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WHEAT
SEED _

SELECTION -HYBRIDIZATION
GENEALOGY-PRODUCTION
CHARACTERISTICS OF THE VARIETIES
REGULATION

Preface by J.RATINEAU Inspector
General of Agriculture Director of the
National School of Agriculture of Grignon

Former **DELARUE** House
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"AGRICULTURAL SEEDS"

Seed Wheat

F. FLANDRIN

Agricultural Engineer,
Head of Regional Services of ON IC

SEED WHEAT

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INTRODUCTION

Questions concerning cereal seeds have been the subject of publications, the purpose of which was above all to provide general elements concerning cereals or such technical part as selection, improvement, treatment of seeds, conservation grains, and dealt secondarily with the questions of seeds themselves.

No work, to our knowledge, had yet grouped together all the documents that could be of interest to those who, directly or indirectly, attach themselves to questions relating to *cereal* seeds .

To fill this gap, we wanted, in a small volume, to bring together scientific, practical, commercial, legal and technical elements , allowing those interested in seed questions to have at hand a sort of summary of essential basic knowledge .

The farmer, seed producer, will find information of interest to him on the subject of the varieties of wheat, their origin, their qualities and defects, which will enable him to make his choice, with full knowledge of the facts, on such or such variety, which can be sown under determined conditions of soil, climate and season.

He will find there, simply explained, the complicated phenomena which preside over the fertilization of the flower of wheat, the selection of varieties, the

artificial hybridization, Mendelian disjunction , so many problems still somewhat mysterious for many and for which we have endeavored to give a simple explanation, within everyone's reach.

The seed producer , organization or individual , will not make any great discoveries, however, in the study of seed production, he will be able to draw practical advice that we believe we can issue based on our experience of more than twenty years, during which we had the opportunity to practice in all sectors of seed production (Selection , Hybridization, Organization of seed production , Studies, Technical controls, Trade and regulations) .

He will find there a rational and original classification of the regulation *of* the production and trade of seeds and also technical data concerning the genealogical origin of wheat varieties.

Finally, the chapters on selection and hybridization, which have made it possible to obtain modern varieties, will make him understand how meticulous and costly the work necessary to the culmination of the selection seed, the centerpiece of the improvement in yields, and therefore *of* the lowering of the cost price.

Students and the curious will have every opportunity to find in our chapter reserved for the genealogical origin of varieties, a study illustrated by the graph which constitutes a real genealogical tree of two hundred varieties of wheat among the best known, all the information of desirable technical order.

This work required very long and patient searches for paternity and involved approximately

six hundred varieties of wheat. We did not think it necessary to append it to our modest work, which is intended only for popularization, and our readers will find only an extract from it, relating to about two hundred varieties.

The original graphic will be the subject of a separate print, which would not belong here.

For many other readers, this little manual will undoubtedly bring some new knowledge and we have thought of them constantly during its writing, in order to make it more understandable, avoiding the use of overly technical terms as much as possible .

We repeat that this modest work has only one claim: that of having grouped together in a small volume all the main knowledge that must be possessed by those who, from near or far, are interested in this question, primordial pou.: the country, and fascinating among all: The Production of Good Seeds.

FF

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I

THE ORIGINS OF OUR WHEAT

For a long time, the varieties of wheat cultivated in France were represented by old country sorts, long since acclimatized to the local conditions prevailing in their area of expansion.

In most cases, these types of wheat, of which we still find sometimes significant islands today , represented, and still represent for some, not varieties bearing specific characteristics, but rather a mixture of breeds having evolved in parallel, subject to to the same conditions of soil and climate, but having reacted differently, according to their own faculties, These sets, which are called "populations " by analogy with the set of individuals who form a population they too, sometimes very diverse characters), are the fruit of a natural selection, where the strongest subjects have generally taken the _step_over the others, who are eliminated from generation to generation.

pas sur

Logic could lead to the conclusion that all is well in this way and that after all nature itself does for free what man did not know how to do or neglected to do.

But, in practice, this is not the case for two reasons:

1° Because nature acts very slowly and

that, if examples abound in the history of life , of the perfecting of beings by adaptation and transformation, our turbulent epoch could not be satisfied with this sure but far too slow action ;

trop

2° Because nature has only one goal, according to appearances: to ensure the reproduction of the species by all means; now, the interest of present-day man is quite far from this concern and, consequently, the action of natural selection cannot, here either, be sufficient for him.

THE EVOLUTION OF METHODS

It was then that we undertook to improve the varieties cultivated, in a way profitable to the interests at stake. These first efforts focused on productivity and the beauty of the grain, but no rational method governed the choice of species. to reproduce and the first results were long to obtain and their effects proved to be fleeting.

For what? because the researchers and especially the farmers and millers relied on *data* that biological science later recognized as false.

The choice of the largest ears of a field with the aim of extracting from it a seed of great value, if it could sometimes give partial results, has always been followed by setbacks; this method is indeed irrational because a plant can produce a large ear instead of providing three or four medium ones, which escape the choice. On the other hand, a sparse part of the field will often provide more substantial ears because the plant that comes from it will have had more light, more food , more humidity.

It was only towards the end of the last century that pioneers got down to work in various parts of the world, but especially in Western Europe.

tale (Sweden, England, Denmark, Germany, Holland, Belgium, Switzerland, France).

The research work on selection was put to good use, depending on the country, by **private organizations** (France, England, Belgium, Germany), **or by State organizations or largely subsidized by the States (Sweden, Switzerland, Denn**

These organizations were not long in extending the field of their research and while maintaining the practice of selection, sought to improve the characteristics of the varieties by crossbr

The discovery of the Austrian monk Mendel, relating to the laws of heredity, subsequently made it possible to **give this work a better defined orientation and thus enabled researchers to save precious time.**

We will see, indeed, further on, how the knowledge of these laws and the observations which are their consequence have made it possible to orient the work of geneticists, to the point of bringing about a quasi automaticity in par

III

THE SELECTION

Selection is work by which a choice is made among a certain number of individuals.

The principles governing breeding, both for plants and for animals, are now well known to many farmers.

Breeders in particular know how to put them into practice ; however, it seemed useful to recall a few basic principles here.

GENEALOGICAL SELECTION

Any genealogical selection must be based on the individual who is for the plant: the plant.
Indeed, in the same wheat, oat, barley, bean or alfalfa plant, all the similar parts of the plant bear identical characters . Obviously, a leaf can be larger than another, an ear more developed than its brother, but these organs carry strictly identical botanical characteristics.

It is therefore absolutely useless to isolate an ear of wheat since all the ears carried by the same plant are twin brothers and we therefore save precious time by taking as a starting point all the ears from the same plant. .

This notion is important when the selection, *as is* very often the case, is exercised for the purpose of commercial produc

It is therefore absolutely essential to deal initially with only one plant-individual; this is what has led all serious breeders either to sow their lines grain by grain or, what is better, to transplant the seeds previously sown in the nursery.

This transplanting has, moreover, the advantage of causing greater tillering of the plants and, consequently, of supplying a greater quantity of grain per individual plant.

The breeder must then possess a ***standard ,*** that is to say possess a sort of matrix, a model, made up of typical plants kept for as long as possible and descriptive technical documents that are sufficiently precise so that at any time, the technician can compare the samples of his products with this model, and compare the measurements and technical and psychological elements with the elements listed on the standard sheet".

If all the characteristics of the plants taken from a small plot (line) are identical and are fixed, that is to say they do not fluctuate either in time or in space, we are dealing with a ***pure line.*** The pure line corresponding to the standard constitutes the variety.

It is the conservation of these characteristics that tends to ensure the selection.

CONSERVATIVE SELECTION

In practice, if the choice of mother plants for production tines takes place only once and is only followed by multiplication, one is exposed, even

des-

if the animal is working on a pure line, to see more or less pronounced differences appear between the plants of the multiplied batch. These differences may come either from fluctuations due to the influence of the environment, or from sudden mutations or variations whose causes are not determined, or from natural crossings, which are fairly infrequent in wheat, especially in temperate and cold regions, or accidental mixtures caused by birds, handling, errors a

To overcome these disadvantages and keep the pure line all its value, the breeder must repeat each year his choice of mother plants in his elite plots, in order to ensure sustainability. nity of a production of value.

THE MUTATIONS

Mutation, or sudden variation, is a phenomenon which appears suddenly in a line, without anything being able to let it be foreseen. It results in the appearance of so-called c aber-rants" that have different characteristics from the lineage in which they appear.

This is how P 13 appeared, a variation with the white ear of *Peace* wheat; the Wilson, wheat with an ear of pink color, appeared in the Hâtif Inver. sand; Hybride40 , wheat with white ears, in the Wilson; Japheth, considered to come from an improvement of Noah's wheat. ancestor of three quarters of our current wheat; Bordeaux rode , also from Noah's wheat. The examples are very numerous and are not limited to morphological differences but are also observed in physiological qualities. This is how the

wheat Denaiffe 31, apart from its morphological differences ,. constitutes an improvement of the Early Reversible wheat from which it comes in terms of resistance to frosts.

The dominant characteristic of the mutation and what makes it all the interest for the breeder is that the variation is definitively fixed as soon as it appears and therefore does not require any fixing work on the part of the breeder. We can therefore say that a *priori* a mutation is always interesting, if it presents a certain progress in any direction, but profitable, compared to the variety which gave rise

This quality of immediate fixity, in mutations , is opposed to the disjunction of hybrids, a phenomenon that we are going to study now.

IV

HYBRIDIZATION

DEFINITION - PURPOSE

Hybridization is an operation which consists of artificially marrying two varieties, so as to obtain a new variety which presents the qualities chosen in both parents.

Before recourse was had to artificial hybridization , the cultivated varieties came either from more or less fixed local races, or from mutations , or from natural hybridizations, phenomena quite frequent in the countries where rages, at least ment of wheat flowering, heat strong enough to cause the floral envelopes to open up and thus allow the wind or insects to bring in foreign pollen before fertilization has taken place.

This hybridization is called: natural, as opposed to artificial hybridization, caused by the hand of man.

So before hybridization was resorted to to improve existing varieties, cultivated wheat had its own qualities and defects.

The evolution of cultivation methods has precipitated the disappearance of certain varieties which were not

more adapted to the new conditions, such as **Bordeaux wheat ,** grown for a very **long time in a large part of France and which has seen its** growing area gradually decrease, for lack of sufficient resistance to lodging, under current growing conditions and the generalization of the use of fertilizers.

Closer to home, we are constantly seeing local wheats recoil before modern hybrids . This is the case, in particular, of wheat from Alsace, very widespread in the East and the North-East, and which gives a little more space every day to new products resulting from hybridizations.

We can also point out, in passing, that there is reason to be worried about this premature regression, in certain regions, of Alsace wheat, because new varieties which have supplanted it, especially in rich, are much less resistant to frosts. **There** is no doubt that the effects of the disaster caused by the winter of 1946-1947 would have been mitigated in this region if the areas cultivated with Alsatian wheat had not been reduced so imprudently.

This remark is exceedingly important and should not be lost sight of by farmers and those who advise them, for the introduction of a new variety into a country cannot take place before several years of rational experimentation, and it would no doubt have been more judicious to try *to improve Alsace wheat* by crossing, rather than systematically replacing it with new varieties imported from other regions, which do not always meet the conditions of resistance required by the very harsh Vosges climate, which prevails in this part of France.

Achievements in this direction have been limited to obtaining wheat:

Vieux Ferrette (improved line from Alsace 22);
Evolution (by crossing with **DD** Tourneur wheat) ; Alsace
338 (by crossing with Vilmo rin23 wheat); Japhet Vilmo- Alsace
(by crossing with Japhet wheat) ; (by crossing with Rouge ;
B^2 de Bordeaux wheat).

We are not aware that any of these wheats have taken on a significant extension and can effectively replace Blé d'Alsace, except perhaps the "Vieux Ferrette" wheat, which represents an improved line.

These examples could be accompanied by many others, in particular: the extension of Vilmorin27 wheat cultivation in southern France , where, in Vilmorin insufficiently cool land , this wheat runs a high risk krai- of scalding. However, no currently known wheat results from the crossing of this excellent variety with local wheat that is resistant to scalding. résistant

There is no need to multiply the examples, the aim of the hybridization having thus been clearly exhibited.

The only useful remark that one can make on this subject, when one examines the genealogical tree of our current varieties, which one will find at the end of this work, is that certain hybridizers operated without having a very specific goal, but have rarely indulged in the haphazard game of the lottery that constitutes the Mendelian disjunction of hybrids , a phenomenon which we will discuss later. Indeed , it may happen that, as a result of an unreasoned crossing, forms appear of any interest, either from the cultural point *of* view cul-

tural (yield qualities), or from the point of view of use (milling value and bakery). It is then pure chance, and very few varieties spread out come variété from this "stroke of luck".

On the contrary, reasoned hybridization is the fruit of a long and patient work, which requires several years and even which, for certain varieties, required several decades. This is generally the result of varieties resulting from several successive hybridizations and which are called multi- hybrids. multi-hybrides.

This is particularly the case for Vilmorin 27 wheat, whose genealogical origins we give below in the form of a diagram.

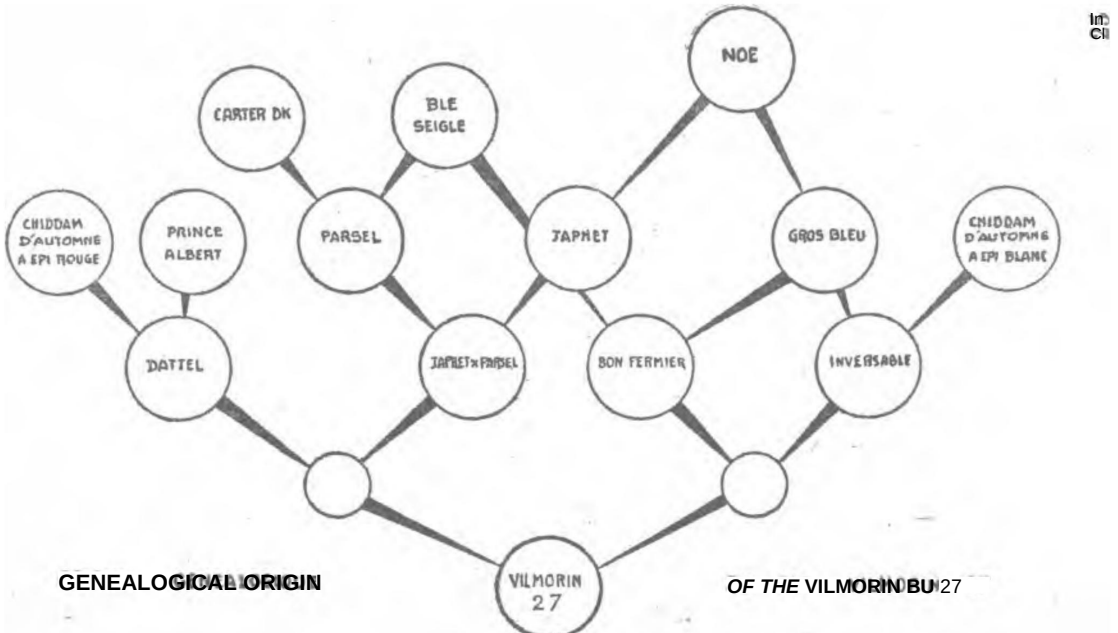
It is remarkable to note that this diagram reveals that the breeder saw fit, here, to involve Noah's wheat twice in this succession of crosses, on the one hand by "Inver sable" and "Bon Fermier", coming of “Gros Bleu”, on the other hand by Japhet X Parsel, coming from Japhet, Japhet and Gros Bleu being both sons of “Noé”. Similarly, “Blé Rye” was used by “Parsel” and, on the other hand, by “Bon Fermier”. This is a very typical example of a “reasoned” multihybrid.

This method of repeated hybridization is obviously the illustration of the principle, stated above , concerning the purpose of hybridization.

PHYSIOLOGICAL PROCESS

We said above that hybridization was a marriage. This process therefore has nothing in common, as some imagine, with the graft.

This is the pure and simple bringing together *of the* vegetative parts constituted by the cambium of the



GENEALOGICAL ORIGIN ***OF THE*** **VILMORIN BU** 27

graft and that of the subject, while hybridization brings into play, through the conjunction of the sexual cells of the parents, the most intimate characteristics of the two individuals who unite, characteristics which are contained in the chromosomes, microscopic corpuscles existing identical in number in all the cells of all wheats and carrying the same characters in all the cells of a determined individual.

The arrangement that intervenes between the characters carried by the half-chromosomes of the father and the mother will condition, at the time of fertilization, those of the daughter cell, which, as we will see later , will transmit to its descendants a whole new range . entanglement of these characters .

Before **pushing further the study of descent , we will quickly examine how hybridization is practiced.**

THERE. STRUCTURE DUL4 FLEVR

To fully understand this operation, it is essential to know the structure of the wheat flower.

Wheat is an antogamous plant, that is to say that each *of* its flowers contains the male organs (stamens) and the female organ (pistil) essential for fertilization in higher plants.

It is from the conjunction of these organs that the germ is born, which engenders the grain.

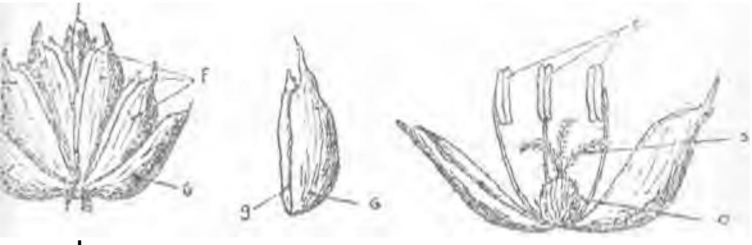
The stamens are those little pale yellow pockets that you see hanging outside the ear in June , tossed about by the wind, dry out, die and fall to the ground .

eol.

moment **that the wheat flowers, which is false, then it withers.**

The pockets of the stamens are carried by peduncles or "nets", which keep them at a suitable height so that at the time of fertilization , the grains of pollen which they contain , and which constitute the "fertilizing dust ", have the maximum chance of falling on the pistil, the female receiving organ.

Their role ended, ksetamines see their nets



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lie down to ensure their expulsion from the flower, they are indeed now useless.

