THE FIRST TWENTY-FIVE YEARS

OF THE

INTERNATIONAL CONVENTION

FOR THE

PROTECTION OF NEW VARIETIES OF PLANTS

UPOVUPOVUPOVUPOVUPOVUPOVUPOVUPOVUPOVUPOVUPOVUPOVUPO

December 2, 1961 — December 2, 1986

UPOV PUBLICATION
No. 879 (E)
ISBN 92-805-0182-8

THE FIRST TWENTY-FIVE YEARS

OF THE

INTERNATIONAL CONVENTION

FOR THE

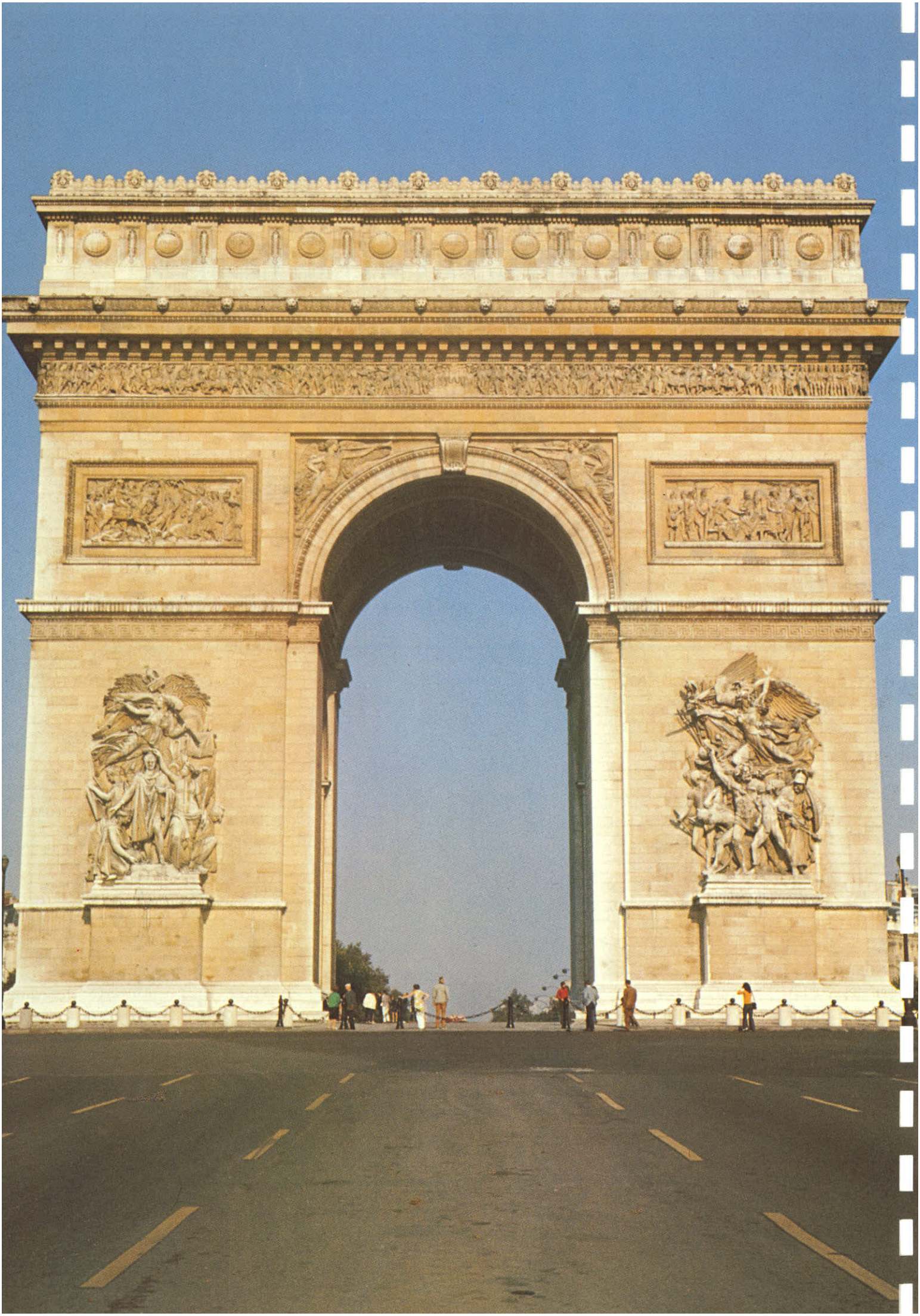
PROTECTION OF NEW VARIETIES OF PLANTS

December 2, 1961 — December 2, 1986

UPOV

Publication
of the International Union for the Protection of New Varieties of Plants

Geneva, 1987



FOREWORD

The International Union for the Protection of New Varieties of Plants has chosen to commemorate the twenty-fifth anniversary of the signature of the International Convention for the Protection of New Varieties of Plants in Paris, which is

— the capital of a major agricultural country that is true to its rural traditions and its culture, but also has its eyes turned towards a future of advanced technology;

— a great metropolis within the European Economic Community which comprises more than 250 million inhabitants and whose agricultural and economic development will contribute to the widespread influence of our civilization and to the strengthening of international cooperation.

For this I thank it most sincerely.

The concentrated attention and the sustained interest that the protection of new varieties of plants still enjoys twenty-five years after that signature, not to mention the high tone of the themes dealt with at the Symposium and the number of countries represented and participants from all parts of the world, are a testimony to the self-perpetuating effects of the Convention.

The progress achieved by plant breeding, and the progress that it has yet to achieve, are so many tokens of a know-how that has to be not only exploited but also enhanced for the benefit of mankind as a whole.

The "variety-seed" connection is vital to a world population that does not stop growing and is still faced in certain regions with severe famines.

It is a connection that generates responsibilities in the maintenance of species and of balance between them, and it is of decisive importance to man's environment and his well-being.

The work carried out by UPOV affords constant encouragement to the development of creative plant breeding and improvement

— on the one hand through the recognition of a right accruing to breeders who create or discover new varieties and who can thus collect royalties and make the investments essential to dynamic research;

— on the other hand through the avowed and reaffirmed resolution of UPOV to bring about a situation where any protected variety remains freely accessible to any person wishing to use it as an initial source of variation for the purpose of creating other varieties.

It contributes to the development of agricultural systems and allied industries through the marketing of new varieties endowed with highly diversified properties.

Its action is to be supported and developed.

I address to UPOV my best wishes for a future of further achievement and success.

François Guillaume
Minister for Agriculture of the French Republic

Arpad Bogsch
Secretary–General of UPOV, 1973-

PREFACE

Twenty-five years ago, plenipotentiaries from five States signed the International Convention for the Protection of New Varieties of Plants. It was signed on December 2, 1961, in Paris.

What were the motivations of the architects of protection for plant varieties and of the Convention, those who introduced property rights—and developed them at the international level—in the field of plant breeding, a field in which the concept of intellectual property was only partially recognized?

The Convention's preamble states that the contracting States were convinced of the importance attaching to the protection of new varieties of plants, not only for the development of agriculture but also for safeguarding the interests of breeders.

The invitation to the first session of the Diplomatic Conference which drafted the Convention, issued by the Ministry of Foreign Affairs of the French Republic in 1957, recalling the legal situation and the measures previously taken in the field, concluded with the following: "It therefore appears desirable that an agreement should be reached among the States wishing to promote the seed trade regarding the principles which should govern the protection of new plant varieties and, if possible, on the appropriate institutions for ensuring such protection."

Those considerations were based on the notion that breeders should be granted the same treatment as authors of scientific, literary or artistic creations, to whom many national laws and a number of international treaties recognized rights and guaranteed the possibility of receiving equitable remuneration for their creative efforts.

The protection of plant varieties not only fills a significant gap in the intellectual property field; it also contributes to improving agricultural products derived from the plant world, particularly foodstuffs. In the end, it is to the advantage of both the producer and the consumer.

This publication contains the report of the commemorative Symposium held on December 2 and 3, 1986, in the Palais des Congrès in Paris.

