut in some instances was actually sprouting standing in the field. The Garnet was easily two weeks earlier than the Marquis, and showed absolutely no sign of rust either here or in Alberta. I believe that this Garnet wheat is proving itself to be even better than what was predicted for it."

In view of the large number of growers who made similar observations regarding the performance of Garnet it is possible to draw a few general conclusions. Thus it is safe to say that Garnet sprouted much more than did Marquis under the extreme conditions of moisture which prevailed during the harvest of 1926 in many parts of the West. On the other hand the former variety did not sprout any worse than did other early maturing varieties such as Ruby or Quality. Furthermore it is probably safe to suggest that had Marquis been cut as early as these more precocious varieties it would have sprouted quite as badly.

As regards shattering it appears clear that Garnet is liable to shell out more easily than Marquis, when over-ripe, but not so badly as Ruby or the Fifes. In this respect Garnet has the appearance of a wheat which would shatter much more easily than it actually does.

While Garnet sprouted worse than Marquis this year, yet it held its colour and its hardness in the stook under the severe moisture conditions, decidedly better than did either Marquis or Ruby in almost all cases.

The straw of Garnet, under certain conditions, did not prove so strong as that of Marquis but was almost always stronger than Ruby.

In length of straw, it would appear that Garnet produces a shorter straw under conditions favourable to rank growth than does Marquis. On the other hand, under extremely dry conditions there is considerable evidence available to indicate that the former variety does not suffer in straw length to the extent that either Marquis or Ruby are liable to suffer. Many farmers for this reason have expressed the opinion that Garnet should be particularly useful on summer-fallow.

It also has been a common observation that Garnet appears to be rather outstanding in its ability to produce a high proportion of grain to straw.

In comparing the yields given in the following tables due allowance should be made for the difference in areas. Thus it is obviously unfair to compare the yield of Marquis from say 200 acres with that of Garnet from only 2 acres. It is believed, however, that the yields submitted may be of value in at least giving some idea as to the returns obtained from Garnet in many different districts and under widely different conditions.

The townships in which Garnet was grown on an acreage basis in each of the three Prairie Provinces, are indicated on the accompanying map by means of numbers (called key numbers). These same numbers also appear in the tables of performance which follow, thereby affording a ready means of obtaining information regarding the behaviour of the above variety in any particular township or district.

If specific information be desired regarding the precipitation enjoyed by a certain district in which Garnet was grown, all that is necessary is to refer to the precipitation tables (pages 42-44), in which will be found a record of the precipitation at points usually quite close to, if not actually within, the district in question. Unfortunately the uneven distribution of the rainfall of 1926 precludes the possibility of submitting a map indicating districts in which the precipitation was either uniformly low or uniformly high.

SUMMARY OF RESULTS ON ORDINARY FARMS—MANITOBA

Post Office	Key No.	Main crop	Acres of		Yield per acre		Comparison of Garnet and main crop	
			Main crop	Garnet	Main crop	Garnet	Garnet—stronger or weaker	Garnet—days earlier
Brandon District (1)								
Alexander	1	Durum	110	4	17	18	.....	12
"	1	Marquis	170	14	20	15	Weaker	12
Belleview	3	Marquis	270	2½	30	35	Weaker	7
Brandon	4	Marquis	160	2	28	30	Weaker	10
"	5	Mindum	100	4	25	12	Stronger	15
"	6	Marquis	105	1¼	20	20	Same	18
"	7	Marquis	138	1¾	24	28	Same	5
"	8	Kubanka	45	2	25	25	Stronger	6
"	7	Marquis	49	1	20	18	Same	9
Bradwardine	9	Marquis	125	3	30	30	Same	10
Chater	6	Marquis	.....	2	20	30	Same	7
Cromer	10	Marquis	13	2	30	33	Same	6
Douglas	11	Quality	105	3½	16	23	Same	5 later
Elkhorn	12	Marquis	181	11	30	35	.....	10
Ebor	13	Durum	197	3	20	33⅓	Stronger	12
Griswold	14	Marquis	40	1½	30	30	Weaker	8
Kemnay	15	Marquis	70	3½	22–35	33	Same	10
"	15	Kota	60	10	23	30	Same	12
Kirkella	16	Marquis	51	3	25	25	Same	6
Methven	17	Marquis	120	4	26	21	Same	12
Nesbitt	17	Marquis	125	1½	24	24	Same	12
Oak Lake	18	Marquis	52	3	38	35	Weaker	10
Pipestone	19	Durum	200	1½	30	25	Stronger	16
Reston	19	Durum	360	3	25–35	48	Stronger	15
"	19	Durum	300	2	20	26	.....	10
Rivers	20	Marquis	60	1	17	20	Same	12
Souris	21	Marquis	130	1⅓	.....	41⅓	Same	4
"	22	Marquis	75	4	31	25	Same	10
Terence	23	Marquis	200	4	30	30	Same	10
Virden	24	Marquis	80	4	48	48	Same	14
"	25	Marquis	2	4	30	35	Weaker	4
Woodnorth	26	Marquis	40	10	25	35	Same	14
"	27	Durum	150	1	26½	31¼	Stronger	18
Dauphin District (2)								
Dauphin	28	Marquis	13	2	22	21	Weaker	8
"	29	Marquis	3¾	1¼	17	28	Weaker	10
"	30	Ruby	30	16	18	30	Stronger	0
Dropmore	31	Marquis	57	1	15	22	Stronger	10
Ethelbert	32	Marquis	.....	3	16	32	Same	6

SUMMARY OF RESULTS ON ORDINARY FARMS—MANITOBA—*Continued*

Post Office	Key No.	Main crop	Acres of		Yield per acre		Comparison of Garnet and main crop	
			Main crop	Garnet	Main crop	Garnet	Garnet—stronger or weaker	Garnet—days earlier
Dauphin District (2)								
Gilbert Plains	33	Marquis	110	4	14	16	Weaker	9
"	34	Marquis	60	2	25	22	Same	12
"	35	Marquis	80	2	14	15	Same	10
Grandview	36	Marquis	35	3	28	28	Weaker	14
"	37	Marquis	6	3	26	22	Same	12
"	38	Marquis	35	1	27	40	Weaker	7
Roblin	39	Marquis	80	3⅓	30	40	Same	9
"	40	Marquis	30	1⅛	15	12	Weaker	8
"	41	Marquis	40	1	14	14	Weaker	11
Venlaw	42	Marquis	43¼	1¼	18	38	Same	10
"	43	Marquis	30	1⅛	20	20	Weaker	9
Lisgar District (3)								
Altona	44	Ruby	58	2	21	20	Weaker	0
"	45	Ruby	.....	80	26	30	Stronger	0
"	45	Marquis	240	1¼	25	28	Same	7
Crystal City	46	Marquis	96	3½	27	20	Stronger	11
"	47	Marquis	90	4	21	30	Same	
"	48	Mindum	16	6	38	12	Same	
Glenora	47	Durum	65	4	25	40	Stronger	10
"	49	Marquis	109	4	35	30	Same	10
"	49	Marquis	35	2	28	37½	Stronger	30
Gretna	50	Marquis	63	3	20	30	Same	9
"	50	Marquis	75	3	45	31	Weaker	10
Kaleida	51	Marquis	86	2½	19½	20	Weaker	5
Mather	52	Durum	94	4	27	15	Same	10
Morden	53	Marquis	108	37	20	22	Weaker	8
Myrtle	54	Marquis	165	3½	25	30	Weaker	11
Pilot Mound	55	Marquis	15	1¾	28	32	Same	8
"	47	Marquis	58½	1½	35	12	Same	10
Rosebank	61	Marquis	195	1½	24	27	Weaker	8
Rosenfeld	56	Marquis	75	3½	21	20	Same	17
"	57	Marquis	35	2	33	30	Weaker	9
"	57	Marquis	96	2	24	31	Same	7
"	58	Marquis	45	5½	38	35	Weaker	10
"	57	Marquis	.....	11	28	28	Weaker	7
Thornhill	59	Marquis	50	2	20	25	Same	11
"	60	Marquis	110	5	30	40	Same	12
Winkler	62	Marquis	25	25	18	29	Same	7
Macdonald District (4)								
Altamont	63	Marquis	66	2	30	28	Weaker	7
Bruxelles	64	Marquis	55	2	33	50	Same	12
"	65	Marquis	196	4	26	32	Stronger	12
"	64	Ruby	75	4	24	39	Same	2
Carman	66	Marquis	62	3	30	35	Same	10
"	66	Marquis	90	3¼	23	40	Stronger	0
"	67	Marquis	60	3½	23	31	Same	10
"	68	Ruby	70	2½	18	20	.....	0
"	69	Mindum	250	30	28	30	Same	10
"	66	Marquis	40	3½	27	33	Stronger	7
"	66	Ruby	118	4	20	18	Weaker	0
"	66	Mindum	53	2	35	15	Stronger	10
Cypress River	70	Marquis	132	3	25	25	Same	10
"	71	Marquis	140	4	27	30	Same	12
"	65	Marquis	105	2	31	11	Weaker	9
"	71	Ruby	80	5	33	37	Stronger	0
"	71	Ruby	65	3½	26	26	Stronger	0
"	71	Marquis	190	4	28	20	Same	8
Elm Creek	72	Ruby	100	.....	24½	30	Same	0
Graysville	73	Marquis	100	5½	25	37½	Same	10
Greenway	74	Kubanka	76	3¾	30	28	Same	8
Homewood	75	Marquis	70	8	14	30	Same	2
Holland	76	Marquis	75	4	21	27	.....	8
"	76	Marquis	80	2	30	30	Same	6
"	76	Marquis	160	2	20	12	Same	6
Macdonald	160	Marquis	80	15	42	40	Same	10
Miami	77	Marquis	71	2	42	45	Same	10
"	77	Marquis	58	1¾	52	45	Weaker	7
"	78	Marquis	10	3½	34	42½	Same	7
"	78	Marquis	38	4½	40	45	Weaker	6

SUMMARY OF RESULTS ON ORDINARY FARMS—MANITOBA—*Continued*

Post Office	Key No.	Main crop	Acres of		Yield per acre		Comparison of Garnet and main crop	
			Main crop	Garnet	Main crop	Garnet	Garnet—stronger or weaker	Garnet—days earlier
Macdonald District (4)								
Newton Siding	79	Marquis	80	1	20	21	Same	6
Notre Dame de Lourdes	80	Marquis	12½	3¼	39	21	Weaker	12
Pratt	85	Quality	70	3½	20-30	25	Same	0
Rathwell	81	Marquis	32	3½	25	28	Weaker	10
"	81	Marquis	130	3	31	33		7
"	81	Marquis	75	9	24	25	Weaker	7
Roland	82	Marquis	125	4	18	17	Same	0
"	82	Marquis	125	2	21	20	Same	13
"	82	Marquis	50	3	18	14	Weaker	11
Roseisle	78	Marquis	70	4	35-40	35	Weaker	7
Rossendale	83	Ruby	90	6	18	24	Same	0
"	84	Marquis	170	5½	35	44	Same	8
Stockton	86	Marquis	71	4	20	23	Weaker	13
Somerset	87	Marquis	90	4	35	40½	Same	10
Treesbank	88	Criddle's	225	4	30-37	28	Weaker	9
Treherne	89	Marquis	260	2	35	35	Same	10
"	87	Marquis	68	3½	30	36	Weaker	5
"	90	Quality	16	2	33	32	Same	0
Union Point	91	Mindum	50	1	37	31	Stronger	8
"	91	Marquis	100	1	40	32	Stronger	10
Marquette District (5)								
Angusville	92	Marquis	24	3	30	20	Same	20
Beulah	93	Marquis	55	4	30	43	Weaker	10
"	93	Kubanka	10	2	23	28	Stronger	12
Birtle	94	Marquis	85	6½	32	39	Same	10
"	94	Marquis	30	1	30	25	Weaker	8
Cardale	95	Marquis	55	21	30	30	Weaker	8
"	95	Quality	64	5	20	35	Same	0
Clanwilliam	96	Marquis	55	1½	37	41	Same	12
Elphinstone	97	Bearded	38	7	29	40	Stronger	18
Foxwarren	98	Marquis	35	13	31	36	Same	10
"	99	Marquis	80	1	33	30	Stronger	6
Hamiota	100	Marquis	46	3½	28	28	Same	8
Kelloe	101	Marquis	3¼	¾	36	32	Weaker	9
Manson	102	Marquis	48	18	22	26	Same	7
McAuley	103	Marquis	10	3	25	15		10
Millwood	104	Marquis	100	1½	35	33	Same	7
Minnedosa	105	Marquis	194	4	34	30	Same	8
"	106	Marquis	1½	2	25	15	Same	17
"	107	Marquis	20	4	32	49	Same	15
"	105	Marquis	50	1	30	25	Same	23
"	108	Marquis	32	¾	30	20	Weaker	13
Miniota	109	Marquis	72	8	30	40	Same	12
Oakner	110	Marquis	110	3½	25	27½	Same	10
Pope	111	Marquis	150	1½	27	27	Same	10
Rapid City	112	Marquis	88	2	25	25	Weaker	12
"	113	Marquis	45	2	30	22	Weaker	11
"	112	Quality	123	2½	10	20	Stronger	0
Sandy Lake	113	Marquis	41¾	3¼	22	22	Same	14
Strathclair	114	Marquis	2	1½	12	34	Stronger	10
Shoal Lake	115	Marquis	130	2½	34	36	Same	14
Solsgirth	116	Marquis	21	6	30	25	Weaker	10
Neepawa District (6)								
Arden	117	Marquis	50¾	2¼	16	25	Weaker	8
Austin	118	Marquis	50	4	27	34	Weaker	6
"	85	Marquis	200	2	35	31	Same	6
"	85	Marquis	24	1¾	22½	28	Stronger	10
Bethany	149	Marquis	60	3	40	35		14
Birnie	119	Marquis	100	3	35	10	Stronger	8
Brookdale	120	Kubanka	45	2	35	26½	Weaker	5
Edrans	121	Marquis	29	1	20	16½	Weaker	7
Franklin	122	Kota	40	4	28	30	Same	15
Gladstone	123	Marquis	25½	4½	24½	30	Same	14
Halboro	124	Marquis	130	3½	24	22	Weaker	8
Kelwood	125	Marquis	11	2	20	18		12
"	125	Marquis	95	3	30	9	Stronger	8
"	126	Marquis	40	2	20	18	Stronger	11
"	125	Marquis	32	3½	24	34½	Same	13
"	127	Marquis	50	1	20	20	Same	10

SUMMARY OF RESULTS ON ORDINARY FARMS—MANITOBA—*Continued*

Post Office	Key No.	Main crop	Acres of		Yield per acre		Comparison of Garnet and main crop	
			Main crop	Garnet	Main crop	Garnet	Garnet—stronger or weaker	Garnet—days earlier
Neepawa District (6)								
Katrime	128	Marquis	95	3¼	24	25	Stronger	13
"	128	Marquis	110	3½	25	32	Same	10
McCreary	129	Marquis	8½	3½	18	30	Stronger	17
"	130	Marquis	138	1½	36¼	41¾	Same	12
McGregor	131	Ruby	120	3½	16	20	Stronger	0
Minnedosa	132	Marquis	51½	3½	35	36	Same	11
"	133	Marquis	22	¾	36	20	Same	10
Moore Park	134	Marquis	50	4½	34	30	Same	12
Neepawa	135	Marquis	102½	3½	33	26	Same	12
Norgate	129	Marquis	2½	1½	20	20	Same	10
Plumas	136	Ruby	30	2½	10	22½	Same	0
Sidney	137	Marquis	55	2½	34	30	Stronger	10
Wellwood	138	Marquis	100	17	40	18	Same	10
"	139	Marquis	100	7	15	25	Same	10
"	138	Marquis	235	4	35	34		10
"	139	Quality	35	3	35	30	Same	0
Nelson District (7)								
Benito	140	Marquis	75	3½	25	40	Stronger	10
"	140	Marquis	74	1	22	25½	Same	10
"	141	Marquis	75	1	24½	12	Same	
"	140	Marquis	100	4	24	41	Same	4
Bowsman River	142	Marquis	350	8	23	30	Weaker	10
"	143	Marquis	10	1	30	40	Same	8
"	143	Ruby	11	1½	25	30	Stronger	0
Harlington	140	Marquis	56	2	26	25		8
Kenville	144	Marquis	75	4	10–25	29	Same	10
"	144	Marquis	63	2	17	20	Same	15
"	144	Marquis	85	¾	10	10	Same	10
"	145	Marquis	12	6	49	53	Weaker	6
Renwer	146	Marquis	20	1	25	29	Same	10
Swan River	147	Marquis	20	1¼	20	25	Same	10
"	147	Ruby	16	1	12	20	Stronger	2
Portage la Prairie District (8)								
Beaver	148	Marquis	68	2	20	20	Weaker	10
Fortier	150	Marquis	60	1½	28	30	Weaker	12
High Bluff	151	Marquis	75	2⅓	24	18	Same	7
Kawende	150	Marquis	50	3	29½	28	Same	7
Langruth	152	Marquis	80	4	18	18	Same	7
"	153	Marquis	30	1¾	20	26	Stronger	11
"	152	Marquis	150	2½	28	26		10
"	152	Marquis	75	3	27	22	Same	12
"	154	Marquis	1	1	35	30	Same	15
Meadows	155	Kota	160	3½	24	33	Stronger	
Moosehorn	156	Marquis	18	1½	20	30	Weaker	10
Poplar Point	157	Marquis	7	½	27	40	Same	11
Portage la Prairie	158	Marquis	240	6½		40	Same	10
"	159	Marquis	41	4	26	17	Same	9
"	159	Marquis	100	3½	22	24	Same	6
"	159	Marquis	50	3	24	30	Same	11
Provencher District (9)								
De Wet	161	Durum	120	1½	25	34	Same	10
Dominion City	162	Ruby	66	3¾	30	40½	Stronger	0
Emerson	163	Marquis	50	1	25	35–40	Same	10
Green Ridge	164	Ruby	130	2		20	Same	0
Halbstadt	165	Marquis	150	1¾	22	25	Weaker	12
Letellier	162	Marquis	22	1½	38	40	Same	10
McTavish	166	Marquis	90	2	25	18	Same	0
Morris	167	Kota	40	2¾	25	30	Same	12
Niverville	168	Durum	52	3¼	34	35	Stronger	20
Otterburne	169	Durum	180	4	40	53	Stronger	9
"	169	Marquis	60	3½	22	25	Stronger	6
"	169	Durum	180	3	30	28	Stronger	15
"	169	Marquis	20	½	20	30	Stronger	15
Ridgeville	170	Marquis	23	20	20	33	Same	14
St-Jean Baptiste	171	Marquis	46	1½	40	20½	Weaker	10
"	171	Marquis	167	3¼	25	35	Stronger	24
St. Pierre	172	Ruby	60	1¼	35	40	Same	2

SUMMARY OF RESULTS ON ORDINARY FARMS—MANITOBA—*Concluded*

Post Office	Key No.	Main crop	Acres of		Yield per acre		Comparison of Garnet and main crop	
			Main crop	Garnet	Main crop	Garnet	Garnet—stronger or weaker	Garnet—days earlier
Selkirk District (10)								
Argyle	173	Marquis	47½	¾	28	63	Weaker	5
Arborg	174	Marquis	42	4	20	25½	Same	7
Chatfield	175	Marquis	10	3½	21	22	Weaker	10
Grosse Isle	180	Ruby	14	1¾	35	48	Same	2
"	180	Durum	108	3	48	46	Stronger	14
"	180	Acme	107	3	48½	44	Stronger	19
Petersfield	176	Marquis	70	1½	34	40	Weaker	10
"	176	Marquis	3	3	20	25	Weaker	12
Pleasant Home	177	Marquis	11	1½	30	23	Weaker	7
Selkirk	178	Kubanka	32	8	40	37	Stronger	10
Teulon	179	Marquis	60	1¼	35	42	Same	4
"	179	Marquis	12	3	39	40		10
Warrenton	180	Marquis	60	2	33	40	Same	8
Winnipeg	181	Durum	60	1½	22	28	Same	12
Souris District (11)								
Boissevain	182	Marquis	190	2	18	17½	Stronger	4
"	183	Kubanka	75	½	23½	27	Weaker	10
Dand	184	Durum	350	3	27	36	Same	11
Deloraine	185	Marquis	90	2	43	35	Weaker	5
Elgin	186	Marquis	110	3	25	19	Weaker	7
Elva	187	Kota	150	2½	29	34	Stronger	12
"	194	Mindum	111	1¾	34	35	Weaker	9
"	187	Marquis	200	1½	30	28	Same	7
Hartney	188	Durum	200	3½	22	25	Stronger	15
Holmfield	189	Marquis	145	4	23	43	Same	10
Killarney	190	Marquis	100	4	25	24	Same	9
"	191	Marquis	100	1¾	25	26	Same	11
"	192	Ruby	60	4	25	25	Stronger	2
"	192	Kubanka	42	2	30	31	Stronger	12
"	190	Marquis	40	3	35	15	Weaker	14
Lena	193	Durum	158	2	23–44	35	Stronger	12
Melita	194	Durum	216½	3½	23	20	Stronger	10
"	195	Durum	140	4	25	26	Stronger	20
"	196	Durum	60	2	25	30	Same	10
"	197	Durum	220	3¼	26¼	21	Stronger	20
Ninette	198	Marquis	75	3	20	27	Stronger	10
Ninga	199	Durum	83	4	24	30	Stronger	7
Waskada	200	Durum	250	1¾	30	40	Stronger	12
"	201	Durum	200	4	30	27	Stronger	24
Springfield District (12)								
Brokenhead	202	Marquis	32	1½	29	30		8
Cloverleaf	203	Marquis	14¼	¼	37	42	Stronger	14
Dugald	204	Ruby	32	2½	34½	49½		3
East Selkirk	205	Durum	49	4	30	25	Stronger	
Lydiatt	206	Ruby	100	1½	33	40	Same	0
"	206	Durum	20	2	37½	32½	Stronger	15
Melrose	207	Durum	45	2	30	44½	Stronger	14
St. Boniface District (13)								
St. Adolphe	208	Durum	100	3½	35	30	Weaker	10

ACREAGE AND AVERAGE YIELDS IN MANITOBA

Electoral Districts	No. of Tests	Garnet		Marquis	
		Acres	Average Yield	Acres	Average Yield
Brandon	21	84	28·3	2,126	27·3
Dauphin	14	27	24·3	623	19·6
Lisgar	20	113½	26·8	1,771½	26·8
Macdonald	36	139½	30·8	3,561½	26·7
Marquette	27	118¼	31·2	1,583½	30·2
Neepawa	27	92	25·7	1,966¾	30·0
Nelson	13	37½	34·2	1,015	22·0
Portage la Prairie	15	33¼	24·0	805	24·4
Provencher	9	35	31·0	628	25·2
Selkirk	9	20½	31·6	315	30·8
Souris	9	24¼	26·5	1,005	26·0
Springfield	2	2	33	46¼	31·5
Total	202	724¾	28·8	15,491½	26·8

GARNET AND RUBY—ACREAGE AND AVERAGE YIELDS IN MANITOBA

Electoral Districts	No. of Tests	Garnet		Ruby	
		Acres	Average Yield	Acres	Average Yield
Dauphin	1	16	30	30	18·0
Lisgar	1	2	20	58	21·0
Macdonald	6	25	27·9	498	22·8
Neepawa	2	5 7/12	20·9	150	14·8
Nelson	1	2½	26·0	27	17·3
Provencher	2	5	40·4	126	32·4
Selkirk	1	1⅔	48·0	14	35·0
Souris	1	4	25·0	60	25
Springfield	2	4	45·9	132	33·4
Total	17	65¾	29·9	1,095	24·0