The pistil *is* formed by a receptor organ, the stigmate, a kind of small feather duster with three branches, carried by the style, which connects it to the ovary which contains the ovum, the female cell to be fertilized.

FERTILIZATION

When the favorable season has arrived, normal fertilization in the flower of wheat takes place in the **following** way

The stamens, which were green, change to pale yellow and then to bright yellow (violet for certain varieties), which indicates that the pollen grains they contain are reaching sexual maturity and can, therefore, ensure there. fertilization.

Simultaneously, the pistil reaches sexual maturity and, a few hours before the fertilizing dust attaches itself to it, the stigma becomes covered with a viscous liquid, intended to facilitate the attachment of the pollen.

A single grain of pollen, out of the tens of thousands contained in each stamen, suffices; this one, impregnating itself with the liquid covering the stigma, germinates, by emitting a pollen tube, the army sets out and nothing will stop it any more. The pollen tube , at the head of which are the male sex cells, penetrates the tissues of the stigma, travels in the style, reaches the internal wall of the ovary and ends up touching its goal: the ovum.

At this moment the conjunction of the male and female sexual cells occurs , an egg is born, which will become the grain.

This marvelous process of fertilization is simple and unmistakably resembles that carried out by nature in higher animals .

The description above, we specify, is that of normal fertilization, which *occurs* in the well-closed chamber constituted by the envelopes specific to each flower (glumellae) and the envelopes common to a group of flowers or spikelet (glumes) .

HYBRIDIZATION ACTUAL

To operate an artificial hybridization, it is first necessary to prevent normal fertilization from occurring.

please. To do this, we operate castration, which exactly as in animals, consists in removing the male organs before fertilization has taken place.

The operation is very simple : it is limited to opening the flower delicately, using special pliers, and to extirpate the still greenish stamens, which are contained therein three in number, after which, to avoid accidental additions of external pollen by the wind, the ear thus prepared must be isolated , protecting it with a small bag of very fine gauze or paper, until the moment when, the breeder judging the opportune moment, he will bring the pollen of the variety he wants to cross with the one whose ear has undergone the preparation described above.

The lapse of time between the castration of the epi-mother and the artificial fertilization varies from two days (in very hot weather) to eight or ten days (in cool, non-sunny weather). It is up to the hybridizer to follow very closely the meteorological conditions prevailing during this period, so as not to carry out untimely openings of the flower to be fertilized, under penalty of compromising the results of his work, especially if he operates on oats or barley, whose hybridization is much more delicate.

He will bring the pollen of the variety to be crossed by half-opening the flower again and brushing the stigma with a brush, previously loaded with the pollen of the variety chosen as father, or by crushing with the tips of the pliers above the pistil , the mature stamens, which were about to release their pollen.

This done, he will take care to replace the ear thus treated in its isolation box, until the moment when, judging that fertilization has taken place, he will release

the prisoner ear, in order to deliver it to the rays of the sun, which will allow it to reach maturity.

It goes without saying that the rod bearing this precious cob will be carefully staked and labelled.

Some breeders do this work in a mesh cage, where the necessary sowing will have been done beforehand, intended to protect the ears, objects of this delicate work, against the depredations of the birds and the clumsiness or the malevolence of the men

When maturity has arrived, the breeder carefully harvests the hybridized ears, carefully preserves them in numbered bags, until the autumn during which he will sow **these** seeds, which carry all his hopes.

THE MENDELIAN DISJUNCTION

The seeds hybridized during the year are then sown in nurseries and the resulting plants will be transplanted into a place that is easy to monitor and protect. Transplanting takes place in October. at a distance of 10 centimeters in all directions between each foot.

Transplanting has the advantage of providing maximum production, which can reach isoo grains for a.

During this first year, no interesting observations will be made, since all the plants resulting from the hybridization will carry the characteristics of the plant chosen as mother.

This first year will therefore only serve to increase the quantity of production.

It will not be the same the second year and it is during this one that the first effects of the crossing will appear. Each plant from the first year crop will be harvested

apart and the product of its ears will be mixed and prepared for sowing the following autumn.

The contents of each of the sachets will be sown in the nursery in a sparse row, with a view to transplanting the second year plots.

During this second *year,* the phenomena due to the Mendelian disjunction will then appear . These will result in the appearance of an extremely heterogeneous group, made up of plants bearing the characteristics of the mother, others bearing the characters of the father, and finally others composed of individuals carrying these mixed characters. and intertwined in an inextricable way , the ordering of which does not seem to obey any rule.

This is how the crossing of a wheat with a mutic red ear (without awns) with a wheat with a bearded white ear will give bearded red ears, white ears without awns, ears carrying these characteristics overlapping to varying degrees. different. The same observation relates to all the other characters such as: height of straw, size, shape and color of the grain, compactness, length, thickness and width of the ear, without forgetting the many very important physiological characteristics such as : ability tillering, earliness, resistance to lodging, disease, scalding, shattering, frost ; productivity, grain quality, etc., etc.

Practically, the breeder finds himself, *from* the second generation, but only from this one, in front of an incredible diversity of different and new forms which, as we said above , *seem* to obey no law.

Indeed, the disorder of this tangle of characters is only apparent and the appearance of the different forms is subject, on the contrary, to very precise rules discovered by Mendel.

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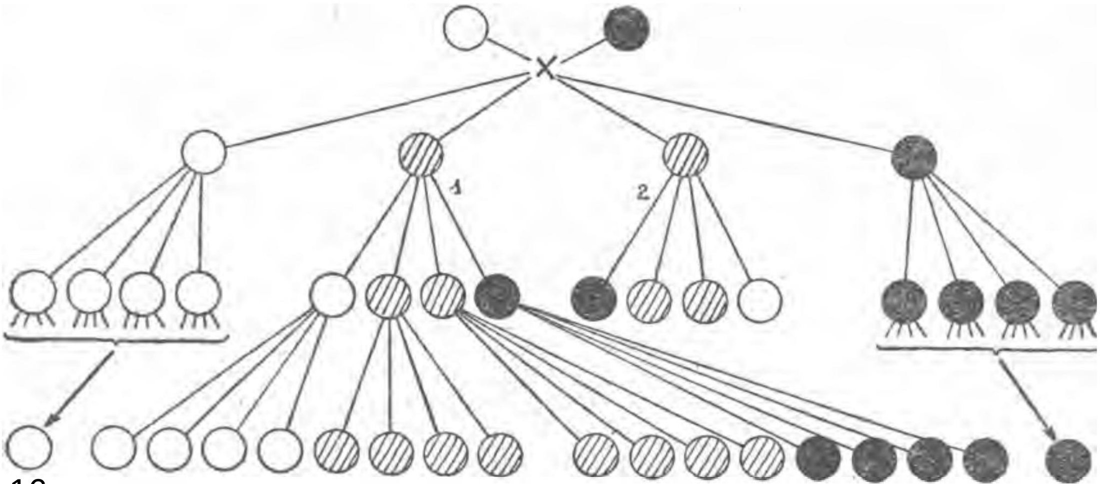

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Mendel, working on peas, discovered that there were dominant characters and dominated or recessive characters. Hybrids carry these two kinds of characters for each of the elements considered, but the proportion in which one will count these and those is well determined: it is 3 to 1.

Let's take, for example, the straw-height character, assuming that it is dominant over the short-straw character.

The crossing of a wheat with high straw and a wheat with short straw will give in the second generation: three plants with high straw for one plant with short straw, but the three plants with high straw will transmit this character differently to their offspring. third generation :

One of the plants with high straw will definitely give rise to plants, all with high straw, which will subsequently only have children with high str This plant is a *homozygote* carrying the dominant character, that is to say a plant in which the dominant character is definitively fixed.

Similarly, the plant with short straw is a homo- homo zygote, but bearer of the dominated character. She will give offspring carrying the definitively fixed short straw character.

The other two plants with high straw will each give in their third generation progeny : 1 homozygous plant with permanently fixed high straw; 2 unattached tall straw plants; 1 plant with short straw permanently fixed, and immediately, as explained by the diagram below, where the high straw character is represented by a white circle and the short straw character by a black circle.

It should therefore be noted that the dominated character is also fixed *in* a proportion of a quarter in each generation.

The other two quarters made up of plants carrying the dominant character (here the high straw), but not fixed, are ***heterozygotes*** and their progeny will give in the same proportion: a quarter of plants fixed with high straw, a quarter of plants fixed short-strawed and two-quarters loose plants, ***and*** so on.

It will be easily understood that the breeder has every interest in fixing his choice on homozygous lines , these, if they combine the qualities sought, will not bring the hazard of a subsequent disjunction.

If the number of characters to be considered by the breeder were two or three, the task would be relatively easy, but in practice it is quite different and the rules we have stated above apply to all the characters taken. in isolation, all of them interesting, to varying degrees it is true, and none of which should be neglected.

If we consider that a plant can bear the fixed dominant character ***A,*** the fixed dominated character ***b*** and other characters as a heterozygote, we then realize the innumerable difficulties facing the breeder and to what extent the faculties of observation must be developed in one who embraces this profession .

SELECTION AFTER HYBRIDIZATION

The coach is therefore in front of a mate disparate riel, in which he will have to distinguish the lines likely to be retained to multiply them , in order to test them on larger surfaces.

This part of the job will often require many years and a great deal of patience and experience. nothing.

Watchmaker's work, worse! Monk 's work , some will say! No! splendid work and which, I assure you , brings to its author a lot of setbacks, certainly, but a lot of satisfactions to those who know how to be patient and know how to orient their work rationally.

When the breeder has made his choice on a hybrid line, which will have successively passed through all the tests and all the tests deemed essential to test its value, he will ensure the stability of the line by applying the principles of selection to it. conservative, described in one of the previous chapters.

If, as is often the case, he intends this new variety for sale, he will then have to *submit* to compulsory formalities, tending to have the new variety registered in the official catalog, instituted by the decree of November 16, 1932.

In addition to the essential administrative formalities, which allow the necessary control of the trade in seed wheat, the novelty will be subjected to tests by specialists from the Institute of Agronomic Research (Versailles station), tests which will relate above all to technical points. nic (fixity, novelty, physiological qualities , etc.).

If the new variety resists all these tests , it will then be entrusted to the official regional stations , then to the official departmental technicians who will include them in comparative trials including varieties already tested, so as to determine their cultural qualities and the regions where novelty can yield the best results.

This device *as* a whole may seem cumbersome and its usefulness may be disputed by some, but if it appeared not only useful, but essential , it is because, around 1930, the production of new varieties had taken on a new dimension. such a scale in our country that it was necessary to create this sieve which no longer allows , as in the past, to put on the market varieties already known, the name of which was only changed for a purely speculative purpose . It is this set of measures that today makes it possible to offer farmers new products that repre

Readers, who are now aware of the many efforts and the important capital which selection requires, you should no longer be surprised to find that the selected seeds are sold at a high price! This is unavoidable, but always insist that the seed purchased corresponds to the denomination on the invoice!

Above all, do not forget that the purchase of quality seeds, which are expensive, necessarily implies the buyer's confidence in his s

Nothing looks more like selected wheat than wheat intended for the mill which has undergone a proper cleaning, so don't buy just anything from just anyone, don't imitate this Norman farmer who is a member of a cooperative of seed production who bought one day, to his great detriment! 200 kilos of *Miracle wheat from* a visiting representative, but buy a variety adapted to your climate and growing conditions from a known house.

V

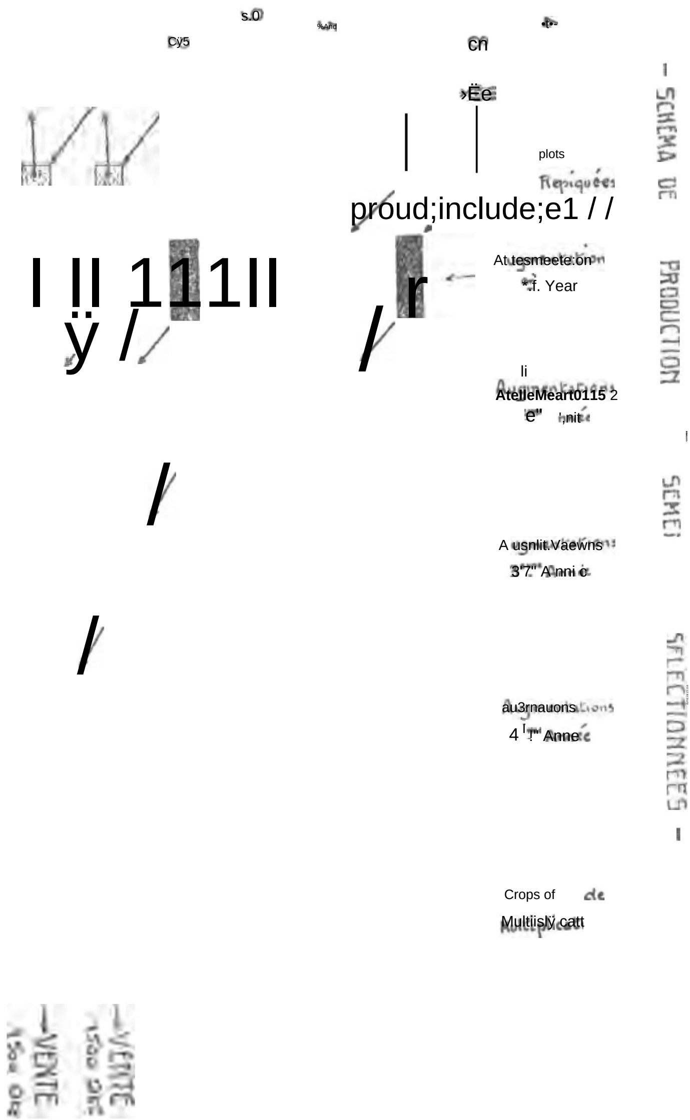
SEED PRODUCTION SELECTED

We will now consider the following operations which must be carried out to produce selection seeds, from the choice of the starting plant, to the sale of the *selection* seed .

In practice, the breeder takes some plants chosen from the starting lines, these plants are compared to the standard and those which do not correspond exactly to the data of the latter are eliminated.

The rest of the starting plots are handed over to supervised multiplication in the selection field and the preserved plants are shelled *separately,* so as to give birth to as many new ones from the starting plots as there are plants chosen. Each year, the same work is carried out and from year to year the lines are multiplied, until the moment when, the field of selection being too small, the breeder entrusts *his elite seeds to* cultivator-reproducers, who have for mission to increase the quantity of seed by sowing, during one year.

During cultivation, these multiplication fields are subject to active monitoring of



from the coach or his assistants. They particularly monitor the appearance of cryptogamic diseases , various mala-dies accidents (lodging, hail, scalding, etc.), note the times of the main vegetative stages (emergence, tillering, heaving, heading , flowering, maturity, cutting), monitor the work of harvesting, re-entry and threshing and finally estimating the harvest.

Relations between the breeding organization and the multipliers are governed by *contracts ,* in particular obliging the growers to deliver the entire harvest resulting from elite seeds.

It is hardly necessary to emphasize that these multipliers must be chosen from among those who have good equipment, knowledgeable personnel and land in good condition, which will make it possible to give every guarantee to the breeding house which supplied the seeds, and in particular threshing facilities to avoid any mixing.

The harvest thus delivered and coming from the elite seeds is received by the selection house , samples are taken and subjected to meticulous examinations, both from the point of view of purity and from the point of view of germination qualities (germination energy or speed of germination and germination capacity or final percentage of germination).

After these operations, the harvest is sorted and the selected seed is then ready for sale.

The decree of April 7, 1937 requires that these seeds have a varietal purity of at least 999%, which means that out of 1,000 grains, the regulations tolerate that only one of these grains does not belong to the variety announced on the label. This basic decree, the text of which can be found in the appendix, sets the minimum germination percentage required at 85 % .

VII

THE USE OF SELECTED SEEDS

Breeding seeds represent a relatively very limited volume compared to the volume of seeds used each year on French soil: barely 1.5 %, or 120,000 to 150,000 quintals out of 10 million quintals planted annually.

This tiny proportion clearly indicates that these seeds , which are expensive to produce, and therefore to buy , can only be acquired by a limited number of farmers who want to be at the head of progress and who are generally open to agricultural methods . modern.

On an individual level, this may well be the case, but if we consider the general interest of our country, which has been living with rationing for nearly eight years, it is quite different and it must be said that the efforts made until now by breeders have not achieved the goal that one might have wished to see achieved: the raising of **overall production in France, by the wide distribution of good seeds.**

Indeed, it should be noted that the distribution of selected seeds was very limited in space and that it penetrated very little into medium and small French farms growing wheat.

For what reasons? It's very simple: first of all because their high price prohibits their use on small farms, for which they represent a heavy burden and, wrongly no doubt, because this expense is often considered unjustified for lands that do not “respond” to investments, such as certain rich lands where cultivation is of the intensive type.

On the other hand, the reduced production of these kinds of seeds limits their distribution to buyers who are particularly well placed in the production regions.

Finally, it must unfortunately be noted that the use of good seeds is not yet common practice on many farms , many growers not being sufficiently aware that this means is still one of those which make it possible to increase production. returns with minimal expense.

VII

REPRODUCTION SEEDS

CURRENT PRODUCTION

It would therefore be very desirable to see the use of good seeds take on a greater development in France, but the reduced production of the seeds selected does not make it possible to envisage a wide distribution of their use.

However, in recent years, breeding seeds have been added to this production .

Breeding seeds come from the controlled multiplication of breeding seeds.
They must, under the terms of the decree of April 7, 1937, present a varietal purity of at least 990%o and a germination capacity of at least 85%.

The production of these seeds is ensured, on the one hand, by specialized houses, some of which are already producers of selected seeds, on the other hand by storage organizations (cooperatives and traders) and also certain farmers authorized to sell the seeds. produced on their farm.

The relationship between the breeding organization and the multiplier cultivators is governed by a convention, dongle type has been adopted official

by the GNIS, and the reproduction of which will be found in the appendix of this work.

This category of seeds is very interesting because, besides being able to be offered at prices much lower than those of selection seeds, while having qualities that bring them closer to the latter, they can be produced in large quantities . more important.