It also recounts the history of the Union and pays tribute to those persons who made vital contributions to its development. Their devotion to the cause of protection of plant varieties will serve as an example to all those who, in the next twenty-five years, will serve the cause of protection of plant varieties and the Union.

Arpad Bogsch
Secretary-General of the
International Union for the
Protection of New Varieties of Plants

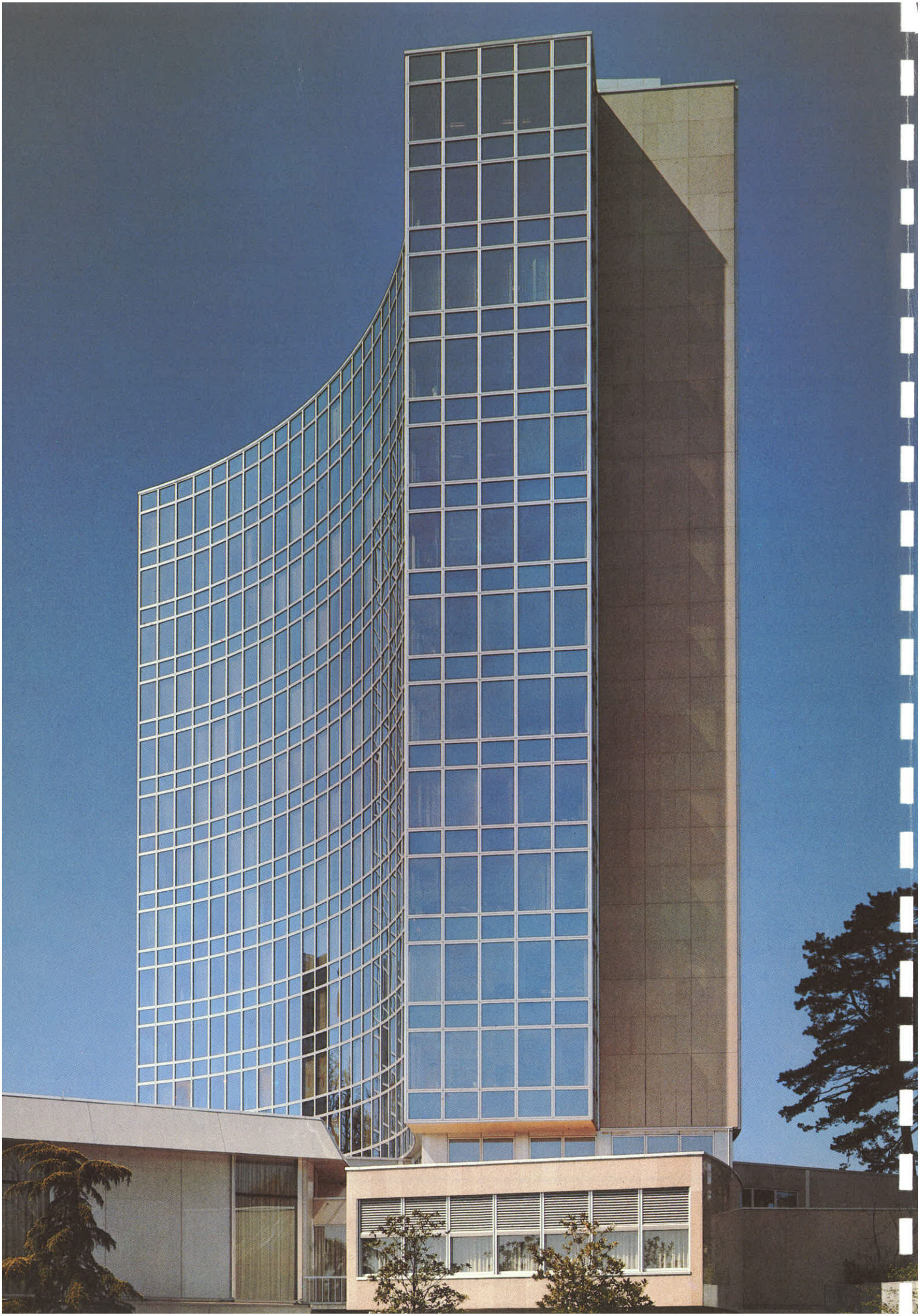


TABLE OF CONTENTS

THE CELEBRATION
OF THE
TWENTY-FIFTH ANNIVERSARY
OF THE
INTERNATIONAL CONVENTION
FOR THE
PROTECTION OF NEW VARIETIES OF PLANTS

PARIS, DECEMBER 1 to 5, 1986

THE PROGRAM OF THE CELEBRATION

At the twenty-eighth session of the Consultative Committee of the International Union for the Protection of New Varieties of Plants (UPOV), on October 11, 1983, the Delegation of France announced that the French authorities would be pleased to make arrangements for holding the twentieth ordinary session of the UPOV Council in Paris, in 1986, in order to celebrate the twenty-fifth anniversary of the International Convention for the Protection of New Varieties of Plants. The Committee welcomed the offer and decided that the anniversary should be celebrated immediately after the ordinary session of the Council.

An Organizing Committee, chaired by Mr. Victor Desprez (France) and composed of Mr. André de Vilmorin (Vice-Chairman) (France), Mr. André Cauderon (France), Mr. Edouard Fontana (France), Dr. Heribert Mast (subsequently Dr. Walter Gfeller) (Office of UPOV), Mr. Roland Petit-Pigeard (France) and Mr. Michel Simon (France), put together a commemorative program, with material support from 67 institutions and firms, that is described below.

December 1, 1986

The Consultative Committee held its thirty-fourth session in Paris, at the Palais des Congrès, Porte-Maillot, in a room richly decorated with flowers, under the chairmanship of Mr. Jean Rigot (Belgium). Representatives of fifteen of the seventeen member States were present. The agenda was essentially the preparation of the Council session on the following day.

In the morning, the Consultative Committee took on the shape of the Council for a few minutes, meeting in extraordinary session, to agree to the Secretary-General of UPOV receiving the award of *Officier de l'Ordre du Mérite agricole* from the French Minister for Agriculture. At midday, the representatives of the member States on the UPOV Council (and on the Consultative Committee) lunched together at the Ministry of Agriculture in the rue de Varenne. In the absence of the Minister for Agriculture and of the Director of his Office, they were received by Mr. Pierre-Henri Culaud, Deputy-Director of the Office. In a formal ceremony, he bestowed upon Jean Rigot, President of the Council of UPOV, and Arpad Bogsch, Secretary-General of UPOV, the award of *Officier de l'Ordre du Mérite agricole*, emphasizing that their activities both within UPOV and on behalf of UPOV had more than warranted that award.

In the afternoon, the Consultative Committee pursued its session in the same room.

In the evening, Mr. Victor Desprez (Chairman of the Organizing Committee) conducted a well-attended press conference at which a large number of newspapermen were able to put questions on the important economic sector of varieties and seeds and on plant variety protection. Questions could also be put to various UPOV personalities.

Afterwards, UPOV invited all the participants at the session of the Consultative Committee, the persons accompanying them, the newspapermen and the members of the Organizing Committee to a banquet in a specially decorated room of the Hotel Concorde Lafayette. It is truly difficult to say which, of the exquisite table or the impressive display of roses, received the greatest acclamation from the numerous guests.

While the delegates were meeting in the Consultative Committee, a fashion show was held for the ladies at a leading Paris fashion house. The proverbial sophistication of the "*haute couture parisienne*" came up to the most critical expectations and was admired by all the guests.

December 2, 1986

In the morning, the Council held its twentieth ordinary session in the room in which the Consultative Committee had met on the previous day.

The number of participants had increased to include also, as observers, representatives of States which were not (as yet) members, and representatives of the European Economic Community (EEC) and the Food and Agriculture Organization of the United Nations (FAO).