SUMMARY OF RESULTS ON ORDINARY FARMS—SASKATCHEWAN

Post Office	Key No.	Main crop	Acres of		Yield per acre		Comparison of Garnet and main crop	
			Main crop	Garnet	Main crop	Garnet	Garnet—stronger or weaker	Garnet—days earlier
Assiniboia District (1)								
Antler	1	Marquis	300	4	35	40	Same	10
Carievale	2	Kubanka	230	4	20	33½	Stronger	6
"	2	Durum	60	3½	16	38	Same	17
"	2	Durum	148	2½	22	18	Stronger	10
Carnduff	24	Marquis	175	4	22	22	Same	5
Carlyle	3	Marquis	60	2	25	20	Weaker	10
"	4	Marquis	72	3	30	22		9
Creelman	5	Marquis	240	4	34	33	Weaker	6
Estevan	6	Marquis	246	4	31½	27	Weaker	7
Fairlight	7	Marquis	82	4½	36½	37	Weaker	8
"	7	Marquis	40	4	26	26	Weaker	4
"	8	Quality	235	4	33	30	Weaker	
"	8	Marquis	75	3½	25	43	Same	10
"	8	Durum	50	3½	25	42	Stronger	15
Frys	9	Marquis	160	3½	34	30	Stronger	12
"	10	Marquis	200	4	26	31	Same	6
"	11	Marquis	175	45	28	30	Weaker	14
Gainsborough	12	Marquis	37	2	22	20	Same	7

SUMMARY OF RESULTS ON ORDINARY FARMS—SASKATCHEWAN—*Continued*

Post Office	Key No.	Main crop	Acres of Main crop	Acres of Garnet	Yield per acre Main crop	Yield per acre Garnet	Comparison of Garnet and main crop: Garnet—stronger or weaker	Comparison of Garnet and main crop: Garnet—days earlier
Assiniboia District (1)								
Glen Ewen	12	Kota	110	3	20	35	Stronger	11
"	15	Marquis	147	3¼	24	30	Stronger	12
"	13	Kubanka	125	3¼	20½	25¼	Same	8
"	14	Marquis	310	5	20	20	Same	10
Heward	16	Marquis	440	2	28	40	Same	7
Hazelwood	16	Marquis	150	1½	40	40	Stronger	10
Maryfield	17	Marquis	100	4	36	36½	Weaker	8
"	18	Durum	250	7	32	25	Same	9
Macoun	19	Marquis	355	8	26	38	Stronger	7
Manor	20	Durum	120	4	24	40	Same	10
"	20	Quality	109	4	40	35	Weaker	10
"	3	Marquis	120	3⅓	29	43	Weaker	7
North Portal	21	Kubanka	250	1¼	29	36	Stronger	4
Oxbow	22	Marquis	100	4	37	36	Same	10
Storthoaks	23	Marquis	10	2	38	38	Stronger	7
"	10	Marquis	25	2	38	39	Stronger	6
Wanchope	25	Marquis	35	2½	30	30	Same	7
Wawota	26	Marquis	46	4¼	29½	40	Weaker	12
"	26	Marquis	90	9	35	35	Same	7
"	26	Marquis	35	5	30	36	Same	9
"	27	Marquis	45	3½	31	52	Weaker	10
Humboldt District (2)								
Aberdeen	28	Marquis	151	4	25	20	Weaker	10
Colonsay	29	Marquis	150	3	29¼	30	Weaker	10
Dafoe	30	Marquis	260	1¾	18	18	Weaker	10
"	31	Marquis	28	2	25	27	Same	8
Folgoet	32	Ruby	60	3	12	30	Stronger	0
Heudon	33	Marquis	25	1	30	45	Same	10
Hillsley	34	Marquis	200	3¼	30	50		6
Kermaria	35	Marquis	100	¾	35	32	Weaker	14
Lac Vert	36	Marquis	50	1	20	32	Weaker	7
"	37	Marquis	50	1	24	32½	Weaker	6
Lanigan	38	Marquis	68	2	25	25	Same	10
"	39	Marquis	125	¾	28	27	Weaker	
Lake Lenore	40	Marquis	160	¾	17	22½	Same	12
"	41	Marquis	38	2	28	27	Weaker	9
Leroy	42	Marquis	250	20	22	25	Same	10
"	43	Marquis	105	1¼	30	35	Same	10
"	43	Marquis	40	9	40	39	Same	7
Marysburg	44	Marquis	78	2	25	26	Same	11
"	45	Ruby	53	3½	32	46	Stronger	0
Marne	46	Marquis	39	1¼	36	32	Same	10
Meacham	47	Marquis	90	4	45	60	Weaker	12
Middle Lake	48	Marquis	200	5¼	27	24½	Weaker	8
Naicam	49	Marquis	68	2	27	32	Weaker	13
"	50	Ruby	40	2	28	33½	Stronger	0
"	35	Marquis	17	1	20	28	Weaker	10
Plunkett	51	Marquis	110	2	20	25	Same	7
"	52	Marquis	250	10	30	25	Weaker	10
"	51	Marquis	10	6	32	34	Weaker	8
Pleasantdale	37	Marquis	45	3½	26	39	Weaker	12
"	36	Marquis	296	1½	27	26	Weaker	12
"	36	Marquis	64	¾	35	40	Same	7
Saxby	47	Marquis	220	20	40	57	Weaker	10
Spalding	53	Marquis	30	4	24	48	Same	10
"	53	Marquis	200	10	22	23	Same	8
"	54	Marquis	29	¾	26	24	Weaker	16
St. Denis	55	Early Red Fife	180	1½	23	30	Weaker	12
Viscount	56	Marquis	170	1½	22	24	Weaker	10
"	57	Marquis	360	4¾	24	28	Same	9
Watson	58	Marquis	75	2	25	25½	Same	10
"	59	Marquis	17¾	3¼	28	30	Same	9
Wimmer	60	Marquis	70	1	34	45	Same	10
Young	61	Marquis	70	2	15	10	Stronger	13
"	62	Marquis	130	1¾	20	15	Weaker	4

SUMMARY OF RESULTS ON ORDINARY FARMS—SASKATCHEWAN—*Continued*

Post Office	Key No.	Main crop	Acres of		Yield per acre		Comparison of Garnet and main crop	
			Main crop	Garnet	Main crop	Garnet	Garnet—stronger or weaker	Garnet—days earlier
Kindersley District (3)								
Beadle	63	Marquis	475	3¾	5	7	Stronger	6
Beechy	64	Marquis	90	4	25	23	Weaker	11
Coleville	65	Marquis	270	2½	10	8	Same	0
Dewar Lake	66	Marquis	100	3	25	15		
Driver	67	Marquis	90	1½	30	28	Weaker	10
Fiske	68	Marquis	200	2	5½	5½		10
"	68	Marquis	130	2	5½	5½		10
Herschel	69	Marquis	100	4	20	15		10
Kyle	70	Marquis	56	4	25	20	Weaker	14
La Porte	71	Marquis		1¾	17	16½	Weaker	15
Macrorie	72	Marquis	47	2	23	17	Weaker	
Plato	73	Marquis	370	4	30	25	Weaker	8
"	73	Marquis	800	4	20	12	Weaker	10
Tuberose	75	Marquis	320	6	30	25	Same	10
Last Mountain District (4)								
Bunglass	76	Marquis	70	2	20	20	Same	8
Cupar	77	Marquis	150	2	18	20	Same	10
Cymeric	78	Marquis		1½	25	23⅓	Weaker	9
Duval	78	Marquis	200	4	18	22	Same	10
Foam Lake	79	Marquis	97	1½	24½	31	Same	10
Goyan	78	Marquis	240	4	15	27	Weaker	7
"	80	Marquis	90	1	9	9	Weaker	4
"	81	Marquis	75	1	15½	17	Same	8
Kelliher	82	Marquis	60	1	22½	20	Same	10
"	83	Marquis	50	1	26	26	Same	10
Lestock	84	Marquis	47	3	25	29	Same	10
Leross	84	Marquis	33	2	23	23	Same	10
"	85	Marquis	140	1¼	20	25	Weaker	10
Leslie	86	Marquis	80	4½	22	26	Weaker	11
"	87	Marquis	37	1⅛	37	42½	Weaker	11
Leslie	88	Marquis	70	5	23	25	Weaker	10
Lockwood	89	Marquis	220	33	14	25	Stronger	10
Markinch	90	Marquis	143	1¼	20	27	Weaker	9
Quinton	91	Marquis	120	2	21	20½	Same	7
Raymore	92	Marquis	65½	4½	24½	25	Same	7
"	93	Marquis	140	3	20	28	Same	10
"	94	Marquis	70	1	31	38	Weaker	8
"	94	Marquis	150	⅞	19	20	Weaker	9
"	94	Marquis	82	2	27	25	Weaker	7
"	95	Marquis	50	1¾	24	28	Stronger	14
"	96	Marquis	95	5	30	32	Same	10
Seman	97	Marquis	200	1	15	18	Same	10
"	95	Marquis	70	1	19	21	Same	5
"	92	Marquis		3⅓	12–20	25	Weaker	10
Silton	98	Marquis	41	2½	12	12	Same	
Southey	99	Marquis	48	2	19	30½	Stronger	10
Strasbourg	100	Marquis	125	2	18	22½	Same	11
"	100	Marquis	99	3¾	17	21¾	Same	
Tate	101	Marquis	180	3	13	16	Same	15
Wynot	102	Marquis	85	1½	26	26	Weaker	8
Wishart	103	Marquis	68½	1⅗	24	25	Weaker	10
Long Lake District (5)								
Aylesbury	104	Marquis	150	4	6	7½	Same	8
"	105	Marquis	282	8	14½	12½	Same	8
Bladworth	106	Marquis	200	4	12	12	Weaker	12
"	107	Marquis	140	4	17	15	Same	10
Chamberlain	108	Marquis	67	2	9	13½	Same	9
Craik	109	Marquis	131	4	14	18½	Same	10
Dilke	110	Marquis	400	6	6	8½	Same	10
Hanley	111	Marquis	285	4	23	21	Same	7
Hawarden	112	Marquis	50	3½	24	25½	Weaker	11
Holdfast	113	Marquis	200	4	10	16	Same	4
Imperial	114	Marquis	117	⅔	12	13	Weaker	12
"	115	Marquis	105	1¾	14	30	Same	10
Kenaston	116	Marquis	350	2	30	20	Weaker	8
"	117	Marquis	230	3¼	16½	17⅓	Weaker	12
Lumsden	118	Marquis	150	2	20	21	Stronger	10
Pense	119	Marquis	97½	2¼	17	26	Same	
Penzance	120	Marquis	200	1¾	15½	14	Weaker	8

SUMMARY OF RESULTS ON ORDINARY FARMS—SASKATCHEWAN—*Continued*

Post Office	Key No.	Main crop	Acres of		Yield per acre		Comparison of Garnet and main crop	
			Main crop	Garnet	Main crop	Garnet	Garnet—stronger or weaker	Garnet—days earlier
Long Lake District (5)								
Renown	121	Marquis	74	1	17½	13	Weaker	9
Simpson	122	Marquis	24	4	17½	16	Same	12
"	123	Marquis	300	2⅓	10	15	Stronger	12
"	122	Marquis	120	1	15	14	Same	12
Venn	124	Marquis	300	4	12	12	Same	9
Watrous	125	Marquis	175	4¾	10	13½		10
"	126	Marquis	.....	1½	10–12	13	Stronger	10
"	125	Marquis	60	5	24½	25	Same	10
MacKenzie District (6)								
Astwood	127	Early Triumph	44	2	28	25	Weaker	7
Clair	128	Marquis	28	2	37	43	Same	9
"	129	Marquis	60	¾	25	30	Stronger	11
"	129	Marquis	60	1	30	38	Same	11
Cluffield	130	Marquis	39	1	40	45	Stronger	11
Elfross	131	Marquis	4½	2	30	25	Weaker	7
Hyas	132	Preston	3	2½	17	28	Same	7
Invermay	133	Marquis	30	3	10	20	Same	18
"	134	Marquis	18	2	35	43½	Stronger	10
"	133	Ruby	57	3	27	35	Same	0
Kitchen	135	Marquis	20	2	20	13	Same	7
Kelvington	136	Marquis	90	4	25	42½	Weaker	10
"	136	Ruby	78	14	22	40	Same	0
"	137	Marquis	110	4	42	43	Weaker	8
"	136	Ruby	27	1	25½	40	Stronger	0
"	136	Marquis	37	¾	34	44	Same	18
Kuroki	138	Marquis	28	2	40	39½	Weaker	10
Norguay	139	Club	120	¾	21	16	Same	10
Nut Mountain	140	Marquis	55	1	30	36½	Same	12
Preeceville	141	Ruby	30	5	7	15	Same	4
Quill Lake	142	Marquis	50	1⅛	33	44½	Stronger	10
Rose Valley	143	Marquis	29	1	23	23	Weaker	10
Rama	144	Marquis	47	¾	25	22	Same	11
"	145	Marquis	46	3½	21	26	Same	10
Scrip	146	Marquis	72	1¾	30	40	Same	15
Stenen	147	Ruby	32	1⅛	22	35	Same	0
"	148	Ruby	20	3	25	33	Stronger	2
Sturgis	141	Ruby	20	1	16	46	Stronger	3
"	149	Marquis	40	2	26	35	Same	10
"	141	Ruby	63	2	22	28	Same	0
Tadmore	150	Ruby	176	4	22½	22½	Stronger	0
Maple Creek District (7)								
Admiral	151	Marquis	43	3½	23	28½	Same	9
Aneroid	152	Marquis	157	1¾	20	24	Same	7
Carmichael	153	Marquis	247¾	3½	15	.....	Weaker	12
Consul	154	Marquis	284	2	15	20	Stronger	8
"	155	Marquis	90	2½	15	18	Stronger	10
Dollard	156	Marquis	107	3	11	7	Same	12
Eastend	156	Marquis	560	4	22	19	Same	15
Frenchville	157	Marquis	300	4	20	26	Same	10
Garden Head	158	Marquis	30	2	15	9	Weaker	13
Gull Lake	159	Marquis	140	1½	9⅝	14⅔	Same	11
Maple Creek	160	Ruby	50	2	15½	20	Same	4
"	161	Ruby	65	1½	12	15	Same	5
Neville	162	Marquis	120	1¼	16	16	Same	15
"	163	Marquis	94	4	21	17½	Weaker	11
"	163	Marquis	355	10	22	18½	Same	13
Ponteix	164	Marquis	225	4	20	40	Stronger	10
Shaunavon	165	Marquis	70	2	21½	17	Same	9
"	166	Marquis	30	1¾	23	18	Same	
Sidewood	167	Marquis	190	2	9	24½	Stronger	10
South Fork	168	Marquis	600	2	16	26	Weaker	12
Tompkins	169	Marquis	60	2⅝	20	31	Weaker	9
"	170	Marquis	196	4	20	20	Same	5
Melfort District (8)								
Armley	171	Marquis	56½	½	26½	15	Weaker	10
"	172	Marquis	.....	1½	17	25	Same	10
"	172	Marquis	35	2	20	21	Weaker	12
"	172	Marquis	40	1	12	15	Weaker	14
"	172	Marquis	54	½	18	24	Weaker	12

SUMMARY OF RESULTS ON ORDINARY FARMS—SASKATCHEWAN—*Continued*

Post Office	Key No.	Main crop	Acres of		Yield per acre		Comparison of Garnet and main crop	
			Main crop	Garnet	Main crop	Garnet	Garnet—stronger or weaker	Garnet—days earlier
Melfort District (8)								
Arborfield	173	Marquis	2	7	27	23	Stronger	15
Aylsham	174	Marquis	90	1	16	12		5
Beatty	175	Marquis	105	8	13	28	Weaker	10
Birch Hills	176	Marquis	190	4½	18	30	Same	9
"	176	Marquis	69	⅔	17	26	Same	14
"	177	Marquis	9	3	45	40	Finer	7
"	177	Marquis	15	50	17	31	Same	10
"	178	Marquis	50	16	43	40	Weaker	12
Bjorkdale	179	Marquis	20	½	28	40	Weaker	12
"	180	Marquis	13	2⅓	27	30	Weaker	10
Carlea	181	Marquis	50	¾	30	25	Stronger	10
"	181	Marquis	126	11	26	26	Weaker	9
"	172	Marquis	50	1	27	28½	Weaker	8
Carragana	182	Marquis	3½	3	25	35½	Weaker	7
"	183	Marquis	29	2	10	12	Same	8
"	183	Marquis	7	⅘	25	33¾	Same	
Dilton Park	181	Marquis	44	½	25⅗	25	Same	10
Eldersley	184	Marquis	60	1	34¾	40	Weaker	10
Hudson Bay Junction	185	Marquis	3¾	1	20	12	Same	10
Kinistino	186	Marquis	3½	3½	10	25	Same	12
"		Marquis	100	10	18-30	24	Stronger	10
Leacross	171	Marquis	102	8	21	25	Weaker	10
"	171	Marquis	50	1	22	16	Weaker	7
Melfort	187	Red Fife	480	30	26	20	Weaker	10
"	188	Marquis	205	10½	21¼	24	Weaker	10
Moore Range	189	Marquis	84	3	29	51	Weaker	5
Nipawin	190	Marquis	107	3	42	25	Weaker	7
"	191	Marquis	60	20	21	27	Weaker	10
"	192	Marquis	40	1	23	28	Weaker	10
Pleasant Valley	193	Marquis	40	1	15	20	Weaker	Few
"	188	Marquis	430	20	20	19	Same	8
"	188	Marquis	49	2¾	25	27	Weaker	8
Pontrilas	194	Marquis	100	3	30	35	Same	7
"	194	Ruby	40	1	18	23	Same	2
"	194	Ruby	35	1	17	16	Stronger	0
Ridgedale	195	Marquis	70	½	25	36	Weaker	7
"	196	Marquis	93	1	29	26	Same	14
"	197	Marquis	48	1	12	16	Same	10
"	197	Marquis	35	12	18	25	Same	10
"	198	Marquis	78	¾	57	50	Weaker	10
Runciman	196	Marquis	20	2	38	28	Same	10
"	196	Marquis	100	4	16½	30	Weaker	10
"	199	Marquis	72	9	28	25	Same	10
St. Brieux	200	Marquis	36	2	20	30	Weaker	12
"	200	Marquis	43	11	33	35	Weaker	15
Silver Stream	199	Marquis	90	18	32	43	Weaker	8
"	199	Marquis	75	2½	20	20		8
Star City	201	Marquis	202	4	20	27	Weaker	
"	202	Ruby	95	9	20	33	Same	0
Sylvania	203	Marquis	109	1	23	26	Weaker	10
Taylorside	204	Marquis	35	55	15	25	Same	14
Tarnopol	205	Marquis	53	2	20	40	Same	8
Tisdale	206	Marquis	30	25	25	28	Same	10
"	207	Marquis	48	2	25	37	Same	10
"	208	Marquis	400	23	20	26	Weaker	7
"	207	Marquis	85	14	35	47	Same	8
"	208	Marquis	60	20	26	41½	Same	9
"	207	Marquis	90	7	18	28	Stronger	24
"	196	Marquis	240	9	27	38	Weaker	10
"	208	Marquis	90	2	16½	19	Weaker	10
"	208	Marquis	160	11	27	42	Same	9
"	209	Marquis	108	10	20	35½	Weaker	11
"	210	Marquis	97	¾	35	40	Same	10
"	211	Marquis	30	3½	24	22	Weaker	8
"	212	Marquis	40	1	36	47	Stronger	6
Valparaiso	212	Marquis	61	2	20	50	Weaker	12
Waterfield	199	Ruby	90	1	24	12	Same	0
"	172	Marquis	60	3½	20	26	Same	12
Winton	213	Marquis	56	4	18-30	25	Same	10

SUMMARY OF RESULTS ON ORDINARY FARMS—SASKATCHEWAN—*Continued*

Post Office	Key No.	Main crop	Acres of		Yield per acre		Comparison of Garnet and main crop	
			Main crop	Garnet	Main crop	Garnet	Garnet—stronger or weaker	Garnet—days earlier
Melville District (9)								
Abernethy	214	Marquis	85	2	34	35	Weaker	10
Brewer	215	Marquis	114	1	25	30	Same	10
Churchbridge	216	Marquis	30	4⅓	14	14	Same	8
"	217	Marquis	45	3	28	38½	Stronger	12
Duff	218	Ruby	96	4	16	21	Same	0
"	218	Marquis	115	7¾	12	27	Same	10
Dubac	219	Marquis	160	4	25	15	Stronger	
Killaly	220	Kitchener	47	1¼	35	36	Same	9
Lemburg	221	Marquis	58	2	20	30	Same	10
Logberg	222	Marquis	55	5	27	29	Same	14
McNutt	223	Marquis	74	1½	17	15	Same	8
"	223	Marquis	60	1⅓	21	25	Same	7
Saltcoats	224	Ruby	88½	3½	25–38	35½	Stronger	0
"	225	Marquis	34	4	30	30	Same	6
Waldron	226	Marquis	56	2	28½	30	Same	7
"	226	Marquis	120	2	30	24	Same	10
Zenita	227	Marquis	70	5	25	15	Weaker	10
Moose Jaw District (10)								
Caron	228	Marquis	200	3	14½	19½	Stronger	6
Keeler	231	Marquis	305	2	10	15	Same	12
Moose Jaw	229	Marquis	200	4	29	27	Same	12
"	230	Marquis	300	4	17–30	67	Weaker	5
Mossbank	232	Marquis	140	2	16	15		0
Tuxford	233	Marquis	240	2½	13½	15	Same	10
North Battleford District (11)								
Belbutte	234½	Ruby	8	3½		21	Same	14
Borden	235	Marquis	235	3½	12	12	Weaker	8
Camp Lake	236	Early Red Fife.	25	2	22	20	Weaker	10
Cleeves	237	Marquis	14	6	32	29	Weaker	10
"	238	Marquis	25	4	25	21	Same	8
"	239	E. Triumph	86	4	19¼	18	Same	10
Cater	240	Ruby	15	2	17	23	Stronger	0
Edam	241	Marquis	100	4	30	25	Same	7
"	242	Kitchener	30	3½	15	10	Same	7
"	243	Marquis	110	6	20	26	Same	8
Eldred	244	Marquis	31	3	15½	26⅔	Weaker	12
Fairholme	245	Galacian	25	2	20	21	Same	
Fielding	246	Marquis	80	1	10	18	Weaker	9
"	246	Marquis	108	1	25	28	Same	10
Fort Pott	247	Red Fife	70	1½	9	19		10
Glen Bush	248	Early Red Fife.	40	2	23	26		10
"	248	Marquis	120	5	25	34	Same	10
Hatherleigh	249	Red Fife	140	1½	19	18	Weaker	14
Highworth	250	Marquis	65½	2½	25½	32		6
Junor	251	Marquis	27	3	17	23	Same	
"	252	Marquis	8	2	23	20	Same	11
Langmeade	253	Marquis	90	2	12	15	Same	9
"	253	Marquis	60	2	19	32	Weaker	12
Meeting Lake	254	Ruby	84	2	17	15	Same	4 later
"	254	Ruby	40	1½	15	31	Stronger	Same
Meadow Lake	255	Red Bobs	35	2	25	25	Same	4
Medstead	256	Ruby	56½	1½	13	17	Stronger	2
Meota	257	Marquis	178	1	38	37	Weaker	9
Mullingar	258	Marquis	90	3	20	27	Same	12
Norbury	259	Ruby	15½	2	16	36	Stronger	0
"	259	Ruby	19	2	32	40	Weaker	2
North Battleford	260	Ruby	30	3½	25	40	Same	0
"	261	Red Bobs	100	4	12¾	13	Weaker	5
Paddling Lake	262	Marquis	31	1½	25	30	Weaker	3
Raddison	264	Red Fife	300	2	12½	20	Weaker	10
Robinhood	251	Marquis	45	4	17	33	Weaker	12
Rabbit Lake	305	Red Fife	45	2½	12	18	Same	8
Rossall	263	Red Bobs	40	4	23	24	Weaker	9
Spiritwood	265	E. Triumph	11	2½	27	25	Weaker	0
Speers	266	Marquis	157	2	11	20	Weaker	12
Speers	267	Ruby	100	1¾	17	27	Stronger	0
Spruce Lake	268	Ruby	16	2	24	37½	Stronger	0
"	269	Red Bobs	80	3	23	33	Same	8