Currently, production of these seeds is estimated to be about double that of pedigreed seeds; however , these two categories together only manage to represent a total of only around 5 % of the wheat seeds planted each year!

CONDITIONS TO BE FULFILLED BY AN ORGANIZATION SEED PRODUCTION

The interest currently aroused among cooperatives and grain traders by this question of the production of breeding seeds leads me to develop this chapter.

Many are today, throughout France, the leaders of cooperatives and serious traders who have understood the primordial interest that there is, for their members or customers, to orient themselves towards employment more and more widespread use of quality seeds.

May those of them who have not practiced this very special activity allow me to give them some practical advice.

First of all, to organize a " semenees " « ee- branch in an existing cooperative or to create a cooperative with the aim *of* producing breeding seeds, what is needed?

P *Seed-mothers:* Look for *and* attach one or

several serious suppliers of genuine selection seeds .

2° ***Varieties:*** Choose a ***limited*** number of varieties of autumn and spring cereals, well adapted to the climate and the soils of the region.

For this choice, it will be essential, without neglecting the preferences of the grower-farmers , to obtain documentation from specialized technicians .

3° ***Multipliers:*** To be able to have, among the members, a core of good conscientious growers , willing to comply with the obligations necessitated by the production of seeds and ***understanding the meaning of these obligations.***

4° ***Control on the ground:*** To be able to put together a control commission including at least : a cereals technician, a representative of the administration.

The role ***of*** this commission, which will be to accept or refuse cultures, must be taken very seriously. ***On his action will depend the success or failure*** of the company, in a proportion of 80 *%.*

5° ***Harvesting, delivery:*** Being able to supervise the threshing of seeds, the measures taken to avoid mixing of batches and ensuring that the threshers are cleaned carefully.

Establish sufficient control so that multipliers do not divert part of the harvest produced by breeding seeds to their own profit.

6° ***Packaging:*** Have a sufficiently large room to ***be*** able to classify the batches by variety ***and by producer on*** arrival and after cleaning; we will reserve if possible a Baté for the arrival *and* a side for the departure.

This room will contain the sorting devices, which must include at least : 1 sorting device by density (separator) ; 1 sorting device by shape in length (cell sorter or casing) ; 1 sorting device per shape in thickness (grid or continuously adjustable gauge) ; 1 brush for oats and barley. 1 dry anticryptogamic treatment device ; *1 bag thresher.*

All *these* devices and the elevators or horizontal conveyors serving them must be installed with the *major concern* of being able to be cleaned *easily, quickly* and *completely.*

is lying.

In the room, it will be necessary to provide :

A healthy and well-closed room for the bag room (which must be in good condition).

A small office for the foreman or foreman responsible for registering entries, supervising the cleaning workshop and supervising the preparation of orders.

Major installations must also include: a sealed chamber for disinsectization by gas; a small repair shop ; a control laboratory.

7° *Control:* Be able to ensure by its own means, with the help of a specialist technician, or have a specialist attached to several cooperatives carry out, the control of purity and germination of all the samples taken from the packaged seeds, as well as on breeding seeds purchased with a view to the multiplication.

8° *Administration:* **Have** an office where **all parties requiring** *correspondence* will be handled

weight, accounting, technical and administrative guidelines . 9° ***Direction:*** To have a director who has ***perfectly understood what a pure seed is,*** who knows what must be done to preserve it in this way and knows how to inculcate in his multipliers the principles to be respected in order to produce pure seed and to seize to all its adherents the interest that attaches to the use of good seeds. 10. ***Export:*** Certain cooperative organizations envisage not only the production of seeds intended for their members, but also the dispatch of the surplus of their production to other regions.

Those of them who plan to give a certain extension to this part of their activity will have to pay special attention to the conditioning of the seeds, the condition of the bags and the impeccable execution of the orders.

They must also pay attention to keeping themselves constantly in good standing with their administrative obligations, in particular requiring certificates from their buyers located in departments subject to this obligation. ***11° Accounting:*** As many wheat cooperatives set up a "seeds" branch, they are reminded that the regulations in force require them to keep separate accounts for each of their two activities.

However, it is accepted that overhead costs, often common to both activities, may be charged at the end of the financial year, when the operating accounts are drawn up.

CURRENT TRENDS

The organization of seed production by cooperatives has not yet been considered

seriously on the general level and this finding is very distressing!

It follows that while many cooperatives equip themselves and organize themselves to produce within their range of action, here the cooperatives group together to put their efforts and their res-
resources in common , in order to be able to have access to an ultra-modern, and therefore very costly, tool to condition their seeds and that here, on the contrary, we are witnessing the emergence of an interdepartmental cooperative whose scope of action will overlap with that of twenty oth

This observation proves that the doctrines are diverse and that in this matter opinions are still very divided.

Who has his? The future will no doubt demonstrate this.

As for us, we remain convinced that: for a serious installation to pay for itself and be profitable, it must process approximately 10,000 quintals of cereal seeds for sale annually.

Moreover, it has not been proven that an installation treating 15,000 quintals per year gives better financial results, because it will need to have two cleaning batteries, and therefore invest costs twice as high, to achieve the sale of 50 % only additional products.

However, whatever form the propagating organisms take, it is heartening to note the interest that is currently being shown in this big question of the production of seeds and in particular of seeds for reproduction.

FUTURE PROSPECTS

It seems obvious that there would be great interest in developing the production of this category of

seeds which, we repeat, still satisfies a large majority of users.

It has been shown that by reserving a large part of the production of breeding houses for supervised multiplication, with a view to selling them in breeding seeds, it would be possible, in a short time, to ensure French farmers an annual supply of approximately four to five million quintals of good seed, i.e. enough to cover 40 to 50% of the area sown, which is largely sufficient, if we accept that the change of seed could only be done every two or three years on average on each farm.

Moreover, this would not prevent the most advanced farmers from acquiring breeding seeds and even from ensuring, by their own means, that their future needs in good propagation seeds are met.

This process would undoubtedly allow many farmers, who are put off by the high price of seeds for selection, to acquire seeds of still very honorable quality at a much lower price .

To put this program into practice, if there is little to be done in the field of selection properly so called, everything would have to be organized at the stage of multiplication by cooperative organizations and specialized traders.

Many organizations, as we have seen, are currently interested in this question and many agricultural cooperatives are currently installing seed cleaning workshops, some of which are very well understood.

However, any idea of dirigisme excluded, which could moreover appear superfluous, if not harmful, in the matter, we fear to see all

these scattered efforts, many of which are very meritorious, reserve unpleasant surprises for their authors.

The multiplication of seeds requires, we cannot stress this enough, a good material installation, but above all a good nucleus of multipliers, well equipped, careful and disciplined .

Finally, control, both of standing crops and of packaged seeds, must be organized on a rational basis.

France, with its numerous and diverse natural regions, with its equally diverse climatic zones and the quality of its land, should undoubtedly hold first place in the world production of cereal seeds.

Unfortunately, this is not the case, and major efforts will still be necessary, aimed at organising , on the one hand, research and experimentation on a fairly large scale and above all by developing regional experimentation, and on the other. apart from the rational production *of* seeds, accompanied by well-understood propaganda to encourage the use of good seeds in the interior and to make French seeds known abroad .

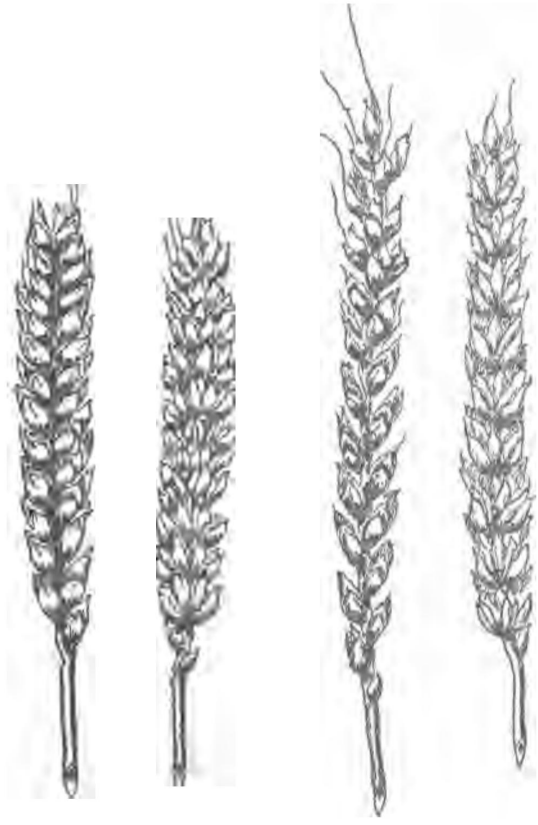
VIII

GENEALOGY OF OUR WHEAT

1° THE TWO BASIC VARIETIES

By examining the graph of the genealogy of the main varieties of wheat, limited to the varieties registered in the official catalog and their parents (a total of 200 varieties), we see that the two fundamental bases of almost all French varieties are: on the one hand, *Noé's wheat,* an old French breed of fairly undetermined origin, grown in the Aquitaine basin, sometimes under the names of Ilede Noé wheat , Blue wheat, Defiance wheat, and possessing particular characteristics which are found in a very large number of varieties that have come from it, such as: fairly high earliness, large and full grain, glaucous white ear, half- full straw, very glaucous foliage, sensitivity to rust and smut, resistance to lodging, and on the other hand : *Shireff Square head* wheat or *Blé à Epi Carré,* obtained *in* Scotland by Professor Shireff and introduced into France from a concealed date.

This wheat has very different characters from Noah's wheat. It has a white, compact, club-shaped ear with medium-sized red grain; the straw is strong and stiff and the ear is erect at maturity.



Wheat

Shireff Square Head or:
Epi Carré

Biede Noah

This wheat had good resistance to cryptogamic diseases, but was relatively late . This is what made him give up by the agri

French cultivators, as soon as the many varieties to which it gave birth by crosses came to supplant it.

This variety has characteristics complementary to those of Noé's wheat and this is no doubt what determined the breeders to base their work on these two types of wheat which, at the time, were good local varieties.

2° THEIR DIRECT DESCENDANTS AND VARIETIES WHO ARE FROM

These two basic varieties gave rise each has a series of varieties which we call their direct sons, which have produced in their turn, by crossing with other varieties, nine- tenths of the wheat currently cultivated.

a) DIRECT SONS OF NOAH :

They are: Big Blue (Noah mutation); Japhet or Blé Dieu (mutation of Noah); Rouge de Bordeaux (mutation or natural hybrid of Noé); Bordier (crossing Noé X Prince Albert); Lamed (Noé X Prince Albert cross); Aurèle Gaby (crossing Noé X Yeoman); Coarse Bearded (assumed to be a mutation of Noah).

Of these seven direct sons, only the first three gave rise to significant offspring .

Gros bleu comes first, since it gave the wheats: Early reversible (by crossing with Chiddam d'automne); Bon Fermier (by crossing with Wheat Rye); Trésor (by crossing with square eared wheat); Talisman (by crossing with Riéti).

The reversible Hâtif wheat, one of the most successful crosses made by Vilmorin, gave birth to

sauce to a very large number of wheats having known , or still knowing, a very great vogue: this is the case of the varieties :

Vilmorin 27, Wilson, Hybride de la Paix, Hybrid 40, Yveline, Mondésir, Providence, Beauce ron, Inversal, Paris Vilmorin, Preparator Etienne, Agronomic Institute, Yga, Nord Desprez, Oscar Benoist, Denaiffe 31, Ilede France, Doctor Ma zet, Pévèle Desprez, Xavier Bernard, Zara, Jules Tézier.

We find in a large number of these main varieties the great qualities of Early reversible wheat : productivity, straw stiffness, earliness , quality of the grain, but also some of its faults: requirement as to the quality of the soil, sensitivity orange rust.

Nevertheless, it should be emphasized that this variety, quite rightly appreciated by breeders as a "genitor" , **has led to *very* great progress in the field of obtaining *new* varieties, the success obtained by Vilmorin 27 wheat, Wilson, Hybride de la Paix, Hybride 40, Oscar Benoist, Providence, are a testimony to this, not to mention that many varieties that have come from them have not yet been sufficiently tested , but nevertheless seem to have a great success (Yga, Doctor Mazet, etc.).**

"Bon Fermier" **wheat , the second son of Gros Bleu, was widely used for a long time and greatly appreciated for the excellent quality of its grain and its cultural qualities, despite its sensitivity to orange rust. However, this old and good variety has now** been ***surpassed*** by the **wheats to which it gave birth. Of his** numerous descendants, the **following varieties should be retained :**

Vilmorin27 (already a descendant of Inversable), Good

Farmer, Bon Moulin, Short Straw Hybrid or IA, Hâtif de Wattines, Chartres Desprez, Soisson nais Desprez, Courtal, Hybrid de la Cloqueterie, Bon Fermier Briard or Cooperator, NR, Ba size 30, Hybrid Lobau.

The third son of Gros Bleu is a very special wheat, it is the "Trésor" wheat, which has been used for a long time in several French regions, but lasted the longest in the West. This wheat was remarkable for its very beautiful yellow grain, but its sensitivity to rust and its tendency to lodge caused it to be abandoned as soon as the use of fertilizers became widespread.

Trésor wheat gave birth to a few wheats interesting such as :

Pont Cailloux or II de Grignon, Moulin Neuf.

Its mutation n° 18 which, taken up by the Belgian Agricultural Institute of Gembloux, gave three good varieties for this country. They

are: Institut de Gembloux, Gembloux 102, Hybride du Centenaire.

Japhet wheat, second son of Noah, by mutation, was cultivated for a long time in France and had a great vogue in the West where the beauty and the quality of its grain had made it appreciated, but the height of its straw l gradually caused the pro fit to abandon the varieties to which he gave birth and some of which are placed at the very top of the list of "great wheats".

By crossing with "Parsel" wheat , then with other varieties including "Dattel" and wheat from " Rouge de Bordeaux" and English wheat "Browick", it gave: Vilmorin 27 (already a

descendant of Inversable and Bon Fermier), Vilmorin23 or Saint-Michel, Pax Cambier, Auchy Cambier, Vilmorin 29, Bersée hybrid, Alma, Reime, Bonnance hybrid, Hy-

Bridle du Joncquois or Hybride 80, Nord Desprez, Franc Nord, Flandres Desprez, Petit Quia quin, Côte d'Or, Hybride de Canonne, Noël Alsace 338, Chartres Desprez, Concorde.

As can be seen, Japhet wheat has been introduced by breeders in many crosses, the results of which have produced famous wheats and others on the way to becoming so.

By crossing with other local varieties, it gave birth to wheat: Gironde X

Japhet, Cloches 26, Jap het X Alsace, President Tardieu.

The third son of. Noé is the *Red wheat from Bordeaux .* It is also the source of many popular varieties. This good variety, cultivated for a very long time *in* the South-West and which has spread to many French regions, except the North and the East, was appreciated for the quality of its small dark red grain, often glazed, much appreciated by millers . , but was neglected because of its limited productivity and tendency to pay. Nevertheless , it survived in certain mediocre soils where it resists

The main varieties to which it gave birth are:

Vilmorin 23 (already a descendant of Japhet); Hybrid des Alliés, which has itself produced : Inversai, Paris Vilmorin, Chanteclair, Kirand, Vague d'Epis, Jade, Sillon d'Or, Bon Fermai, Bon Moulin, Champ Joli, Courtal, Bataille 132, Hybrid de la Cloquetterie , Vilmorin 29, Hybrid de Sensée, Maximum Cambier, Carlotta Strampelli, Moyen court 31,

Hybrid de la Paix, who gave himself : Paix 13 à épi blanc, Providence, Monette, Beau ceron, F Bordeaux, Colmar 115, B2.

***b)* DIRECT SONS OF SHIREFF SQUARE HEAD.**

The direct sons of ShireffSquare head or Epi Carré wheat are :

Trésor by crossing with Gros Bleu), Epi Carré X Inversable (by crossing with Inversa ble), Bastard de Rimpau (by crossing with an American wheat with bearded red ear), Epi Carré X Kreloff (by crossing with Kreloff), Massy (by crossing with Rouge de Bordeaux).

We therefore see immediately that the interpenetration of the two basic varieties took place from the beginning, which proves how much the breeders realized , from the start of their work, how "complementary" the qualities of the two were. *basic* varieties . This is why we will find in the descendants of these five wheats almost all those that we have found in the lists above.

We will therefore limit ourselves here to listing descendants of the five sons of “Epi Carré”. They are : The

descendants of Trésor (already listed above), Pévèle Desprez (coming from Epi Carré X Inver sable), President Riverain (coming from Epi Carré X Inversable), Carlotta Strampelli (Massy X Riéti), Hybride des Alliés (Massy X Parsel), Short Straw Hybrid or L4 (Epi Carré XKreloff) X Bon Fermier).

The interdependence of varieties or genealogical tree comprising approximately two hundred varieties of wheat, including all those currently listed in the official catalog (the only varieties whose sale is authorized), is shown in the form of a graph inserted at the end of this book.

You will also find, in the following pages, the list of these varieties with their synonyms,

their genealogical origin and the name of their breeders.

There are many other lesser known varieties which, in addition to those shown in the graph quoted above, are included in a large format graph which is the subject of a separate print. Work is in progress for the elaboration of a genealogical chart of oats grown in France.