At the session, which was shorter than usual, the Council discharged the duties entrusted to it by the Convention, particularly by approving the Secretary-General's report on the activities of the Union in 1985, the report on his management and on the financial situation of the Union in 1985, together with the accounts for 1985. The Council further approved the progress reports on the work of various subsidiary bodies and also their programs of work. In particular, it decided on the principle of a revision of the Convention in order to improve it, or even to extend it to other types of living material, thus bearing witness to the same dynamic spirit that had moved the "fathers of the Convention" some twenty-five years earlier.

The afternoon was devoted to the first part of the Symposium, which took place in one of the vast conference rooms at the Palais des Congrès. The access to the conference room was marked out by what are known as floral decorations, but which in fact constituted a series of beauty competitions composed of flowers, fruit, vegetables and seed, against a mineral background that was also of great elegance.

The number of participants grew yet again to exceed 220 persons, including:

- representatives of fifteen of the seventeen member States (Belgium, Denmark, France, Germany (Federal Republic of), Hungary, Ireland, Japan, Netherlands, New Zealand, South Africa, Spain, Sweden, Switzerland, United Kingdom, United States of America);
- representatives of five non-member States (Argentina, Finland, Morocco, Norway, Poland);
- representatives of two intergovernmental organizations and one semi-governmental organization (European Economic Community (EEC), Food and Agriculture Organization of the United Nations (FAO), International Seed Testing Association (ISTA));
- members of seven international non-governmental organizations (International Association of Horticultural Producers (AIPH), International Association for the Protection of Industrial Property (AIPPI), International Association of Plant Breeders for the Protection of Plant Varieties (ASSINSEL), International Community of Breeders of Asexually Reproduced Ornamental and Fruit-Tree Varieties (CIOPORA), Association of Plant Breeders of the European Economic Community (COMASSO), Seed Committee of the Common Market (COSEMCO) and International Federation of the Seed Trade (FIS));
- individual participants;
- numerous well-known French guests;
- the "fathers of the Convention" and former, retired Presidents of the Council as guests of honor.

Three addresses were given, by Mr. Jean Rigot, President of the Council of UPOV, Dr. Arpad Bogsch, Secretary-General of UPOV, and Mr. Pierre-Henri Culaud, Deputy-Director of the Office of the Minister for Agriculture of France. The participants subsequently enjoyed a première: the *Groupe d'étude et de contrôle des variétés et des semences* (GEVES—the Plant Variety and Seed Study and Control Group) arranged for the first time a slide-show with a commentary describing its task and its activities, thus covering the essential aspects of the variety and seed sector. The audience, mainly composed of experts, enthusiastically applauded the quality of the production and the wealth of information contained in the audiovisual presentation. Finally, Dr. Cornelis Mastenbroek, who was President of ASSINSEL from 1980 until the summer of 1986, yet again enthralled his audience with his paper on the contribution of plant breeding to food production, drawing on his long practical experience, his erudition and also his enthusiasm as a man working for the good of mankind.

A visit to the largest regional seed facility, belonging to the *Coopérative agricole de l'arrondissement de Reims* (CAAR—the agricultural cooperative of the district of Rheims), brought the participants back to earth. Although many of them were indeed amazed at the size of the facility through which, comfortably seated in buses, they were able to follow the path of the seed from the hopper in which the rough seed was received right up to the loading bay for the cleaned, processed and packed seed.

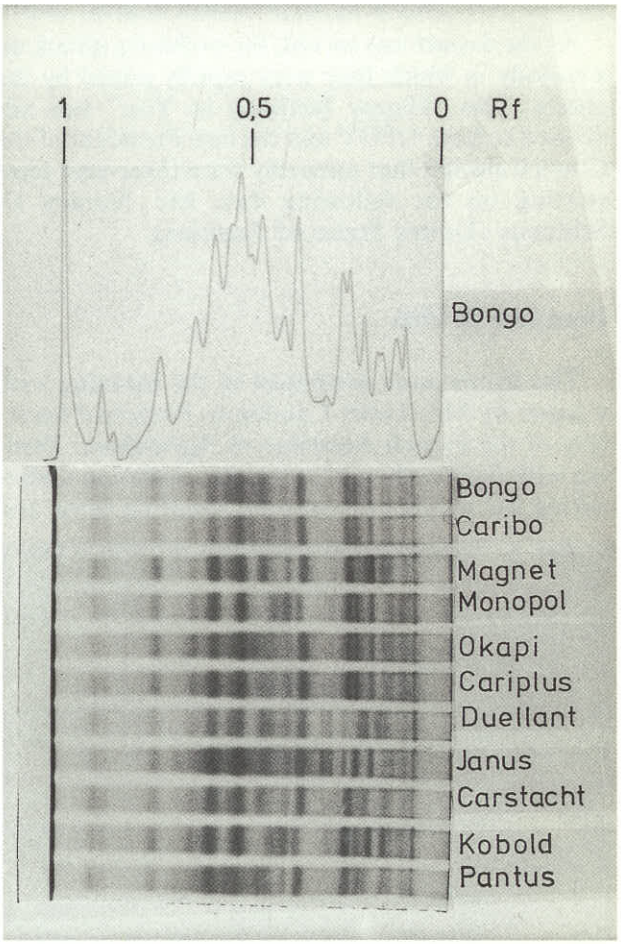
An excellent dinner, accompanied by champagne and served in the vaults of a well-known cellar, brought this memorable day to an end.

December 4 and 5, 1986

The following two days were set aside for visits to public and private facilities in the plant variety and seed sector. The participants had the choice of visiting facilities in which new plant varieties are developed or tested, or in which breeding research is supported, in four different regions of France, that is to say the Paris area, the Northern region, the central region and the South-East. A visit to the South-West, in the region of Toulouse, had also been scheduled but was cancelled due to the small number of applicants.

Those who visited the Paris region were able to see a part—due to the limited time available—of the installations at the *Institut national de la recherche agronomique* (INRA-CNRA—the National Institute of Agronomic Research) in Versailles. The choice was centered on the vegetable greenhouses. The attention of the participants was drawn, in particular, to the work on asparagus since the specific biological characteristics and the mode of exploitation of this species show some originality. Two establishments specialized in agricultural crops opened their doors: the Etablissements C.C. Benoist at Orgerus (Yvelines) and the Groupe Verneuil at Verneuil-l'Etang (Seine-et-Marne). The one is a family undertaking which celebrated its centenary in 1984 and the other is the offspring of seven cooperatives. The one showed, in particular, the breeding work carried out on cereals in a growing chamber and the practical applications of electrophoresis and the other its impressive installations for processing seed. Finally, vegetables and above all flowers were the order of the day at the Etablissements Clause in Bretigny-sur-Orge (Essonne).

The Northern region has always been, and remains, one of the most advanced areas in agriculture. Within a radius of some few kilometers are to be found an impressive number of breeding firms, some of them over 100 years old and others recently established. A choice had therefore to be made. Two family undertakings were selected, the Etablissements Desprez in Cappelle-en-Pévèle par Templeuve and Blondeau in Bersée, a firm with more open financing, Claeys Luck in Lille, and finally Sérasem in Prémesques par Pérenchies, a joint venture (*groupement d'intérêt économique*) whose capital is held by the *Union nationale des*



coopératives agricoles de céréales (UNCAC—the National Union of Cereals Cooperatives), Ringot, UCASEF and eighteen cooperatives. Although the structures differ, they pursue a common aim: the improvement of agricultural crops. Attention was therefore devoted to cereals, beets, rape, protein plants, fodder plants, etc. and, in view of the seasonal weather, the work carried out in the laboratory.

In the central region, attention was also mainly devoted to agricultural crops. A cooperative which was originally a regional one, the *Coopérative agricole de la Limagne* (corresponding to the plain of the Allier) began some thirty years ago with the production of maize seed and subsequently with

The ladies were given the opportunity of joining a sightseeing trip round the city, with lunch taken at the restaurant of the Eiffel Tower.