SUMMARY OF RESULTS ON ORDINARY FARMS—SASKATCHEWAN—*Continued*

Post Office	Key No.	Main crop	Acres of		Yield per acre		Comparison of Garnet and main crop	
			Main crop	Garnet	Main crop	Garnet	Garnet—stronger or weaker	Garnet—days earlier
North Battleford District (11)								
St. Walburg	270	Russian	60	3¼	30	31	Same	10
"	269	Marquis	64	3	20	17⅓	Same	15
Turtleford	271	Marquis	160	4	38	37½	Same	10
"	238	Marquis	175	3	31	40	Weaker	10
"	272	Marquis	20	25	15	35	Weaker	12
"	238	Marquis	46	3½	20	25	Same	11
Vawn	241	Marquis	118	3¾	26¼	25½	Same	20
Witchekan	273	Ruby	34	3¾	27½	38	Stronger	0
"	274	Ruby	30	2	22	25½	Same	3
Prince Albert District (12)								
Alingly	275	Marquis	52	1	28	30	Stronger	10
Avebury	276	Marquis	86	2½	25	22	Same	10
Briarlea	277	Marquis	75	2	25	30	Weaker	10
Canwood	278	Marquis	90	5	20	18	Same	10
"	278	E. Triumph	96	8	21	35	Weaker	2
"	279	Marquis	4	2	28	30	Stronger	14
"	278	Marquis	120	10	33	30	Weaker	8
"	280	Marquis	46	1	18	25	Weaker	15
"	281	Ruby	34	2	14	10	Stronger	0
"	282	Marquis	26	1½	23	27	Same	10
Duck Lake	283	Red Fife	26½	3½	26	26	Weaker	14
Fish Creek	284	E. Red Fife	30	1½	25	34	Stronger	6
Henribourg	285	Marquis	110	9	20	45	Same	10
"	285	Marquis	32	1¼	30	40	Same	10
"	286	Marquis	110	3	35	30	Weaker	10
"	286	Marquis	172	3	30	32	Weaker	10
Leask	287	Marquis	80	4	20	25	Same	10
"	288	Marquis	150	2	20	28¼	Weaker	5
"	287	Marquis	110	3½	25	28	Same	8
"	289	Marquis	90	3	23	29	Weaker	8
Marchant Grove	281	Marquis	20	4	16	21½	Weaker	14
"	281	Marquis	40	4	16	21	Same	10
Mattes	290	Marquis	15	1	37½	35	Weaker	10
Marcelin	291	Marquis	120	2¾	14	22	Weaker	10
Mount Nebo	292	Ruby	8¾	4½	26½	27	Same	0
Paddockwood	293	Marquis	90	8	20	24	Weaker	10
"	293	Marquis	25	2½	25	32	Weaker	10
"	294	Marquis	60	8	15	24½	Weaker	25
"	294	Marquis	80	8½	9	30	Weaker	15
Prince Albert	295	Red Bobs	21	2	29	35	Weaker	9
"	295	Marquis	81¾	3¼	32	22	Weaker	10
Rosthern	296	Kitchener	165	1¾	15	11	Weaker	7
"	297	Kitchener	24	1	10	17	Same	12
St. Louis	298	Marquis	50	2¾	14	28	Same	15
Shellbrook	281	Marquis	65	4	26	22	Same	12
"	299	Marquis	120	2	30	34	Weaker	9
"	300	Marquis	73	2	18	25	Weaker	7
"	281	Marquis	70	¾	28	40	Weaker	10
"	301	E. Triumph	130	3½	20	30	Weaker	6
Titanic	302	E. Red Fife	219	4	14	17½	Weaker	8
Wakaw	303	Marquis	20	3	22	18	Weaker	7
Wild Rose	304	Marquis	150	26	35½	27½	Weaker	12
Qu'Appelle District (13)								
Baring	305	Marquis	31	3¾	27	25	Weaker	.....
"	305	Marquis	300	1¾	21	33	Same	8
Esterhazy	306	Marquis	100	7	30	25	Weaker	6
"	306	Marquis	140	2	20	22	Weaker	9
Fleming	307	Marquis	340	3¾	24	20	Same	10
Grenfell	308	Marquis	50	4	30	40	Weaker	6
Huronville	309	Marquis	200	4	23	20	Same	5
Indian Head	310	Marquis	21	3	24	23⅓	Same	12
Kipling	311	Marquis	150	1¼	15	25	Stronger	10
"	312	Marquis	350	4	28	32	Weaker	9
"	313	Marquis	6	6	24⅝	30	Weaker	8
Langbank	314	Marquis	215	4	25	25	.....	6
"	315	Marquis	200	3½	28	34	Weaker	8
Muscow	316	Marquis	16	1½	25	26	Weaker	5

SUMMARY OF RESULTS ON ORDINARY FARMS—SASKATCHEWAN—*Continued*

Post Office	Key No.	Main crop	Acres of		Yield per acre		Comparison of Garnet and main crop	
			Main crop	Garnet	Main crop	Garnet	Garnet—stronger or weaker	Garnet—days earlier
Qu'Appelle District (13)								
Tantallon	317	Marquis	17	3	32	36	Weaker	4
Rocanville	318	Marquis	45	3	35	40	Weaker	10
St. Hubert's Mission	319	Marquis	44	2¼	30	55	Same	10
" "	320	Marquis	35	2	16	22	Same	10
Welwyn	321	Marquis	140	3¼	34	30	Weaker	8
"	321	Marquis	56	3½	34	30	Same	16
Wolseley	322	Marquis	600	3	30–35	30	Weaker	10
Windthorst	323	Marquis	165	3½	30	40	Same	10
"	323	Marquis	182	8	25	40	Same	10
Rosetown District (15)—								
Biggar	324	Marquis	42	4	15	15	Stronger	5
Bounty	325	Marquis	65	3½	22	30	Weaker	13
Delisle	326	Marquis	150	2	21	14½	Same	10
Dunfermline	327	Red Bobs	103	1½	17	26½	Same	10
Juniata	328	Marquis	80	4	12	17		20
Lizard Lake	331	Marquis	90	2	10	25	Same	11
Langham	329	Marquis	142	6	11½	13½	Weaker	16
Leney	330	Marquis	390	10¾	23	24		15
Laura	332	Marquis	200	¼	33	24	Same	5
Rosetown	333	Marquis	150	4	24	21	Weaker	8
"	334	Marquis	230	3½	25–47	35	Same	12
Sovereign	335	Marquis	390	1½	30	33½	Same	10
Spinney Hill	336	E. Red Fife	110	8	16	15	Weaker	10
Swanson	337	Red Fife	150	2	10	10	Same	14
Saskatoon District (16)—								
Bradwell	339	Marquis	5	2	22	17	Same	8
Blucher	340	Red Fife	104	¾	25	25	Stronger	10
"	340	Marquis	205	1	14	21	Stronger	12
Cheviot	341	Marquis	340	2	18	14	Weaker	10
Hepburn	342	Marquis	300	3¾	10⅓	12½	Weaker	10
Sutherland	343	Marquis	600	4	30	32	Same	8
South Battleford District (17)—								
Adanac	344	Marquis	400	2	14	25	Stronger	10
Evesham	345	Marquis	290	4	20	25	Same	10
Furness	346	Marquis	191	2	23	21	Same	10
Gallivan	347	Supreme	168	9	29	25	Same	8
Lashburn	348	Marquis	150	7¾	10	8	Same	10
Lloydminster	349	E. Red Fife	40	2	30	25	Same	20
"	350	Marquis	112	3	26	28½	Weaker	10
"	350	Marquis	33	1	10	25	Same	11
"	351	Marquis	49	1	36	35	Same	9
"	72A	Marquis	2¼	1½	28	28½	Stronger	7
"	72A	Marquis	95	1	24	32	Same	8
Lone Rock	346	Red Fife	120	1	17	25½	Weaker	12
Marshall	352	E.Triumph	60	4	25	27	Stronger	10
"	353	Marquis	150	3	34	34	Same	9
"	353	E. Triumph	40	1	19	24	Weaker	10
Maidstone	354	Marquis	95	3½	30	28	Same	20
"	355	Marquis	10	4	27	42½	Stronger	18
Palo	356	Marquis	168	2	11	12½	Weaker	10
Paynton	357	Marquis	300	5	42	42	Weaker	8
"	358	Marquis	90	4	20	26	Weaker	8
"	253	Marquis	30	2	29	20½	Same	9
"	357	Marquis	4	4	17½	23½		8
Salvador	359	Marquis	25	2	24½	25	Weaker	8
Scott	360	10 B	270	4	17	21	Same	10
Senlac	361	Marquis	96	4	28	29	Weaker	7
Springwater	362	Marquis	350	4	5–17	11	Same	
Wilkie	363	Marquis	25	2	10	24	Same	8
"	364	E. Triumph	232	4½	13½	18⅜	Weaker	11
"	365	Red Bobs	120	2	11	13	Same	6
Swift Current District (18)								
Herbert	366	Marquis	345	3	9	9	Same	7
Lawson	367	Marquis	150	4	20	30	Weaker	13
Lancer	368	Marquis	300	4½	10	9	Weaker	10

SUMMARY OF RESULTS ON ORDINARY FARMS—SASKATCHEWAN—*Concluded*

Post Office	Key No.	Main crop	Acres of		Yield per acre		Comparison of Garnet and main crop	
			Main crop	Garnet	Main crop	Garnet	Garnet—stronger or weaker	Garnet—days earlier
Swift Current District (18)								
Morse	369	Marquis	330	3¾	25	5	Stronger	6
"	370	Marquis	240	1	20	12	Stronger	8
Pennant	371	Marquis	225	3½	20	21½		11
Prelate	373	Marquis	150	2	17	19	Weaker	7
Riverhurst	367	Marquis	160	4	23	22	Same	7
Weyburn District (19)—								
Bechard	374	Marquis	450	2	53	60	Weaker	7
"	375	Marquis	350	1 7/10	43	50	Weaker	12
Ceylon	376	Marquis	150	3	36	33	Same	8
Corrine	377	Marquis	550	3	36	25	Same	6
Colgate	378	Marquis	280	3	28	38	Same	10
Fillmore	379	Marquis	20	5	30	36	Same	14
Goodwater	380	Red Fife	300	4	38	35	Stronger	8
Halbrite	381	Marquis	50	2	28½	28	Same	10
Kronau	382	Marquis	400	6	10	10	Same	10
Lang	383	Marquis	.....	3½	38	29½	Weaker	10
Mount Green	384	Marquis	250	1½	20	26	Same	10
Neptune	385	Marquis	.....	3½	35	40	Same	8
Osage	386	Marquis	56½	1½	26	20	.....	14
Torquay	387	Marquis	14	1½	32	33	Weaker	6
Wilcox	388	Marquis	100	4	33	22	Same	10
"	389	Marquis	500	1¾	35	24	Stronger	10
Yellow Grass	390	Marquis	128	3	30	35	Same	11
Willow Bunch District (20)—								
Congress	391	Marquis	90	2¾	25½	19	Weaker	13
"	391	Marquis	80	2½	33¾	32	Same	13
"	392	Marquis	215	3	22¼	26⅔	Same	10
Crane Valley	393	Marquis	250	3 7/10	22	33	Same	10
Fife Lake	394	Marquis	136	4	23	30½	Weaker	8
Gravelbourg	395	Marquis	180	4	25	27	Same	10
Kincaid	396	Marquis	67	3	22	20	Same	5
LaFleche	397	Marquis	394	12	18⅔	17¼	Weaker	10
Palmer	398	Marquis	372	12	27	28	Weaker	10
Yorkton District (21)—								
Barbour	399	Ruby	20	1½	28	34	Stronger	0
Beaverdale	400	Marquis	215	2½	20	23	Weaker	12
Calder	401	Ruby	120	1½	16½	32	Same	0
"	401	Marquis	38	1¾	37	40	Weaker	9
Donwell	402	Marquis	100	¾	15½	15	Stronger	14
Hubbard	403	Kota	106	4	18	20	Stronger	7
Kamsack	404	Marquis	120	¾	24	35	Weaker	8
Mikado	405	Huron	190	7½	24	28	Stronger	9
Orcadia	406	Marquis	68	4	24	49¼	Same	11
Rhein	407	Marquis	93	2	25	22½	Same	16
Rokeby	408	Marquis	90	2¼	20	15	Same	11
Runnymeade	409	Marquis	54	¾	20	28	Same	9
Springside	406	Marquis	90	1½	20	25	Weaker	10
"	410	Marquis	80	4	23	28	Weaker	8
Stornoway	411	Marquis	90	1½	15	36	Same	11
"	412	Marquis	44	4	31¼	22½	Same	10
"	412	Marquis	16	4	21	22	Same	10
"	413	Marquis	73	5	25	30	Same	10
Theodore	414	Marquis	54	2	28	31	Same	10
Togo	401	Ruby	38	3	21	38	Stronger	0
"	401	Ruby	20	1	14	14	Same	0
"	415	Ruby	90	8	20	17	Same	0
"	415	Ruby	160	3	19	33	Stronger	3
Veregin	405	Marquis	12	1¼	36	40	Stronger	12
"	405	Marquis	45	3½	33	28	Same	5
"	416	Marquis	50	1	30	27	Stronger	10
Willow Brook	417	Marquis	40	1¼	12	20	Weaker	7

ACREAGE AND AVERAGE YIELDS IN SASKATCHEWAN

Electoral Districts	Number of Tests	Garnet		Marquis	
		Acres	Average Yield	Acres	Average Yield
Assiniboia	29	146½	32·7	3,870	28·7
Humboldt	39	138¼	35·0	4,438	26·4
Kindersley	13	44½	16·2	3,048	18·2
Last Mountain	34	107	25·7	3,311	19·6
Long Lake	24	79¼	16·1	4,207	14·9
MacKenzie	19	35¾	34·3	863	30·0
Maple Creek	19	57¾	24·3	3,651	18·1
Melfort	68	485½	29·4	5,306	23·8
Melville	14	45	24·7	1,076	24·1
Moose Jaw	6	17½	30·4	3,185	24·6
North Battleford	24	98¾	28·9	2,157	22·8
Prince Albert	32	136	27·8	2,442	24·3
Qu'Appelle	23	81	30·9	3,203	28·4
Rosetown	11	41¾	22·0	1,929	20·5
Saskatoon	5	12¾	20·2	1,450	20·8
South Battleford	22	67¼	24·7	2,585	22·5
Swift Current	8	25¾	11·9	1,900	17·3
Weyburn	14	39	29·3	3,299	32·2
Willow Bunch	9	47	24·8	1,784	33·1
Yorkton	19	43¾	28·6	1,372	22·5
Total	432	1,750	27·8	55,076	23·2

GARNET AND RUBY—ACREAGE AND AVERAGE YIELDS IN SASKATCHEWAN

Electoral Districts	Number of Tests	Garnet		Ruby	
		Acres	Average Yield	Acres	Average Yields
Humboldt	3	5	31·4	100	18·4
Mackenzie	9	34⅛	32·5	503	21·9
Maple Creek	2	3½	17·9	115	13·5
Melfort	4	12	29·0	260	20·7
Melville	2	7½	27·8	184½	23·2
North Battleford	11	24	31·5	440	18·9
Prince Albert	2	6¼	21·2	42¾	16·6
Yorkton	6	18	24·4	448	18·9
Total	39	110⅜	29·1	2,093¼	19·9

SUMMARY OF RESULTS ON ORDINARY FARMS—ALBERTA

Post Office	Key No.	Main crop	Acres of		Yield per acre		Comparison of Garnet and main crop	
			Main crop	Garnet	Main crop	Garnet	Garnet—stronger or weaker	Garnet—days earlier
Acadia District (1)—								
Big Valley	1	Marquis	215	3¾	35	36	Same	10
Delia	2	Marquis	175	2	8	11	Same	9
Excel	3	Marquis	114	5	8	8	Same	20
Morin	4	Marquis	150	2	40	38	Same	10
Morin	5	Marquis	60	2	35	25	Weaker	20
Oyen	6	Red Fife	110	2	6	7	Same	15
Vandyne	7	Marquis	75	3½	13	10	Weaker	10

SUMMARY OF RESULTS ON ORDINARY FARMS—ALBERTA—*Continued*

Post Office	Key No.	Main crop	Acres of		Yield per acre		Comparison of Garnet and main crop	
			Main crop	Garnet	Main crop	Garnet	Garnet—stronger or weaker	Garnet—days earlier
Athabaska District (2)—								
Abee	8	Marquis	6½	2½	10	22	Same	12
"	8	Marquis	7	1	12	20½	Same	0
Athabaska	9	Marquis	53	2	35	40	Weaker	9
"	10	Marquis	56	2	.....	45	Weaker	7
"	9	Marquis	20	1	22	34	Weaker	11
"	11	Preston	50	1	18	31	Same	15
"	12	Preston	60	1	18	26	Same	14
"	12	Ruby	130	10	30	55	Same	0
Ashmont	13	Marquis	40	1	11	19	Same	10
"	14	Marquis	15	¾	17	10	Weaker	12
Boyle	15	Marquis	46	4	18	28	Weaker	10
"	16	Marquis	37	2½	31	32	Weaker	9
Bon Accord	17	Red Bobs No. 222	80	4	61	60	Weaker	3
"	17	"	60	4	30–58	60	Weaker	3
"	17	Red Bobs	310	10	40	53	Same	5
Boyne Lake	18	Red Bobs	20	½	20	30	Same	5
Brosseau	19	E. Triumph	120	3	16	15	Same	7
Charron	20	Marquis	2½	¾	40	41	Weaker	10
Clyde	48	Marquis	47	1	22	37	Weaker	10
"	49	Red Bobs	25	1	14	15	Same	6
Craigend	21	Marquis	15¾	2	11	12½	Stronger	14
Elk Point	22	Red Fife	34	2	5	14	Stronger	
"	23	Marquis	20	½	5	6	Stronger	
Egremont	24	Marquis	13½	2	12	17½	.....	12
Ferguson Flats	25	Marquis	20½	2½	18	30	Same	10
Flat Lake	26	Marquis	30	7/8	26	28	Same	10
Gibbons	27	Marquis	35	3	11½	20	Same	8
"	17	Marquis	130	3¼	40	47	Same	8
Grandin	28	Marquis	14	1	12	14	Same	0
Grosmont	29	Red Fife	60	3	27	35	Weaker	7
Lafond	30	Ruby	69	1	15	25	Weaker	0
"	30	Ruby	60	1	16	16	Stronger	0
Meanook	31	Kitchener	25	4	16	25	Weaker	9
Owlseye Lake	32	Huron	69	1	25	33	Stronger	10
"	33	Marquis	12	¾	9	7	Same	6
"	32	Huron	70	4	18	27	Same	12
Radway Centre	34	Marquis	22	1	16	30	Same	8
"	35	Ruby	3	3	6	12	Stronger	0
"	35	Ruby	10	1	27	22	Same	0
Redwater	36	Marquis	79	2	31	37	Stronger	12
Rochester	37	Red Bobs	26	1	18	20	Same	6
"	38	Red Bobs	55	1	25	25	Same	6
"	39	Marquis	80	¾	18	23	Same	10
St. Paul de Metis	40	Marquis	30	1	.....	20	Weaker	9
"	30	Preston	90	¾	20	38	Weaker	.....
"	32	Marquis	120	1	10	12	Weaker	8
St. Vincent	41	Marquis	85	4	17½	26	Same	7
Sarrail	42	Marquis	35	3	35	41	Weaker	12
Sugden	43	Marquis	8	1	23	21	Same	7
Thorhild	36	Ruby	45	2	23	25	Stronger	0
"	36	Ruby	34	1½	18	25	Stronger	4
Warspite	44	Marquis	33	1	3½	11	Weaker	4
Waskatenau	45	Ruby	4	1¾	8	25	Stronger	0
"	46	Marquis	29	1	18	22	Weaker	8
Vilna	47	Preston	24	¾	20	16	Same	8
Battle River District (3)—								
Blackfoot	50	Ruby	35	1⅔	28½	30	Same	0
"	51	Marquis	106	2	29½	34	Stronger	7
Cadogan	52	Marquis	90	4	15	18	Same	8
"	53	Marquis	56½	3½	21	19	Weaker	12
Chauvin	54	Marquis	400	3	36	35	Same	10
"	55	Marquis	113	1	25	20	Weaker	10
Connolly	56	Marquis	80	3	28	35	Weaker	8
"	56	Marquis	60	3	28	34	Weaker	7
Dewberry	57	Marquis	80	¾	23	14	Weaker	0
Edgerton	58	Marquis	68	2	20	19	Weaker	7
Fabyan	59	Marquis	50	1	40½	48	Weaker	10

SUMMARY OF RESULTS ON ORDINARY FARMS—ALBERTA—*Continued*

Post Office	Key No.	Main crop	Acres of		Yield per acre		Comparison of Garnet and main crop	
			Main crop	Garnet	Main crop	Garnet	Garnet—stronger or weaker	Garnet—days earlier
Battle River District (3)								
Hardistry	60	Marquis	125	5	24¼	28½	Stronger	11
"	61	Marquis	55	2½	25	28		3
"	62	Marquis	80	3½	18	28½	Weaker	10
Irma	63	Supreme	80	2	35	35	Weaker	3
"	64	Marquis	95	2	25	30	Stronger	14
Islay	65	E. Triumph	50	7¼	35	43	Weaker	6
"	66	Red Fife	29	1	30	33		11
"	67	Marquis	37	1⅛	32	42	Same	10
"	68	Marquis	74	1	33	40	Weaker	6
Kitscoty	69	Red Bobs No. 222	19	2	42	35½	Stronger	6
"	70	Marquis	122	2	32¾	32½	Weaker	10
"	71	Marquis	120	4	28	36	Stronger	8
Leighton	72	Marquis	45¾	1¼	18	20	Same	10
Mannville	73	Red Bobs	74	1	37	34	Weaker	6
Minburn	74	Marquis	57	1	20	27	Same	10
Provost	75	Marquis	168	2	19	19	Weaker	7
"	76	Marquis	140	4	21	22½	Weaker	10
"	77	Marquis	190	3½	19	19	Same	12
Riverton	78	Marquis	120	4	20	30	Weaker	10
"	78	Marquis	340	4	11	16	Weaker	10
Rising Sun	79	Marquis	67	1	26	20	Same	10
Tring	57	Marquis	58	2	.....	40	Same	14
Vermilion	80	Marquis	65	1	16	20	Same	.....
"	81	Marquis	75	1	25	30	Weaker	8
"	82	Marquis	38	1	19	30	Stronger	5
"	80	Ruby	30	1	20	30	Same	10
Wellsdale	83	Marquis	40	1	18	38	Same	15
Bow River District (4)—								
Acme	84	E. Triumph	93	2	35	32	Weaker	12
"	85	Marquis	420	3¾	25	25	Same	12
Champion	86	Marquis	300	2	22–30	40	Weaker	14
Delacour	87	Marquis	220	4	28	27	Weaker	6
Irricana	88	Marquis	956	4	20	22½	Weaker	8
Milo	89	Marquis	150	2	30	21	Same	12
Camrose District (7)—								
Alliance	90	Kitchener	108	2	25	30	Same	11
Botha	91	E. Triumph	280	2	20	14	Stronger	10
"	92	Red Bobs	262	3½	42½	14	Weaker	5
Camrose	93	Marquis	145	1	28	39	Same	10
"	94	Marquis	33	1½	27	40	Same	18
"	95	Marquis	90	1	20	49½	Same	8
Castor	96	Marquis	140	3¾	18	26	Same	8
"	96	Marquis	95	4	4	6	Weaker	12
Daysland	97	Marquis	197	3	39	33	Weaker	10
"	98	Marquis	70	1	25	25	Weaker	10
Duhamel	99	Marquis	25	1½	31	40	Weaker	10
"	99	Red Bobs	45	1	25	25	Stronger	11
Edberg	100	Red Fife	4	4	30	21	Weaker	12
Foreman	101	Marquis	160	4	31	30	Weaker	10
Forestburg	102	Marquis	385	4½	44	46	Same	7
Kelsey	103	Marquis	175	5	33	38	Same	15
Kinsella	104	Marquis	52	4	.....	30	Same	8
"	105	Ruby	120	4	25	35	Stronger	0
Killam	106	Kitchener	50	¾	19	17		14
"	107	Red Bobs	140	1	40	33	Weaker	5
"	108	Marquis	50	5	20	20	Same	10
Lougheed	109	Red Bobs	216	4	27	33		21
"	110	"	70	1	25	30	Weaker	10
"	111	Marquis	262	2	24	35	Same	10
Meeting Creek	112	Marquis	26	1½	21½	33½	Same	14
"	113	Marquis	152	30	30	42½	Stronger	20
Mirror	114	Ruby	53	2	34	23	Stronger	0
"	115	Ruby	120	4	32	27½	Stronger	0
Nevis	116	Ruby	96	4¼	20	35	Stronger	0
Ohaton	117	Red Fife	155	5	33	40	Same	16
"	117	Marquis	160	2	25	25	Weaker	10
"	118	Marquis	66	½	.....	40	Weaker	5