LIST OF MAIN VARIETIES OF WHEAT

(Varieties registered in the official catalogs are in italic CAPITALS.) The number appearing in the left column allows the location of the varieties on the graph of the genealogy of the varieties .

itariiuas CHART	DESIGNATION • VARIETY	GENEALOGICAL ORIGIN	BREEDER
B6	AKAGOMUGHI	Unknown ..... (Japan).	
C4	*ALLIES* (Hybrid of the Allies)	Massy X Parsel	Vilmorin.
E6	***ALMA***	(Vilmorin23 X Allies) X Vilmorin 27.... Blondeau.	
B4	***ALSACE*** 22 (Colmar 22) .	Selection in Red of Alsace	St. de Colma
C5	ALSACE 84	Selection in Al sace 22 Alsace	
AT 5	ALSACE 338	X Vilmorin 23	
E5	AMERICAN RED BEARDED	Unknown ..... (America).	
G2	***ANNIE***	Early CD X Wilson Dromigny Hamel.	
136	ARDITO ..... Akagomughi X (Wil helmin X Riéti).. Strampelli.		
(M	***ARISTIDE-BRIAND***	Wilson X Geffroy... Leblond.	
F6	***AUCHY-CAMBIER***	\M'llorin27 X Vile morin23 Ardito X White	Cambier.
AT 5	***AUGUSTE TEZIER***	sauce ..... Tezier.	
D5	***AURELE-GABY***	Noah X Yeoman ..... Lemaire.	
CL	AURORA	Jacinth X Ladoga ... Farrer.	
133	B2	Alsace X Bordeaux.. Schribaux.	
113	BANKUT	Selection in Mar quis	

SPOTLIGHT CHART	DésioNsrlos DE LA veaulli	GENEALOGICAL ORIGIN	BREEDER
F5	BEARDED FROM UKRAINE ...	Unknown	(Occle Russia).
C5	*BATTLE* 132	Allies X Japheth	Battle.
FL	*BEAUCERON*	(Marshall X Reverse)X Peace	Benoist.
B2	*BELLEVUE*	K3 X Cuirassier ...	1.people.
CI	*BLADETTE DE BESPLAS* (Tuscany)	Local wheat S.- W France	Domain of Besplas.
C5	*BLAYGHATIVE CAMBIER* (B.ltif productive) • • • •	Origin not determined	Gambier.
G2	WHITE PRECQCE t131c from Savoy) 1'.	Country wheat S.- E France	
132	*BLE PEBBLES* (Floren ce Aurore)	Florence X Aurore .. (South Africa)	North).
B2	*APRIL WHEAT*	Selection in Florence X Aurore ...	Turner.
B1	BLE DE HALLAND	Sweden country wheat..	
G5	BLE DE LA RUTTI	Prov. wheat Swiss..	
H3	*BLE DE L'YVELINE* (Yveline)	Wilson X Vilmorin 27 C.	ÿBenoist.
D6	*BLE DES DOUES*	58 X Czeckacz	St. Clermont.
B3	*BLE DU MESNIL*	Variation of DI (7).	Turner.
F5	WHEAT RYE	Country wheat , Loire Valley	
D5	*BON FERMAL*	Good Farmer X Schribaux	Allies.
F4	*GOOD FARMER* (Sensa tion)	Big Blue X Wheat Rye	Vilmorin.
F5	BON FERMIER BRIARD (Cooperator)	Variation of Bon Fer mier	Cooper.de la Brie.
C5	BON MEUNIER	Origin unknown ..	Alliot.
ES	*BON MOULIN*	Allies X Bon Fermier	Vilmorin.
F3	*BONSAC*	VulteboeufX Inver sand	Dromigny and Hemel.
D4	*BRITTANY DESPREZ* . .	Goldendrop X Insti tut Agronomic ..	Desprez
B5-H2	BROWICK	Selection in Prince Albert	
CI	*CAPELLE DESPREZ* ..	Unknown origin ...	Desprez.
C3	*CARLOTTA STRAMPELLI*	Riéti X Massy	Strampelli.
E5	CARTER DI{ (Straw pen steep)	English origin	Carter.
DI	*CERES BATTLE*	Origin unknown ...	Battle.
D3	CHAMBORD	Champion X Bordeaux	Vilmorin.
IM	*CHAMPAGNE*	Unknown origin ...	
A3	NORTH CHAMPION.	(WillemI X Wilhel mine) X Wilhel mine	St Waningen.

SPOTLIGHT CHART	DESIGNATION VARIETY	GENEALOGICAL ORIGIN BREEDER
D2	*CHAMP-JOLI*	(Allies X Bearded Invertible) X Bladette liesplas ..... Turner. of
C4	CHAMPLAIN	Chiddam d'Automne à épi rouge X Vic white ..... Vilmorin. toria
F3	*CHANTECLAIR*	Allies X Bearded Invertible ..... Turner.
112 E4	*CHARLES DELORME* . *CHARTRES DESPREZ* ..	Origin unknown. The mayor. (Japheth X Parsel) •X Hyb. to this straw .. Desprez.
A3-G2	AUTUMN CHIDDAM with white ears	Origin ..English
D4-G4	CHIDDAM OF AUTUMN with red spike	English origin .....
114	*WHITE CHIDDAM OF MARCH*	Origin unknown ...
F3	*BELLS* 26	(Gironde X Japhet) X J. Invertible ..... Benoist.
hi 1 B3	COLUMBUS ..... COLMAR 115 (Bordeaux 115)	Origin unknown ... Change in Bordeaux ..... Stat . Colmar.
G4	*CONCORDE*	(Japheth X Parsel) X Wilson ..... Lemaire.
112 B3	CONQUEROR ..... *COTE-D'OR*	Origin unknown .. Mouton rouge X (Vil- morin23 X Paix 13) Station Dijon Hybride
E5	*CO URTAL*	à cte straw X Allies ..... CGA
B2 C2 B3	CRETAN ... . CUIRASSIER ..... CURAWA	Origin unknown ... ... LittleClub X Champion du Nord) X Crétan Wheat
D6	CZESKAOZZ.....	of Hungarian origin Turner .
Al A4 F3	*DC TURNER* (DC)- DD(DD Turner)— DATEL	Origin unknown ... Origin unknown Turner. Chiddam d'Automne à épi rge X Prince Albert Vilmorin.
Fl Al	*DENAIFFÉ* 31 ..... DIAMOND	Varied. by Inversable Denaiffe. Kolbende Svalof X Halland Wheat ...Halland
A2	DIAMOND II	Diamond X Extra KolbenII .....Svalof.
G3	*DOCTOR MAZET (Man doul)*	Invertable X Marquis Mandoul.
G5	*DRUCHAMP*	Flèche d'Or X Vil morin27 ..... C. Benoist.
F6	DUIVENDAAL AI.....	Square cob X Zeeland Pr. Brokema.
AT 5	EDDA	(Rieti X Wilhelmine) X Akagomughi
• A2	EMMA	Wilhelmine X Essex Gradkof .....

SPOTLIGHT CHART	DESIGNATION VARIETY _	GENEALOGICAL ORIGIN	GETINTEUR
E3	*PPE D'OR*	Teverson X Vilmorin23	Goodness.
B2	EXTRA KOLBEN ...	Kolben of Svalof X Sort 0201	
A2	*EXTRA KOLBEN*	Selection in Extra Kolben	Svaldf.
B4	*EVOLUTION*	DD X Alsace	Turner.
D5	*FLANDERS DESPREZ* ..	Vilmorin23 X PLM NR X	Desprez.
F8	*GOLDEN ARROW*	Yeoman	Bormans.
B1	FLORENCE	Hybrid of Italian origin	
G5	FRANC-COMTOIS	Good Farmer X Vui teboeuf	
F6	*FRANC NORTH*	YgaX Vilmorin 23 ..	Blondau.
Al	*SPRING FYLGIA* (O9y0de Svalof)	**Extra** Kolben of Sva 18fX Aurore	SvaRif.
F5	GALUIS 30	Inversable X Wilhel mine Blé	Bartenders.
G1	GEFFROY	found in Eure Geffroy X	
G1	*GEFIR*	Iron Variation in	The mayor.
DL	GEMBLOUX 102	Tre sor 18	Gembloux.
AB	*GENTILE ROSSO* 4	GentileRosso 1/2 Aristato X Ardito.	**Prof. Avancl.**
AB	GENTILE ROSSO SEMI ARISTATO	Selection in Gen tile Rosso	
F2	*GERBOR*	Select. in Rational Blé de	**G.Lawrence.**
If	GIRONDE	pays S.-O France	
E2	GIRONDE JAPHET	Gironde X Japhet ..	
E5	*GOLDENDROP* (Red of Scotland)	Wheat of English origin	
ES	*GOLDENDROP* 184	Selection in Gol dendrop	**Bartenders.**
D4	BIG BLUE	Selection in Noé ..	
B4	BIG HEAD	BrowickX Chiddam of Aut. white-tailed Origin	Vilmorin.
H1	*G U*	unknown ...	**Rieti.**
A4	HALETTT	Select. in Victoria d'Automne	
H3 .	HARD RED CALCUTTA.	Origin unknown ...	
F4	*HATIF OF WATTINES*	L4 X wheat unknown ...	Desprez.
F2	*HATIF INVERSABLE* (Inalettable)	Gros bleu X Chiddam d'Aut. white-eared	Vilmorin.
A2	*HEINES KOLBEN SOM MER WEIZEN* (Heine Kolben)	Variation *of* Saumur	Huh.
Cl	'HURON	White Fife X Ladoga	
F3	*HYBRID* 40 (Bells 32)	Wilson Variation	C. Benoist.
F3	*HYBRID* **48** *DESPREZ.*	Invertible X Tever sound	Desprez.

SPOTLIGHT CHART	DESIGNATION VARIETY	GENEALOGICAL ORIGIN
F4	*SHORT STRAW HYBRID* (L4)	(Epi square X Kreloff) X Good Farmer Schribaux.
C6	*HYBRID FROM BER SEE* ..	Allies X Vilmorin23 Blondeau.
1116	*BONNANCE HYBRID*	Vilmorin23 X Ba size 30 Battle.
B4	*BARREL HYBRID*	Vilmorin23 X White Gambier ..... Gambier.
Dl	CENTER HYBRID NARY	Variation in Tré sor 18 ..... Gembloux.
E5	*HYBRID OF THE CLO QUETERIE*	Short Straw Hyb. X Allies ..... Battle.
D5	*JUNCQUOIS HYBRID* (Hybrid 80)	Vilmorin 23 X Insti tutAgronomique .. Desprez.
F3	" *LOBAU HYBRID* ..	Agronomic Institute X Good Farmer ... Lepeuple.
G5	*HYBRID DU MELAN TOIS*	Origin unknown Desprez.
C2	*TOWER HYBRID*	(Vilmorin 23 X Insti tutAgronomique) X Providence Blondeau.
F2	*ILE-DE-FRANCE*	Invertable X Invertable ..... Bormans.
F2 185	*IMPERATOR* ..... *INNOVATION BATTLE* 30 (Battle 30)	Invertible X Wilson G.Lawrence. Selection in Good Farmer ..... Battle.
E3	AGRONOMIC INSTITUTE (L1)	(RiétiX Epi square) X Invertable .....Schribaux.
DL	GEMBLOUX INSTITUTE	Selection in Tré sor 18 ..... Gembloux.
E2	INVERSABLE BEARDED ..	Variation in Invertible .....
C3	*INVERSABLE BURGUNDY*	Invertible X Bor deaux ..... Turner.
D2	*INVERTIBLE RIETI* 3 ..	Invertible X Riéti 3 Nicholas.
F5	*INVERSABLE XAVIER BERNARD* (Xavier-Bernard)	Invertible X Wilhel mine ..... X.Bernard.
F4	*REVERSE*	Invertible X Allies Schribaux.
011	IRON	Origin unknown ...
B1	JACINTH F4	Selectt in Red Fife
	JADE	Chanteclair X Vil morin27 ..... Turner.
04	*I JAPHET* (Wheat God)	Selection in Noé. Vilmorin.
D3	JAPHET ALSACE	Japheth X Alsace ..... Benoist.
E4	JAPHET PARSEL	Japhet X Parsel ..... Vilmorin.

SPOTLIGHT IRRIPRIC	DÉSIGNATION VARIETY	GENEALOGICAL ORIGIN	BREEDER
F3	***JULES TEZIER***	White tuzelle X Inversable ..... Tezier.	
D2	K3 ..... (Epi square X Kréloff)	X Invertible ..... Schribaux.	
DO	K8 ..... Origin Unknown ... Schribaux.		
E3	***KIRAND***	Chanteclair X Vilmo rin 27 ..... Turner.	
B2	KOLBEN DE SVALOF.. Select. in Heine's Kolben	Sval8f.	
F3	KRÉLOFF ..... Origin unknown ...		
G2	***LA FAYETTE*** Cl	Selection in Wilson Lemaire.	
	LADOGA .....From Russia Inversible X 113.... G. Laurent.		
E2	***LIBERATOR*** A3	K3....	
	LITTLE CLUB ..... Unknown origin ...		
G5	MANDOUL P4	Invertible X Mani toba	Mandoul.
114	MANITOBA (Marquis of Canada)	Red Fife X Red *of* Calcutta	
H4	***MARIV AL***	Oscar-BenoistX Good Farmer ..... D. and Hamel.	Hamel.
G3	***MARQUIS***	Red Calcutta X Red Fife .... Saunders.	Saunders.
El	MARSHALL C3	Origin unknown ..	
	MASSY ..... EplCarré X Bordeaux Vilmorin.		
C3	***MAXIMUM CAMBIER*** ..Allies X K3	Gambier.	
C4	MELBOR	Select. from Bordeaux Vilmorin.	
B6	***MENTANA***	(Rieti eXWilhelmine) X Akagomughi	Strampelli.
G2	WORLDSIR ..... Select. in Wilson.		
El	MONETTE. Variation in Peace.	Turner.	
G5	MONT CALME 22 ..... Selection in Wheat	the Rütli ..... Station Mont Calme.	
D3	***MOULIN-NEUF***	Selection in Trésor TJ.GA	U.G.A.
D5	***MOUTON***	Wheat from the Jura region.	
B3	MOUTON A EPI ROUGE Wheat ide country East France		
h3	***MOYENCOURT*** 31	Curawa X Carlotta Strampelli ..... C. Benoist.	Benoist.
D4	NOE (Blue wheat) ..... Old French breed		
B5	***CHRISTMAS***	caise (N/A) Vilmorin Variation 23 .... Legland.	
E8	***NORTH DESPREZ***	Hybrid 80 X Vilmo rin27 ..... Desprez.	
E3	***NORMANDY LEBLOND*** Hybrid 40 X Vilmo rin 27	Leblond.	
F6	NR ..... Good Farmer X Bearded from	Ukraine .... Bormans.	
F2	***OSCAR-BENOIST*** (Middlecourt)	Gironde X Reversible C. Benoist.	Benoist.

SPOTLIGHT CHART	DESIGNATION VARIETY	GENEALOGICAL ORIGIN	GETTRIM.UR
E2	*PEACE* (Peace Hyb.)	Invertible X Cham board	Vilmorin.
D2	PEACE 13 (P 13)	Peace variation with white ears	
F4	*PARIS-VILMORIN* (Vil morin Paris)	Invertible X Allies ..	Vilmorin.
E5	PARSEL	Carter DK X Wheat Rye	
E6	*PAX CAMBIER*	Vilmorin 23 X Vil morin 27 Wheat	Currency.
II5	PEARL OF HARM	from the Chartres region (Vilmorin23	Hermand.
C2	*LITTLE QUINQUIN*	X Agronomic Institute) X Providence	
G2	LITTLE RED		Blondau.
F4	*PEVEL*	Wheat of Swiss origin Ear square X Inver sand	Desprez.
D3	*PICARDY DESPREZ* ..	Allies X Agronomic Institute	Desprez.
D4	*PLM 1*	Selection in Mou ton	Dijo station
G3	*POLONIUM*	Invertible X Vilmo rin27	Bormans.
D2	*PONT-CAILLOUX (II* of Grignon)	Treasure X Peace	
H2	EARLY CD	Coulomb X Pre White	Bretigniere.
E2	*EARLY JULY PREPARATOR*		Quiet Mo Station .
E3	*ETIENNE* (G4)	Invertible X K3	G.Lawrence.
El	*PRESIDENT ANDRE TARDIEU* (RL 34)	(Rieti X Epi square) X Invertible	Schribaux.
G4	*RESIDENT PRESIDENT*	(Japheth X Alsace) X Hybrid 40	The blond.
C6-G3	PRINCE-ALBERT	Square spike X Inver sand	Desprez.
G4	PROGRESS	Selection in Ox ford Red	
Fl	PROLIFIC DWARF	Scandinavian origin .. Mutation Reversible	Turner.
DL	*PROVIDENCE*	Peace X Yeoman	The mayor.
E2	RATIONAL	K3 X Invertible t	G.Lawrence.
U4-B1	RED FIFE	Origin unknown ...	
C5	*REIMS*	Siegerlander X Vile Sailor 23	Lafite.
D4	*RENE-LEBLOND*	Japheth X Alsace 84 ..	The blond.
E4	*REINFORCEMENT*	PLMX(Vilmorin27 Italian	IRA Versailles
C3	RIETI	origin ...	Station , Rieti,
C2	RIETI 3	Selection in Riéti	
C2	*RIETI* 11 (Rieti Todaro).	Selection in Riéti	Todaro.
E4	*RIMPAUS FIQUIERBAS TARD* (Bastard of Rimpau)	American Wheat X Square Ear	Rimpau.