In the evening, the Organizing Committee gave a dinner on the Seine for some 400 persons on board one of the famous *bateaux-mouches*. Lit up by dozens of spotlights, the most beautiful parts of Paris glided past the diners who were charmed by both the excellent candlelight dinner and the panorama presented to them, as also by the well-known tunes played by an orchestra of great talent.

As the dessert was served, the orchestra struck up a melody in which they were rapidly joined by the guests. This "Happy Birthday to You" was addressed to both UPOV and the new President of the Council elected that same day for a three-year term starting on the following day, Mr. Stanley D. Schlosser (United States of America).

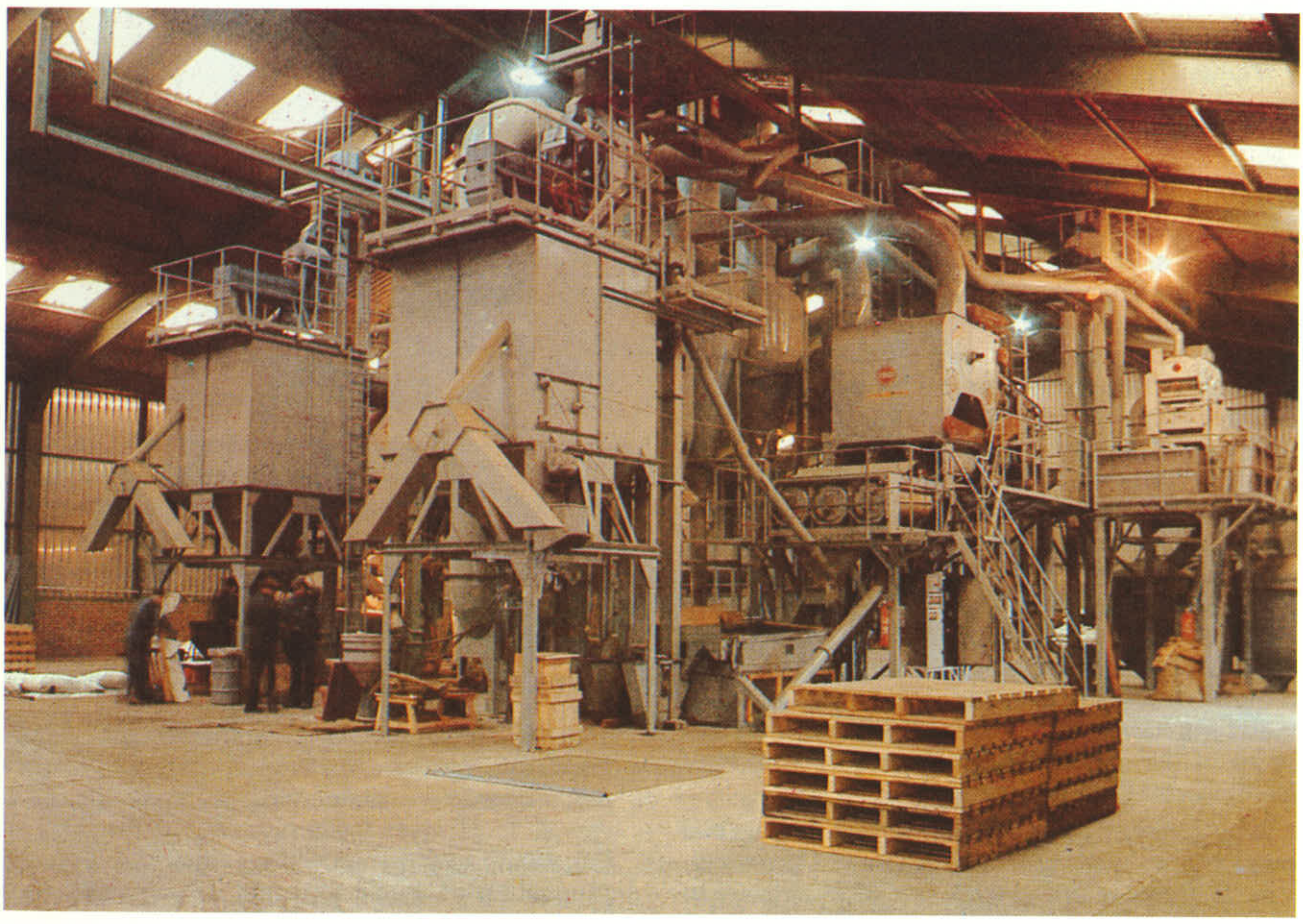
December 3, 1986

The Symposium continued in the morning with a paper by Mr. André Cauderon, Perpetual Secretary of the French Academy of Agriculture. Dealing with the breeding of plants as a common undertaking for public laboratories, breeding firms and users of varieties, Mr. Cauderon provided, in a highly concentrated form, matter for deep reflection on the future of plant breeding and plant variety protection; a future which he, just as Dr. Mastenbroek, situated within that of mankind.

The lectures were followed by a lively discussion; however, this discussion was all too brief and interesting questions could not be dealt with as they would have deserved since the organizers had laid on other activities for the afternoon.

Following the Symposium, many of the participants, together with those accompanying them, travelled to Rheims. In view of the large number of participants, the organizers divided them up into three different language groups for the scheduled visits. The visits by each group to champagne cellars were a very special experience. The history of champagne and the description of its production were listened to with great interest by the visitors who had perhaps not previously suspected the amount of care that goes into each bottle of champagne.

With the onset of twilight, the cathedral of Rheims appeared to the visitors at its most mystical. Although the marvellous rose-windows no longer shone in all their colors, the approach of night made the large edifice appear even more majestic and lent it a profound solemnity.



breeding. This led to the Limagrain group, which today represents one of the largest seed groups in the world, with activities ranging over maize, sunflower, beets, fodder plants, vegetables and flowers. The visit took up a whole day, and an additional half day was devoted to its cellular and molecular biology laboratory located on the university campus of Cezeaux in Clermont-Ferrand. The half day devoted to the INRA plant breeding station in Clermont-Ferrand was sufficient to visit the installations, but hardly sufficient to fully appreciate all the advances achieved at that station such as, for example, the maize hybrids that set out from there to conquer first the North of France and then Europe; it was also there that the system of cytoplasmic male sterility in sunflower, which is now used internationally for the production of hybrid varieties, was developed.

In the South-Eastern region, visits focused on ornamental plants. At the unit of the *Groupe d'étude et de contrôle des variétés et des semences* (GEVES—the Plant Variety and Seed Study and Control Group) in La Baronne, which is responsible, in particular, for the testing of rose and carnation varieties, the visitors could see for themselves that the secret of an efficient plant variety protection system resides in the enthusiasm of the

examiners for their work. The neighboring Station Midi of the *Comité national interprofessionnel de l'horticulture florale et ornementale et des pépinières* (CNIH—the National Professional Committee of Floral and Ornamental Horticulture and of Nurseries) showed its applied research work in fields as varied as vegetative propagation, nematological analysis, rational heating management and energy saving, and economic studies. The floral plant breeding station of INRA at Fréjus showed that an effective breeding program, making use of advanced techniques, now referred to as biotechnology, could make do with a fairly simple laboratory, but could not exist without greenhouses to shelter the young plants, in this case gerberas, when they leave the test tube or the Petri dish nor, above all, the know-how and intuition of the "conventional" breeder. The very immensity of the areas planted with roses, most of which roses would disappear without trace, at the Cannet-des-Maures estate of the Etablissements Meilland showed how difficult it is to create a new variety even in vegetatively propagated plants: between five and eight thousand crosses carried out each year produce some 250,000 to 300,000 seeds and, at the end of the process, only four to six marketed varieties. The visit to the Pradet estate of the Etablissements Barberet et Blanc proved that the same is true of carnation. Finally, their plant physiology laboratory in La Londe demonstrated what is involved in the micropropagation of carnation on a commercial scale.