SUMMARY OF RESULTS ON ORDINARY FARMS—ALBERTA—*Continued*

Post Office	Key No.	Main crop	Acres of		Yield per acre		Comparison of Garnet and main crop	
			Main crop	Garnet	Main crop	Garnet	Garnet—stronger or weaker	Garnet—days earlier
Camrose District (7)								
Round Hill	95	Marquis	8	1 1/16	36	49	Weaker	5
Rosalind	119	Marquis	95	4 1/2	25	38	Same	11
Sedgwick	110	Marquis	240	4	27	34	Weaker	10
"	120	Red Fife	118	2	36	40	Same	10
Stettler	121	Marquis	290	4	30	38	Same	14
Strome	122	Red Fife	138	1 3/4	39 1/2	40	Same	13
Viking	123	Marquis	47	3	25	30	Same	10
"	124	Marquis	90	1	18	22	Stronger	0
Edmonton East and West Districts (8-9)								
Alcomdale	125	Marquis	35	1	15	15	Same	10
"	125	Club	24	1 1/2	21	15	Weaker	10
Casavant	126	Marquis	110	1 1/2	31	50	Weaker	10
Graminia	127	Red Fife	24	1	18	21	Same	7
Holborn	128	Marquis	23	1	30	34	Same	10
Legal	129	Marquis	20	3/4	37	35	Weaker	10
Lunnford	130	Red Bobs	24	3	22	33	Stronger	.....
Morinville	131	Red Bobs	194	2 1/2	30	28	Weaker	10
Namao	132	Marquis	120	4 1/2	38	55	Same	10
N. Edmonton	133	Marquis	97	1	30	35	Stronger	2
Onoway	134	E. Red. Fife	17	1	23	45	Weaker	12
"	134	Early Red Fife.	18	1	23 1/2	45	Same	20
"	135	Marquis	27	1	17	25	Same	10
Picardville	136	Marquis	42	1	30	35	Same	.....
Lethbridge District (10)								
Cardston	137	Marquis	35	1	30	20	Weaker	12
"	137	E. Triumph	71	2	29	20	Weaker	14
Delbonita	138	Renfrew	90	4	33	26	.....	12
Raymond	139	Marquis	2 1/2	1 1/2	25 1/4	25 1/4	Weaker	9
Pinard	140	Marquis	50	4	25	23	Weaker	5
Spring Coulee	141	E. Triumph	4 1/2	3 1/2	28	26	Weaker	0
Macleod District (11)								
Black Diamond	142	Ruby	20	1 1/2	25	27	Same	0
Brant	143	Red Bobs	280	3	37	30	Stronger	6
Cowley	145	Marquis	3	1 1/2	11	6 1/2	.....	9
Claresholm	146	Marquis	147	3	13	32	Weaker	8
Fishburn	147	Marquis	55	2	32	25	Same	10
"	147	Marquis	40	2	35	25	Weaker	10
High River	148	Marquis	160	4	25	27	Weaker	8
Indus	149	Red Bobs	120	5	20	24	Weaker	7
"	149	Red Bobs	500	1 1/3	30	37	Weaker	0
Mazeppa	150	Marquis	210	4	27	27	Weaker	12
"	150	Marquis	130	4	24	25	Weaker	18
"	150	Marquis	60	3 1/2	19	25	Weaker	10
Nanton	151	Marquis	216	4	48	42	Same	8
"	152	Marquis	100	3 1/2	27	22	Same	3
"	153	Marquis	360	4	45	30	Weaker	8
"	153	Marquis	350	5	24	30	Weaker	10
Okotoks	154	Marquis	60	2	39	32	Weaker	10
"	155	Marquis	35	3 1/2	30	37	Weaker	12
"	156	Marquis	14	2	15	45	Weaker	.....
Pincher Creek	157	Marquis	35	1 3/4	20	16	Weaker	15
Shepard	149	Marquis	190	3 1/2	25	27	Weaker	6
Springridge	158	Marquis	40	4	33	27 1/2	Weaker	10
Medicine Hat District (12)								
Avalon	159	Marquis	40	4	12	12	Same	11
Bow Island	160	Marquis	390	10	10	14	Weaker	11
Etzikom	161	Marquis	140	1 1/2	10	9 1/2	Weaker	3
Foremost	162	Marquis	135	5	10 1/2	10	Same	10
Millicent	163	Marquis	150	1 1/2	.....	35	Same	11
Walsh	164	Supreme	162	4 3/4	27	24 1/2	Weaker	9
"	165	Kota	25	9 1/2	25	31	Stronger	10

SUMMARY OF RESULTS ON ORDINARY FARMS—ALBERTA—*Continued*

Post Office	Key No.	Main crop	Acres of		Yield per acre		Comparison of Garnet and main crop	
			Main crop	Garnet	Main crop	Garnet	Garnet—stronger or weaker	Garnet—days earlier
Peace River District (13)								
Beaverlodge	166	Red Bobs	12	½	37½	25	Weaker	7
Berwyn	167	Marquis	140	2	40	37	Same	6
Bluesky	168	Marquis	27	2	20	18½	Weaker	14
Brownvale	169	Marquis	215	2	15	20	Stronger	7
Buffalo Lake	170	Ruby	65	5	25	40	Same	0
"	170	Marquis	56	4	22	22½	Same	0
"	171	Marquis	31	1	35	26	Same	12
Blueberry Mountain	172	Marquis	40	1	30	30	Same	8
" "	173	Marquis	60	1	25	28	Weaker	10
Clairmont	174	Huron	90½	1½	36	24½	Same	9
"	175	Marquis	152	1½	35	30	Stronger	11
"	174	Marquis	100	2½	25	28	Same	8
"	176	Marquis	86	¾	28	35	Stronger	7
Dapp	177	Red Bobs No. 222.	24	1¼	44½	42	Weaker	7
Duffield	178	Kitchener	35	1	30	15	Same	12
Fawcett	179	Marquis	5	1	17	21	Stronger	10
Friedenstal	180	Marquis	140	4	25	24	Same	7
"	180	Marquis	200	4	24	24	Same	10
Grande Prairie	181	Marquis	80	2	44	40	Weaker	7
"	176	Marquis	88	4	36	32	Weaker	7
"	175	Ruby	250	3	20	20	Same	0
"	181	Kitchener	50	1	35	25	Weaker	18
"	182	Ruby	130	2	27	30	Stronger	0
Grimshaw	183	Marquis	210	1¾	21	25	Same	12
Hattonford	184	Red Bobs	3	1	30	35	Weaker	20
Hazel Bluff	185	Kitchener	18	2	.....	20	Weaker	20
High Prairie	186	Marquis	.....	3½	.....	55	Stronger	.....
Hythe	187	Marquis	50	2	28	40	Weaker	0
"	187	Huron	30	1	43½	30	.....	7
Keephills	188	Marquis	15	1	20	18	Weaker	10
La Glace	189	Marquis	85	1½	40	40	Same	8
Last Lake	190	Red Bobs	60	2	18	26	Weaker	10
"	190	Ruby	40	1⅓	21	32	Stronger	0
"	190	Ruby	11	3½	14	12	Same	0
Linaria	191	Marquis	12	½	14	32	Same	10
Mellowdale	192	Preston	51	½	26	37½	Weaker	6
Nampa	193	Marquis	20	2	8	8	Same	11
Pibroch	194	Red Bobs	62	1	34	25	Same	4
"	194	Red Bobs	111	4	34	55	Same	7
Prestville	195	Marquis	60	1	30	30	Same	3
Peace River	196	Marquis	.....	1	.....	40	Stronger	.....
Rochfort Bridge	198	Marquis	51	4	40¼	48½	Weaker	10
"	199	Huron	28	4	36	45	Stronger	.....
"	199	Ruby	19	3	31	52	Stronger	0
Roycroft	200	Marquis	150	2	35	32½	Same	7
Rio Grande	201	Marquis	33	1⅓	44	47	Weaker	11
"	202	Marquis	60	1¾	50	51	Weaker	15
Sexsmith	203	Red Bobs No. 222.	1¾	4	46	40	Same	7
"	176	Marquis	40	2	20	25	Stronger	8
"	171	Marquis	135	1¾	29	30	Weaker	8
"	176	Marquis	70	1	27	30	Same	.....
"	204	Ruby	30	⅞	30	20	Same	0
"	205	Marquis	92	1	34½	33½	Same	10
Vanrena	206	Marquis	28	4	12	6½	Weaker	10
Wembley	207	Marquis	100	¾	33	44	Weaker	12
Westlock	185	Red Bobs	20	1	11	18	Same	11
"	208	Marquis	72	4¾	40	38½	Same	10
Whitelaw	209	Ruby	40	2	14	7½	Stronger	0
"	168	Ruby	27	3	13	18	Same	6 later
Red Deer District (14)								
Blackfalds	210	E. Triumph	40	1¾	40	35	Weaker	0
"	211	Ruby	30	4	29	38	Weaker	0
"	211	Ruby	130	4	30½	41	Weaker	0
Bowden	212	Marquis	71	6	42	51	Weaker	10
"	213	Marquis	52	2	33	45	Weaker	8
"	214	Red Bobs	22	1½	34	51	Weaker	10

SUMMARY OF RESULTS ON ORDINARY FARMS—ALBERTA—*Continued*

Post Office	Key No.	Main crop	Acres of		Yield per acre		Comparison of Garnet and main crop	
			Main crop	Garnet	Main crop	Garnet	Garnet—stronger or weaker	Garnet—days earlier
Red Leer District (14)								
Delbourne	215	Marquis	90	4½	32	37	Weaker	7
Didsbury	216	Ruby	30	3	30	38	Same	0
"	216	Marquis	50	1½	38	51	Weaker	7
"	216	Ruby	140	3⅓	32	39	Weaker	4 later
"	216	Ruby	138	1½	38	50	Weaker	6
"	217	Ruby	80	1½	27	45	Weaker	6
"	218	Ruby	100	4	30	37½	Weaker	0
Eagle Hill	219	Marquis	15	2	15	25	Same	7
Evarts	220	Ruby	100	4	24	42	Stronger	0
Elnora	221	Marquis	65	2	23	35	Same	9
Gilby	222	Red Fife	200	2	12	14½	Same	10
"	223	Ruby	60	2	40	52½	Same	0
Harmatton	224	Marquis	30	2½	15	24	Weaker	15
"	225	Ruby	86	8	35	31	Weaker	0
Hespero	226	Ruby	73	2	25	35	Stronger	0
Huxley	227	E. Triumph	85½	4½	40	25	Same	0
"	228	Marquis	71	2	25	34	Same	10
Innisfail	229	Ruby	100	3½	20	17	Same	0
"	230	Marquis	8	2	25	35	Same	10
"	231	Marquis	235	4	38	37	Weaker	7
"	229	Marquis	45	2	30	32	Same	14
"	232	Marquis	193	7	35	37½	Same	5
"	232	Marquis	956	4	20	22½	Weaker	8
Knee Hill Valley	233	Marquis	40	4	20	42½	Same	10
" "	234	Ruby	50	4	20	30	Same	0
Leslieville	235	Marquis	20	3	21¼	28	Same	10
"	235	Ruby	10¾	2	26	29	Same	0
"	236	E. Triumph	8	3	36	38	Weaker	5
Lousana	237	Marquis	57	1½	35	30	Weaker	8
Markerville	238	Ruby	96	4½	20	35	Stronger	0
Mayton	239	Ruby	10½	1½	10	16	Same	0
"	240	Marquis	60	4	28	26	Same	3
Olds	241	Ruby	85	3	30	51	Same	0
"	242	Marquis	66	4½	44	45	Stronger	10
"	242	Marquis	99	1½	25	57	Weaker	8
"	243	Marquis	58	2	33	51	Weaker	10
"	243	Red Bobs	125	4	40	49	Weaker	8
"	242	Marquis	60	3½	45	51	Weaker	10
Penhold	244	Red Bobs	38	2	30	27	Same	10
Red Deer	245	Ruby	40	8	28½	54¼	Same	4
"	246	Ruby	177	3¼	40	27	Same	0
"	211	Marquis	70	6	28	31	Weaker	10
Sundre	247	Marquis	40	1½	33	45	Weaker	12
Sunnyslope	248	Marquis	65	2	24	30	Weaker	7
Vegreville District (15)—								
Chipman	249	Marquis	29	1	37	40	Same	7
"	250	Red Bobs	95	4	4	6	Weaker	12
Fort Saskatchewan	251	Marquis	24	2⅓	35	38	Same	10
"	252	Red Bobs	38	2½	30	36		10
"	253	Marquis	46	2	49	44	Weaker	10
"	253	Red Bobs	80	3	30	32	Same	14
Holden	254	Marquis	21	1¼	40	43	Stronger	10
Lamont	255	Marquis	60	1	15	26	Same	8
"	255	Marquis	114	2½	10	15	Same	7
"	255	Marquis	80	1	20	26	Same	6
Lavoy	256	Marquis	50	1	15	10	Stronger	9
Mundare	257	Marquis	56	1⅓		42	Same	14
Peno	258	Red Fife	49	2¾	18½	30		5
Ranfurly	259	Marquis	19	¾	16	12	Weaker	14
Ryley	260	Marquis	100	4	23	22	Weaker	9
Skaro	258	Kota	50	2	30	41	Stronger	6
Tofield	261	Ruby	53	47	18	30	Same	0
"	262	Marquis	60	1	39	30	Weaker	10
Vegreville	263	Early Red Fife	85	¾	20	25	Same	10
"	264	Marquis	50	1	11	21	Weaker	10
"	265	Red Fife	30	1	16	31	Weaker	12

SUMMARY OF RESULTS ON ORDINARY FARMS—ALBERTA—*Concluded*

Post Office	Key No.	Main crop	Acres of		Yield per acre		Comparison of Garnet and main crop	
			Main crop	Garnet	Main crop	Garnet	Garnet—stronger or weaker	Garnet—days earlier
Wetaskiwin District (16)—								
Ardrossan	266	Marquis	30	4	30	32½	Same	10
Bentley	267	Ruby	160	3½	25	35	Same	0
"	267	Ruby	30	2	25	50	Same	0
Bittern Lake	268	Marquis	50	5	48	42	Stronger	12
"	268	Red Bobs	150	5	42	41	Same	7
"	269	Red Bobs	90	1	20	26	Weaker	10
Beaumont	270	Ruby	52	3	25	30	Same	7
Clive	271	Ruby	65	3½	35	45	Same	5
"	271	Ruby	60	4	35	53	Stronger	6
Conjuring Creek	272	Red Bobs	60	1	15–35	40	Stronger	0
Genesee	273	Marquis	13½	1	21½	24½	Same	6
Lacombe	271	Ruby	150	3	37	27	Same	0
"	274	Marquis	43	3	31	41	Same	11
"	275	Marquis	38	3	29	37	Same	12
"	276	Ruby	50	1½	24	27	Same	0
Leedale	222	Ruby	40	2	20	30	Same	4
"	222	Ruby	12	1½	34½	40	Same	2 later
Leduc	277	Marquis	148	2	35	38		15
"	277	Marquis	50	1¾	50	46	Same	10
"	277	Marquis	50	4	30	47	Weaker	12
Millet	278	Marquis	49½	1	20	34¾		12
"	279	Marquis	22	4	30	27½	Same	7
Morningside	274	Huron		2	43	38	Same	0
Ponoka	280	Marquis	84¼	3¼	23	16¾	Weaker	6
"	281	Marquis	30	3⅓	20½	42	Weaker	10
"	281	Kitchener	64	4	33	44	Same	14
"	282	Marquis	75	⅝	22½	49	Weaker	9
Rimbey	283	Ruby	20	4	25	35	Stronger	1 later
"	284	Ruby	310	10⅜	25	62	Stronger	3 later
"	284	Marquis	60	2¼	27	40	Weaker	20
Wetaskiwin	285	Red Bobs	36	3½	36	42	Same	7
"	286	Marquis	65	2½	33	30	Weaker	2
"	287	Marquis	96	2½	30	33	Weaker	8
"	286	Marquis	40	2	30	28	Weaker	6
"	286	Marquis	37	3¼	35	50	Weaker	9

ACREAGE AND AVERAGE YIELDS IN ALBERTA

Electoral Districts	Number of tests	Garnet		Marquis	
		Acres	Average Yield	Acres	Average Yield
Acadia	6	18¼	19·6	789	24·0
Athabasca	28	47	30·0	1,055¾	21·5
Battle River	30	69	27·2	3,157	23·8
Bow River	5	15¾	26·4	2,046	23·5
Camrose	22	88½	35·7	2,935	28·8
Edmonton East and West	8	11¾	41·9	474	30·7
Lethbridge	3	6½	23·1	87½	27·0
Macleod	18	57¼	28·7	2,205	30·4
Medicine Hat	5	20½	12·3	705	10·2
Peace River	33	68	28·3	2,703	29·4
Red Deer	24	75	37·4	2,516	27·5
Vegreville	12	18⅔	31·8	653	22·8
Wetaskiwin	18	48	37·0	981	30·3
Total	212	543⅔	31·0	20,307¼	26·3

GARNET AND RUBY—ACREAGE AND AVERAGE YIELDS IN ALBERTA

Electoral Districts	Number of tests	Garnet		Ruby	
		Acres	Yield	Acres	Yield
Athabasca	8	21¼	36·7	355	22·1
Battle River	2	2⅔	30·0	65	24·6
Camrose	4	14¼	31·2	389	27·2
Macleod	1	1½	27·0	20	25·0
Peace River	9	23⅔	28·5	612	22·1
Red Deer	19	66¾	38·8	1,536¼	30·2
Vegreville	1	47·0	30·0	53	18·0
Wetaskiwin	11	38·4	44·5	949	28·1
Total	55	215½	35·8	3,979¼	25·7

PRECIPITATION AT VARIOUS POINTS IN MANITOBA IN INCHES OF RAINFALL*

Post Offices	Tp. R.M.	Oct. 1, 1925, to Mar. 31, 1926	April and May, 1926	June and July, 1926	Aug., Sept., Oct., 1926	Total Oct. 1, 1925, to Oct. 31, 1926
Berens River	39– 3–1E	6·94	1·57	2·96	8·40	19·87
Birtle	17–26–1	2·88	1·40	3·91	8·94	17·13
Brandon	10–19–1	2·58	1·43	4·97	10·11	19·09
Cypress River	7–12–1	.....	2·20	4·66	9·53	.....
Dauphin	25–19–1	3·17	0·78	2·64	8·31	14·90
Graysville	6– 6–1	2·74	1·37	6·57	6·57	17·25
Le Pas	56–27–1	3·89	1·73	3·81	3·49	12·92
Minnedosa	15–18–1	2·45	1·35	3·78	9·10	16·68
Moose Horn Bay	26– 7–1	5·41	1·17	2·07	7·28	15·93
Morden	4– 5–1	6·77	1·92	6·95	8·31	23·95
Morris	4– 1–1E	2·02	0·82	5·54	7·81	16·19
Ninette	5–17–1	4·23	1·42	6·37	5·77	17·79
Oakbank	11– 5–1E	5·43	1·34	4·50	9·82	21·09
Pierson	3–29–1	.....	3·05	6·05	7·90	.....
Pinawa	14–12–1E	3·91	0·65	2·87	6·19	13·62
Portage la Prairie	.....	.....	.....	4·53	10·32	.....
Rapid City	13–19–1	4·62	1·53	2·64	10·71	19·50
Russell	21–28–1	.....	2·13	4·63	8·78	.....
Souris	7–21–1	4·14	1·72	5·47	7·60	18·93
Swan Lake	5–10–1	4·05	1·22	5·84	9·12	20·23
Swan River	36–26–1	.....	1·26	1·53	5·91	.....
Treesbank	8–16–1	4·36	5·45	8·25	9·00	27·06
Treherne	8–10–1	4·99	2·66	6·34	12·48	26·47
Virden	10–26–1	.....	.....	5·73	7·43	.....
Warren	13– 1–1	4·97	0·82	5·63	10·96	22·38
Waskada	2–25–1	3·27	2·22	7·07	7·22	19·78
Winnipeg	.....	3·84	0·99	5·24	9·80	19·87

*Data kindly supplied by the Meteorological Service of Canada, Department of Marine and Fisheries, Toronto, Ont., Sir Frederick Stupart, Director.