SPOTLIGHT CHART	DESIGNATION VARIETY	GENEALOGICAL ORIGIN	COUNSELOR
B4	*ROUGE D'ALSACE* (Rge d'Altkirch)	Wheat of pay NE France	P. Genay.
C4	*ROUGE DE BORDEAUX* (Bladette de Lesparre)	Selection in Noé ..	
H4	CALCUTTA RED.	Origin unknown ...	
H1	ROUGE DE LORRAINE (Lorraine-Rge de la Seille)	Wheat from NE countries *France*	
H4	SAINT-HUBERT	Undetermined origin. Permanent.	Bormans.
AT 5	*ARLES SAISSETTE* ..	Selection in Sais selleblanche B5 WHITE-SAISSETTE .	
A5	*DISH OF MANI NET*	Origin not specified. Selection in Sais sette d'Arles	Tezier.
B3	SAUMUR	Old French wheat (Brie)	
E4 C8	SHIREFF SQUARE HEM) (Epi square).... SIEGERLÄNDER	Originating in Scotland .. Wheat from the Sieg valley	P. Shireff. Shireff.
F3	*SILLON D'OR*	Chanteclair X Vilmo rin 27	J Tourneur.
G3	*SOISSONNAIS DESPREZ*	Mondésir .X Short Straw Hybrid ... Desprez.	
B2	SORT 0201	Origin unknown ... SvalÖf.	Svalöf.
H3	*SULLY*	Conqueror X Marquis Lemaire.	
E6	*SUPERHATIVE*	Selection in Flè Che d'Or.	D. and Hemel.
D3	*TERROIR*	Riéti X big blue...	Lemaire.
G4	*TALISMAN*	Saint-Hubert X Vil morin27	Bormans.
G2	*TEVERSON*	Selection in Bro wick	
Dl	TUSCANY	Wheat from Italy	
E3	*TRESOR*	Vilmorin big blue X square epi.	
D2	TRESOR 18	Selection in Trésor Gembloux.	
B6-F1	*TUZELLE BLANCHE DE PROVENCE*	Local wheat -- Pro wind	
C6	*TUZELLE ROUGE DE LA DROME*	Selection in Tu zelle de Provence..	
E3	*WAVE OF EARS*	Chanteclair X Vilmo rin 27	Vilmo-rin. Turner.
B6	*VARRONE*	Riéti X Wilhelmine. Strampelli.	Strampelli.
H2	*VERCORS*	Origin not determined mined	Bormans.
C4	VICTORIA BLANC (Autumn Vic toria)	Wheat from the Mayenne region	
B4	*OLD FERRETTE*	Selection in Alsace 22	Stat. **Colmar.**

CHART	DIS/ONATION OF THE VARLITY	GENEALOGICÁL ORIGIN	BREEDER
B5	*VILMORIN* 23 (Hybrid 23 Saint Michel)	(Melbor X Big Head)X (Japheth X Parsel)	Vilmorin.
G4	*VILMORIN* 27 (Hybr. 27)	[Dattel X (Japhet X Parsel)]X (Inversable X Bon Fer mier)?	Vilmorin.
C6 03	*VILMORIN* 29 (Hybr. 29) *YUITEBOEUF*	Vilmorin 23 X Allies Selection in Petit Rouge	Vilmorin. Dr Margot.
E5	*WILHELMINE* (double Walcorn)	Zeeland X Duiven daal	Prof. Brokema.
Cl	WHITE FIFE	Variation of Red Fife	
IM	*WILSON*	Invertible Mutation	C. Benoist.
El-E6	YEOMAN	Browick X Red fife	King.
G4	YGA *BLONDEAU* (Yga)	Vilmorin 27 X Red fife	Blondau.
DL	*ZARA*	Reversible X Ftiéti..	Strampelli.
DO	ZEELAND	Origin unknown ...	

IX

THE CHARACTERISTICS OF THE VARIETIES

The varieties are, as we have seen in the chapter concerning the Mendelian disjunction, composed of standard individuals which are all similar , when we are in the presence of a pure line (which must be the case of a pure line). carefully selected seed).

The typical individual who represents them possesses a set of very numerous characteristics, some of which are advantageous for the producer, the processor or the consumer and some of which , on the contrary, constitute faults.

To take a concrete example : a variety of wheat can be, in the French North-East, very resistant to lodging, productive and resistant to cryptogamic diseases, but present an insufficient resistance to cold for certain winters harder than the others. , or possess an insufficient baking value.

When the farmer wants to choose the variety that he will entrust to the soil, he experiences certain difficulties in bringing together in the same variety the different qualities required for his particular case and since the " perfect varieties from all points of view" have not been found, he will have to look for the one which will bring together the greatest number of qualities, and which, consequently, will be likely to provide the best meil-

their yield of quality grain, taking into account the local conditions in which it will grow .

Given the large number of varieties which will be available for choice, it seemed useful to give a list of the varieties classified in order of merit, for each of the main elements to be considered.

We can practically limit ourselves to the list • of characters below : 1.

Frost resistance; 2. Resistance to lodging; 3. Tillering ability; 4. Earliness; 5. Resistance to cryptogamic diseases (orange rust, stem rust, decay, smut); 6. The degree of alternativity; 7. The baking value of grains; 8. The requirement, as for the quality of the grounds; 9. Resistance to scalding; 10. Productivity.

We give below the list of varieties of wheat, whether or not listed in the official catalog of varieties, classified in order ***of*** merit for each of the elements listed above. This classification has been established on the basis of the results of tests carried out by numerous experimenters and by ourselves, and on the work of the National Center for Agronomic Research of Versailles , as well as on the indications provided by **J.** Ratineau, Inspector General of Agriculture, Director of the National School of Grignon (1).

(1) ***Cereals,*** by **J.** RATINEau, encyclopedia e The Earth ". Flammarion, editor.

. 1° FROST RESISTANCE.

The term "frost resistance" is a rather general term, which includes two main elements : *on* the one hand, the resistance to direct cold resulting from the fall of the thermometer below a certain temperature (it is this lowering absolute temperature which caused the catastrophe of *the* winter of 1946-1947) and which directly kills the wheat, by producing a drying out *of the* vegetable tissues of the leaves and of the foot", June tissues are not long in becoming gangrenous, this which leads to the death of the plant, or a weakening such that the crown roots cannot ensure the "recovery" of the plant thus affected. This direct action is aggravated by the absence of snow, which plays an extremely important protective role, — on the other hand, frost damage can be due to alternating freezing and thawing, occurring at the very end of the winter. winter, particularly in the continental climates of the centre, the east and the north- east, which produce a veritable tearing of the tissues of the wheat, which does not take long to die if the state of the soil does not allow *it (which* is often the case) to quickly pass the press roller, which can sometimes save a piece of wheat placed in this bad case.

It is not possible to indicate which varieties resist better than others to this destructive action , on the other hand resistance to direct cold has been studied by many observers and allows us to give the classification below :

a) VERY RESISTANT VARIETIES:

Alsace, Alsace 22, Old Ferrette. **b)**

RESISTANT VARIETIES: Blé

des Dômes, Côte d'Or, Reims, Tassilo. **e)**

FAIRLY RESISTANT VARIETIES :

B2, Evolution, Extra KolbenH, Hantera, Pévèle Desprez.

d) LITTLE SENSITIVE

VARIETIES: Beauceron, Blanc Précoce, Maximum Cambier, Mont Calme 22, NR, Préparateur Etienne, Vague d'Epis, Vuiteboeuf, Wilson. e) SUSCEPTIBLE VARIETIES :

Allies, Bon Fermai, Bon Moulin, Champ Joli, Chanteclair, Cloches 26, DC Tourneur, Flèche d'Or, Goldendrop, Goldendrop 184, Early Wat tines, Short Straw Hybrid, Bersée Hybrid, Hybrid 40, Battle Innovation 30, Kolben de Heine, La Fayette, Olympique, Picardie Desprez, Preparator Etienne, Rouge de Bordeaux, Sillon d'Or, Superhâtif, Vilmorin 23, Vilmorin 27, Vil morin29, Yga. f) QUITE SENSITIVE VARIETIES : Early white Cambier, Bon Fermier, Hybride du Joncquois, Hybride 46, Ilede France, Inversable, Inversai, Moulin Neuf, René Leblond, Vercors. g) VERY SUSCEPTIBLE VARIETIES : Spring Fylgia.

2 ° RESISTANCE TO LODGING

This element is conditioned by the quality of the straw, more than by its size, it is thus that certain wheats with medium straw such as: Bretonnières and Early White offer only passable resistance to lodging, whereas Mont Calme 22 whose straw is higher pays less easily.

Tassilo, with a fairly high straw, is even more resistant, as are DD Tourneur and Inversai, which offer the same degree of resistance as Vilmorin 23, whose straw is shorter.

The classification below therefore has no relation to the height of the straw, but penalizes

only the actual resistance to lodging, under similar conditions for all varieties: a) SUPERIOR RESISTANCE:

Druckamp, Hybride du Joncquois.

b) VERY GOOD

RESISTANCE: Côte d'Or, Hybride de la Tour, Vilmorin27.

e) GOOD RESISTANCE:

Auchy Cambier, Chanteclair, DC Tourneur, 1âtifInversable, Hauters, Huron, Hybride 40, Hy flange 46, Inversai, Jade, Marival, Maximum Cam bier, Pax Cambier, Pévèle Desprez, Picardie Des prez, Reims, Tassilo, Vilmorin 23, Yga . d) FAIRLY GOOD

RESISTANCE: Cambier **Early White , Champ Joli, Spring Fylgia, Wattines Early, Short** Straw Hybrid, **Bersée Hybrid , Ilede France, Mont Calme 22, Preparator Etienne, President Riverain, Superhatif, Vercors, Vilmorin29, Vuiteboeuf .**

e) PASSABLE RESISTANCE:

PreCode **White , Bon Fermai, Bretonnières, Clo ches 26, Flèche d'Or. Innovation Bataille 30, La Fayette, Olympique, René Leblond, Wilson, Yve line. 9 f) LOW RESISTANCE: ':?1**

Bon Fermiér, Bon Moulin, Extra Kolben II, NR, Rouge de Bordeaux, Vaumarcus. g) POOR RESISTANCE:

Allies, Goldendrop, Goldendrop 184, Kolben de Heine, Moulin Neuf.

° TILLING FACULTY. 3

The ability to tiller allows the wheat to make a "strain" giving rise to a greater or lesser number *of* stems, intended to bear ears.

This faculty can be very interesting when the wheat, having suffered damage during the winter,

or not having lifted regularly, this one can fill the gaps to a certain extent by its own means.

Everyone knows that the typical wheat with strong tillering is the "Goldendrop" variety , whose particularity has led to it sometimes being called "rabbit wheat ", so great is, on the one hand, its ability to re-grow after being damaged by the tooth of the rabbits, but also its ability to provide a large number of stems on the same foot.

It should not however be believed that, in such a case, each stem will give rise to a cob! Indeed , it happens with this variety that quite a few stems “rise” too late (those around the perimeter in general) and fail to form a normal ear containing edible grain in due time !

On the other hand, it was noticed that the ability to tiller is not related to the length of the growing season of each variety.

Thus we find in wheats with good tillering, spring wheats such as: Extra Kolben II, Kolben de Heine, Fylgia de Printemps, alternative wheats, such as: Hybride de Bersée, Chanteclair, La Fayette, wheat which must vegetate quickly, especially the first ones.

Here is how the varieties are classified for their ability to tiller : a)

VERY GOOD TILLING :

Extra Kolben II, Goldendrop, Hybride du Jonc quois, Kolben de Heine, Maximum Cambier, Vil morin 23, Yveline, Yeoman. ***h)*** **GOOD TILLING :**

Early white Cambier, Chanteclair, Côte d'Or, Spring Fylgia, Goldendrop 184, Short Straw Hybrid, Bersée Hybrid, Hybrid 46, La

Fayette, Mouton, NR, René Leblond, Teverson, Vaumarcus, Vilmorin 27.

***C)* GOOD TILLING:**

Allies, Alsace 22, Blanc Précoce, Bon Moulin, Bretonnières, Champ **Joli,** Cloches 26, Mont Calme 22, Moulin Neuf, Vilmorin 23, Vuiteboeuf. Vuiteboeuf.

d) AVERAGE TILLING:

Bon Fermal, Bon Fermier, DC Tourneur, Early Wattines, Early Reversible, Hybrid of Peace, Hybrid 40, Ilede France, Innovation Battle 30, Japhet, Olympique, Preparator Etienne, Riéti, Rouge de Bordeaux, Superhatif, Trésor, Vercors, Whilelmine, Wilson.

e) BAD TILLERING:

Arrow d'Or, Oscar Benoist.

4° **EARLY HEADING :**

The precocity of a wheat is something sometimes difficult to estimate in a rigorous way, especially when one wishes to classify the wheat in order of precocity of maturity. It can happen in the hot season that drought, or extreme heat, hastens the maturity of a wheat, thus preventing **a** precise distinction to be made within one or two days between the date of maturity of a variety and that of of the neighboring va riety.

It is generally estimated that it takes 45 to 50 days from heading to maturity. Now the date of heading can be determined more precisely and it is this element which has been noted by the experimenters in order to judge the relative earliness of the different varieties.

Without being absolutely rigorous, this classification nevertheless gives fairly precise indications.

cises to the farmer to allow him to make his choice:

a) EARLY WHEAT :

Flèche d'Or, Short Straw Hybrid, Superearly.

b) SEMI-EARLY WHEAT :

Beauceron, Early White Cambier, Early White, Côte d'Or, Spring Fylgia, Early Inversable, Huron, Hybrid de la Tour, Maximum Cambier, Olympique, Pévèle Desprez, Preparer Etienne, Vilmorin27.

e) WHEAT. SEMI-EARLY TO SEMI-

LATE : Druchamp, Hybride de Bersée, Hybride 40, He de France, Inversai, Jade, Vercors, Vilmorin 29, Yveline.

d) SEMI-LATE WHEAT :

Bon Fermier, Bretonnières, Champ Joli, Chante clair, Bells 26, Hâtif de Wattines, Hybride du Joncquois, Innovation Bataille 30, Kolbende Heine, Mont Calme 22, Moulin Neuf, NR, Vilmo rin23, Vuiteboeuf, Wilson.

e) SEMI-LATE TO LATE WHEAT :

Goldendrop, Hybrid 46, Bordeaux Red, Vaumarcus.

f) LATE WHEAT :

Allies, Bon Fermai, Bon Moulin, DC Tourneur, Extra Kolben II, Goldendrop, La Fayette, René Lebiond.

5 ° RESISTANCE TO CRYPTOGAMIC DISEASES :

RUST

Wheat rust is caused by parasites belonging to the class of fungi, but several of these parasites can indeed cause this disease, which is likely to pro

lead to a significant reduction in yields and even lead to real scalding.

However, not all varieties of rust are equally dangerous to wheat; two of its forms will only hold our attention:

Stripe rust, which appears first in the season and which is due to the form: Puccinia glu marum, and stem rust, caused by: Puccinia nia graminis, which occurs at the end of the season, but which can, however, cause damage very importa so many.

The susceptibility of different varieties of wheat to these two forms of rust is different and seems completely independent. This is why we will give the nomenclature of varieties resistant to stripe rust on the one hand and that of varieties resistant to stem rust on the other.

The classification of wheat according to their resistance to these two distinct diseases has been delicate and cannot be absolutely rigorous, because the conditions favorable to the appearance and development of its two parasites require special conditions of temperature and humidity. , which do not occur every year.

It was therefore sometimes necessary to wait several years before being able to classify certain varieties in their respective category, according to their resistance.

Moreover, we know that the excessive use of nitrogenous fertilizers sometimes greatly favors the development of rusts.

RESISTANCE OF WHEAT TO YELLOW RUST

a) RESISTANT WHEAT:

Blé des Dômes, Côte d'Or, 11th in France.

b) LOW SENSITIVE WHEAT :

Allies, Beauceron, Bon Moulin, Chanteclair, DC

Turner, Spring Fylgia, Goldendrop **184,** Tade; Kolbende Heine, Maximum Cambier, Mont Calme 22, NR, Pax Gambier, Sillon d'Or, Ver Core.

e) SENSITIVE :

WHEAT : Productive early white, Early white, Bretonnières, Cloches 26, Druchamp, Goldendrop, Short-straw hybrid, Hybrid 40, Innovation Bataille 30, La Fayette, Preparer Etienne, René Leblond, Rouge de Bordeaux, Vilmorin 23, Vuiteboeuf, Wil son, Yga, Yvelinc. d)

SOMEWHAT SENSITIVE:

WHEAT : Bon Fermai, Champ Joli, Extra Kolben II, Flan dres Desprez, Flèche d'Or, Hâtif de Wattinee, Hybride de Bersée, Hybride de la Cloqueterie, Hybride du Joncquois, Hybride 46, Inversai, Moulin New, Olympic, Super-Hated, Vilmorin 27, Vil morin 29.

e) VERY SENSITIVE

WHEAT: Good Farmer, Early Reversible.

WHEAT RESISTANCE WITH BLACK RUST

a) RESISTANT WHEAT:

Preparer Etienne. b)

LITTLE SENSITIVE :

WHEAT : Blé des Dômes, Bon Sac, Cloches 26.

C) SENSITIVE :

WHEAT : Allies, Blanc Précoce, Bretonnières, Chanteclair, Chartres Desprez, Extra Kolben II, Early Inver sable, Hybride de Bonnance, Hybride du Jonc quois, Hybride 40, Ilede France, Inversai, Kolben de Heine, Maximum Cambier, Mont Calm 22, Moulin Neuf, NR, Olympique, René Leblond, Soissonnais Desprez, Vilmorin 23, Vilmorin 27, Vuiteboeuf, Wilson, Yga.

d) SOMEWHAT SENSITIVE

WHEAT: B2, Champ Joli, Côte d'Or, Druchamp, Flèche d'Or, Goldendrop 184, Jade, Vilmorin 29, Yveline. e) HIGHLY SENSITIVE WHEAT :

Early White Cambier, Bon Fermai, Bon Fermier, Bon Moulin, DC Tourneur, Goldendrop, Early Wattines, Short Straw Hybrid, Hybrid 46, La Fayette, Pévèle Desprez, Rougede Bordeaux.

CHARCOAL — DECAY

These two diseases are very often confused.

They are however very distinct, as much by their external manifestations as by their effects on wheat vegetation, their mode of development and the treatments which tend to combat them.

***Wheat smut* is caused by a microscopic fungus of the Ustilaginate family, called Ustilago tritici. The "spores", which can be** assi-**likened to the seed, of this fungus lodge in the furrow or the "brush" of the wheat and germinate at the same time as it. The parasite invades the tissues of wheat from an early age and vegetates with it, living at its expense.**

By the time the ear comes out of the sheath, it is already destroyed, or rather the floral tissues of the ear are replaced by the black spores of the fungus, which therefore matures long before the wheat.

At harvest, all that remains of the ear is the skeleton or "rachis", all production being suppressed . The rachis being washed out by the summer rains, there is no visible trace of the disease left at this time, but the spores disseminated by the wind and the insects have already infected the grains of the neighboring ears, in view of

At harvest, the smut is therefore *invisible on the grain,* which can only conceal in its furrow or in its brush a few invisible spores. **It is**

therefore absolutely utopian to qualify a sample of wheat grains as “charcoal”.

This disease only rarely reaches a significant development. It is not possible to give a classification of the varieties by degree of resistance.

However, we can indicate that the " Yveline" variety seems to show good resistance , whereas : Bon :

Sac, Pax Cambier, Pévèle Desprez, Picardie Desprez seem sensitive and that :

Côte d'Or, Oscar Benoist (Moyencourt), Vilmo Vilmo Fin27 seemed very sensitive.