The program of visits in the South-Eastern region included a free evening in Antibes on December 4, but the participants had the pleasant surprise of an invitation to dinner at the home of Mr. Alain Meilland. The conversation of course turned on the protection of plant varieties. After having spoken of the pioneering role played by his own father—a role referred to in the second part of this publication—Mr. Meilland emphasized with eloquence and conviction the attachment of breeders to this form of protection and expressed the urgent wish that it be further improved and introduced into the largest possible number of countries.

The President of the Council of UPOV, speaking on behalf of all concerned, repeatedly expressed his thanks to the Organizing Committee and to all those who had contributed both personally and materially to the success of the celebration and its unforgettable commemorative program.

Walter Gfeller
Vice Secretary-General of UPOV

THE SYMPOSIUM OF DECEMBER 2 AND 3, 1986

ADDRESS

by Mr. Jean Rigot,

President of the Council of UPOV

Permit me, first of all, to express our gratitude, to all figures from the civil service and academic circles and to all the participants who have paid us the honor, and given us the pleasure, of being with us on this memorable day of the twenty-fifth anniversary of the signing of the Paris Convention.

Your presence here is a sign of your interest for our Union and for the work it accomplishes. It is also a mark of esteem for the speakers who are to follow me on the rostrum and who will give life to this Symposium.

To each of you, I extend our welcome; to each of you, whose participation truly touches us, I address the warmest thanks of UPOV.

A twenty-fifth anniversary is a high day in the life of associations as it is in the life of men. A day of celebration uniting all those who have worked directly or indirectly for the development of our Union and all the friends of our Union.

Among those who have worked hard for UPOV, there is a man who has sadly left us for ever. Dr. Heribert Mast, Vice Secretary-General of UPOV from 1974 onwards, passed away on August 15 following a brief but severe illness that he bore with the courage and determination which were typical of him. This competent, and also charming, man was a driving force of UPOV and extensively contributed to its development and to its reputation throughout the world. Both UPOV and each of us individually will remember with gratitude this man of action, who was also a friend for many of us, and whose loss and whose absence temper our happiness on this day. I salute his memory. At the same time, I wish every success to his successor, Dr. Walter Gfeller, who is well known to us and enjoys our trust, in his task as the new Vice Secretary-General.

Twenty-five years of activity! Is that not enough to assess the progress of an association, the effectiveness of its action and, indeed, to commemorate the event?

Our French friends felt it was, just as we did. Through the Organizing Committee, headed by Mr. Victor Desprez, they have drawn up an outstanding program the quality of which you were able to judge for yourselves yesterday evening.

Each of us will take away an unforgettable memory of these celebrations, of that I am already convinced!

A memory of a twenty-fifth anniversary! A memory of a stay in this city, at the heart of the Ile de France, which has borne witness in the past to so many events, both unhappy and happy.

Paris, that has always been at the center of France's prestigious history, has seen revolutions, the horror of war, defeat, but also the glory of victory and the birth of noble ideas.

Although so many heads, even those of princes and kings, arbitrarily rolled in Paris, this city was also the forge of the human liberties that have travelled the world and to which we are all so attached.

An inspiration to a large number of singers, writers, scientists and politicians, Paris was also the inspiration of those to whom we owe the fact of being here today, those who decided on the means of supporting and protecting the efforts of breeders who had given an impetus to progress in agriculture, to increases in yield and to solving the problem of famine in the world, this blot on our modern age of triumphant technology.

Indeed, twenty-five years ago to the day, a Convention was signed here in Paris that was to afford at last to the creators of new plant varieties an effective right in their investments of knowledge, work, time and money. A right which was to effectively protect them against exploitation of their work by unscrupulous competitors who had made no effort and undertaken no investment.

I salute the fathers of that Convention who had the humility to recognize the limits of industrial property in the field of biology and the wisdom to

conceive protection adapted to the characteristics and properties of the living matter constituted by a plant variety. A creation which is able to reproduce itself, to propagate itself without the intervention of man.

There are certain challenges in life that should not be taken up, but whose reality must be admitted and the necessary adjustments made.

Twenty-five years! The age of adulthood at which illusions are exchanged for expectations, the age at which the calm waters and enchanted coasts of youth are left behind for the high, and sometimes heavy, seas of life.

Following a relatively peaceful voyage during which it called at the ports of the five continents, each time picking up new passengers, the ship of UPOV is now sailing between the reefs of biotechnological inventions.

Devoured by scientific curiosity, thirsty for new knowledge, insatiable for exploits and records, man has also penetrated the secrets of the infinitely small and would now like to become their master.

He has at last succeeded in modifying, or even bypassing, certain steps in the normal process that leads to plant life.

These discoveries and inventions, which obviously deserve equitable protection, have awakened old factions, whetted appetites and fortified those who dream of simplifying everything and strive to unify all forms of protection for inventions and creations.

At this point, twenty-five years on, when UPOV, and all those who join with UPOV on this day, look back to its origins, is it not truly the perfect time for the pilgrims that we are to recall what breeders' rights are and what is the reason and the justification behind this special form of protection?

Obviously, despite their wisdom, the fathers of the Convention could foresee neither the irruption of biotechnological inventions nor their impact in the field of plant breeding!

Be that as it may! They have shown the way and have innovated in thinking up specific solutions to specific problems.

Let us heed their lesson! Their recipe still has currency even if the ingredients have changed.

May this return to our origins inspire and fortify the imagination and creativity of those who will be called upon to regulate the new problems, may it suggest to them progress rather than conservatism, adaptation rather than uniformity, specificity rather than standardization. Everything is perfectible and nothing is impossible when imagination goes hand in hand with power.

Although a twenty-fifth anniversary is the end of one stage, it is also the start of a new stage in which the main concern must remain the effective and full defense of breeders, for whom UPOV was set up, and therefore of the users, that is to say the farmers who, finally, are to enjoy the advantage of the work of all those concerned.

That will not be possible without loyal collaboration and good relationships between the breeders' associations and UPOV and without the effort made for mutual understanding.

I am sure that the inheritance of twenty-five years of the Paris Convention will be neither lost nor squandered. The concern to continue the work already in hand must guide the experts in the two systems of protection and make them tackle the task of protecting biotechnological innovations.

Aware of the current limitations of the two instruments of protection and of their loopholes in respect of new inventions, I know that they will have the humility, that becomes so well those who possess the power or the knowledge, to sit together around the same table. After having rid themselves of their prejudices, having wisely surrounded themselves with scientific advisers specialized in biology, they will let themselves be guided by a search for the general interest and the interest of the breeders in particular. Serenely, without the pressure of time or indeed any other pressure, after having taken stock of the new problems, they will seek and propose original solutions commensurate with the needs of inventors, breeders and users.

A difficult task? Perhaps! "The greatness of a profession," said Saint-Exupéry, "is to unite men—quite a task!"

This day of celebration of the twenty-fifth anniversary should not, however, make us forget the future! A future which appears assured to me by the action of the past and by the solidarity of breeders and of UPOV.

Following this long introduction, too long perhaps, I now come to the purpose of our assembly, the twenty-fifth anniversary Symposium.

It is different from its predecessors as far as the topic is concerned and also in its organization, since the intention was to adapt it to the circumstances, that is to say a time of stocktaking, and assume a more formal tone.

We therefore have the special honor of receiving and listening to the Representative of the Minister for Agriculture of the French Republic.

I would thank the Minister's Representative for having devoted a part of his precious time to

UPOV and to those who are to some extent the architects of agricultural development.

We shall listen to his words with great attention.

However, the Symposium will begin with an address by Dr. Arpad Bogsch, Secretary-General of UPOV, and also Director General of WIPO. The spirit and the brains of UPOV, Dr. Bogsch has also been its guardian and its witness for many a year. His long experience and his knowledge are invaluable, as you may well imagine. I am sure therefore that you will listen to him with great interest.

We shall then have the opportunity of hearing Dr. Cornelis Mastenbroek. It is hardly necessary to introduce this eternally young breeder renowned throughout the world and in a considerable number of research stations and centers. However, since it is the tradition, I will mention a few events in his career. Nevertheless, I shall not cite all his responsibilities and activities: there are so many of them that it is probable, and indeed not unlikely, that I would forget some of them!