PRECIPITATION AT VARIOUS POINTS IN SASKATCHEWAN IN INCHES OF RAINFALL*

Post Office	Tp. R. M.	Oct. 1, 1925, to Mar. 31, 1926	April and May, 1926	June and July, 1926	Aug., Sept., Oct., 1926	Total, Oct. 1, 1925, to Oct. 31, 1926
Aneroid	9–10–3W	.....	2·23	4·75	3·76	.....
Assiniboia	8–30–2W	.....	2·40	5·84	4·06	.....
Battleford	43–16–3W	2·13	3·66	1·54	3·73	11·06
Beechy	22–10–3W	.....	2·73	1·89	2·23	.....
Biggar	35–14–3W	.....	3·07	2·38	3·79	.....
Carlyle	8– 2–2W	3·77	2·96	5·94	6·47	19·14
Caron	17–29–2W	.....	.....	1·91	3·17	.....
Ceylon	6–20–2W	4·96	3·32	5·75	7·07	21·10
Coulee	7–29–3W	5·32	2·39	4·77	4·60	17·08
Craik	24–28–2W	.....	4·31	2·00	3·50	.....
Davidson	26–29–2W	2·83	4·82	2·40	4·16	14·21
Drinkwater	15–23–2W	1·87	3·40	2·92	3·63	11·82
Fort Qu'Appelle	21–13–2W	4·18	4·62	2·55	5·04	16·39
Francis	13–14–2W	3·63	2·85	5·04	6·03	17·55
Girvin	25–29–2W	3·80	4·51	1·73	3·62	13·66
Hubbard	35–10–2W	3·74	4·28	1·80	6·35	16·17
Humboldt	37–22–2W	.....	3·68	1·60	2·80	.....
Illerbrun	11–18–3W	2·12	1·10	2·86	4·95	11·03
Imperial	27–25–2W	.....	5·02	1·63	5·55	.....
Indian Head	18–13–2W	3·89	4·41	3·24	5·99	17·53
Kamsack	29–32–W.P.	3·25	2·14	3·24	8·00	16·63
Leitchville	9–19–3W	3·35	0·98	1·76	2·89	8·98
Lestock	27–14–2W	4·25	2·46	3·25	4·77	14·73
Lost River	49–16–2W	2·60	4·87	1·87	8·47	17·81
Lumsden	19–21–2W	.....	3·00	2·40	3·80	.....
Maple Creek	11–26–3W	3·15	1·15	2·53	2·88	9·71
Maskakee Springs	38–26–2W	2·22	8·33	4·75	6·45	21·75
Melfort	45–18–2W	3·16	4·65	2·66	7·23	17·70
Midale	5–11–2W	3·75	3·21	5·43	7·16	19·55
Moose Jaw	16–26–2W	2·93	2·72	3·25	5·09	13·99
Nokomis	29–22–2W	2·69	4·29	1·76	3·59	12·33
Outlook	29– 8–3W	3·97	2·20	1·71	1·91	9·79
Pennant	18–17–3W	.....	.....	3·10	2·91	.....
Pilger	40–23–2W	1·61	4·14	.....	5·28	.....
Prince Albert	48–26–2W	1·56	3·66	3·03	5·29	13·54
Qu'Appelle	18–14–2W	3·76	4·47	3·80	5·04	17·07
Quill Lake	36–16–2W	2·44	5·15	2·60	6·20	16·39
Regina	17–19–2W	3·77	3·74	3·71	5·47	16·69
Rosthern	42– 2–3W	2·74	4·50	1·27	3·66	12·17
St. Walberg	54–23–3W	3·95	4·00	1·60	3·87	13·42
Scott	39–20–3W	3·34	3·88	2·34	4·16	13·72
Semans	28–20–2W	2·30	5·00	.....	2·74	.....
Strasbourg	24–22–2W	3·86	4·87	3·53	5·81	18·07
Swift Current	15–14–3W	3·14	2·78	4·82	4·30	15·04
Turtleford	51–21–3W	3·67	3·77	3·40	.....	.....
Vidora	4–26–3W	.....	1·05	4·03	4·50	.....
Waseca	47–24–3W	4·16	3·14	2·24	4·52	14·06
Witchekan	52–11–3W	4·11	3·57	1·94	5·69	15·31
Yellow Grass	10–16–2W	3·93	2·65	6·67	6·15	19·40
Yorkton	26– 4–2W	.....	.....	4·13	6·26	.....

* Data kindly supplied by the Meteorological Service of Canada, Department of Marine and Fisheries, Toronto, Ont. Sir Frederick Stupart, Director.

PRECIPITATION AT VARIOUS POINTS IN ALBERTA IN INCHES OF RAINFALL*

Post Office	Tp. R. M.	Oct. 1, 1925, to Mar. 31, 1926	April and May, 1926	June and July, 1926	Aug., Sept., Oct., 1926	Total, Oct. 1, 1925, to Oct. 31, 1926
Alix	39–23–4W	5·85	3·36	4·65	7·48	21·34
Alliance	40–13–4W	6·16	2·47	5·09	.....	.....
Athabasca	.....	3·69	2·85	2·82	7·13	16·49
Beaverlodge	72–10–6W	7·40	1·96	6·51	3·21	19·09
Beaver Mines	6– 2–5W	7·65	2·30	4·41	8·48	22·84
Bittern Lake	46–21–4W	3·95	3·46	2·54	5·02	14·97
Calgary	24– 1–5W	3·94	1·52	5·72	11·77	22·95
Calmar	49–26–4W	6·06	5·35	3·21	9·70	24·32
Camrose	47–20–4W	.....	4·59	1·53	6·50	.....
Cardston	3–25–4W	5·64	1·19	.....	7·34	.....
Claresholm	12–27–4W	3·18	0·92	7·75	9·79	21·74
Cowley	7– 1–5W	5·26	1·89	3·82	8·43	19·40
Edmonton	52–24–4W	4·62	3·93	.....	7·00	.....
Fort Vermilion	R. Lot No 8	2·40	1·33	4·37	4·20	.....
Gadsby	38–17–4W	.....	2·72	6·20	5·82	.....
Gem	23–16–4W	2·69	0·94	2·42	3·09	9·14
Harmatton	32– 4–5W	4·03	0·91	5·83	14·64	25·41
Heldar	58– 7–5W	5·42	3·32	1·77	7·67	18·18
High River	19–29–4W	6·30	1·17	4·20	9·18	20·85
Hillsdown	38–25–4W	5·55	2·33	2·96	8·83	19·67
Hill Spring	4–27–4W	.....	0·65	5·04	7·77	
Lacombe	40–26–4W	6·69	3·83	4·08	10·81	26·01
Lethbridge	8–21–4W	2·97	0·98	5·82	7·24	17·01
Lloydminster	50–28–3W	.....	1·03	0·41	0·31	.....
Lundbreck	7–2 –5W	4·19	0·93	6·08	6·14	17·34
Lyndon	12–29–4W	4·25	.....	7·57	9·78	.....
Majorville	19–20–4W	3·57	1·14	4·30	5·38	14·39
Meanook	64–22–4W	5·03	3·67	2·23	9·05	19·98
Okotoks	20–29–4W	.....	1·10	5·79	10·60	.....
Olds	32–1 –5W	5·62	1·38	5·55	12·49	25·04
Patricia	20–13–4W	2·50	1·15	1·69	3·25	8·59
Peace River	.....	.....	2·20	5·75	2·70	.....
Pekisko	17– 2–5W	.....	1·18	5·80	12·81	.....
Perbeck	34–22–4W	3·15	.....	4·69	6·83	.....
Pincher Creek	6–30–4W	4·94	1·32	5·86	10·38	22·50
Ranfurly	51–12–4W	6·94	3·23	2·85	6·39	19·41
Raymond	6–20–4W	3·63	1·24	4·75	4·19	13·81
Red Deer	38–27–4W	6·06	3·72	3·97	11·35	25·10
Stettler	39–19–4W	5·10	3·46	6·76	5·74	21·06
Three Hills	31–24–4W	3·23	0·70	5·92	7·38	17·23
Twin Lakes	1–24–4W	2·68	0·46	2·26	7·00	.....
Vermilion	50– 6–4W	5·44	5·31	4·49	8·58	23·82
Wabasca	81– 1–5W	.....	2·69	5·31	5·97	.....
Wetaskiwin	46–24–4W	6·80	2·89	4·80	7·92	22·41

* Data kindly supplied by the Meteorological Service of Canada, Department of Marine and Fisheries, Toronto, Ont. Sir Frederick Stupart, Director.

ATTITUDE OF GARNET TOWARD STEM RUST

Investigations at the Dominion Rust Research Laboratory, Winnipeg, Man.

(By Dr. C. H. Goulden)

Garnet wheat has been under observation in the experimental field here for the seasons 1925 and 1926. The results obtained in comparison with those from ten other well known varieties in experimental work are given in table 1.

TABLE 1.—AVERAGE YIELD, DAYS TO MATURE AND STRENGTH OF STRAW, 1925 AND 1926

Name	Days to mature	Strength of straw*	Yield per Acre (bush.)
Reward	96	83·0	34·25 ±1·65
Marquillo	103	72·5	33·40 ±1·62
Garnet	96	63·5	32·70 ±1·60
Ceres	99	75·8	32·30 ±1·56
Quality	98	81·3	30·00 ±1·49
Marquis	101	70·5	29·60 ±1·50
Ruby	97	74·5	29·40 ±1·45
Renfrew	103	87·8	25·70 ±1·33
Kitchener	102	93·5	23·10 ±1·23
Red Bobs	101	89·5	22·75 ±1·21
Red Fife	106	82·3	20·75 ±1·05

*Strength of straw is given on a percentage basis.

In the table the yield data are not particularly significant as the two seasons were quite different in many respects. The seasons differed chiefly with respect to rust injury. In 1925 the later susceptible varieties were very severely damaged while in 1926 the effect of rust was scarcely noticeable. Thus in 1925 Garnet outyielded Marquis by 7.4. This was undoubtedly due to its earliness as it enabled it to escape severe rust injury. In 1926 Marquis gave a slightly higher yield than Garnet.

Extensive tests on the rust resistance of Garnet and a number of other varieties have been made at the Rust Laboratory. This work has been conducted by Dr. Margaret Newton and Mr. T. Johnson of the Plant Pathology staff, and they have reported as in tables 2 and 3 with comments below.

TABLE 2.—PERCENTAGE STEM RUST ON SEVEN WHEAT VARIETIES IN FIELD TESTS AT WINNIPEG, 1925 AND 1926*

Variety Tested	1925	1926
Garnet, R.L. 15 (Ottawa 652)	75	85
Marquis C.I. 6364	85	85
Ceres R.L. 127 (C.I. 6900)	75	75
Kota R.L. 221 (C.I. 5878)	60	70
Quality R.L. 133	70	85
Reward R.L. 79 (Ottawa 928)	90	80
Ruby R.L. 12 (Ottawa 623)	80	85

*This test was conducted under artificial epidemic conditions, consequently the percentage of rust is as high in 1926 as in 1925.

TABLE 3.—REACTION OF SEVEN SPRING WHEAT VARIETIES TO SEVEN PHYSIOLOGIC FORMS OF WHEAT STEM RUST

Varieties Tested	Host Reaction to Physiologic Forms No.:						
	21	29	30	32	34	36	†
Garnet R.L. 15 (Ott. 652)....	4+	4+	4 4+	.....	4− 4+	4+	4 4+
Marquis C.I. 6364.....	4	4−	4	4=	4−	4	2−
Ceres R.L. 127 (C.I. 6900)...	3+ 4−	2+ 3±	3− 4	3−	3± 4+	4 −4	2+ 3±
Kota R.L. 221 (C.I. 5878)....	3+ +	3	3+	3+	4=	3++	3
Quality R.L. 133.....	3+ 4	4− 4	3 4	4−	3+ 4	3+ 4−	1 3=
Reward R.L. 79 (Ott. 928)...	3+ 4	3+ 4	4− 4	4	3+ 4	4− 4	2 3
Ruby R.L. 12 (Ott. 623).....	4+	4+	4	4	4− 4+	4+	2+ 3

†This form appears to be a new one, but has not yet been given a number.

As will be seen from tables 1 and 2, only two of the wheats tested, Ceres and Kota, showed any real resistance in the field. Garnet, Marquis, Quality, Reward, and Ruby were entirely susceptible. In 1925 Garnet, owing to its early maturing qualities, was not as heavily rusted as was Marquis. This difference in amount of rust could not be attributed to difference in susceptibility of the two wheats, as under severe greenhouse tests (see table 3), Garnet was the only one of the seven wheats tested which showed no resistance to any of the seven physiologic forms used. A comparison of tables 2 and 3 indicates that there is a direct correlation between greenhouse and field results. In both these tests Ceres and Kota were the only varieties which showed any promise of rust resistance.

PART III—MILLING AND BAKING

MILLING AND BAKING QUALITIES OF WHEAT

In determining the value of a variety for the great wheat-growing areas of Western Canada, one of the most important considerations is that of quality.

Good quality in wheat may be defined briefly as the ability of the latter to produce a high yield of flour of good colour capable of absorbing a large quantity of water and producing the maximum number of "well-piled" loaves per barrel.

The quality of Canadian wheat has attained an enviable reputation on the world's markets chiefly on account of "the strength" of the flour which it produces and its consequent value for blending with "weaker" wheats. This reputation is due, to a great extent, to climate and soil, yet it owes much to the care which has been taken in encouraging the growth of varieties which are capable of producing the highest grades of flour. We cannot influence the climate, neither can we improve appreciably the character of the soil but we can safeguard our reputation by continuing to encourage the propagation of varieties which are capable of attaining the highest degree of development in different districts and which are known to possess high milling and baking qualities.

The relationship between "high development" in the wheat kernel and what we recognize as "high quality" is seldom appreciated as fully as it should be. Thus a variety which produces an excellent quality of flour under environmental conditions for which it is well adapted may produce a relatively poor quality under conditions inimical to its proper development. It is of the greatest importance, therefore, from a quality as well as from a yield standpoint, that varieties be grown which are most likely to attain the highest degree of development where grown.

The data in the foregoing pages give some indication as to the degree of development to which Garnet seems capable of reaching in a large number of fairly representative districts.

It now remains to be shown to what extent this variety is able to fulfill the requirements of a *high quality variety* in these districts. The data given in the following tables may not be sufficiently extensive to answer this question fully, but it is believed that they are of sufficient value to warrant their publication at this time.

Since Marquis is the most widely grown variety of wheat in Western Canada, and since it very largely sets the standard of quality, this variety largely has been used as a basis of comparison in connection with our investigations into the quality of Garnet.

MILLING AND BAKING TESTS OF GARNET GROWN ON EXPERIMENTAL FARMS AND STATIONS

In 1924 and 1925 samples of Garnet and Marquis chiefly grown on summer-fallow were collected from the Dominion Experimental Farms and Stations in the Prairie Provinces with a view to comparing their milling and baking qualities. Each sample consisted of 1,500 grammes or approximately 3¼ pounds of clean grain. The latter was tempered by adding enough water to bring the total moisture content up to 15 per cent, and allowing it to remain in glass jars in a warm room over night. The wheat was milled by an Allis-Chalmers Experimental Mill into a straight grade flour, but no special effort was made to obtain *total* flour yield. The baking test was made in duplicate on flour samples of 340 grammes each. The crude protein of the wheat and the absorption of the flour are corrected to 13½ per cent moisture content basis. The former as well as the weight per thousand kernels was determined by the Chemistry Division of the Central Experimental Farm. The following tables give the results of twenty-four comparable tests on the two varieties.

MILLING TESTS

Garnet compared with Marquis from crops grown on the Dominion Experimental Farms and Stations in 1924 and 1925.

Milling Number	Variety	Source	Probable Grade	Appearance	Weight per bushel	Weight per 1,000 kernels	Crude Protein	Flour extracted
					lb.	grammes	p.c.	p.c.
*24.19	Garnet	Brandon plot	1 N	Bright	62·5	29·91	12·5	66·2
23·23	Marquis	Brandon plot	1 N	Bright	61·6	35·83	12·5	70·2
24·54	Garnet	Morden plot	1 N	Bright	65·0	31·03	12·5	67·2
24·55	Marquis	Morden plot	1 N	Bright	64·0	36·09	12·6	70·5
*25·19	Garnet	Brandon plot	2 N	Dull	58·0	23·14	11·7	68·4
25·22	Marquis	Brandon plot	2 N	Dark to dull	60·0	27·68	12·2	68·1
25.37	Garnet	Morden plot	1 N	Bright	60·2	26·86	11·9	70·9
25·44	Marquis	Morden plot	1 N	Bright 10 p.c. piebald	60·0	29·20	13·5	66·7
25·1	Garnet	Brandon field	2 N	Bright, shrunken	59·0	22·74	12·1	71·3
25·2	Marquis	Brandon field	3 N	Bright, 50 p.c. piebald	62·0	29·79	10·1	67·3
25·3	Garnet	Morden field	1 N	Bright	63·0	28·68	12·4	70·0
25·4	Marquis	Morden plot	1 N	Bright	62·0	28·13	13·5	67·9
Average	Garnet	Manitoba			61·3	27·06	12·2	69·0
"	Marquis	"			61·6	31·12	12·4	68·5
24·120	Garnet	Swift Current plot	1 N	Medium bright	62·5	31·72	15·4	71·0
24·113	Marquis	Swift Current plot	1 N	Medium bright	64·0	34·62	15·3	67·4
24·1	Garnet	Rosthern plot	1 N	Bright	63·0	28·50	14·1	67·5
24·7	Marquis	Rosthern plot	1 N	Bright	63·2	30·98	14·8	66·7
24·48	Garnet	Scott plot	1 N	Bright	62·5	26·66	14·4	66·3
24·45	Marquis	Scott plot	1 N	Bright	64·3	26·29	14·7	68·7
25·54	Garnet	Indian Head plot	1 N	Bright	62·6	24·36	13·5	68·4
25·58	Marquis	Indian Head plot	1 N	Bright	64·6	30·33	14·2	71·9
25·69	Garnet	Swift Current plot	1 N	Medium bright	61·0	25·34	15·2	71·8
25·72	Marquis	Swift Current plot	1 N	Bright	62·2	27·50	16·3	71·4
25·92	Garnet	Scott plot	1 N	Bright	63·5	31·82	14·0	74·8
25·96	Marquis	Scott plot	1 N	Bright	63·5	35·78	15·0	74·3
25·5	Garnet	Indian Head field	2 N	Bright	58·0	19·44	15·0	71·0
25·6	Marquis	Indian Head field	2 N	Bright	59·4	21·86	15·7	67·8
25·11	Garnet	Swift Current field	1 N	Bright	61·2	23·74	14·8	69·6
25·12	Marquis	Swift Current field	1 N	Medium bright to bright	62·0	26·10	15·9	69·9
25·7	Garnet	Rosthern field	1 N	Medium bright	60·0	26·91	13·7	69·2
25·8	Marquis	Rosthern field	2 N	Dull, weathered	61·4	31·54	14·3	70·3
25·9	Garnet	Scott field	1 N	Bright	63·1	27·52	13·5	74·5
25·10	Marquis	Scott field	1 N	Bright to medium bright	62·0	34·41	14·1	71·1
Average	Garnet	Saskatchewan			61·7	26·60	14·4	70·4
"	Marquis	Saskatchewan			62·7	29·94	15·0	70·0

24·83	Garnet	Lethbridge plot, dry land	2 N	Bright	59·8	21·84	13·0	70·4
24·84	Marquis	Lethbridge plot, dry land	1 N	Bright	62·0	27·03	14·0	69·2
24·108	Garnet	Beaverlodge plot, summer fallow	3 N	Medium bright, lightly frosted	60·0	29·72	15·4	69·0
24·105	Marquis	Beaverlodge plot, summer fallow	1 N	Medium bright	62·0	35·30	15·4	70·9
24·95	Garnet	Fort Vermilion plot, summer fallow	1 N	Bright	64·0	29·90	12·8	71·4
24·93	Marquis	Fort Vermilion plot, summer fallow	2 N	Bright, odd piebald	63·5	39·61	13·0	70·1
25·103	Garnet	Lacome plot, summer fallow	3 N	Medium bright, lightly frosted, odd sprt'd	60·1	29·05	.....	71·1
25·108	Marquis	Lacombe plot, summer fallow	3 N	Medium bright, lightly frosted, odd sprt'd	62·8	29·64	.....	70·7
25·181	Garnet	†Olds plot, summer fallow	2 N	Medium bright, lightly frosted	60·2	29·74	13·6	71·7
25·182	Marquis	Olds plot, summer fallow	3 N	Dull, light frost, some sprouted	60·5	31·47	13·8	70·4
25·137	Garnet	Beaverlodge plot, summer fallow	2 N	Medium bright	59·5	23·01	13·8	69·5
25·140	Marquis	Beaverlodge plot, summer fallow	1 N	Medium bright, odd piebald	61·7	32·24	15·6	69·4
25·144	Garnet	Beaverlodge plot, potato land	1 N	Medium bright	60·7	24·45	13·7	72·0
25·145	Marquis	Beaverlodge plot, potato land	1 N	Medium bright, 5 p.c. piebald	61·7	28·52	13·9	69·9
25·147	Garnet	Fort Vermilion plot, summer fallow	1 N	Medium bright	62·3	32·94	14·1	73·8
25·150	Marquis	Fort Vermilion plot, summer fallow	1 N	Bright, odd piebald	63·0	37·53	14·6	71·9
Average	Garnet	Alberta	.....	.....	60·8	27·58	13·8	71·1
"	Marquis	Alberta	.....	.....	62·2	32·67	14·3	70·3
Average	Garnet	Manitoba, Saskatchewan and Alberta	.....	.....	61·3	27·04	13·6	70·3
"	Marquis	Manitoba, Saskatchewan and Alberta	.....	.....	62·3	31·15	14·1	69·7
		Garnet in percentage of Marquis	.....	.....	98·4	86·81	96·5	100·9

* 24 and 25 at beginning of milling numbers indicate crop years 1924 and 1925.
† Agricultural School, Olds, Alta.

BAKING TESTS

Garnet compared with Marquis from crops grown on the Dominion Experimental Farms and Stations in 1924 and 1925

Milling Number	Variety	Source	Absorption	Loaf Weight	Loaf Volume	Crumb Texture	Crumb Colour	Flour Colour	
								Dry	Wet
			p.c.	grammes	c.c.	p.c.	p.c.	p.c.	p.c.
24.19	Garnet	Brandon plot	60·7	495·0	2,203	94·5	94·5	85·0	90·0
24.23	Marquis	Brandon plot	61·4	495·0	2,145	95·0	96·0	94·0	95·0
24.54	Garnet	Morden plot	61·2	494·0	2,020	95·0	93·5	92·0	94·0
24.55	Marquis	Morden plot	61·2	499·0	1,983	95·0	94·5	94·0	94·0
25.19	Garnet	Brandon plot	64·9	503·0	2,085	97·0	95·0	94·0	95·0
25.22	Marquis	Brandon plot	62·7	501·0	2,005	95·5	95·0		
25.37	Garnet	Morden plot	66·1	507·0	2,130	97·5	94·5	92·0	97·0
25.44	Marquis	Morden plot	67·1	519·0	1,963	92·5	92·0	98·0	98·0
25.1	Garnet	Brandon field	63·2	500·0	2,005	95·0	91·0	88·0	92·0
25.2	Marquis	Brandon field	62·2	497·0	2,038	95·0	95·5	96·0	96·0
25.3	Garnet	Morden field	62·7	495·0	2,163	93·5	94·0	86·0	91·0
25.4	Marquis	Morden plot	63·3	502·0	2,070	96·0	96·0	97·0	96·0
Average	Garnet	Manitoba	63·1	499	2,101	95·4	93·8	88·6	92·8
"	Marquis	"	63·0	502	2,034	94·8	94·8	93·8	95·8
24.120	Garnet	Swift Current plot	60·8	480·0	2,258	96·5	96·0	86·0	94·0
24.113	Marquis	Swift Current plot	60·3	468·0	2,505	98·5	101·0	94·0	96·0
24.1	Garnet	Rosthern plot	61·7	477·0	2,125	95·0	94·0	88·0	91·0
24.7	Marquis	Rosthern plot	61·0	495·0	2,018	95·5	95·0	95·0	94·0
24.48	Garnet	Scott plot	59·7	490·0	2,115	92·0	90·0	86·0	92·0
24.45	Marquis	Scott plot	60·2	493·0	1,933	94·0	92·5	96·0	96·0
25.54	Garnet	Indian Head plot	65·8	515·0	2,025	92·0	89·0	87·0	94·0
25.58	Marquis	Indian Head plot	66·4	513·0	2,095	95·5	96·0	100·0	100·0
25.69	Garnet	Swift Current plot	64·4	503·0	2,158	97·5	93·0	89·0	96·0
25.72	Marquis	Swift Current plot	65·0	506·0	2,110	97·0	95·0	96·0	100·0
25.92	Garnet	Scott plot	64·1	497·0	2,328	97·5	95·0	86·0	95·0
25.96	Marquis	Scott plot	64·6	507·0	2,105	96·5	96·5	98·0	100·0
25.5	Garnet	Indian Head field	65·1	495·0	2,313	94·5	92·5	84·0	90·0
25.6	Marquis	Indian Head field	64·2	508·0	2,018	94·5	93·0	95·0	96·0
25.11	Garnet	Swift Current field	63·5	502·0	2,235	98·5	93·0	84·0	90·0
25.12	Marquis	Swift Current field	64·6	507·0	2,173	98·5	96·5	97·0	96·0
25.7	Garnet	Rosthern field	63·7	497·0	2,175	95·5	91·5	85·0	90·0
25.8	Marquis	Rosthern field	63·2	495·0	2,245	99·0	99·0	98·0	97·0
25.9	Garnet	Scott field	63·8	500·0	2,155	97·5	92·0	86·0	92·0
25.10	Marquis	Scott field	64·1	503·0	2,138	98·0	97·0	97·0	96·0
Average	Garnet	Saskatchewan	63·3	495·6	2,189	95·7	92·6	86·1	92·4
"	Marquis	"	63·4	499·5	2,134	96·7	96·2	96·6	97·1

24.83	Garnet	Lethbridge plot, dryland	62·5	488·0	2,010	92·5	90·0	86·0	92·0
24.84	Marquis	Lethbridge plot, dryland	62·1	498·0	2,133	90·0	91·5	96·0	95·0
24.108	Garnet	Beaverlodge plot, summerfallow	62·2	476·0	2,120	97·5	97·0	93·0	96·0
24.105	Marquis	Beaverlodge plot, summerfallow	61·8	478·0	2,260	97·5	96·5	94·0	96·0
24.95	Garnet	Fort Vermilion plot, summerfallow	61·6	499·0	1,948	89·0	87·5	88·0	91·0
24.93	Marquis	Fort Vermilion plot, summerfallow	63·1	494·0	2,007	92·5	92·5	96·0	96·0
25.103	Garnet	Lacombe plot, summerfallow	61·1	502·0	2,160	94·5	87·0	91·0	93·0
25.108	Marquis	Lacombe plot, summerfallow	63·2	521·0	2,050	96·5	96·5	99·0	100·0
25.181	Garnet	Olds plot, summerfallow	62·6	506·0	2,068	95·0	94·0	94·0	98·0
25.182	Marquis	Olds plot, summerfallow	63·4	506·0	2,070	96·0	97·0	97·0	100·0
25.137	Garnet	Beaverlodge plot, summerfallow	60·9	499·0	2,295	95·5	89·5	89·0	94·0
25.140	Marquis	Beaverlodge plot, summerfallow	64·7	516·0	2,125	96·0	95·0	99·0	98·0
25.144	Garnet	Beaverlodge plot, potato land	60·7	500·0	2,225	96·5	90·5	90·0	92·0
25.145	Marquis	Beaverlodge plot, potato land	62·0	510·0	2,010	99·5	96·5	99·0	99·0
25.147	Garnet	Fort Vermilion plot, summerfallow	61·1	501·0	2,060	99·5	91·0	89·0	94·0
25.150	Marquis	Fort Vermilion plot, summerfallow	62·2	511·0	2,050	99·0	96·0	98·0	97·0
Average	Garnet	Alberta	61·6	496·0	2,110	95·0	90·8	90·0	93·8
"	Marquis	"	62·8	504·0	2,088	95·9	95·2	97·2	97·6
"	Garnet	Manitoba, Saskatchewan and Alberta	62·7	496·6	2,140·7	95·4	92·3	88·0	93·0
"	Marquis	" " "	63·1	501·6	2,093·7	96·0	95·5	96·6	97·0
Garnet in percentage of Marquis			99·4	99·0	102·2	99·4	96·6	91·4	96·0

NOTES ON MILLING AND BAKING TESTS—GARNET GROWN ON EXPERIMENTAL STATIONS

The milling and baking tables indicate that in these particular tests Garnet averaged appreciably lower than Marquis in weight per measured bushel, in crude protein content, and in flour and crumb colour, and significantly lower in weight per thousand kernels. In absorption, loaf weight and crumb texture Garnet is slightly lower than Marquis, while in loaf volume the former variety is significantly greater. Garnet produces a flour carrying more of the yellow pigments than Marquis, and hence has been awarded a lower score for flour colour.