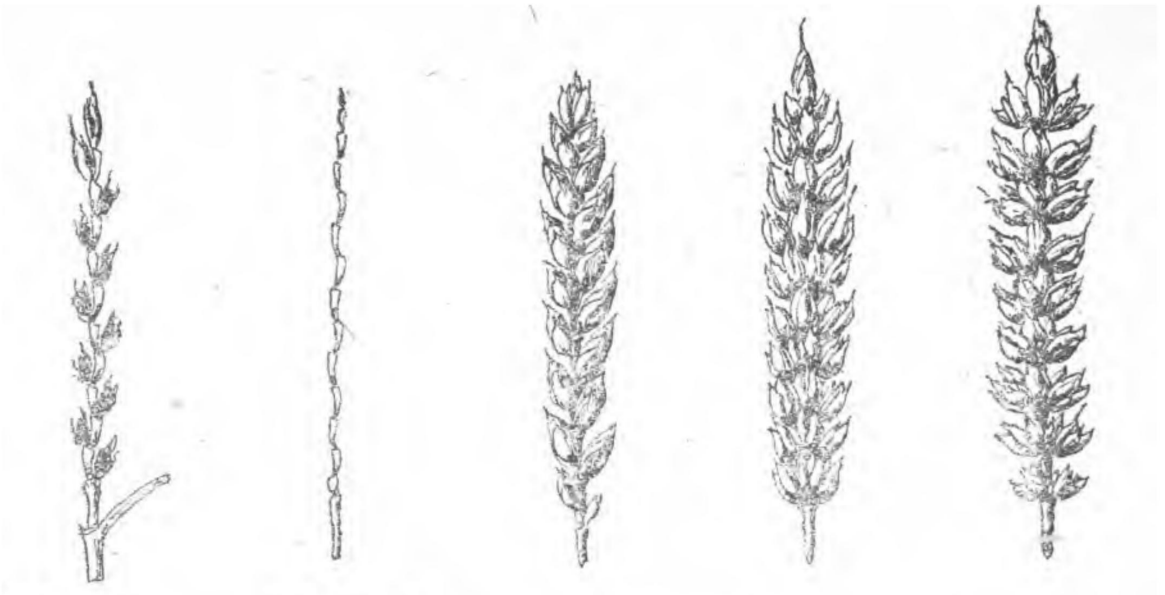
The only effective treatment against anthrax, which is currently known, consists in soaking the grains for twenty minutes in water at 54°. This treatment is very delicate, because this temperature must not be exceeded by more than 2° or else the germination capacity of the seed will be suppressed. This is what makes it impractical on the farm.

Wheat bunt is Elneà a microcopic fungus very similar to that of coal, called “Tilletia caries”.

The disease evolves in the same way as anthrax, but its effect and especially its external appearance are quite different.

The ear of bunted wheat keeps its floral envelopes (glumes, glumellae, bones) ; until harvest, it really has the appearance of an ear, but it has a “disheveled” appearance, due to the fact that the glumes and lemmas are half-open

The grain coat is not destroyed. Only the interior of the grain (embryo and kernel) has undergone a profound modification and is almost totally replaced by hundreds of thousands of fungus spores.



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BUNK WHEAT

The grain has therefore become a swollen pocket of bunt seeds.

Rotted grain is much lighter than sound grain, it floats when a handful of grain is thrown into a basin of water, while the sound grain sinks to the bottom.

There is therefore a fundamental difference between the way in which the two diseases present *themselves* at harvest time : Smut:

no grain formation; Decay : grain formed,
but whose almond is rem
placed by a soot-colored dust.

During threshing, many “decayed” grains burst under the blows of the thresher and the black, foul-smelling dust constituted by the spores of decay spreads over the healthy grains. Most of the spores fall off, but a number *of* these are retained in the furrow and especially in the "brush" hairs of the kernel, giving a black streak at the tip, "tip" of the kernel, which is referred to as the grain "bouté".

Butted grain is a grain that carries thousands of fungus spores. If this grain were put in the ground, we would sow with the plant the disease that would destroy it.

These grains must be absolutely prohibited for seed, but a seed can however be infected by a limited number of spores , therefore invisible, but no less harmful! This is why it is essential to treat the seeds of seeds, which is easily done by soaking , sprinkling or dusting.

We cannot give a classification of the varieties resistant to bunt, moreover the varietal factor does not seem very important to consider in the case of bunt, the treatment being generally effective and relatively easy to apply.

6° **DEGREE OF ALTERNATIVITY.**

All the varieties do not vegetate in the same way and these behave in particular very differently as regards the length of the vegetation period , that is to say the period of time which normally elapses, in an average year. , between sowing and maturity.

Some varieties, called "winter", must be sown relatively early, their vegetation period being longer, this is the case of the varieties : Alsace, Goldendrop, Teverson, Wilhelmine.

Others can be sown a little later such as: Vilmorin 27, Hybride 40, Hâtif Inversable, Wilson, Providence.

Semi-alternative wheats such as: Vilmorin23, Vilmorin29, Hâtif de Wattines, Ilede France, can be sown a little later.

Alternative wheats have the ability to vegetate more quickly and can be sown in the climate of the Paris region, until around the 10 March.

This is particularly the case for Flèche d'Or, Chantecler, Allies, Hybride de la Paix, Soissonnais Des prez.

Finally, we find a series of very fast-growing wheats which not only can be sown until mid-April, but most of which could not be sown earlier without risking being affected by late frosts.

These spring wheats generally require a higher average temperature for planting . végéter, it would also be absolutely useless to sow them earlier, only the crows would benefit from them because their emergence would only occur when the temperature had risen sufficiently.

To this category belong wheat: Fylgia

de Printemps, Florence X Aurore, Extra Kolbén

U. A fairly precise classification has been made among a good number of varieties, the main points of which are given below (the dates indicated relate to the climate of the Paris region) : a) WINTER WHEAT (to be sown befo Alsace, Early White Cambier, Early White, Côte d'Or, Dattel, Goldendrop, Short Straw Hybrid , Mont Calme 22, Prince Léopold, Teverson, Wilhelmine. b) HALF-WINTER (to be sown until Ja Ardito, Beauceron, Blé des Dômes, Bon Fermier, Bretonnières, Cloches 26, CarlottaStrampelli, Gros Bleu, Gua, Hasty Inversable, Hybrid with short straw, Hybrid 40, Hybrid 46, Institut Agrono mique, Jules Tézier, Maximum Cambier, Moulin Neuf, NR, Oscar Benoist, Providence, President Riverain, René Leblond, Vercors, Vaumarcus, Vil morin27, Wilson. c) HAL February 20) : Auguste Tézier, Bon Moulin, Blé Rye, DC Tourneur, Gerbor, Goldendrop 184, Hâtif de Wat fines, Hybride du Joncquois, Hybride de la Tour, Ilede France, Inversai, Marival, Pévèle Desprez, Preparer Etienne, P. L M., Rouge de Bordeaux, Saissette de Maninet, Villa Glori , Vilmorin 23, Vil morin29, Vuiteboeuf, Yga. d) ALTERNATIVE WHEAT (sowı Allies, Annie, Bladette de Besplas, Bon Fermat, Champ Joli, Chanteclair, DC Tourneur, D Tourneur, Desprez Picardie, Druchamp, Flèche d'Or, Franc Nord, Gironie, Henri Tourneur, Hybrid of Peace, Hybrid of Bersée, Hybrid of Cloqueterie, Innovation Bataille 30, Jade, Ja phet, Kirand, La Fayette, Mentana , Noé, Olympic , Soissonnais Desprez, Superhâti

e) SPRING WHEAT (sown until April 15) :

Aurore, Chiddam de Mars, Extra Kolben II, Florence X Aurore, Fylgia de Printemps, Huron, Kolben de Heine, Marquis, Moyencourt 31, Saumur de Mars.

7 °BAKERYVALUE.

All the elements that we have commented on so far contribute to what could be called: the cultural value of your wheat.

They are the ones who will ultimately condition the quantity of grain and straw harvested per hectare, but they are of no direct interest to the miller and the baker, processors, and no more so for the consumer.

On the contrary, the various qualities of the grain, which have been commonly grouped under the general term " baking value", will ultimately be partially determinant of the qualities of the bread, the final product, the quality of the bread also depending, in a significant proportion, of the quality of manufacture of the flour and the care taken during the kneading operations of the dough and the conduct

The main qualities that the French consumer wants to find in his bread are the following boast:

1. **Pleasant external appearance, golden crust, smooth.**
2. **Well-developed, light, not very dense bread.**
3. **Crispy, thin, sticky crust.**
4. **Elastic crumb whose eyes, regular, must occupy more than half the volume of the bread.**
5. **Frank and pleasant smell and taste.**

To assess all of these characteristics, the surest method is obviously the bread-making test, but apart from the fact that this method requires a fairly large amount of equipment, it cannot give

convincing results only if it is used by experienced experimenters, knowing how to conduct their 1st trial by eliminating as much as possible all the causes which would diminish their comparative value.

In order to overcome this drawback and to allow a greater number of interested parties to form, however, an opinion on the comparative value of the grain of various varieties or mixtures of varieties, different kinds of methods have been devised which have been put into practice. by breeders, to enable them to assess the value of their new lines and by millers, to guide them in their flour mixes or in their purchases.

These methods have the advantage of being more expeditious , of requiring less equipment and of being a little more " mechanical"; they are in fact based on "numerical values" and not on ". ". This advantage is moreover only partial, because they do not judge the final product which is the bread, and they only make it possible to quantify some of the elements which condition the quality of the bread.

DETERMINATION OF BAKED VALUE.

The determination methods are two kinds : :

L ° **THE PELSHENKE METHOD,** which consists in measuring the fermentation time of the dough and the qualities of the gluten, is a direct method, a little empirical, but which ultimately gives quite good results.

It has the advantage of being based on the work that occurs within a ball of total milling, including flour and bran and whose work of deformation and disintegration is followed when the ball head is plunged into a glass of 'water.

2° **THE OTHER METHODS** are based on the measurement of the two main qualities of gluten : *Elasticity,* which gives the dough the possibility of swelling without breaking and which finally makes it possible to obtain fairly large eyes making it light (the type of wheat possessing this quality to a high degree is Goldendrop), and *tenacity,* a quality which makes the dough resist to a certain extent the swelling of fermentation (type of wheat with high swelling: Trésor).

These methods, which all lead to comparable results, use different processes:

The Chopin extensimeter, the best known device, sends compressed air under a strip of dough, thus imitating the pressure exerted by the gases produced by the fermentation within the baker's dough ; a bubble *forms* which inflates and bursts when the breaking point is reached. A recording manometer, in connection with the apparatus, transcribes the modifications of the pressure, strong at the beginning, the strip of dough being thick and which results in the pressure element or P and which decreases at the same time as the thickness of the dough. the dough bubble. If the bubble swells a lot, this indicates that the dough is very elastic and this is transcribed on the diagram and gives the element G (swelling).

The stylus of the recorder manometer has drawn a diagram whose height is P, length G and surface W, this famous W about which much has been said and whose numerical value makes it possible to pass judgment on this set of qualities of the dough that the we called the "baking value".

Other devices, less widespread, exist to measure the baking value of pasta, but, if they are different in their construction and the

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1 : 11k at strong teoac...te' e f aksle &Jase:aie': Type: Treasure.

21 Wheat:a fallale tenacati and Brande elaseactti:Type: Goldenctrep.

3: Blea farte holding et grande ela s tteste : Type: Florence Arore.

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operational process **implemented ,** they conduct all to measure the elements considered above.

A well-harvested wheat in a normal year, in France, can be judged as follows, with regard to the value of its W:

W less than 50: bad.

W from 50 to 75: passable.

W from 75 to 100: medium.

W from 100 to 150: good.

W above 150: very good.

These figures should not be given too strict a strictness, because the variety factor is not the only factor in conditioning the baking value of wheat. Indeed , certain elements can contribute to modifying it in quite significant proportions.

Thus the climate, the nature of the soil, the previous crop, the use of fertilizers, the dates of sowing and harvesting, the time of the trial and the quality of storage play a role. important. It is no less true that, all other things being equal, it is always in our interest to prefer varieties providing grains capable of producing good bread, to those which have sometimes been called: fodder varieties ".

».

The long period of shortage *that* we have just gone through has caused the question of the quality of wheat to be neglected. Could we attach ourselves to it, when our resources only allowed us to distribute an insufficient ration in which substitutes had a large share?

The future will no doubt allow us to return to a more rational use of the noble cereal and the encouragement of quality will have to result in the adoption of a premium for the baking value .

We give below, as an indication and taking into account the reservations formulated above, an approximate classification of the wheat varieties

best known, (Killing to their baking value :

GOOD TO VERY GOOD (W greater than 150) :
Bon Moulin, Extra Kolben II, Florence-Au
rore, Providence.

b) GOOD (W from 100 to 150) : Auguste Tézier, Blanc Hâtif Cambier, Champ Joli. DC Tourneur, Denaiffe 707. Denaiffe 991, Flèche d'Or. Short straw hybrid, Imperator, La Fayette, PLM, Provinois, Superhâtif, Tas silo, Vilmorin27, Yga. *c) me-*

Yr, NNE (W from 75 to 100) :
Allies, Aurèle Gabv, Bastard de Rimoau, Blé *des* Dômes. Bon Fermai, Chanteelair, Bells 26, Côte d'Or. DD Turner. Gentile Rosso YNoé, Gua 113. Early Inversable, Hybrid du Châtelet, lie de France, Innovation Bataille 30. Inversai, Japhet-Mottin, Moulin Neuf, NR, Olympique, Petit Onimplin, Trainer Etienne, René Le blond. Roland, Wave of Epis, Vilmorin 29, Wilson, Yeoman II.

d) FAIR (W from 50 to 75) :
Al'aee22, Bescar, Bladettede Puylaurens, Good bag. Bordeaux 115, Carlotta Strampelli. Denaiffe 31, Gs.ffrov, Goldendron. Goldendrop 184, Gros Bleu, Hâtif de Wattinee, Hybride de la Paix, Hybride 77, Hybride 40, Institut Agronomi (rue, Jules Térier, Kolbende Heine, Maximum Cambier, Mentana, Mouton, Noé, Oscar Benoist, Pont Cailloux, Riéti II, Range of Bordeaux, Siegerl8nder, Square head 240, Saint Pierre, Struhe34, Teverson, Trésor,

Vénorerouge, Virgilio, Zara e) :
POOR (W less than 50) : Bretonnière, Carlotta X Inversable, Chiddamde Mars, Fylgiade Printemps, Gembloux18, Gentile Rosso, Hybrid of Bersée, Hybrid of Joncquois, Radin, Roussillon, Wh

Mars, Théveny, White Tuzelle, Varrone, Vilmorin23, Vilmo-
Vuitebeeuf, Wilhelmine.

8° GROUND REQUIREMENT.

Certain varieties of wheat can be sown in almost all lands, they are rare, unfortunately , and it is this ability that has allowed certain types of wheat to spread in almost all regions of France and in almost all soils.

This is the case with soft wheats such as Vilmorin 23, which can be sown almost anywhere, the limit of its cultivation being located in the south, approximately at Gironde, Cantal and Drôme.

Other varieties cannot stand small land and not even medium land; these are demanding varieties, requiring good soils with bottom and where the culture is of the very intensive type, this is the case of the varieties : Hybride du Jonc quois, Druchamp, Vilmorin 27, Hybride 40. Druchamp,

In insufficiently rich soils, these varieties cannot feed their grain completely and produce products of inferior quality.

Finally, some varieties are very undemanding and are content with medium or even lean soil; their use in rich soils brings only setbacks, their straw often not being *able to* resist the weight of the too heavy ears.

This is the case of: Goldendrop, N. **R.,** Rouge de Bordeaux, Moulin Neuf.

A classification, which we give below, per. It is necessary to judge the place to be assigned to each variety in this :

respect : *a)* VERY RICH LANDS :

Druchamp, Hybride du Joncquois, Hybride de la Tour, Pévèle Desprez, Vilmorin 27.

b) RICH LANDS :

Alma, Chanteclair, Côte d'Or, Desprez Picardie, Flèche d'Or, Fylgia de Printemps. Early Inver sable, Hybride 40, Hybride 46, Jade, Marival, Maxi mum Cambier, Tassilo, Vague d'Epis, Yga.

C) QUITE RICH LANDS :

Beauceron, Blanc Hâtif Cambier, DC Tourneur , Hybride de Bersée, Ilede France, Inversal, Mont Calme 22, Reims, Vilmorin 23, Vilmorin29, Wilson, Yveline. *d)* MIDDLE AND POOR LANDS:

Allies, Bellevue, Bon Fermai, Bon Moulin, Bretonnières, Blanc Précoce, Fleshy Joli, Cloches 26, Goldendrop, Goldendrop184. Hâtif de Wattines, Innovation Bataille 30. Kolhende Heine, La Fayette, Moulin Neuf, NR, Olympique, Preparator Etienne, Resident President, René Leblond, Rouge de Bordeaux, Superhâtif, Vaumarcus, Vercors , Vuitebceul.

9° RESISTANCE TO SCALDING.

The resistance of a wheat to scalding is a complex formed by quite a number of elements, including: the date of sowing, the adaptation of the variety chosen to the richness of the soil and the characteristics of the climate of the region, the special weather conditions for the year in question, the use of basal fertilizers.

The main thing is to choose the variety carefully according to the length of its vegetative cycle, on the one hand, its requirements from the point of view of the quality of the soil, on the other hand, these precautions being able to enormously reduce the risks of scalding.

It is for this reason that it is difficult to classify the varieties in this respect, the present classification présen-

would be many points of comparison with the one given previously on the subject of alterna tivity.

However, it is possible to indicate that the wheat from Meslilet le Beauceron proved to be particularly refractory to scalding.

Some varieties can be considered to have good resistance. These are : Blanc Précoce, Bretonnières, :

Flèche d'Or, Hâtif Inversable, Préparateur Etienne, Reims, Rouge de Bordeaux, Vaumarcus, Vuiteboeuf.

Vuitebœuf.

10° PRODUCTIVITY.