Dr. Mastenbroek was first a breeder, and then the director of a plant breeding station. Known and valued by the breeders' organizations, he became President of the Dutch Breeders' Organization, of the European Cereal Atlas Foundation, and then for six years President of ASSINSEL, a position from which he has just retired.

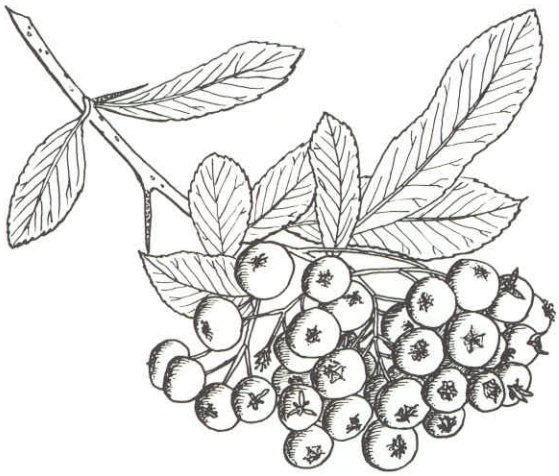
The second and final speaker at this Symposium is an eminent French scientific figure, Mr. André Cauderon. Again, there is hardly any need to introduce a scientist whose reputation has gone well beyond the frontiers of his own country. But again, I shall do so, since such is the custom.

Mr. Cauderon represents almost forty years devoted to genetic research. He is one of the fathers of the first maize varieties which set out to conquer the North; Director of a station at the time, he contributed to solving the problems of cytoplasmic male sterility in sunflowers; Scientific Director of the Plant Production Sector of the *Institut national de la recherche agronomique* (INRA—the French National Institute of Agronomic Research), then Director of the *Bureau des ressources génétiques* (the Office of Genetic Resources); Chairman of the *Comité technique permanent de la sélection* (the Standing Technical Committee on Breeding); member of the *Institut de France* (Academy of Sciences); member and Perpetual Secretary of the Academy of Agriculture. In a nutshell, knowledge, experience and competence at the service of this Symposium.

Mr. Cauderon, I have read in a French publication that you were described as a plant magician. I am not sure whether you like that description, but it is in any event evocative and, for me, flattering.

Now, at the end of my few words, having observed your great patience, I must express to you my gratitude and my hope that both this afternoon and the morning of tomorrow will rise to your expectations.

I declare the Symposium of the twenty-fifth anniversary of UPOV to be open.



ADDRESS

by Dr. Arpad Bogsch,

Secretary-General of UPOV

Almost thirty years ago, in February 1957, the Ministry of Foreign Affairs of the French Republic invited the following twelve European States to participate in a Diplomatic Conference: Austria, Belgium, Denmark, Finland, Germany (Federal Republic of), Italy, Netherlands, Norway, Spain, Sweden, Switzerland and the United Kingdom, together with the following three intergovernmental organizations:

- United International Bureaux for the Protection of Industrial, Literary and Artistic Property (BIRPI),
- Food and Agriculture Organization of the United Nations (FAO),
- Organisation for European Economic Co-operation (OECE).[1]

The Conference's objective was to study the protection of breeders' rights in new plant varieties.

The Diplomatic Conference met in Paris from May 7 to 11, 1957, and was opened by the Under-Secretary of State for Agriculture, Mr. Loustau. The Head of the French Delegation, Mr. Ferru, was appointed President. The first session—that of 1957—did not, however, lead to the conclusion of a Convention, but only to the adoption of a Final Act. This provided for continuation of the Diplomatic Conference at a later date following further preparatory work.

This further preparatory work lasted four years (from 1957 to 1961), during which a draft International Convention for the Protection of New Varieties of Plants was drawn up in the course of several meetings of experts. At the end of the last such meeting, Mr. Jean Bustarret, delegate of France and chairman of the Committee of Experts, reported that "the experts saw no need to prolong discussions, because only the Conference could decide upon the various matters on which they had not been able to reach unanimous agreement." At the same time, Mr. Bustarret stressed the "climate of mutual understanding and friendly cooperation that had reigned during the Committee's work."

This advice was taken and, in July 1961, the Ministry of Foreign Affairs of the French Republic invited the States and intergovernmental organizations that had been invited to the first session to participate in a second session of the Diplomatic Conference, together with the European Economic Community (EEC) and the following four non-governmental organizations:

- International Association of Plant Breeders for the Protection of Plant Varieties (ASSINSEL),
- International Association for the Protection of Industrial Property (AIPPI),
- International Community of Breeders of Asexually Reproduced Ornamental Varieties (CIOPORA),[2]
- International Federation of the Seed Trade (FIS).

The second session of the Diplomatic Conference opened in Paris on November 21, 1961, at the International Conference Center of the Ministry of Foreign Affairs. The closing date for the Conference was fixed at December 2. Among the participants in the Conference were the foremost experts of the time taking part as delegates, for example, Dr. Dirk Böringer, Mr. Jean Bustarret, Mr. Bernard Laclavière, Professor Dr. Ludwig Pielen, Mr. Halvor Skov and Mr. Leslie Smith, as well as the following experts who participated as observers: Mr. Claude Hutin, Mr. René Royon, Mr. Ernest Tourneur and Mr. André de Vilmorin. On December 2, 1961, the date set, exactly twenty-five years ago, the forty-one articles of the International Convention for the Protection of New

[1] Later to become the Organisation for Economic Co-operation and Development (OECD).

[2] Later to become the International Community of Breeders of Asexually Reproduced Fruit-Tree and Ornamental Varieties (CIOPORA).

Varieties of Plants were adopted and signed by plenipotentiaries from the following five countries: Belgium, France, Germany (Federal Republic of), Italy and the Netherlands.

During the following year, when it remained open for signature, the Convention was also signed by Denmark, Switzerland and the United Kingdom.

The philosophical or political bases for the Convention are to be found in the Universal Declaration of Human Rights adopted by the United Nations General Assembly in 1948. Article 27 of the Declaration provides that "everyone has the right to the protection of the moral and material interests resulting from *any scientific*, literary or artistic *production* of which he is the author."

Plant varieties are scientific productions. Their protection is not only right, but is also useful for the development of agriculture and, therefore, it corresponds to the general interest. What the Convention's contracting States wished to achieve was that the moral and material rights of breeders should be guaranteed, in accordance with clearly defined and internationally recognized uniform principles. Under the Convention, the contracting States must grant protection to the breeder of a new variety when it fulfils the following three criteria:

- it must be *clearly distinguishable* by one or more important characteristics from existing varieties;
- it must be sufficiently *homogeneous*;
- it must be *stable* in its essential characteristics after repeated reproduction or propagation.

"Protection" means that any sale of propagating material of the variety is subject to the breeder's authorization.

To have effect, the Convention still had to enter into force through ratification by three States.