MILLING AND BAKING TESTS OF GARNET AND MARQUIS GROWN BY CO-OPERATORS

In 1925 Garnet and Marquis, along with a number of other varieties of spring wheat, were grown by co-operators in Manitoba, Saskatchewan, and Alberta in small rod-row plots. The seed in all cases had been supplied from Ottawa the previous year, except in the test at Linfield where the seed used was obtained from the co-operator's own plots the previous year. Samples of approximately 500 grammes each were obtained from these plots and tempered by the addition of 15 c.c. of water, for 20 minutes before milling. The baking test was conducted on 50 grammes of flour in duplicate in accordance with the methods outlined in an earlier publication.[7] The following tables describe the wheat used and give the chemical, milling and baking results. An endeavour was made to obtain samples from districts not represented by Experimental Stations and, especially, from those districts where Garnet may prove to be particularly valuable.

This series was limited of necessity to very small quantities of seed, and as a consequence must not be accepted as affording conclusive evidence as to the relative value of the varieties tested for growing in the districts concerned.

The wheat in this series was milled in September, 1926 and baked in November, 1926.

[7]Saunders, C. E., *Wheat Flour and Bread*—Bull. 97, Central Experimental Farm, Ottawa 1922.

Garnet compared with Marquis, grown by co-operators in different parts of the Prairie Provinces, in 1925, under identical environmental conditions

Milling Number	Variety	Location	Key No.	Probable grade	Appearance	Weight per bushel	Weight per 1,000 kernels	Flour extracted	Crude protein	Hydrogen ion concn.	Diastatic power (Rumsey's value)*
Manitoba						lbs.	grammes	p.c.	p.c.		
1591	Garnet	Dropmore	31	1 N	Bright	62·7	28·9	66·7	10·7	6·30	118·8
1592	Marquis	Dropmore	31	1 N	Bright	61·0	30·7	67·4	12·3	6·33	122·0
1593	Garnet	Teulon	179	1 N	20 per cent slightly piebald	63·0	29·7	69·0	7·7	6·40	230·0
1594	Marquis	Teulon	179	2 N	25 per cent piebald	61·9	32·0	65·2	8·3	6·37	109·2
1595	Garnet	MacDonald	160	1 N	Bright	62·0	28·4	69·7	12·8	6·35	130·0
1596	Marquis	MacDonald	160	1 N	Bright	60·2	29·7	65·7	12·8	6·27	74·4
1597	Garnet	Miami	77	1 N	15 per cent slightly piebald	63·1	30·2	68·8	9·0	6·37	163·2
1598	Marquis	Miami	77	3 N	50 per cent piebald	62·8	30·1	69·2	8·9	6·40	115·6
Average	Garnet	Manitoba				62·7	29·3	68·6	10·1	6·37	160·5
"	Marquis	"				61·5	30·6	66·9	10·6	6·34	105·3
Saskatchewan											
1599	Garnet	Lashburn	348	1 N	Odd piebald	63·0	32·6	71·4	13·5	6·34	133·6
1600	Marquis	Lashburn	348	1 N	Odd piebald	62·9	35·5	69·3	14·2	6·30	93·2
1601	Garnet	Valparaiso	212	1 N	Bright	62·8	30·0	70·2	11·4	6·30	144·4
1602	Marquis	Valparaiso	212	1 N	Bright	60·2	31·4	67·9	12·5	6·37	82·8
1603	Garnet	Glamis	335	1 N	Bright	62·3	29·4	72·9	13·7	6·28	160·0
1604	Marquis	Glamis	335	1 N	Bright	62·5	33·1	69·9	13·8	6·11	94·8
Average	Garnet	Saskatchewan				62·7	30·7	71·5	12·9	6·31	146·0
"	Marquis	"				61·9	33·3	69·0	13·5	6·26	90·3
Alberta											
1605	Garnet	Clyde	48	1 N	Bright	63·0	38·4	67·0	13·0	6·21	156·8
1606	Marquis	Clyde	48	1 N	Bleached a little	61·0	37·8	63·5	12·0	6·40	94·4
1607	Garnet	Linfield	197	1 N	Odd kernel frost blistered	61·0	37·5	70·1	13·5	6·19	320·8
1608	Marquis	Linfield	197	1 N	Bright	61·0	41·0	68·8	13·9	6·19	126·0
1609	Garnet	Mannville	73	2 N	Weathered, bleached, slight sprouting	58·1	25·3	70·1	15·2	6·20	202·8
1610	Marquis	Mannville	73	1 N	Weathered, bleached	60·2	28·1	72·4	16·5	6·29	54·0
Average	Garnet	Alberta				60·7	33·7	69·1	13·9	6·20	226·8
"	Marquis	"				60·7	35·6	68·2	14·1	6·29	91·5
Average of 3 groups	Garnet	Manitoba, Saskatchewan, Alberta				62·1	31·0	69·6	12·1	6·29	176·0
"	Marquis	"				61·4	32·9	67·9	12·5	6·30	96·7

*See page 55 for definition and discussion of "Diastatic Power."

BAKING TESTS

Garnet compared with Marquis, grown by co-operators in different parts of the Prairie Provinces in 1925, under identical environmental conditions

Milling number	Variety	Locality	Key No.	Fermentation time	Absorption	Loaf volume	Loaf shape height / diam.	Crumb texture	Baking strength	Crumb colour	Remarks
				hr. min.	p.c.	c.c.		p.c.	p.c.	p.c.	
Manitoba											
1591	Garnet	Dropmore	31	3 12	72·6	418·0	0·64	98·0	93·3	94·0	
1592	Marquis	Dropmore	31	3 8	76·0	431·0	0·62	91·0	92·5	95·0	Open texture.
1593	Garnet	Teulon	179	3 32	73·7	354·0	0·59	91·0	82·3	88·0	Poor.
1594	Marquis	Teulon	179	3 27	73·1	364·0	0·61	89·0	83·7	94·0	Poor.
1595	Garnet	MacDonald	160	3 25	75·2	472·0	0·69	99·0	102·9	97·0	
1596	Marquis	MacDonald	160	3 26	73·8	443·0	0·64	95·0	95·2	97·0	
1597	Garnet	Miami	77	3 26	74·0	412·0	0·64	93·0	91·6	89·0	Fair strength, poor color.
1598	Marquis	Miami	77	3 17	71·6	371·0	0·59	86·0	81·8	90·0	Poor.
Average	Garnet	Manitoba	.....	3 24	73·9	414·0	0·64	95·3	92·5	92·0	
"	Marquis	"	.....	3 20	73·6	402·0	0·62	90·3	88·3	94·0	
Saskatchewan											
1599	Garnet	Lashburn	348	3 22	73·5	484·0	0·61	100·0	104·1	98·0	
1600	Marquis	Lashburn	348	3 26	72·5	460·0	0·62	100·0	101·0	100·0	
1601	Garnet	Valparaiso	212	3 24	72·7	454·0	0·58	98·0	100·5	95·0	
1602	Marquis	Valparaiso	212	3 17	74·0	449·0	0·59	97·0	98·5	98·0	
1603	Garnet	Glamis	335	3 4	76·1	448·0	0·59	99·0	100·1	98·0	
1604	Marquis	Glamis	335	3 4	72·9	440·0	0·57	97·0	95·3	98·0	
Average	Garnet	Saskatchewan	.....	3 17	74·1	462·0	0·59	99·0	101·6	97·0	
"	Marquis	"	.....	3 16	73·1	450·0	0·59	98·0	98·3	98·7	
Alberta											
1605	Garnet	Clyde	48	2 55	75·8	478·0	0·67	96·0	101·6	98·0	
1606	Marquis	Clyde	48	2 51	78·0	435·0	0·65	89·0	95·0	91·0	Gray crumb, poor texture.
1607	Garnet	Linfield	197	2 46	74·6	438·0	0·65	99·0	97·0	95·0	Short fermentation.
1608	Marquis	Linfield	197	2 37	74·6	440·0	0·64	93·0	94·7	97·0	Short fermentation.
1609	Garnet	Mannville	73	2 51	72·4	451·0	0·69	101·0	100·2	96·0	
1610	Marquis	Mannville	73	2 50	71·0	473·0	0·69	103·0	102·5	99·0	
Average	Garnet	Alberta	.....	2 51	74·3	456·0	0·67	98·7	99·6	96·3	
"	Marquis	"	.....	2 46	74·5	449·0	0·67	95·0	97·4	95·7	
Average of 3 groups	Garnet	Manitoba, Saskatchewan, Alberta	.....	3 12	74·1	440·9	0·67	97·4	97·4	94·8	
"	Marquis	" "	.....	3 8	73·8	430·6	0·64	94·0	94·0	95·9	

NOTES ON MILLING AND BAKING TESTS—GARNET GROWN BY CO-OPERATORS

In these tests, it will be noted, Garnet appears to have an advantage over Marquis in weight per bushel. In weight per thousand kernels, however, Garnet is appreciably lower in all cases but one.

In crude protein content of flour Marquis averages a little higher than Garnet.

In diastatic power a marked difference was noted between the two varieties, Garnet being particularly high in this regard. This variety, therefore, should be valuable to blend with flour low in diastatic power.

In volume, texture and shape of loaf, Garnet shows superiority over Marquis.

In the final reduction of all baking figures, in these particular tests, to a figure indicating baking strength, Garnet is higher in every case except two. In the matter of colour of crumb Marquis is better than Garnet.

DIASTATIC POWER OF MARQUIS AND GARNET FLOURS

By diastatic power is meant the activity of diastase and other enzymes with which it may be associated, in the production of maltose from starch. Since Garnet appears to be considerably higher in diastatic power than does Marquis, as measured by Rumsey's method,[8] it might be well to discuss this question a little further in view of the bearing it may have on the two varieties.

Kent-Jones[9] makes frequent reference to Canadian wheat as occasionally being "deficient in diastatic enzymes." Banks[10] refers to the general run of high-grade Canadian Spring Wheat as being rather poor in fermentability. Alcock[11] mentions that in certain seasons the wheat from sections in Alberta is lacking in diastatic enzymes. It would appear, therefore, that flour milled from sound Marquis grown in parts of Western Canada at least, may be deficient in diastase.

Bailey[12] points out two advantages accruing from a fairly high diastatic activity in bread doughs. He says: "The first involves the maintenance of a fairly constant and reasonably high sugar level. The second involves the economy resulting from using the starch of the flour as a source of fermentable sugars, since the necessary sugar can be secured more cheaply in this than in any other form."

Although a deficiency in diastase may be remedied satisfactorily by the judicious use of ingredients such as malt flour or malt extract by the baker, yet the miller prefers to produce a flour as nearly perfect as possible in all respects. One of the methods employed by the latter in making up this deficiency is the use of wheats high in diastatic power for blending purposes. It would appear that Garnet may prove a useful variety in this respect.

[8]Rumsey, L. A., "The Diastatic Enzymes of Wheat Flour and Their Relation to Flour Strength," Chicago, 1922.

[9]Kent-Jones, D. W., "Modern Cereal Chemistry," 1924. The Northern Publishing Co., Ltd., Liverpool.

[10]Page 62.

[11]Alcock, A. W., "Milling and Baking Qualities of Western Canada Wheat." Northwestern Miller, March, 1925.

[12]Bailey, C. H., "The Chemistry of Wheat Flour," 1925. The Chemical Catalog Co., Inc., New York, N.Y.

REPORT ON TESTS OF LARGE LOTS OF MARQUIS AND GARNET BY THE MINNESOTA STATE EXPERIMENTAL MILL, ST. PAUL, MINNESOTA

Reported by R. C. Sherwood, April, 1926

"Two lots of wheat representing the varieties Marquis and Garnet grown at Scott, Saskatchewan, have been tested for comparative milling and baking quality. They were both dark, hard and vitreous, and of nearly the same protein content. The Garnet was 1.3 pounds per bushel heavier than the Marquis. The former showed 11.2 per cent moisture, the latter, 14.5 per cent moisture. The Garnet graded number 1 hard spring, and the Marquis number 2 dark northern spring, according to the United States grain standards.

"Milling tests were made of each lot using approximately 80 bushels for each test. The details of the milling method are described in Bulletin 23 of the Minnesota State Department of Agriculture. The wheat for each test was conditioned by washing, tempering in two periods, and scouring in the usual manner. Because of the high moisture content of the Marquis wheat it was tempered for a total time of 8 hours, while the Garnet wheat was tempered for a total time of 22½ hours. The Marquis went to the first break rolls at 15.0 per cent moisture and the Garnet at 15.6 per cent. Judging from the manner in which the wheats milled each might safely have carried 0.5 per cent more moisture.

"The yields of products are shown in table 1. The method of calculation used for the majority of the milling tests made in the Testing Mill gives yields calculated to the basis of the original moisture content of the wheat as received. Yields of flour are calculated at present to the basis of 13.5 per cent moisture in the flour, as this is the maximum legal limit for moisture. The yields obtained in these tests when calculated in the above manner show substantially higher yields of flour and of total products from the Garnet wheat. The difference in yields is due, in large part to the difference in original moisture in the wheat. In order to eliminate the effect of the original moisture the yields of flour have been corrected to the basis of 13.5 per cent moisture in both wheat and flour. Yields corrected in this manner give a more accurate representation of the relative milling value of the two varieties.

"The corrected yields show 74.19 per cent and 75.84 per cent straight grade flour, respectively, from the Marquis and Garnet wheat samples. In this connection it must be remembered that the Garnet wheat showed 1.3 pounds per bushel higher test weight.

"No difficulties were experienced in milling either of the two samples. The Garnet wheat was somewhat more vitreous than the Marquis, and required more water in tempering. There was no noticeable difference between the two, however, in respect to their manner of grinding. Both were considered to be very good milling wheats.

"The percentages of crude protein, moisture and ash in the wheat and flour are given in table 1. The percentages of protein corrected to a uniform moisture basis show that the Marquis wheat was slightly higher than the Garnet, and the Marquis flour was insignificantly higher than the Garnet flour. The ash content of the flours of the same grade was the same.

"During the tests, portions of the flour milled from each variety were bleached with different concentrations of chlorine. The flour milled from the Garnet wheat was distinctly yellow, both in the dust and in the slick, and bleaching tests were made to determine whether this yellow colour could be satisfactorily removed. Three concentrations of chlorine were used as the straight grade flours were milled, namely, 0.4, 0.6, 0.8 ounces chlorine per barrel. A small portion of the Garnet patent flour (75 per cent) was treated with chlorine at the rate of 1.0 ounces per barrel. The effects of bleaching were demonstrated when the flours were baked.

" Baking tests of the flours were made in the laboratory of the Testing Mill at the Baking School of the Dunwoody Industrial Institute, and in the commercial bake-shop of Purity Baking Company, St. Paul. The results of the tests in the Testing Mill laboratory are shown in table 2. The baking procedure is described in Bulletin 23, page 12. The flours were baked twice, the first time five days after milling, and again six weeks after milling. Absorption of the Marquis was about 1 per cent higher than the Garnet when fresh, and about 2 per cent higher when aged six weeks. The average loaf volume of the straight grade flours was the same when the fresh flours were baked, but when baked later the average loaf volume of the Garnet was 100 cc. higher than the Marquis.

" The colour score of the Marquis was invariably higher when flours with similar treatment were compared. The Garnet showed a distinctly yellow colour in the dough and in the crumb of the baked loaf in the case of the unbleached flour. Bleaching with 0.4 to 0.6 ounces chlorine per bbl. improved the colour of the crumb. Similar increase in colour score was noted with the Marquis bleached flours. Grain and texture of the Marquis bread was superior to the Garnet in every case but one. Judging from the texture score the Garnet did not withstand the higher concentrations of bleaching agent as well as the Marquis.

" Two flours of each variety, numbers 196, 197, 201, and 202 were baked in the plant of the Purity Baking Company, St. Paul, using about 260 pounds of flour for each dough. The doughs were fermented first as a fairly stiff sponge, for about 4 hours, remixed with the balance of the ingredients at high speed to make a slack dough, and after 15 minutes rest put through the machines. Under the treatment in this bakery the Garnet flour appeared to have somewhat greater 'strength' of gluten. It stood up a little better than the Marquis in the fermentation of the sponge. All four doughs were easily handled in the commercial machines. The loaves were scored in the laboratory of the Purity Company. The significant points in their report are given in table 3. It will be noted that aside from colour the two varieties were scored nearly the same."

TABLE I—MILLING TESTS OF MARQUIS AND GARNET WHEAT GROWN AT SCOTT, SASK.

——	Marquis No. 279	Garnet No. 280
Grade, United States Federal Standards	2 DkNS	1 Hd. S.
Weight per bushel, pounds	61·0	62·3
Dockage, per cent	0	0
Total screenings, per cent	1·21	1·67
Weight of wheat milled, pounds	5,220	5,220
Moisture in wheat before tempering, per cent	14·5	11·2
Moisture in wheat after tempering, per cent	15·0	15·6
Yield of products calculated to original moisture content of wheat—		
Straight grade flour, per cent (corr. to 13·5 p.c. moisture)	73·3	77·86
Total feed, per cent	26·60	27·62
Total products, per cent	99·93	105·48
Yields of straight grade flour corrected to 13·5 p.c. moisture in both wheat and flour, per cent	74·19	75·84
Crude proteain (N x 5·7)—		
Wheat as received	14·14	14·31
Flour as milled	13·30	13·17
Crude protein (Nx5·7) corrected to 13·5 p.c. moisture—		
Wheat	14·31	13·94
Flour	13·30	13·22
Moisture in milled products—		
Straight grade flour,per cent	13·48	13·80
Bran, per cent	14·16	15·29
Shorts, per cent	11·93	13·63
Red Dog, per cent	13·28	12·67
Ash content corrected to 13·5 p.c. moisture—		
Wheat, per cent	1·43	1·32
Straight grade flour, per cent	0·47	0·47
Patent flour (75 p.c.) per cent	0·41	0·41

TABLE 2.—BAKING TESTS OF MARQUIS AND GARNET WHEAT SHIPPED FROM SCOTT, SASK.

Flour Lab. No.	Description	Absorption	Loaf Volume	Colour Score	Texture Score
	Baked in Testing Mill Laboratory 1 week after milled.	p.c.	c.c.		
195	Marquis straight unbleached	.....	.....	.....	.....
196	Marquis straight bleached 0·4 oz. chlorine	64·3	2,170	101	100
197	" " " 0·6 " "	62·9	2,210	102	100
198	" " " 0·8 " "	62·9	2,200	102	100
199	Marquis patent (75 p.c.)....unbleached	63·4	2,300	99	95
200	Garnet straight unbleached	62·6	2,290	96y	95
201	" " bleached 0·4 oz	61·4	2,200	99	96
202	" " " 0·6 oz	62·6	2,170	100	95
203	" " 0·8 oz	61·2	2,100	99	94
204	" patent (75 p.c.) unbleached	62·9	2,120	94y	97
205	" " " bleached 1·0 oz	62·6	2,060	100	97
	Check State Mill 92 p.c. patent unbleached	64·3	2,010	100	100
	Baked in Testing Mill Laboratory 6 weeks after milling				
195	Marquis (see above)	71·4	2,050	99g	100
196	" "	70·0	2,190	101	100
197	" "	71·4	2,200	102	100
198	" "	72·6	2,220	102	100
199	" "	70·0	2,460	100	100
200	Garnet "	68·6	2,290	98y	96
201	" "	69·1	2,250	100	100
202	" "	68·6	2,390	99	96
203	" "	70·6	2,300	99	94
204	" "	69·1	2,230	98y	94

TABLE 3.—BAKING TESTS IN THE COMMERCIAL BAKERY OF PURITY BAKING COMPANY, ST. PAUL

Flour Lab. No.	Description	Loaf Volume	Grain	Colour	Flavour	General Average
		c.c.				
196	Marquis	1,850	Fine and even	Fairly white	Very good	85
197	"	1,850	"	Fair	Good	80
201	Garnet	1,870	"	Creamy to yellow	Excellent	85
202	"	1,850	"	" "	"	80

BAKING TEST OF MARQUIS AND GARNET FLOUR BY THE STANDARD BREAD CO., OTTAWA

About 300 pounds each of Marquis and Garnet unbleached, straight grade flour was obtained from the Minnesota State Experimental Mill out of flours bearing numbers 195 and 200 respectively in Dr. Sherwood's report, and submitted to baking tests by the Standard Bread Co. of Ottawa. These bakings were made by the most modern methods and machinery, and in the ordinary commercial way. In the following table, Mr. Lamothe, Vice-President of the Company, records his opinions of the two flours:—

—	Marquis	Garnet
	p.c.	p.c.
Absorption value	100	99
Gluten value	100	100
Colour value	100	90
Loaves per barrel value	100	99
Volume of loaf value	100	100
Quality of loaf value	100	100
Quality of gluten value	100	100
All-round average value	100	98

Mr. Lamothe reports: "It is the writer's opinion that if Garnet flour is as good as what we baked commercially in our factory it should have no difficulty in competing with flour made from Marquis wheat, particularly if the former is bleached."