The productivity of a wheat is obviously conditioned by the richness of the soil, that of the bottom and that coming from the complementary fertilizers, by the "success of the culture", itself depending on many factors and in particular on the judicious choice *of* the variety and the time of sowing, but it also depends on the "productive capacity" of the varieties. It is therefore uniquely this capacity for productivity that interests us here.

For the reasons indicated above, we will understand all the difficulty that there may be for an experimenter to decide on this element, because, even in a well-run test center, it is possible that during n a campaign, such a variety *adapted* better than its neighbor to the sowing date chosen, the dose of fertilizer used , the harshness of the winter or the spring rains! That is why it is very difficult to classify varieties in this regard.

Nevertheless, the varieties which have attracted the attention of several experimenters and whose qualities have been confirmed in cultivation may be pointed out, and it may be said that the above varieties ci-des-

sub can be likely to provide big returns. These are :

Beauceron. Wheat from Mesnil, Jade, Hybrid Berfrom Bersee , Pévèle Desprez, Vihnorin27, Yga.

This very short list is in no way limiting and we repeat that we have obtained fairly numerous and consistent information for these varieties . There is no doubt that among modern hybrids , the tests interrupted during the war will allow us to extend this next list.

is lying.

EXPERIMENTATION.

Experimentation is a science, it is a science that requires a lot of precision and attention. Its aim is to differentiate the individuals subjected to its influence, for us, the varieties, as to their reactions to such and such an element, or as to their behavior in a given environment .

It allows us to estimate the qualities of the varieties by comparison with each other, but this comparison always retains a relative value, that is to say that it often only has a local value corresponding to the determined environment in which they have grown the varieties tested. Under these conditions and only under these, experimentation has certain precision.

Practically, this experimentation could not satisfy us, so it was considered essential to increase the number of experimentation centres.

Do trials from multiple centers give consistent and consistent results for a variety? Then one can make a judgment on the said variety and this one takes place in

our classifications, in the body of knowledge that we have of the value of each of them.

Experimentation on cereals has been entrusted in France to the Ministry of Agriculture, which has a specialized technical service responsible for organizing it at national level.

This service includes a center, the Institute of Agronomic Research, located in Versailles, one *of* whose main roles, alongside research, is to try new varieties compared to those already known, and to know their characteristics , qualities and flaws.

Secondly, the Official Experimentation Service includes regional stations such as those of Clermont-Ferrand, Dijon, Montpellier, Rennes, Bordeaux, Colmar, where similar trials are carried out, but preferably involving varieties adapted to region or undergoing adaptation trials.

Thirdly, the departments of Agricultural Services are responsible for organizing trials each year, with the help of the most enlightened farmers and agricultural schools.

It is obvious that the number of varieties included in the trials decreases as one descends from the central plan to the departmental plan.

Parallel to this official organization, the private efforts are also quite significant.

However, if, in the establishments and houses specializing in selection work, this work is carried out with the required rigor by experienced technicians, the same is not always true in the trials organized by certain farmers . agri-culteurs.

There is a certain danger in drawing conclusions too quickly from organized trials without sufficiently guarding against sources of error, these d'erreure.

being very numerous, and we repeat again_ that experimentation being a science requiring technical knowledge, precision, attention and patience, it is not within everyone's reach and those who intend to take an interest in it for the The organizers , even for their exclusive benefit, will act wisely by taking all the desirable precautions, which will be indicated to them by the technicians specializing in this delicate question.

It would also be eminently desirable for the number of regional stations to be increased, the diversity of our climate and our soil requires it and many farmers would like to see large, well-organized trials in their region, there is no doubt that production there would gain a lot.

SEED REGULATION

The seed trade is very old. Even **before the big specialized houses that we know today offered seeds of a certain value, the farmer was eager to entrust the soil with seeds that did not come from his crops. Although the equipment of many farms has for a long time included a rare ta, making it possible to roughly clean the seeds and that some farmers have even installed a cell sorter in their attic, the concern to acquire seeds from elsewhere always been great among the French grower anxious to obtain always better.**

It is therefore not surprising to note that for a long time millers, grain merchants, sometimes bakers, were interested in the question and that they added this commercial branch to their activity. But, if most of them exercised this function honestly, others , seeing in it only a new profit, did not hesitate to use deception.

This state of affairs has led to certain reactions from buyers, who have become suspicious, and from public authorities, who have deemed it useful to put a brake on these fraudulent ac

This is how the first texts came into being.

suppressing seed fraud (Law of August 1, 1905, Law of July 8, 1907, Decree of January 22 , 1919).

The *Law of* August 1, 1905 empowered the Administration to define by decrees, after the Council of State issued a ruling, the different products (in this case to define the standards of the different categories of seeds) and made mandatory indication of the origin and composition of the goods .

Pursuant to this law, the first decree concerning wheat seeds is that of March 26, 1925. This decree specifies the indications which must be provided concerning the identification of seeds and their category and tends in particular to clarify these indications, obliging sellers to be specified on the labels accompanying the bags of wheat seed :

The name of the variety, the degree of purity, the source of the seed, the indication of the germination capacity.

The Decree of January 27 , 1933 further tightens the regulations and prohibits the sale, under the name of seed, of wheat having a germination capacity of less than 85% and containing more than 20 grams of impurities per kilo, of which a maximum two grams of seed ot

It also gives a more precise definition of the term "selection ". In addition, it provides that only the denominations included in the official catalog opened at the Ministry of Agriculture, in application of the *decree of November* 16 , 1932. Finally, it establishes the control, by the Fraud Prevention Service, of all draft catalogues , commercial prospectuses, posters, used

to announce the sale of wheat from start.

The Decree of September 23 , 1934 extends to seed oats and seed potatoes the obligations set by the aforementioned decree.

The Decree of April 7 , 1937 extends these same provisions to seed barley and corn, while further specifying the obligations of sellers.

These texts constituted the starting point of all current regulations governing the production and trade of seed cereals.

Nowadays, this regulation has been supplemented by a set of texts added to each other, some of which overlap and cancel each other out. This set of about 500 texts has been taken up and classified by subject and we give the essentials in the following pages, so that the reader can quickly find the texts which govern a given

question. classification of the texts currently governing all questions of cereal seeds, we have grouped these by subject, in chapters, the nomenclature of which is indicated below:

1° Seed standards.
2° General texts. 3° Sowing. Sowing. 4° Seed production. 5° Trade in seeds. 6° Distribution of seeds. 7° Price of seeds. Premiums. Margins.
8° Movements of seeds.
9° Repression, Fraud.
10° Credit.

SEED PNOMEMS.

The seed standards, i.e. the conditions which the seeds must meet, have been set by the following texts:

***Decree of January* 27, 1933: Standards, definition of selection.**

***Decree of September* 23 , 1934: Standards of avoi seed nees and seed potatoes.**

***Decree of April 7 ,* 1937: Standards for seed cereals and application to barley and corn of the provisions of the decree of September 23, 1934.**

***ONIC circular* no. 39 *of* 11 *August* 1942: Standards for cereals suitable for sowing, conditions for the purchase, sale and exchange of th**

***Circular* 265 *of the Minister of Agriculture of March* 14, 1947: Standard for native seed maize .**

2° GENERAL TEXTS.

***Law of August* 15 , 1936: Law creating the Office du Blé and stipulating in particular by its article 17 that this organization will fix the methods according to which the seed trade will be e**

***Decree of October* 4 , 1939, organizing the defense of the wheat market.**

***Decree of* 3 *September* 1940 organizing the rye market.**

***Law of November 17,* 1940, transforming the Office du Blé into an Office des Céréales and extending the jurisdiction of this wheat organization real.**

***Circular* Si *of the ONIC of January* 18, 1944: Regulates: the purchase by merchants and organizations selling seeds, the signing of contracts between them and producers, institutes the**

control of purchases by the Departmental Cereals Committees; lays down the conditions for the approval of seed producers; determines the need for employment certificates; sets the conditions for the circulation of seeds, the penalties to be applied in the event of fraud.

Circular n° 70 ***of*** *ro.NIC* ***of March 1,*** 1946: Codifies the regulations concerning the seeds of these decrees".

Circular No. 265 ***of the Ministry of Agriculture of March*** 14 , 1947: Regulation of the production and sale of native seed corn. ,

Decree of August 27 , 1948: This codification decree , although still incomplete in our opinion, brings a great deal of clarity and precision to the obligations of producers, multipliers and sellers of seeds of the various categories.

It specifies in its title I[er] the conditions that multiplication contracts must meet in order to be valid.

This decree brings a very important modification to the system of purchases outside contracts, these purchases having to be declared to the GNIS within fifteen days of the recognition on the ground, which has become an obligation.

Title II resumes, by codifying them; the obligations of undertakings engaged in the trade in seed grain.

Title III deals with sales regimes.

Article 13 lays down the obligation for all seed sellers to subject their products to an anticryptogamic treatment. However, the date from which this obligation will come into force will be fixed by ministerial decree.

Title IV deals ***with*** the circulation of seed cereals.

Title V dealing with the control of establishments

of selection and multiplication recalls the administrative obligations incumbent upon them.

Finally, Title VI refers to the penalties applicable to offenses committed in connection with the trade in cereal seeds.

Circular 57/732/118 *of* 10 *May* 1948: This administrative document resumes, for the 1948 marketing year, the system and characteristics of cereals suitable for sowing.

Circular 57/917/119 *of* May 27, 1948: Dealing with the regulation of Secobrah barley and its standards .

3 ° SOWING. RESEEDS.

SEEDING.

Many texts have been adopted each year concerning: sowing issues, sometimes to encourage them, sometimes to limit them (Circular 73 0.N.1.B. of November 24, 1938, Circular 163 ONIB of December 13, 1939) ; issues of replacement of wheat destroyed by frost , inventory of areas destroyed, allowances allocated for reseeding spring wheat , incentive bonuses for increasing sown areas, etc. It does not seem appropriate to list the fifty or so texts issued under these various titles, each of them adapting to the special conditions that prevailed at different times. However, it is useful to know the main basic texts which are : *Law of December* 24 , 1934 and *Decree of April* 24 , 1936, limiting sowing.

Law of October 25 , 1941, obliging farmers to sow areas of wheat at least equal to the average of the quantities declared sown in 1937.1938.

Law of November 16 , 1942, renewing the terms of the previous law for the 1942-1943.

Law of 22 *May* 1944: Same for the 1943-1944 campaign.

Law of July 18 , 1947, instituting a premium in courageously to the cultivation of wheat and rye.

Order of October 1 , 1947 ***and Decree of October*** 9 1947, fixing the methods of application of the present law.

Order of March 5 , 1948 amended by ***the order of May*** 8 , 1948 and ***order of August*** 30 , 1948 fixing the amount of the cultivation incentive premium for wheat and rye for the 1948 harvest and the methods of payment.

4° **PRODUCTION OF SEEDS.**

This important chapter should be broken down into four sub-chapters :• a) Procurement and contracts; (b) Delivery of producers; (c) Payments to producers; d) Seed sorting. *a)* **PURCHASES. CULTURAL CONTRACTS.**

The purchases ***of*** seeds from producers by authorized organizations (breeding houses, multiplication cooperatives, traders approved for the seed trade) have been regulated by numerous texts, the essentials of which we give below among the most recent : ***Decree of July 1,*** 1938: regulates purchases of seeds from producers.

Law of July 5 , 1942, stipulating that ONIC will set the conditions under which will be sold and delivered directly to companies the seeds cultivated under contract.

Circular n° 39 *of August* 11 , 1942: Establishes the "delivery contracts" concerning wheat recognized as standing from the 1942 harvest, to make up for the deficit caused to seed crops decree in multiplication on contract by winter frosts 1941-1942.

Decisions n° 14 and 15 *of the GNLS.* of January 6 *and February* 6 , 1943: Fix the model of the standard convention of multiplication to pass between the companies and the multipliers.

Circulars S1 and S2 *of* ro.NIC *of January* 18 1944 and *May 18 ,* 1946: These circulars deal with various issues and in particular set the conditions for non-contract purchases from producers. This question is also taken up in the circulars below: Circular 93 - ONIC of June 2, 1947; Circular 52.671 ONIC of August 13, 1947.

Order of March 6 , 1947: Officially homologous to the standard agreement model developed by the GNIS

Order of October 26 , 1948: Fixes the percentage of non-contract purchase authorized to production

organisations. *b)* DELIVERIES FROM PRODUCERS TO C

APPROVED.

Law of August 15 , 1936: Article 3 of this basic law establishing the Office du Blé provides that the farmer retains the right to deliver his wheat harvest to the organization of his choice.

Decree of November 23 , 1937: This codification decree deals, in its article 17, with the terms of wheat deliveries to storage agencies.

Law of July 5 , 1942: Dealing with the delivery *of* coarse grains to seed houses.

Several circulars have modified the terms and conditions for the delivery of cereal seeds to approved organisations. These are :

Circular No. 65 - ONIC of July 22, 1943; No. 15/17 ONIC of September 2, 1941; No.

15.451 ONIC of April 24, 1946. No. 265 ONIC of March 14, 1947 (maize).

c) PAYMENT OF SEEDS TO PRODUCERS.

Payment for seed wheat delivered by producers to breeding houses or similar organizations, as well as wheat from sorting, intended for milling, and unsold ***wheat*** seed returned to milling, must take place, obligatory , by intermediary of the Crédit Agricole Laisses ; with the obvious aim of being able to exercise effective control over transactions which go beyond the storage agencies, which are regularly placed under the supervision of the *ONIC* control services

Several texts have clarified this obligation and have fixed the procedures according to which these regulations were to operate.

The main texts governing this issue are :

the decree of 28 November 1937 (article 17).

The decree of September 9, 1939.

The ONICSi circular of January 18, 1944.

d) SORTING OF SEEDS.

Decree of July 1 , 1938: Regulates the sorting of seeds.

Circular 8893 ***of September*** 10, 1938: Specifies more specifically the procedures according to which custom sorting, carried out on behalf of farmers, must be operated and the conditions to which the authorization must satisfy.

Circular 81 - ***of January*** 21, 1946 : • Regulation of seed sorting.

5° **TRADE IN SEEDS.**

This question is very vast and has been the subject, on its own, of a large number of legislative and regulatory texts.

We have tried to classify these texts according to their purpose, but this classification is very delicate. since many texts relate to different objects.

We were able, however, to establish the following classification yes, if not perfect, at least allows us to limit searches : *n)* Texts of a general nature.

(b) Approval of *seed* organizations *and* Sellers. Resellers. Brokers.
d) Professional card. elAccounting of Seed Organizations. (f) Sale *of* seeds by storage organizations .

(g) Sale of seeds by producers.

n) **GENERAL TEXTS.**

The first basic text *regulating* the seed trade is the Law of August 1, 1905, commented on at the beginning of this chapter.

Decrees of annihilation were issued, notably : January 22, 1919; March 26, 1925; January 27 , 1933; October 14, 1936; April 7, 1937: July 1 , 1938; September 2, 1938 , June 13, 1942 ; September 28, 1945 . texts complement each other.Some repeal provisions provided for by their predecessors.It is therefore very difficult not to consider these texts as a whole.

However, we can consider that, among these tex

your, some are of an importance which deserves that we stop there.

The decrees of January 27, 1933 and April 7, 1937 have been commented on above, so we will not return to them .

The decree of October 14 , 1936: Lays down the rules for the purchase of seeds from farmers, establishes multiplication and selection premiums, provides for the terms of payment through the Caisses de Crédit Agricole, the authorization of the Cereals Committee for sorting by grain traders, keeping of special material accounts by the various enterprises and persons involved in seed production.

The decree of July 1 , 1938: Recalls various obligations imposed by the previous decree, also provides for purchases outside the contract, declarations to the Cereals Committee, the procedures for registration and approval of traders preparing wheat suitable for sowing, lays down the rights of the organizations with regard to the regulation of the staggering of sales practiced at the time, gives new details with regard to the special accounts to be kept by the organizations or persons engaged in the trade in seed wheat, and finally lays down the obligations of seed groups and traders subject to the payment of the taxes and contributions provided for in articles 7 and 24 of the Law of 15 August 1936 establishing the Office du Blé.

Decree of September 28 , 1945: Limits the purchase of seed cereals to selection and multiplication companies. Limit off-contract purchases of seed grains. Refers to varieties of rye that can be sold as seed. Fixes the conditions that the multiplication contracts must meet.

On the other hand, various circulars have brought

clarifications to these texts with regard to their application.

Circular No. C 67 *of September* 10 , 1938: Con
circle :

A) The persons and companies covered by the decree of July 1 , 1938, authorized to trade in seed wheat;

B) Special situation of the cooperatives of storage and cooperative storekeepers;

C) Conditions for the exercise of wheat trade
seed for the 1938-1939 campaign;

D1 Storage of seed wheat with traders *and* breeding and multiplication companies ; El Custom cleaning of wheat that
can be used for *seed.*

Sidu circular of *January* 18, 1944: This very important circular codifies many previous texts concerning the trade in seed cereals. It deals in particular with the following questions :

1) Purchases from producers.

2) Control of purchases by the Departmental Committees .

3) Conditions to be met by Be companies
delivering seed wheat to the trade.

4) Sales plan.

5) Tax system.

6) Movement of seed grain.

7) Control of breeding and multiplication establishments.

8) Penalties.

Circular S2 *of May* 18, 1946: Amends circular SI of January 18, 1944, on the following points :

1° Purchases of seeds from producers.

2° Conditions to be fulfilled by companies *ee* delivering seed wheat to the trade.

3° Sales system.

As can be seen from the statement above, the regulation of the seed trade is very complex and it is highly desirable that a *very* comprehensive seed code intervene to clarify this situation .

(b) APPROVAL OF SEED ORGANIZATIONS.

This question is settled by the circular Si "of January 18, 1944 (Title III) quoted above .

Various circulars have been issued by the ONIC administrative departments :

Circular 129 IG *of 7 May* 1945, concerning the approval of traders. This very important circular . takes up the entire previous question and codifies all these texts.

Circular 53 of *July* 4, 1946: Concerns the technical conditions to be met by any establishment , commercial or cooperative, producing or selling seeds in conformity with the decree of April 7, 1937. It deals

in particular with: 1° Approval of companies engaged in the

trade of seeds . 2° Various activities relating to the seed trade.