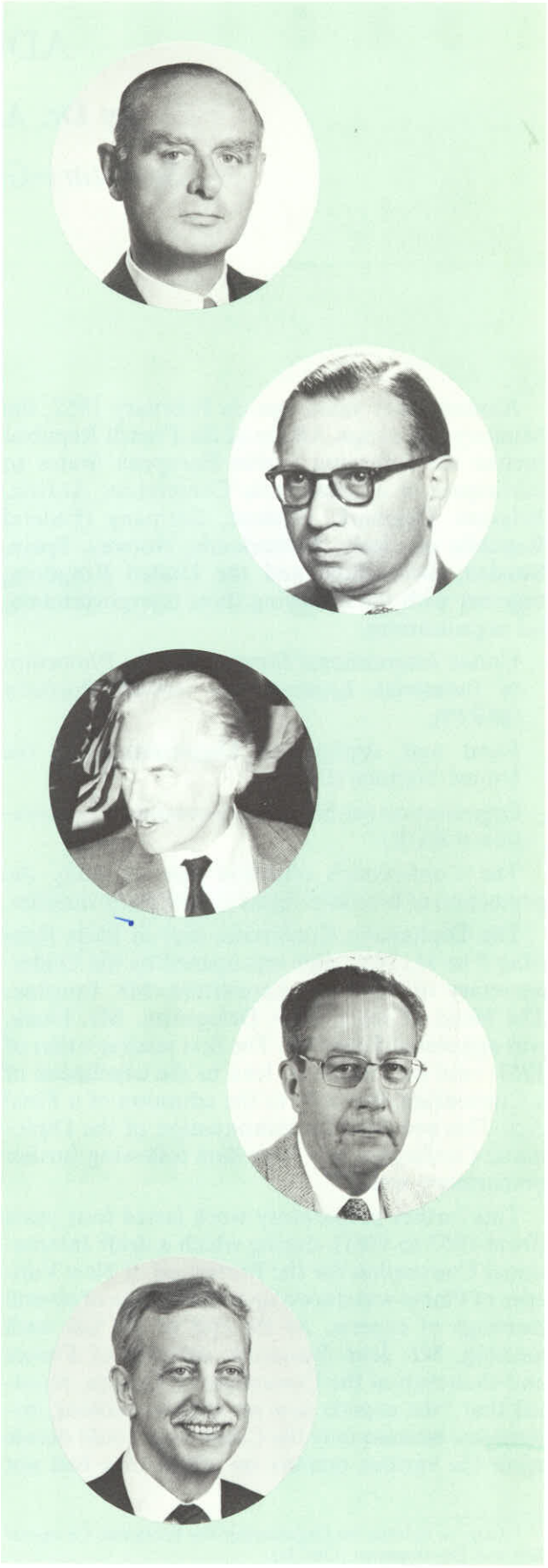
The first instrument of ratification was deposited in 1965 by the United Kingdom, the second in 1967 by the Netherlands, and the Convention entered into force on August 10, 1968, following ratification by the Federal Republic of Germany.

This was the origin of the International Union for the Protection of New Varieties of Plants, called UPOV.

Like many other international organizations, UPOV chose Geneva for its headquarters.

Since its creation, the Convention has been revised twice, once in 1972 and again in 1978.

The aim of the second revision was to introduce amendments into the Convention so as to allow more States to accede. This goal was achieved since



the number of UPOV member States has increased. They are now seventeen, namely, Belgium, Denmark, France, Germany (Federal Republic of), Hungary, Ireland, Israel, Italy, Japan, the Netherlands, New Zealand, South Africa, Spain, Sweden, Switzerland, the United Kingdom and the United States of America.

Development of the Convention has been the work of men who have devoted themselves to the task with enthusiasm and energy. It would be far too long to mention all those who have contributed to the establishment and development of UPOV, but I shall at least mention the Presidents of the Council, UPOV's supreme body, in which all member States of the Union participate. In chronological order, they were:

- Mr. Leslie Smith, United Kingdom,
- Professor Dr. Ludwig Pielen, Federal Republic of Germany,
- Mr. Bernard Laclavière, France,
- Mr. Halvor Skov, Denmark,
- Dr. Walter Gfeller, Switzerland, and
- Mr. Jean Rigot, Belgium, who is the current President of the Council.

I wish to pay tribute to all the Presidents of the Council, and to the chairmen of the various Committees, for their outstanding contribution to UPOV's development.

UPOV's first Secretary-General was my predecessor, Professor G.H.C. Bodenhausen, who was Secretary-General from 1969 to 1973. Every Secretary-General is assisted by a Vice Secretary-General. The first was Mr. Halvor Skov of Denmark, who occupied this post for four years, from 1970 to 1974. He was followed by the late Heribert Mast, Vice Secretary-General for twelve years, from March 1, 1974, to August 11, 1986. Since yesterday, December 1, 1986, our Vice Secretary-General has been Dr. Walter Gfeller. I take this opportunity to thank Mr. Skov for the excellent pioneering work he accomplished and to recall with emotion the immense work carried out by Dr. Mast, as well as to wish Dr. Gfeller every success.

Today, we have a good Convention. As I have already mentioned, the 1978 revision led to the accession of a number of States. Nevertheless, we still need many more States in order to guarantee the protection of the moral and material interests deriving from plant breeding all over the world. The way to achieve this might be through another

revision of the Convention, which could also be justified by the need to improve the scope of protection. In addition, it must be determined what system of protection is to be envisaged for biotechnological inventions of genetic engineering as applied to plants. In the search for solutions to all these questions, I am convinced that UPOV will be guided solely by the desire to ensure that the Convention guarantees the protection of the legitimate interests of breeders and thus contributes to the development of our natural resources for the good of all mankind.

In conclusion, allow me to express my admiration to the French authorities and to all those who have helped to organize this jubilee.

The program of festivities is impressive.

Its conception and realization have called for considerable efforts, both on the part of the French public authorities and private associations.

I am sure that all those present here, from all over the world, will join me in paying tribute to the men and women who have organized this event and in thanking them for their devotion and work, the success of which is now assured.

ADDRESS

by Mr. Pierre-Henri Culaud,

Deputy-Director of the Office of the Minister for Agriculture of France

Mr. François Guillaume, the Minister for Agriculture, is obliged to be outside the country for the whole of this week and has therefore asked me to tell you how much he regrets not being able to participate in this Symposium and he begs you to accept his apologies.

Your Union has chosen France to hold its meetings to mark the twenty-fifth anniversary of the International Convention for the Protection of New Varieties of Plants. The Minister for Agriculture has asked me to tell you how much the French Government was honored by your choice and to express to you its honor and its pleasure in welcoming the many eminent figures who are gathered together here.

Twenty-five years ago, to the day, five European States, soon to be followed by three others, signed the International Paris Convention for the Protection of New Varieties of Plants and thereby set up your Union. That act was the outcome of the efforts and vision of figures from many different horizons, several of whom are amongst us today and to whom we must pay special homage.

Since then, nine other States belonging to various continents have ratified the Convention and have acceded to UPOV. Still others are preparing to join. The very fact of the expansion of your Union demonstrates its vitality and dynamic action.

The 1961 Convention is based on a simple and forceful idea: to apply to discoveries made in the plant kingdom one of the principles of the Universal Declaration of Human Rights adopted by the United Nations General Assembly in 1948, to the effect that "everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author."

Scientific research knows no frontiers and none should be placed before the dissemination of its results. It was therefore important that protection should be provided at an international level. Your Union thus enables breeders and discoverers of new plant varieties to enjoy equitable remuneration from their propagating material—seed or seedlings—that is marketed. At the same time, your Union ensures that the dissemination of these new varieties takes place without hindrance.

I would like to observe that the protection afforded by your Organization in no way constitutes an obstacle to international cooperation in this field, particularly as regards the developing countries. Indeed, France has gone a long way in that direction by assisting numerous of those countries in the introduction and growing of new varieties adapted to their soil, to their climate or to their technology. In the same way, international research institutes which wish to make the results of their work available to farmers in the developing countries, without asserting their rights as breeders, may of course do so without difficulty.

The mission entrusted to your Union is all the more essential in view of the considerable progress achieved by agricultural research over recent decades and by the fact that even that progress is likely to be of small consequence compared to the prospects that are opening up today.

Farmers did not take long to realize the importance of genetic improvements in raising the yield, the quality of their products or the resistance of crops to parasites. The first breeders were farmers. Subsequently, however, despite its merits and the astonishing results that were sometimes achieved, empiricism was replaced by science and industry. Deeply committed in most cases towards international competition, which becomes sharper and sharper, our farmers have no option but to innovate. To use the term employed by Mr. Jacques Poly, chairman and managing director of the *Institut national de la recherche agronomique* (INRA—the French National Institute of Agronomic Research), agriculture at the end of the twentieth

century will be a "high added-value activity, with high scientific and technological input."