COMPARISON OF LOAVES BY PRIVATE INDIVIDUALS

A number of loaves of bread from the above commercial test were distributed to prominent persons in the city of Ottawa and vicinity, and an opinion solicited regarding the relative merits of the two varieties as regards colour, texture, and flavour. Following is a brief summary of their opinions:—

Colour.—Twenty-one persons preferred Marquis in colour of crumb, four preferred Garnet and forty did not state any definite opinion. All persons remarked that the Garnet crumb was more creamy or darker than the Marquis.

Texture—Six persons preferred Garnet, sixteen preferred Marquis, twenty-four found no difference, and twenty gave no definite opinion.

Flavour.—Twenty-two persons preferred Garnet, seven preferred Marquis, twenty-four found no difference and thirteen gave no definite opinion.

REPORT ON TEST BY THE PILLSBURY FLOUR MILLS CO., MINNEAPOLIS, MINNESOTA

(Reported by M. A. Gray, Chemist, March, 1926)

Tweny bushels of Garnet and twenty bushels of Marquis grown at the Scott Experimental Station, Saskatchewan, in 1925, were tested by the Pillsbury Flour Mills Co., which makes the following report.

—	Garnet	Marquis
Colour of crumb	100·25	102·50
Protein (Wheat) (N x 5·7)	14·35	13·36
Protein (Flour) (N x 5·7)	13·36	13·60
Ash	·385	0·39
Absorption	60·00	60·50
Expansion	100·50	101·00
Bread score	90·50 (V.G.)	90·50
Weight per bushel	61·00	61·50

"We can see little difference between the quality of Garnet and Marquis."

TESTS MADE BY THE WESTERN CANADA FLOUR MILLS LABORATORY, WINNIPEG, MANITOBA

(Reported by A. W. Alcock, Chemist, December, 1925)

Small samples of Garnet and Marquis of the 1925 crop were tested in the laboratory of the Western Canada Flour Mills, Winnipeg, and reported upon on December 29, 1925, by Mr. A. W. Alcock, Chemist. The data submitted is given in the following table:—

MILLING AND BAKING TESTS

Garnet and Marquis compared by A. W. Alcock, Chemist for Western Canada Flour Mills, Winnipeg, Manitoba

(Calculated to a moisture basis of 13·5 per cent)

Sample	Where grown	Test weight	Character of wheat	Protein	Ash in flour	Colour of flour
Marquis	Morden	62·0	Plump, rather starchy	10·98	0·405	Creamy white.
Garnet	"	61·0	Bright red	12·00	0·425	Dull white.
Marquis	Brandon	59·5	Poor sample, dark, immature and thin	13·20	0·385	Creamy white.
Garnet	"	56·25	Dark in colour, thin and weathered	12·46	0·46	Yellow.
Marquis	Scott	63·0	Plump, red	14·14	0·38	Little dull.
Garnet	"	64·0	Plump, red	13·84	0·42	Distinctly creamy.

(Calculated to a moisture basis of 13·5 per cent)

Sample	Where grown	Absorption	Loaf volume	Colour	Texture	Appearance	Remarks
Marquis	Morden	61·5	2,090	92	95	96	
Garnet	"	63·0	2,160	95	98	97	
Marquis	Brandon	58·5	2,270	96	99	99	
Garnet	"	60·5	2,270	86 Yellow	98	98	A very poor sample.
Marquis	Scott	59·5	2,190	88 Dull	92	94	
Garnet	"	60·0	2,100	82 Dull Yellow	90	93	

TESTS MADE BY THE OGILVIE FLOUR MILLS CO., LTD., MONTREAL, QUE.

(Reported by A. J. Banks, Chemist, April, 1926)

Mr. A. J. Banks, Chemist for the Ogilvie Flour Mills Co., made comparative tests of Garnet and Marquis grown in 1925. On April 16, 1926, he reported as follows:—

"The samples used in this inquiry were:—

"1. Average sample Number One Northern wheat ex Winnipeg Grain Exchange.

"2. Marquis wheat, Rotation B, raised on dry land, received from Mr. Fairfield, Superintendent of Experimental Farm, Lethbridge, Alberta.

"3. Garnet wheat, raised on irrigated land. Also received from Mr. Fairfield of Lethbridge.

"4. Garnet wheat from Mr. V. Matthews, of the Experimental Farm at Scott, Saskatchewan.

"5. A good sample of Ontario Red Winter wheat pastry flour of relatively strong type.

—	Weight per Imperial Bushel	
	Uncleaned	Cleaned
	lb.	lb.
No. 1 Northern	64	64
Marquis, Lethbridge	61½	62
Garnet, Lethbridge	62	63
Garnet, Scott	64½	64½

"The milling qualities may be disposed of in a very few words. They were satisfactory in all respects except flour colour. This quality is undesirable. The strong rich yellow colour unquestionably discounts its commercial value."

ANALYSES OF PATENT GRADES OF FLOUR

Representing 42¼ per cent of the total flour extraction. Results stated in terms of 13 per cent moisture content

—	Colour	Gluten		Protein per cent	Ash per cent	Lactic acidity
		Wet per cent	Dry per cent			
Average No. 1 Northern	100	43·9	14·4	13·8	0·509	0·165
Marquis, Lethbridge[1]	95	50·0	17·0	16·0	0·422	0·132
Garnet, Lethbridge[2]	96	34·9	11·7	11·4	0·550	0·165
Garnet, Scott	93	41·3	13·7	13·0	0·535	0·175

[1] Dry land.
[2] Irrigated.

—	Ferment-ability	Dough strength	Resili-ence	Bread colour
No. 1 Northern	100	100	100	100
Marquis, Lethbridge	76	114	108	100
Garnet, Lethbridge	154	34	40	97
Garnet, Scott	151	40	44	96
Ontario Winter Wheat	103	7	10	105

" In the first column we have an expression of the relative degrees of fermentability which are the outcome of a number of active factors grouped together and aptly termed by Prof. Bailey ' Saccharogenesis '.

" The second column gives an expression of the relative strength of the samples referred to No. 1 Northern. Strength is here regarded as a form of cohesion of the gluten complex of the dough, or in other words, a degree of resistance to the action of a compressing force.

" Resilience, in the third column, is as its name implies a measurement of the rebound of the dough following the degree of compression indicated by its ' strength ' value.

" As a general rule Ontario winter wheat flour, particularly that from white winter wheat shows an entire lack of resilience, and much less strength than that of the type selected.

" The sample of Marquis from Lethbridge shows rather poor fermentability combined with a high degree of strength and resilience. It is characteristic of the general run of high-grade Canadian spring wheat. It responds well in blend with weak varieties such as the winter wheat quoted.

" The two samples of Garnet show closely similar characteristics, viz., a high degree of saccharogenesis, low strength and resilience.

" Garnet wheat would blend well with Marquis, and yield an excellent flour, probably one giving greater general satisfaction than that from straight Marquis.

" On the other hand, the Dominion is already producing a more than ample supply of spring wheat of medium to fairly low strength quality, and I am of the opinion that if the samples of Garnet truly represent the normal characteristics of this strain it would be a deplorable act of retrogression to foster its growth.

" This view is further emphasized by reference to the colour quality. The decidedly strong yellow colour is a particularly unfavourable feature.

" We have already too much Durum wheat under cultivation. This wheat, like Garnet, has a high degree of fermentability, low dough strength and resilience, and a strong yellow colour. Kota wheat is also coming more into evidence. The current crop of Kota wheat shows greater strength and resilience than Garnet, but it again is reduced in value by reason of its pronounced yellow colour."

TESTS ON GARNET AND MARQUIS BY LAKE OF THE WOODS MILLING CO., KEEWATIN, ONT.

(Reported by J. M. Pearen, Chemist, January, 1927)

Garnet and Marquis samples for testing purposes, were directed by the Cereal Division, Ottawa, to the laboratory of the Lake of the Woods Milling Co., Keewatin, Ontario, from crops grown in 1926 at various points in Western Canada. In the following table the results of these tests are recorded:—

MILLING AND BAKING TESTS

Garnet and Marquis compared by J. M. Pearen, Chemist for Lake of the Woods Milling Co., Keewatin, Ont., from 1926 crop.

Variety	Source	Weight per bushel	Flour Yield	Ash	Protein	Absorption	Weight of Loaf	Volume	Loaf colour
		lbs.	p.c.	p.c.	p.c.	p.c.	gms.	cu. in.	
Garnet	Swan River, Manitoba	63	73·5	0·48	9·9	64·7	535	202	Yellow
Marquis	" "	63	74·0	0·44	11·2	64·7	535	224	Creamy white
Garnet	Rockham, "	64	74·0	0·49	10·0	64·7	535	206	Light yellow
Marquis	" "	63	74·0	0·47	10·8	66·2	540	216	Creamy white
Garnet	Teulon, "	63	73·0	0·50	12·2	65·9	538	209	Light yellow
Marquis	" "	65	74·5	0·42	12·8	66·5	540	222	Creamy white
Garnet	Leacross, Saskatchewan	66	75·0	0·44	12·6	66·5	540	214	Light yellow
Marquis	" "	66	75·5	0·42	11·2	66·5	540	214	Creamy white
Garnet	Valparaiso "	65	75·0	0·48	9·3	64·7	540	206	Light yellow
Marquis	" "	65	75·5	0·42	13·2	66·2	545	230	Creamy white
Garnet	Beatty, "	65	75·0	0·46	13·0	64·7	535	204	Light yellow
Marquis	" "	65	74·5	0·42	13·0	66·2	540	222	Creamy white
Average—Garnet		64·3	74·3	0·475	11·2	65·2	537	207	
" Marquis		64·5	74·7	0·432	12·0	66·1	540	221	

"1. The general appearance of Garnet wheat is superior to Marquis from districts which produce low protein wheat, also the appearance of Garnet is superior to Marquis after both have been exposed to wet harvest weather. However, the superiority ends there as the result of these tests would lead us to mill Marquis in preference to Garnet in spite of the latter's better appearance.

"2. The milling test of these two wheats shows no decided spread in yield of flour. The slight advantage which Marquis has in this respect is due to the fact that its bran holds together better than Garnet and allows of a better clean up without too high ash in the flour. The same tendency for the bran to pulverize in the case of Garnet is no doubt responsible for the higher ash in the Garnet flour. This is a bad feature.

"3. The baking test brought out two distinct characteristics in these two wheats. The colour of the loaf was very much superior from Marquis in every case, while in every instance but one the volume of loaf was quite noticeably larger from Marquis. The absorption and bread yield did not show a decided advantage for either variety.

"4. The protein test gave a higher percentage from Marquis in five out of six of the comparative tests completed. Considering the fact that the Garnet had a stronger appearance in every instance the protein result proved to be the truer guide to baking quality. This characteristic of Garnet to appear strong when it is low in protein will help it to grade, under present grading conditions, better than its baking quality warrants.

"5. While we realize the urgent need for a variety of wheat to replace Marquis in certain districts of western Canada we are frankly of the opinion that Garnet is not a satisfactory substitute from a milling and baking quality standpoint."

Mr. Pearen has also conducted tests on samples from Southern Manitoba, Swift Current and Scott, Saskatchewan. He comments in a general way on these samples in the following words: "Garnet is undoubtedly worthy of consideration as a substitute for Marquis in southern Manitoba where the rust infection is worst. We believe a Garnet with low protein content will make a loaf of equal colour to a badly rusted Marquis, and by escaping the rust would certainly give a much superior yield of flour; but we do not think that Garnet should be considered a worthy substitute for Marquis throughout Western Canada."

MILLING AND BAKING QUALITIES OF GARNET COMPARED WITH A NUMBER OF OTHER VARIETIES

In this bulletin thus far the milling and baking qualities of Garnet have been compared with those of Marquis exclusively. Since certain other well-known varieties are recognized by the trade and occupy a prominent place on the market, a comparison should also be made between these and the former variety. Such a comparison is attempted in the following table, although it is freely admitted that the data available are somewhat limited. A further difficulty is encountered when attempting to average results obtained from varieties which have been grown partly in districts for which they are not suited and partly in districts for which they are well adapted. Such varieties as Kitchener, Early Triumph and Early Red Fife, for example, when grown in districts where rust is prevalent, give results which are likely to lower appreciably their average performance throughout the whole country.

In the following table are recorded the results of tests made of 5-pound samples obtained from the Dominion Experimental Farms and Stations of the crop years 1924 and 1925. The flour was stored about six weeks before the baking test was made.

Commercial test loaves baked by the Standard Bread Co., Ottawa.

Commercial test loaves baked by the Standard Bread Co., Ottawa.

Representative loaves of Garnet and Marquis from two localities.

MILLING AND BAKING TESTS

Test of Nine Varieties grown on the Dominion Experimental Farms and Stations in the Prairie Provinces in 1924 and 1925.

Variety	Marquis	Early Red Fife	Early Triumph	Garnet	Kitchener
Number of tests	20	6	12	19	17
Weight per bush., lb	62·4	62·3	59·9	61·3	61·1
Water absorption in per cent	63·1	61·8	62·3	62·4	62·5
Volume of loaf in cu. cm	2,117·8	2,033·1	2,029·9	2,163·2	2,049·2
Crumb texture value in per cent	96·1	92·7	93·3	95·2	93·0
Crumb colour value in per cent	95·3	92·4	92·6	92·3	90·5
Flour Colour—Dry—Value in per cent	96·7	95·8	95·3	89·1	93·8
" Wet—Value in per cent	97·1	96·5	95·8	93·5	94·6

Variety	Kota	Red Fife	Ruby	Supreme
Number of tests	15	11	16	14
Weight per bush., lb	62·7	60·3	62·0	60·6
Water absorption in per cent	65·5	62·6	63·9	62·9
Volume of loaf in cu. cm	2,095·6	2,095·9	2,142·5	2,227·3
Crumb texture value in per cent	94·4	94·2	95·6	96·8
Crumb colour value in per cent	90·9	93·2	94·9	96·0
Flour Colour—Dry—Value in per cent	88·5	95·8	94·5	95·6
" Wet—Value in per cent	91·2	95·6	96·8	95·1

In these tests, it will be noted, Kota gave the highest average weight per measured bushel while Early Triumph gave the lowest. In this respect Garnet and Kitchener compared closely, but both were lower than Marquis.

In water absorption Kota ranked distinctly the highest, Ruby coming next in order. Between the other varieties the differences were not very pronounced.

In loaf volume Supreme scored appreciably highest, Garnet coming second.

In crumb texture Supreme and Marquis contended for first place with Garnet and Ruby coming second.

The estimation of the colour value of the crumb and flour was based chiefly on the degree of yellow colouration present, the higher ratings being given to the crumb or flour with the least yellow. It will be noted that Garnet is superior to Kitchener and Kota in crumb colour and only slightly lower than Early Red Fife and Early Triumph. In flour colour, it is superior to Kota but significantly lower than the other varieties.

In the following three tables the colour valuations awarded the flour and crumb from four varieties grown on the Federal Experimental Farms in the Prairie Provinces in 1924 and 1925 are given. An examination of these tables indicates, among other things, that while Garnet ranks appreciably lower in colour of flour and crumb than Marquis, yet it seems entitled to rank higher in crumb colour than either Kota or Kitchener. It is interesting to note that in Garnet the crumb colour is a distinct improvement over the flour colour, whereas in Kitchener the reverse is the case.

COMPARATIVE ESTIMATION OF COLOUR VALUES IN THE CASE OF FOUR VARIETIES

(Dry Flour Colour Value in Percentages)

Crop Year	Variety	Brandon	Morden	Indian Head	Swift Current	Rosthern	Scott	Leth-bridge	Lacombe
1924	Garnet	95·0	92·0	.....	86·0	88·0	86·0	86·0	
1925	"	94·0	92·0	87·0	89·0	91·0	86·0	.....	91·0
		89·5	92·0		87·5	89·5	86·0	.....	
1924	Kitchener	88·0	.....	93·0	94·0	94·0	93·0	94·0	
1925	"	84·0	.....	93·0	98·0	96·0	95·0	95·0	95·0
		86·0	.....	93·0	96·0	95·0	94·0	94·5	
1924	Kota	83·0	90·0	94·0	89·0	88·0	87·0	85·0	
1925	"	86·0	92·0	86·0	91·0	86·0	89·0	88·0	94·0
		84·5	91·0	90·0	90·0	87·0	88·0	86·5	
1924	Marquis	94·0	94·0	95·0	94·0	95·0	96·0	96·0	
1925	"	.....	98·0	100·0	96·0	97·0	98·0	98·0	99·0
			96·0	97·5	95·0	96·0	97·0	97·0	

(Wet Flour Colour Value in Percentages)

1924	Garnet	90·0	94·0	.....	94·0	91·0	92·0	92·0	
1925	"	95·0	97·0	94·0	96·0	94·0	95·0	.....	93·0
		92·5	95·5	.....	95·0	92·5	93·5		
1924	Kitchener	85·0	.....	95·0	95·0	95·0	92·0	95·0	
1925	"	88·0	.....	97·0	100·0	95·0	98·0	96·0	98·0
		86·5	.....	96·0	97·5	95·0	95·0	95·5	
1924	Kota	83·0	90·0	91·0	88·0	91·0	91·0	92·0	
1925	"	92·0	92·0	94·0	92·0	90·0	94·0	92·0	96·0
		87·5	91·0	92·5	90·0	90·5	92·5	92·0	
1924	Marquis	95·0	94·0	95·0	96·0	94·0	96·0	95·0	
1925	"	.....	98·0	100·0	100·0	98·0	100·0	98·0	100·0
		.....	96·0	97·5	98·0	96·0	98·0	96·5	

(*Crumb Colour Value in Percentages*)

1924	Garnet	94·5	93·5	.....	96·0	94·0	90·0	90·0	
1925	"	95·0	94·5	89·0	93·0	97·0	95·0	.....	87·0
		94·8	94·0	.....	94·5	95·5	92·5		
1924	Kitchener	89·5	.....	91·0	98·0	90·0	87·0	91·0	
1925	"	86·0	.....	89·5	92·5	92·0	93·0	90·0	92·5
		87·8	.....	90·3	95·3	91·0	90·0	90·5	
1924	Kota	90·5	93·0	97·5	97·5	89·0	89·5	85·5	
1925	"	92·0	86·0	91·0	87·0	94·0	89·5	84·0	97·0
		91·3	89·5	94·3	92·3	91·5	89·5	84·8	
1924	Marquis	96·0	94·5	95·0	101·0	95·0	92·5	91·5	
1925	"	95·0	92·0	96·0	95·0	99·0	96·5	95·0	96·5
		95·5	93·3	95·5	98·0	97·0	94·5	93·3	

GARNET AND MARQUIS GRAIN BLENDED, MILLED AND BAKED

Small quantities of Marquis and Garnet from the 1926 crop were blended, as indicated in table, and conditioned up to 15 per cent moisture content in glass jars over night. The original moisture contents of the Brandon and Indian Head samples range between 11.7 and 12.2 per cent; the Rosthern and Scott samples between 10.2 and 10.6 per cent.

The wheats were milled into straight grade flours by an Allis-Chalmers Experimental Flour Mill, using four breaks and seven reductions on each sample. The samples were milled on December 7th and 8th and baked December 20th and 21st. The following tables give the description and behaviour of the samples tested.

MILLING TESTS

Garnet and Marquis Wheat Blended and Milled from Crops Grown on Dominion Experimental Farms and Stations in 1926

Milling number	Blend	Source	Probable grade	Appearance	Weight per bushel	Weight per 1,000 kernels	Flour extracted	Ash content	Flour colour		Remarks
									Dry	Wet	
	p.c.				lb.	gms.	p.c.	p.c.	p.c.	p.c.	
1661	Marquis 50 " 50	Brandon Indian Head	1 N	Bright, plump	63·0	30·572	72·4	0·44	100	100	Bran—large, coarse.
1662	Garnet 50 " 50	Brandon Indian Head.	1 N	Bright, plump	62·1	26·020	72·0	0·52	93	94	Bran—small, less coarse than 1661.
1663	Marquis 25 " 25 Garnet 25 " 25	Brandon Indian Head. Brandon. Indian Head.	1 N	Bright, plump	62·4	27·910	73·2	0·49	96	97	Bran—medium large, medium coarse.
1664	Marquis 40 " 40 Garnet 10 " 10	Brandon Indian Head. Brandon. Indian Head	1 N	Bright, plump	62·4	29·912	72·6	0·45	98	98	Bran—larger and coarser than 1663.
1665	Marquis 50 " 50	Rosthern Scott..	1 N	Medium bright, plump.	60·0	30·400	71·7	0·41	98	99	Bran—flaky, coarse.
1666	Garnet 50 " 50	Rosthern Scott.	2 N	Bright, lean, vitreous.	59·0	24·062	71·0	0·53	92	92	Bran—finer and less coarse than 1665.
1667	Marquis 25 " 25 Garnet 25 " 25	Rosthern Scott. Rosthern. Scott.	1 N	Bright, medium plump.	60·0	26·518	71·8	0·49	95	95	Bran—larger than 1666.
1668	Marquis 40 " 40 Garnet 10 " 10	Rosthern Scott. Rosthern. Scott.	1 N	Bright to medium bright, medium plump.	60·0	27·806	72·2	0·44	98	97	Bran—equal to 1667.

NOTE.—Ash content is corrected to 10 per cent moisture of flour.

BAKING TESTS

Garnet and Marquis Wheat Blended and Milled from Crops grown on Dominion Experimental Farms and Stations in 1926

Milling Number	Blend	Source	Fermentation time	Water absorbed	Water retained	Volume	Loaf shape	Crust	Texture	Baking strength	Crumb colour	Remarks
	p.c.		hr. min.	p.c.	p.c.	c.c.	height, diameter	p.c.	p.c.	p.c.	p.c.	
1661	Marquis.....50 " 50	Brandon..... Indian Head..	3 5	71·1	44·7	480	0·70	99	99	102·4	98	Elastic, resilient dough; creamy white.
1662	Garnet.....50 " 50	Brandon..... Indian Head..	3 12	71·4	44·4	485	0·71	99	100	103·8	93	More pliable than 1661; creamy to creamy yellow.
1663	Marquis.....25 " .....25 Garnet.....25 " 25	Brandon..... Indian Head Brandon Indian Head	3 9	71·2	44·8	493	0·70	99	98	103·4	96	More elastic and resilient than 1662; creamy to creamy white.
1664	Marquis.....40 " .....40 Garnet.....10 " 10	Brandon..... Indian Head Brandon Indian Head	2 59	72·4	45·7	481	0·67	97	99	101·3	97	More elastic than 1663; creamy white.
1665	Marquis.....50 " 50	Rosthern..... Scott.	2 45	69·6	42·9	491	0·68	96	98	101·3	99	Resilient, elastic, lively dough; creamy white.
1666	Garnet.....50 " 50	Rosthern..... Scott	3 0	70·9	43·1	503	0·71	99	101	105·6	92	Excellent dough, but more pliable than 1665; creamy yellow.
1667	Marquis.....25 " .....25 Garnet.....25 " 25	Rosthern..... Scott Rosthern. Scott	2 39	70·9	42·8	485	0·68	98	100	101·9	96	More elastic and resilient than 1666; creamy to creamy white.
1668	Marquis.....40 " .....40 Garnet.....10 " 10	Rosthern..... Scott Rosthern Scott	2 42	69·3	41·8	481	0·69	98	100	101·4	97	More elastic and resilient than 1667; creamy white.