3° Accumulation of the activities of storekeeper and breeder or grain grower. 4° Procedure

to be followed for the approval of new seed establishments.

Circular 3006 CG *of December* 4 , 1946: This circular relates to the operation and prerogatives of the Departmental Cereals Committees. Its Title II, third paragraph, gives details regarding the registration of

selection and multiplication outlets, the activity of which predates 18 January 1944.

It specifies that after this date the approval of these bodies cannot be pronounced by the central departments of the Cereals Office.

c) VENDORS. DEALERS. BROKERS.

The regulation and control of the activity of these have been specified by several texts, the main ones being: Circular 29 of January

20, 1942; Circular Si of January 18, 1944;

Circular 52 of May 18, 1946.

Circular S3 lists the different categories

categories of establishments or persons assigned to deal with seeds and specifies their role in this matter.

d) PROFESSIONAL CARD.

Decision n° 13 *of the GNIS (Official Journal of February* 24 , 1943): This decision establishes a professional card and stipulates in particular in its article r : only those holders of a profession card will be authorized to trade in seeds : certificate issued by the (National Interprofessional Group for the Production and Use of Seeds, Grains and Plants).

Growers authorized by the EC to sell the seeds they produce directly are also subject to this obligation .

The decision indicates the conditions to be fulfilled in order to obtain the said card and the obligations incumbent on the holders *of* the card.

Decision No. 21 *of the GNIS* of 26 *May* 1943: Specifies that only holders of the “breeder” card may trade in selection or original selection seeds and that only holders of the “producer” bunt .

L

gainier" will be able to trade in breeding seeds.

Circular S1 of January 18, 1944: This circular , already cited above, deals with the question of the professional card, in its titles I and III.

Circular 35 AP1 of *January* 11 , 1946 (Agricultural Production Department): Exempts cooperatives from the obligation to hold a professional card.

e) **ACCOUNTING OF SEED ORGANIZATIONS.**

Decree of October 14 , 1936: This text, quoted above , stipulates in its article 6 that any person. or group, engaged in operations spitting or selling wheat seeds, must keep a register . details of which are indicated, and send to the Cereals Committee each year, in the second half of March, the statement of the operations of the preceding year.

Circular n° 52.873 *of August* 28 , 1947: Provides clarifications to the Cereals Committees on the documents that must be provided to them, monthly and annually, by seed sellers. in order to enable them to exercise control over the buying and selling of wheat seed and the use of cel these.

P SEEDS SALES BY ORGANIZATIONS STORERS.

Pursuant to the legislative texts regulating the trade in seeds, circulars have set the terms and conditions *for the* sale of seeds by storage organizations to farmers and the transfer of seeds between storage organizations.

The texts governing these issues were drawn up by the ONIC and brought to the attention of the organizations by the Cereals Committees.

The main circulars in this area are :

1° *Circular* 6943 *of November* 12, 1937, which authorizes cooperatives to sort wheat from its members, with a view to selling it as start.

2° *Circular* 25.683 *of August* 31 , 1940, which authorizes cooperatives to sell wheat delivered by their members and users as wheat suitable for sowing and, by derogation from the legislative texts in force, without guarantee of purity or germination (wheat suitable to seed). 3° *Circular* 25.844 *of September* 18 , 1940, fixing the rate of premiums allocated to cooperatives for sorting and to farmers for quality , for wheat suitable for sowing.

4° *Circular* n° 26 *of February* 5 , 1944. This circular, sent by the Seine-et-Oise Cereals Committee to the cooperatives of this department, clearly summarizes the terms of sale relating to transactions made between storage organizations and farmers , and between the storage organizations themselves , with regard to wheat suitable for storage start.

(g) **SALES BY PRODUCERS.**

We mean here by producers the farmers authorized to dispose of their personal production in seed, after having been duly authorized for this purpose by the Cereals Committee of their department and having received a professional card from the

The farmers involved were equated with seed establishments; this assimilation was recalled by Instruction No. 298 **B** of the administration of indirect contributions, dated December 1947.

With regard to relations between farmers multiplying seeds on behalf of

storage organizations authorized to trade in seed, or which deliver to them cereals suitable for sowing, the sale to organizations has been regulated by texts which were mainly intended to enforce temporary obligations, resulting for example from the staggering rule for deliveries, texts that have become irrelevant .

° DISTRIBUTION OF SEEDS. 6

Faced with the difficulties experienced by farmers in certain years, and particularly since the war, in obtaining cereal seeds, the production of seeds meeting the standards of the decree of April 7, 1937 being very insufficient, ONIC had to take an interest the distribution of wheat suitable for sowing on the different points of the territory .

This organization was therefore led to consider : 1" The periodic inventory of the availability of the departments. 2° The needs of each department. 3° The movements to be considered, taking into account the resources covering all or part of the local needs.

call.

4° The blocking of certain batches and in particular of Fylgia spring wheat for the 1948 sowings.

5° Reasoned release of these lots, as and when measure of local or external needs.

6° The elaboration of quotas fixed to each department, either to be taken from local resources , or to be received from other departments.

All these questions have been resolved, thanks to a set of instructions given by the services

from ONIC to its regional offices and mental départe-
departments , I think it is useless to enumerate these ces
internal texts which, for the most part, have only made it possible to resolve temporary difficulties .

On the other hand, ONIC was rightly moved by noting that certain departments with few producers were buying quantities of seeds, particularly wheat, which did not seem to correspond to their needs.

This body therefore had to take the decision to require purchasers to provide a certificate of use endorsed by the local administrative services, in order to prevent a large quantity of seed wheat from being diverted from its normal destination .

The system of employment certificates was set by the texts below : :

1° ***Circular S1 of January*** 18, 1944 ***(Title IV) :*** :
Requires the certificate of employment and gives the model of this document in the appendix.

2° ***Circular*** S2 ***of*** 18 May 1946 (3rd ***paragraph):***
Gives in particular the list of departments for which certificates are required. It will be noticed, on reading this list, that the departments which appear there are: on the one hand, those where the production of wheat is very low and the breeding important ; on the other hand, those which include large agglomerations, urban or industrial .

3° ***Circulars*** n° 76 ***of August 7 ,*** 1946 and 48.977/7 ***of December*** 14 , 1946: Extend this obligation to cereals suitable for sowing.

4° ***Circular*** 52.008/93 ***of June*** 2, 1947: Gives a new list of departments subject to the obligation to provide employment certificates.

5° ***Circular* 58/756/121 *of July* 27 ,** 1948 adds Corsica to the departments already designated.

On the other hand, the low grain resources of spring of the 1947 harvest led to greater vigilance in controlling the use of secondary cereals from seeds requested by farmers for the sowing of 1948.

To this end, it, ***by circular*** 55.959/115 ***of February*** 5 , 1948, decided that a ***certificate of use*** would be required of any farmer addressing to the Cereals Committee a request for seed of coarse cereals.

7° SEED PRICES.

The selling price of cereal seeds is fixed each year by a ministerial decree, generally appearing in August, and fixing the price of cereals from the new harvest and, at the same time, the maximum selling price of each category of different kinds of seed cereals.

Application circulars set the selection, multiplication and sorting margins, as well as the premiums allocated to producers.

With regard to cereals from the 1947 harvest, these elements were fixed by : ***The*** :

decree of September 9, 1947: Fixes the limit price for the sale of seed cereals, the margins for selection, reproduction and commercial seeds . Gives the list of cereal varieties

which, being considered as “novelties”, can be sold at a price to be freely discussed between buyer and seller.

On the other hand, the harshness of the winter of 1946/1947 having destroyed a large part of the sown fields, the farmers who, in the autumn of 1947, had no wheat likely to be suitable for sowing,

were eligible for seed wheat allocations at the price of the previous season.

This government decision resulted in to a certain number of texts and in particular:

1° *Decree of* 6 *February* 1948, instituting the right of farmers affected by frost to benefit from the reduced price and determining the conditions to be fulfilled in order to be admitted thereto.

This decree, published late, was nevertheless known to the competent authorities and gave rise to circulars published prior to this date, in particular:

Circular SF 148 of October 2, 1947;
Circular SF 152 of November 3, 1947;
The ministerial circular of October 22, 1947.

The prices of seed cereals from the 1948 harvest were fixed by *the decree of* August 4, 1948 and *the order of October* 14 , 1948 which fixes the methods of application.

8° MOVEMENTS OF SEEDS.

a) *Internal circulation :* The circulation of seed cereals is not free; it must be regularized by withdrawing from the Tobacconist Recipe a *movement title.*

The formalities to be carried out in this respect

have been pre-arranged. cised by: *The decree of December* 30 , 1942 stipulates that all transport of seed wheat must be accompanied by a movement document, whether it is a shipment from a seed processing organization, or from a producer, and as well for the seeds- decree as for the corns suitable for the seed.

As regards coarse grains, these must also be accompanied by a

title of movement, except however for seeds of coarse cereals dispatched from an authorized body , which nevertheless remains subject to the formality of the transport authorization, issued by the Cereals Committee.

Note 772 *of the Indirect Contributions of* August 21 , 1947 specifies that the movement titles can only *be* issued by tobacconists' receipts, to cover a movement of seed wheat, only on production, by the applicant, of the authorization of the Cereals Committee .

(b) Imports: Many administrative texts have been drafted to regulate the import of seed cereals , but relate to specific points.

The decree of October 29 , 1946 stipulates that the import of cereal seeds may only be carried out after having obtained the authorization of the Interprofessional Commission,

whose composition the said decree gives.

c) Exports: As with imports, the order indicated above makes this movement subject to the prior obtaining of authorization , issued by the Interprofessional Commissio

In addition, the decree of August 2 , 1947 provides for mandatory marks for exported seeds.

9 ˚ REPRESSION. FRAUD.

At the beginning of the chapter on legislation, we gave some explanations of the first texts which regulated the seed trade.

We summarize here, briefly, the impact of these different texts on the repression of commercial fraud.

used in the cereal seed trade :

Law of August 1 , 1905: This law, of a general nature, concerns fraud committed on all kinds of goods; it provides for implementing decrees , which we will study below.

Law of July 8 , 1907: This law concerns the sale of fertilizers. It lays down the principle of action for a price reduction, in the event of injury of more than a quarter.

Decree of March 26 , 1925: This text, taken in application of the law of August 1, 1905, applies the provisions of this law to the trade in wheat seeds and specifies the penalties to be applied, on the occasion of offenses committed i

Decree of January 27 , 1933: Specifies the regulations concerning the trade in seed wheat and submits sellers of seed wheat to increasingly precise obligations.

A circular bearing the same date sets the terms of application *of* this decree.

Decree of September 23 , 1934: Extends the provisions of the preceding decree to seed potatoes and seed oats.

Ministerial circular n° 120 *of January* 28 , 1935: This circular comes in application of the law of August 1, 1905 and specifies even more clearly than the previous texts the standards which seed wheat, invoices and labels must meet. In Title III, this circular also specifies the standards with which oat seeds must comply .

Law of March 10 , 1937: Completes the law of July 8, 1907, by applying to seeds and plants intended for agriculture the possibilities of action in r

price reduction, in the event of damage of more than a quarter.

Decree of April 7 , 1937: This very important text codifies the previous texts and in particular repeals the decree of September 23, 1934, relating to seed standards, sellers' obligations, penalties incurred in the event of an infringement.

This text is still the one which, at the present time, serves as the basis for the classification of the different categories (seeds : selection, reproduction, commercial seeds, and determines their characteristics .

Ministerial circular of April 27 , 1937: Porte application to seed barley and maize of the provisions of the decree of 7 April 1937.

On the other hand, this text specifies certain questions relating to the registration of these cereals in the catalog of species and varieties and obliges seed companies to submit their draft catalogues, prospectuses and current prices. concerning barley and maize, to the Ministry of Agriculture, prior to any publicity.

Law of November 5 , 1941: Provides for penalties for anyone who has diverted seeds, with a view to using them for another subject.

Law of December 17 , 1941: This very important law enacts sanctions against anyone who has diverted cereals from the normal circuit.

This text is therefore of particular interest to us, for the repression of offenses committed by those who fraudulently use wheat or coarse grain seeds for food. human or animal

Order of November 13 , 1943: Taken in application of the previous law, particularly concerns cereal seeds.

Law of *October* 8 , 1943 Concerns breaches of sowing obligations.

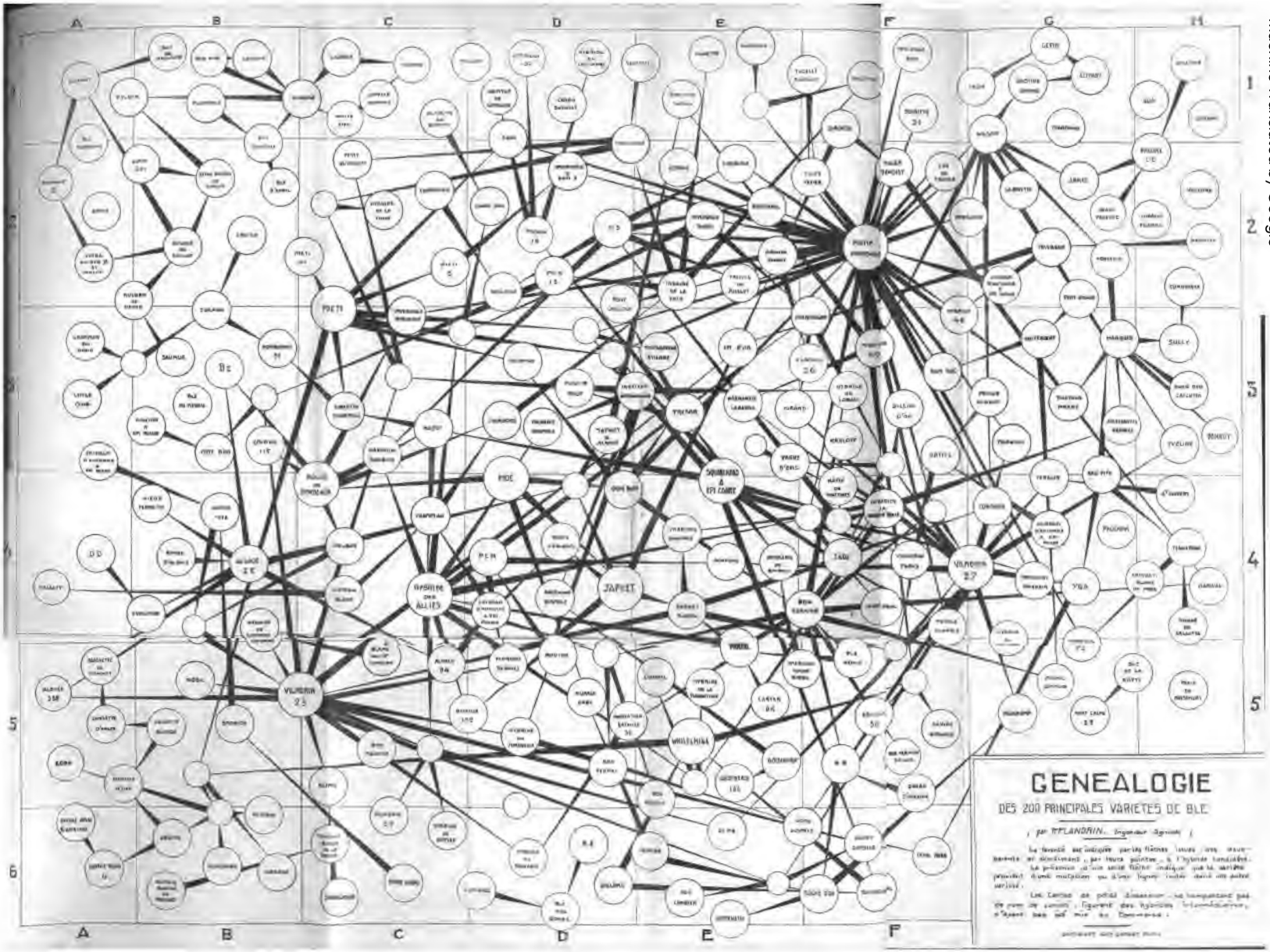
10° CREDIT.

In the autumn of 1947, the government took a series *of* measures tending to bring about, by all the means in its possession, an increase in the areas sown, the constant reduction of which since 1938 had been one of the elements which resulted in the reduction overall *wheat* harvest .

In order to provide farmers with as many facilities as possible and to encourage them to sow more wheat, one of the measures in question provided credit facilities to farmers for the purchase of seed.

A circular of *October* 15 , 1947, issued by the Caisse Nationale de Crédit Agricole, fixed the conditions which loan applications must satisfy . These short-term loans can be renewed until **I** 1[yes] September 1948.

Circular *SF* 151 *of October* 30 , 1947, addressed by the presidents of the Cereals Committees , invites them to provide the Caisses de Cré dit with information enabling them to judge the merits of the applications filed.



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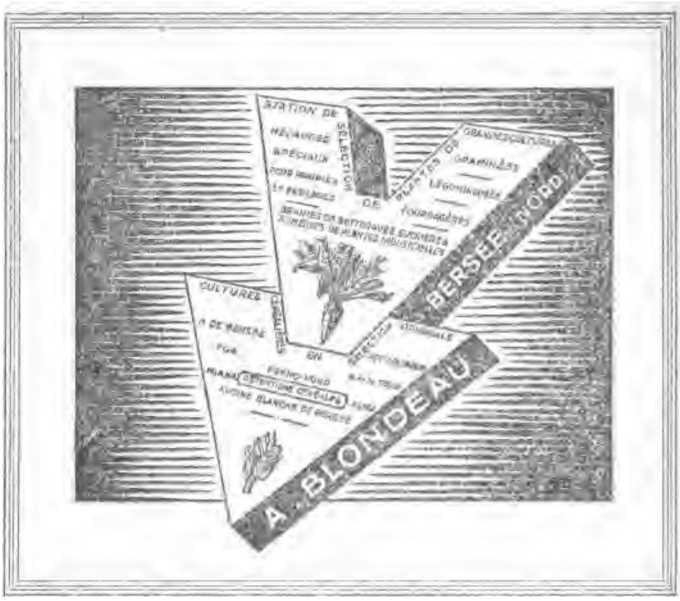

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