Note.—Water absorbed, water retained, and volume are corrected to 10 p.c. moisture of flour.

Both varieties milled satisfactorily whether blended or unblended. Although there was little difference in the percentage of flour extracted in the lots within either of the two groups, yet the percentage of ash was appreciably higher, depending upon the amount of Garnet present. Since the greater proportion of the ash of the wheat kernel is derived from the outer layers it was assumed that more of the branny particles were present in the flour of the Garnet.

The colour of the flour from Garnet was yellower or more creamy than that from Marquis, while in the blends the degree of yellowness was in proportion to the amount of Garnet used. The straight Garnet flour could be described as creamy yellow and the Marquis creamy white.

In the baking test not much difference was noted in the relative values of the different lots. The baking strength, as indicated in the tables, appeared to be slightly in favour of Garnet. During the fermentation period Garnet resisted fermentation slightly better than Marquis. The shorter fermentation period noted between No. 1655 and No. 1656 is partly due to slight weathering on the Marquis sample from Scott. The behaviour of the blends seemed to follow the percentage of Marquis included.

Careful observations were made on the dough consistency of the different flours. Marquis produced a more elastic, more lively, and more resilient dough than Garnet. The Garnet could be described as being more pliable than Marquis, although a very nice type of dough. The dough consistency of the blends corresponded to the amount of Marquis included.

In the matter of crumb colour the Garnet and Garnet-Marquis blends were darker than straight Marquis. Again, as in the case of the flour, the Garnet crumb could be described as creamy yellow and the Marquis Creamy white.

BRAN MEASUREMENTS OF MARQUIS AND GARNET

Since there may be a relationship between the thickness of bran and flour yield on the one hand and between thickness of bran and the degree to which this pulverizes in milling on the other, samples of bran from the foregoing milling tests of Marquis and Garnet were subjected to comparative measurements in a preliminary investigation on this characteristic.* The measurements were taken on the thickness of five pieces of bran, superimposed on each other, by an apparatus devised by Polikeit.[13] The average thickness per bran flake in millimeters, measured under normal and increased pressures and repeated six times is shown in the following table:

BRAN MEASUREMENTS

Milling number	Variety	Normal pressure	Increased pressure
		m.m.	m.m.
1661	Marquis	0·216	0·110
1665	Marquis	0·201	0·112
		0·209	0·111
1662	Garnet	0·193	0·097
1666	Garnet	0·165	0·079
		0·179	0·088

Bran produced from Marquis in these tests, it will be noted, measured appreciably greater in thickness than that from Garnet.

* For these measurements we are indebted to Dr. F. T. Wahlen, Chief Seed Analyst, Seed Branch, Dominion Department of Agriculture.

[13] L. Wittmack—Landwirtschaftliche Samenkunde, Berlin, 1922. Page 49.

MARQUIS AND GARNET FLOURS BLENDED AND BAKED

Garnet and Marquis straight grade flours were blended from samples of wheat milled from the 1926 crop. A description of the samples used is included in the tables. The flours were aged about six weeks and then tested for baking qualities.

MILLING TESTS

Garnet and Marquis Straight Grade Flours Blended from Wheats grown on the Dominion Experimental Farms and Stations, in 1926

Milling No.	Variety	Source	Probable Grade	Appearance	Weight per bushel	Weight per 1,000 K.	Flour extracted	Flour blended	Ash Content	Flour Colour	
										Dry	Wet
					Lb.	grammes	p.c.	p.c.	p.c.	p.c.	p.c.
1653	Marquis	Brandon	1 N	Bright, plump	62·8	29·416	70·7	50	0·44	99	100
	Marquis	Indian Head	1 N	" "	63·5	31·970	70·9	50			
1654	Garnet	Brandon	1 N	" "	62·2	27·312	70·3	50	0·45	90	93
	Garnet	Indian Head	1 N	" "	64·0	27·966	71·1	50			
1655	Marquis	Brandon						25	0·45	95	96
	Marquis	Indian Head						25			
	Garnet	Brandon						25			
	Garnet	Indian Head						25			
1656	Marquis	Brandon						40	0·44	97	97
	Marquis	Indian Head						40			
	Garnet	Brandon						10			
	Garnet	Indian Head						10			
1657	Marquis	Rosthern	1 N	Bright, plump	61·8	28·416	68·3	50	0·38	99	99
	Marquis	Scott	1 N	Weathered, plump	60·3	31·380	69·8	50			
1658	Garnet	Rosthern	1 N	Bright	61·0	23·824	69·5	50	0·45	89	91
	Garnet	Scott	2 N	Bright, lean	58·6	25·208	70·2	50			
1659	Marquis	Rosthern						25	0·44	95	96
	Marquis	Scott						25			
	Garnet	Rosthern						25			
	Garnet	Scott						25			
1660	Marquis	Rosthern						40	0·42	98	97
	Marquis	Scott						40			
	Garnet	Rosthern						10			
	Garnet	Scott						10			

BAKING TESTS

Garnet and Marquis Straight Grade Flours Blended from Wheats grown on Dominion Experimental Farms and Stations in 1926.

Milling Number	Variety	Source	Flour Blended	Fermentation time	Water absorbed	Water retained	Volume	Loaf shape	Crust	Texture	Baking strength	Crumb colour
			p.c.	hr. min.	p.c.	p.c.	c.c.	height, / diam.	p.c.	p.c.	p.c.	p.c.
1653	Marquis	Brandon	50	3 13	71·8	45·3	497	0·67	96	96	101·7	98
	"	Indian Head	50									
1654	Garnet	Brandon	50	3 28	69·8	42·3	536	0·70	99	94	105·9	91
	"	Indian Head	50									
1655	Marquis	Brandon	25	3 21	70·9	44·0	523	0·68	98	95	104·3	95
	"	Indian Head	25									
	Garnet	Brandon	25									
	"	Indian Head	25									
1656	Marquis	Brandon	40	3 25	70·8	43·7	524	0·67	97	93	103·1	96
	"	Indian Head	40									
	Garnet	Brandon	10									
	"	Indian Head	10									
1657	Marquis	Rosthern	50	2 40	69·6	42·1	476	0·65	94	95	97·1	98
	"	Scott	50									
1658	Garnet	Rosthern	50	3 5	69·0	40·9	521	0·68	96	95	103·0	89
	"	Scott	50									
1659	Marquis	Rosthern	25	2 52	69·0	41·4	505	0·69	98	97	102·7	96
	"	Scott	25									
	Garnet	Rosthern	25									
	"	Scott	25									
1660	Marquis	Rosthern	40	2 49	69·6	43·4	516	0·69	98	94	103·3	97
	"	Scott	40									
	Garnet	Rosthern	10									
	"	Scott	10									

NOTE.—Water absorbed, Water retained, and Volume are corrected to 10 p.c. moisture basis.

In flour colour the Marquis was creamy white and Garnet creamy yellow. The colour improved in blends corresponding to the amount of Marquis included. The ash content of the Marquis (mill No. 1657) was lower than that of Garnet, (mill No. 1658). The Garnet wheat used in this blend was lean, as shown by the weight per thousand kernels.

In the baking test, Garnet showed a little greater "strength." The dough seemed to resist fermentation a little better than Marquis. In the case of mill No. 1657, the Marquis wheat sample from Scott was somewhat weathered, which would hasten fermentation. In crumb colour Marquis was creamy white and Garnet creamy yellow. The Marquis was quite superior in this respect both to Garnet and to the Garnet-Marquis blends.

GARNET AND MARQUIS BLENDED WITH A PASTRY (WEAK) FLOUR

Garnet and Marquis straight grade flours milled by the Minnesota State Experimental Mill and bleached at the rate of 0.6 oz. chlorine per barrel, from wheat grown at Scott, Saskatchewan, in 1925, were blended with a pastry grade, commercially milled from Ontario winter wheat. The following table gives a summary of the results obtained:—

MARQUIS AND GARNET BLENDED WITH A PASTRY FLOUR

Test Number	Blend	Protein	Diastatic Power (Rumsey's) value	Baking Strength	Texture	Crumb Colour	Remarks
		p.c.		p.c.	p.c.	p.c.	
1622	Garnet	13·5	286·8	93·6	97	97	Good
1623	Marquis	13·2	199·6	97·7	95	99	Very good
1624	Pastry Grade Flour	9·1	133·2	80·7	82	93	Poor
1612	Garnet 50% + Pastry Grade 50%			87·4	83	92	Poor
1613	" 60% + " 40%			85·1	84	92	Poor
1614	" 70% + " 30%			86·4	91	94	Fair
1615	" 80% + " 20%			88·9	95	96	Fair
1616	" 90% + " 10%			91·3	94	95	Fair to good
1617	Marquis 50% + " 50%			85·0	84	93	Poor
1618	" 60% + " 40%			89·1	84	92	Poor texture
1619	" 70% + " 30%			93·5	87	93	Fair
1620	" 80% + " 20%			91·7	91	96	Fair to good
1621	" 90% + " 10%			94·7	94	97	Good

The protein content and baking strength of the pastry flour was low. The diastatic power (Rumsey's value) was highest for Garnet and lowest for the pastry flour. The blends of Garnet and Marquis with the pastry grade were not in any case, equal to the check tests of the flours from the two varieties. The baking values corresponded fairly closely with the proportion of pastry grade flour included in the blends. Very little difference was shown in the above tests in the comparative value of Garnet and Marquis for blending with the pastry or weak flour when the separate baking strength of the two varieties was considered.

BLEACHING EXPERIMENT WITH MARQUIS AND GARNET FLOURS

Garnet and Marquis wheats were milled into straight grade products with our Experimental Flour Mill from wheats grown at Ottawa and Swift Current in 1925. The samples were milled in December and immediately treated with Novadelox B. (Novadelox B is a harmless bleaching and maturing powder which originated in Europe. It is particularly useful in this experiment to test out easily the effect in improving the colour of flour by a process which does not

materially affect the baking strength). The flour was baked into test loaves about four weeks after milling. The following table gives the results of the experiment.

Garnet is decidedly improved by the use of Novadelox B in bleaching although it does not bleach to the same degree as Marquis.*

BLEACHING EXPERIMENT WITH MARQUIS AND GARNET FLOURS FROM CROP 1925

Milling Number	Variety	Source	Flour Treatment	Flour dry	Colour wet	Baking strength	Crumb colour	Remarks on crumb colour
				p.c.	p.c.	p.c.	p.c.	
1505	Marquis	Ottawa	Check	96	96	95·6	95	Creamy
	"	"	Novadelox B 5/10 oz. per brl.	99	99	95·2	100	Creamy white
	"	"	" 6/10 oz. "	100	100	94·5	100	Creamy white
1504	Garnet	"	Check	85	89	98·1	90	Creamy yellow
	"	"	Novadelox B 5/10 oz. per brl.	96	98	99·1	96	Creamy
	"	"	" 6/10 oz. "	97	99	97·0	97	Creamy
1503	Garnet	Swift Current	Check	85	88	97·1	92	Deep creamy
	"	"	Novadelox B 5/10 oz. per brl	96	99	96·6	98	Creamy to creamy white
	"	"	" 6/10 oz. "	97	99	94·9	99	Creamy white

PART IV—CONCLUSIONS

GENERAL CONCLUSIONS

From the data now available we may conclude that Garnet is a variety which merits consideration especially in those districts where the conditions are inimical to the proper development of Marquis. It is generally agreed that it is preferable to produce a well developed Garnet sample than a poorly developed or unsound sample of Marquis. For reasons given below, however, we cannot recommend Garnet as a substitute for Marquis in districts where the latter variety may be depended upon to thrive successfully, although even in these districts it may often be profitable to the farmer to allow the former variety to occupy a part of the area devoted to wheat.

From the standpoint of milling and baking qualities, Garnet, undoubtedly, does not rank as high as Marquis all things considered, although it seems entitled to rank among the good milling wheats. The chief point regarding which Garnet is open to criticism is in the colour of flour. This without doubt is more creamy than Marquis. Since, however, bleaching and maturing processes have become so highly developed and are becoming so generally practised, the objection to the colour of Garnet would appear to be appreciably minimized.

SUMMARY OF THE BULLETIN

1. Garnet, an early maturing, beardless variety of hard red spring wheat was developed from a cross made in 1905 at Ottawa, Canada, between the two varieties Preston A and Riga M. It is quite closely related to the well known variety Ruby, which variety it resembles to some extent.

2. The continued good behaviour of Garnet in plot tests conducted in widely separated districts, and over a period of years, caused it to be increased in order to permit a more extensive investigation of its various qualities.

3. Extensive milling and baking tests of Garnet, Marquis and a number of other varieties grown in 1924 and 1925 on Federal Experimental Farms in the Prairie Provinces have been made by the Cereal Division, Ottawa.

4. Similar tests, but on a smaller scale, have also been made by Canadian Milling Companies.

* See Dr. Sherwood's report for further work on the bleaching of Garnet flour.

5. From the crop of 1925 grown at the Experimental Farm, Scott, Sask., 80 bushels each of Garnet and Marquis were shipped to the State Testing Mill at Minneapolis, and 20 bushels of each to the Pillsbury Flour Mills Co., also of Minneapolis, for milling and baking tests on a commercial scale.

6. As a result of the field performance of Garnet as well as of its behaviour in milling and baking tests, it was decided to make this variety available for trial by farmers in 1926, but in quantities limited to 4 bushels per person. Farmers to the number of 2,826 obtained a total of 6,954 bushels of seed of Garnet direct from the Dominion Experimental Farms, while several hundred additional farmers were able to obtain their requirements from two or three private growers. The total area occupied by Garnet in Western Canada in 1926 is estimated at about 12,900 acres.

7. Reports from several hundred farmers *re* the performance of Garnet in comparison with that of their main crop have been received and tabulated as have also the data accumulated from tests conducted at the various Dominion and Provincial Farms.

YIELD

8. On the average of all tests conducted to date on the Dominion Experimental Farms and Stations as well as on Provincial Farms, Garnet outyields Ruby quite definitely, but there does not appear to be a significant difference in yielding ability between the Garnet and Marquis. This statement would seem to apply pretty generally to tests conducted by farmers as well. On the other hand, Garnet appears capable of outyielding Marquis by a substantial margin in specific districts, notably those in which an early variety has a distinct advantage.

EARLINESS

9. Garnet matures from 5 to 10 days earlier than Marquis and about a day ahead of Ruby. Under certain conditions the difference in maturity between Garnet and Marquis may be considerably greater than this.

STRENGTH OF STRAW

10. In strength of straw Garnet appears to come between Marquis and Ruby, being slightly stronger than Ruby, but not quite so strong as Marquis. Under some conditions, however, Marquis shows distinctly greater strength.

RUST RESISTANCE

11. In tests conducted at the Rust Research Laboratory, Winnipeg, Garnet did not display any resistance to any of the seven physiologic forms of stem rust used. Although this variety may not possess rust resistance, it may prove of value in rust areas by partially escaping this disease owing to its ability to mature early.

MILLING VALUES

12. Weight per bushel.—In the case of samples obtained from the Dominion Experimental Farms and Stations in the Prairie Provinces in 1924 and 1925, Garnet weighed slightly less per measured bushel than did Marquis. On the other hand, records at the Dominion Farms at Brandon, Indian Head, Rosthern, Scott, and Lacombe over a period of six to eight years, show that Garnet and Marquis averaged 62 pounds and 61.9 pounds per bushel respectively. Where the supply of moisture is ample, Garnet appears to equal, if not to excel, Marquis in weight per bushel. Thus, over a twelve-year period at Ottawa, Garnet averaged 64.1 pounds and Marquis 62.7 pounds per bushel.

Size of Kernel.—The kernel in the case of Garnet is normally smaller and more linear in shape than is that of Marquis, and where conditions are not favourable for full development of the kernel, this is inclined to be "lean" and not quite so desirable for milling purposes.

In weight per thousand kernels Garnet is almost always appreciably lower than Marquis.

Hardness of Grain.—Garnet produces a more vitreous kernel than Marquis and appears to hold its colour better under moist conditions. This difference is particularly evident in districts where Marquis produces starchy or "piebald" kernels.

Flour Yield and Ash Content.—Garnet appears to equal Marquis in flour yield where the weight per bushel is equal to, or even slightly less than Marquis.

In most Experimental Mill tests the ash content of Garnet was appreciably higher than in Marquis, but in the commercial test at Minneapolis this was found to be the same for the two varieties.

Flour Colour.—The colour of the flour of Garnet is more yellow or dark than is that of Marquis. The unbleached flour of Garnet when freshly milled may be described as light yellow or creamy yellow, while that of Marquis may be described as creamy white.

Garnet has been satisfactorily bleached by two types of commercial bleaching and maturing agents.

Crude Protein.—The crude protein of Garnet grain is usually somewhat lower than that of Marquis, although the appearance of the grain might lead one to think otherwise.

BAKING QUALITIES

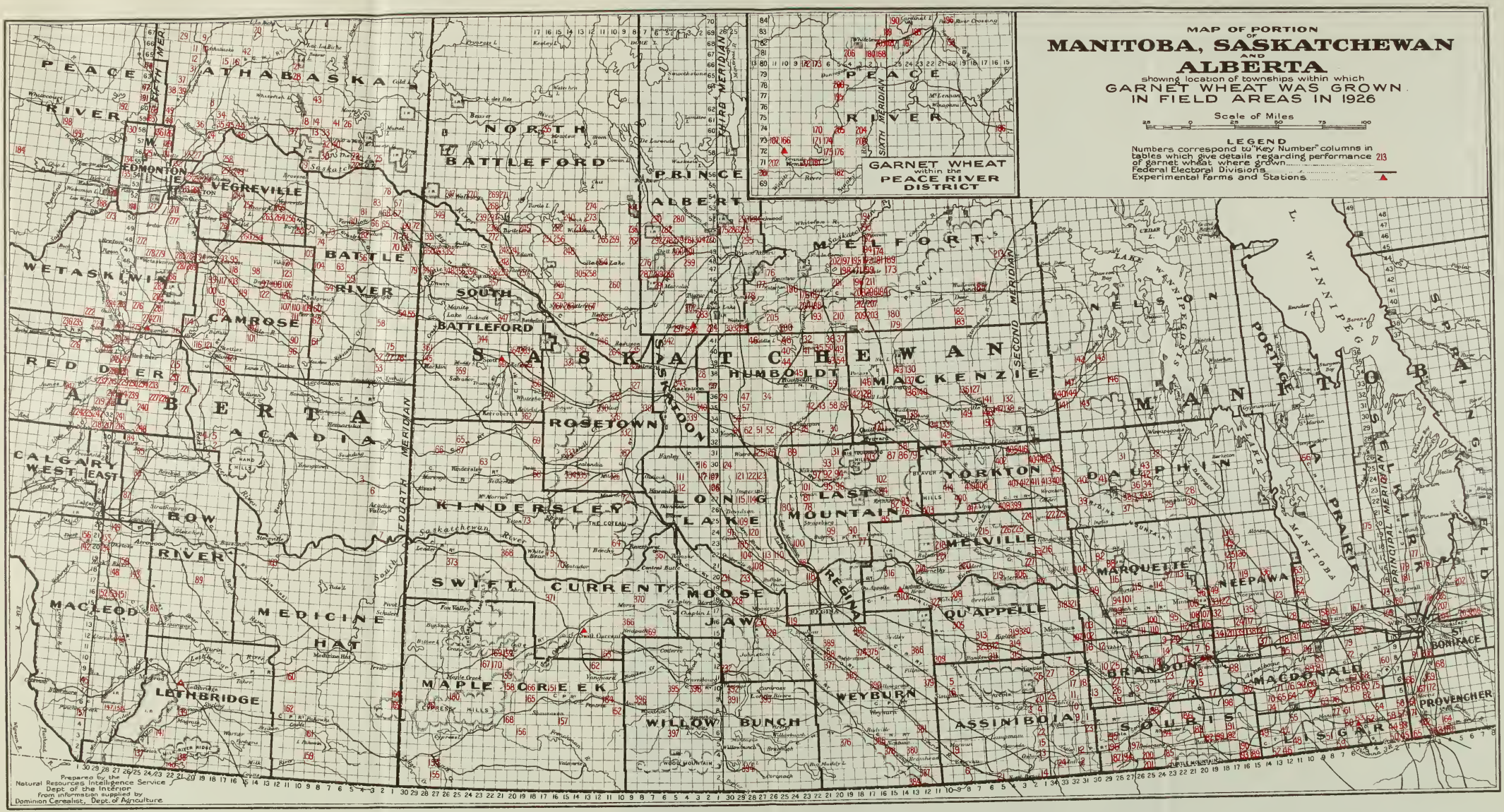
13. Water Absorption and Bread Yield.—Generally speaking, the flour of Marquis absorbs a little more water than does that of Garnet and, consequently, is inclined to produce a little higher bread yield.

Dough Consistency and Stability.—Garnet flour produces a dough of less resilience and elasticity than Marquis. The Garnet is considered more pliable in consistency than Marquis. In experimental and commercial test bakes the Garnet dough resisted fermentation slightly better than Marquis. When subjected to modern, large-production baking machinery and methods Garnet proved very satisfactory in stability.

Loaf Volume.—In the majority of tests Garnet produced a loaf of slightly greater volume than Marquis. This, possibly, is explained by the greater saccharogenic fermentability of the Garnet flour as particularly evidenced by a browner crust when baked and by studies of "diastatic power."

Crumb Colour.—In colour of crumb Garnet ranks appreciably lower than Marquis. On the other hand there is considerable evidence available to indicate that the crumb colour of Garnet is entitled to rank higher than such varieties as Kota or Kitchener.

Crumb Texture.—In texture of crumb Garnet is nearly equal to Marquis. On the other hand Garnet appears to be superior to Early Red Fife, Early Triumph and Kitchener in this respect. Good texture combined with high volume is commonly regarded as an indication of high baking strength in "baker's marks."


MAP OF PORTION
OF
MANITOBA, SASKATCHEWAN
AND
ALBERTA
showing location of townships within which
GARNET WHEAT WAS GROWN
IN FIELD AREAS IN 1926
Scale of Miles
LEGEND
Numbers correspond to "Key Number" columns in tables which give details regarding performance of garnet wheat where grown
Federal Electoral Divisions
Experimental Farms and Stations
GARNET WHEAT within the PEACE RIVER DISTRICT
PEACE RIVER
SIXTH MERIDIAN
PEACE RIVER
ATHABASKA
NORTH BATTLEFORD
PRINCE ALBERT
MELFORT
EDMONTON
VEGREVILLE
BATTLE RIVER
WETASKIWIN
CAMROSE
SOUTH BATTLEFORD
SASKATCHEWAN
HUMBOLDT
MACKENZIE
NELSON
RED DEER
ALBERTA
ROSETOWN
YORKTON
DAUPHIN
ACADIA
CALGARY WEST
EAST
KINDERSLEY
LONG LAKE
LAST MOUNTAIN
MELVILLE
MARQUETTE
NEEPAWA
BOW RIVER
SWIFT CURRENT
MOOSE JAW
REGINA
QU'APPELLE
MACLEOD
MEDICINE HAT
BRANDON
MACDONALD
PORTAGE LA PRAIRIE
MANITOBA
LAKE WINNIPEG
LETHBRIDGE
MAPLE CREEK
WEYBURN
WILLOW BUNCH
ASSINIBOIA
SOURIS
PROVENCHER
BONTFACE
FOURTH MERIDIAN
THIRD MERIDIAN
SECOND MERIDIAN
PRINCIPAL MERIDIAN
Prepared by the
Natural Resources Intelligence Service
Dept. of the Interior
From information supplied by
Dominion Cerealist, Dept. of Agriculture

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