Scientific and technical research, and the application of its results, is now decisive for agriculture and the food industry, decisive for improving productivity, reducing costs, developing new products to meet the demands of the consumers and also to guarantee greater respect for the environment. Within the research effort pursued over recent decades, and which will doubtlessly be further intensified, genetics, particularly that of cultivated plants, occupies a prime place.

To illustrate what I am saying, permit me to dwell an instant on the case of France and to make two remarks on plant variety research in my own country. Although not specific to this field, public research and private research are increasingly associated. The authorities have endeavored over the last forty years to develop effective public research by means of bodies such as the National Institute of Agronomic Research, the *Centre national de la recherche scientifique* (CNRS—the National Scientific Research Center) and the universities. However, it has become progressively obvious that the public effort alone is not sufficient. Increasing efforts have therefore been made to encourage, by means of coordination or incentive, joint work between public and private research, whereby the former concentrates on the more basic aspects and the latter on the creation of varieties aimed at satisfying the market. Various examples could be given of programs that have been run jointly, for example by INRA and the larger firms. Again, in this field it is confirmed that high-yield agriculture is not possible without powerful and active upstream and downstream industries.

Secondly, the improvement of existing varieties and the creation of new varieties have strongly contributed to progress in agriculture in the plant field. Indeed, half the additional yield obtained from the crops involved is frequently attributed to these factors.

Genetic research has had many repercussions. It has enabled crops to be developed in areas to which, previously, they were hardly suited, it has increased yields, improved the quality of products, but also led to economies in the use of intermediary products such as fertilizers, whereby the scientists forecast even more spectacular gains for the future.

The fact that research demands increasingly heavy investments, in particular, means that its results must be carefully protected. That constitutes a *sine qua non* for research workers and breeders to continue their work.

The system of protection provided by your Union has played its part well. In France, for instance, we may note a constant growth in the number of applications for plant variety certificates in respect of all plant species—agricultural crops, vegetables, ornamentals and flowers. This protection afforded to breeders' rights has doubtlessly meant the availability to our agriculture of higher quality varieties and has thus constituted an element in the progress of agriculture.

Despite all this, as a result of the speeding up of scientific and technical advances, your Union is faced with new problems. For instance, you will be obliged to make allowance for the advance of biotechnology. The onus will be on the scientists, lawyers and practitioners gathered together within your Union to find types of protection that are adapted to the features of such research and at the same time to ensure the free availability of the results achieved.

Additionally, in view of the never-ending multiplication of plant varieties, your Union will have an increasingly arduous task in monitoring the varieties that appear and defining those that are truly novel.

The creation of plant varieties constitutes an essential factor in agricultural progress. France lends its full support to the activities undertaken by your Union to perfect the existing protection machinery.

In a scientific environment characterized by an acceleration of innovation, UPOV must turn its thinking and proposals even more towards placing the most recent advances of scientific and technical progress at the disposal of agriculture.

The promotion of research by protecting the work of breeders is without a doubt the necessary condition and warranty of further progress. Permit me therefore, in closing, to convey to you the confidence of the Minister for Agriculture in UPOV's activities and his wishes for the success of this Symposium and for the future of your Union.

LECTURE

by Dr. Cornelis Mastenbroek,

Honorary President of the International Association of Plant Breeders for the Protection of Plant Varieties (ASSINSEL)

THE CONTRIBUTION OF PLANT BREEDING TO FOOD PRODUCTION

1. Plant breeders selected improved cultivars in the beginning with simple means but later with increasing inventiveness and investment; and, over the years, they have greatly contributed to a substantial increase in the production of plant products used for the nutrition of men and animals or utilized in other ways. While it may be that research in crop husbandry has also contributed a great deal to improved crop production—through application of fertilizers, through mechanization, and as a result of better control of weeds, pests and diseases, to mention only a few factors—there can be little doubt that improved cultivars have brought about the most cost-effective contribution.

2. With respect to quantity, evidence of increased yields from recently-introduced cultivars as compared with older cultivars is shown in the figures below for a number of crops. These data refer to yields of products mainly consisting of carbohydrates, which provide energy for physical activity, as do oils and fats. Other constituents, such as proteins and amino acids, are important nutrients for maintaining the structure of the organism. Examples of increased content and improved composition are cited. Certain constituents, which are present in much smaller concentrations in plant products, are important or even indispensable for proper and balanced nutrition (for example vitamins). Whether compounds determining taste or smell or compounds that have a medicinal effect, influencing physical and/or mental health, should be considered food is highly questionable. Poisonous compounds certainly cannot be understood to be food. Their presence may prevent plant products from being used as food or limit their use as such, unless the dangerous substances can be removed or dissolved easily and cheaply. If this is not possible or is too expensive, such genotypes should be avoided through breeding.

3. Increased productivity often makes a variety popular with growers, giving that particular cultivar a predominant position in cultivation. With some crop species this has been followed by an epidemic occurrence of (possibly) new pathotypes of a disease agent to which the variety was resistant originally. Since other varieties remained resistant, plant breeding succeeded in providing a means of stabilizing production to a greater or lesser extent.

4. The extent of food production is also greatly influenced by soil and climatic conditions. To some degree, plant breeding has produced cultivars more or less adapted to such stress conditions. Plant breeding cannot provide an answer to extreme political situations leading to food scarcity, but it is certainly able to respond to political measures intended to stimulate cultivation of particular crops.

5. At present, in some countries, there is excess production of a few kinds of food. There is an apparent need for alternative crop plants and it is likely that such crops will have to be adapted to modern cultivation methods through breeding.

Plant breeding is not to be blamed for excess production; it has contributed a great deal to a much better food situation in many countries throughout the world.

By interpreting "food production" in a materialistic sense, "mental food" is excluded from my lecture. Successes in breeding ornamental plant species will not be reviewed, however much joy they may bring to breeders, growers and spectators, and I apologize to the breeders in question.

Crop plants providing carbohydrates, fats and proteins are clearly food crops. These include vegetables such as peas, carrots, garden beans and French beans, whereas other vegetables such as lettuce and cucumbers mainly provide vitamins, proteins and substances that give them a pleasant taste.

There are too many food crops for each of them to be dealt with in the time allocated; a choice has had to be made.

1. It is generally assumed that our far-off ancestors, when starting to reside in permanent settlements, soon started to grow crops by making use of material collected in nature. It is very likely that, at that time, they already chose to some extent the more suitable and attractive types. It is also very likely that they made some further selection in the course of cultivation. But equally, natural regional or local differences in climatic and soil conditions exercised their influence on the natural vegetation and on the cultivated primitive crops, resulting in different so-called "local or land varieties." An interesting example of very precise adaptation was reported by Bunting and Curtis (1968) in African sorghum.

Early civilizations knew a few crop varieties, e.g. wheat and grapes. There is no evidence that selections were tested in comparative trials. Two earliest records of testing progenies of individual plants against each other in comparative trials refer to Le Couteur of Jersey (around 1800) and Patrick Sheriff of Scotland (1819) with wheat and oats. From around 1870 onwards, making crosses between varieties and exercising selection in the progenies springing therefrom became increasingly popular among breeders and has remained so up to this very day. Gradually, more complicated techniques demanding more equipment and facilities were introduced. Breeding therefore became more and more expensive and this made breeders aware of the necessity of equitable remuneration for their investments. Although a voluntary system providing some remuneration existed in a few countries —the United States of America had already established legal protection of vegetatively propagated plants in 1930!—breeders held the view that they deserved proper legal protection.

As a result of the initiative and perseverance of a group of breeders in north-western Europe under the inspiring leadership of Ernest Tourneur and organized in ASSINSEL since 1938, governments gradually became convinced that plant variety protection would be beneficial not only to plant breeders but also to growers and national agricultural production. Eventually, following an initiative by the French Government, this resulted in the conclusion of the Paris Convention on December 2, 1961, the very reason for this commemorative meeting.

2.1 The very first sentence of the preamble to the text of the Convention reads: "Convinced of the importance attaching to the protection of new varieties of plants not only for the development of agriculture [...]." Data will be given to show that plant breeders have indeed contributed—and it may be postulated contributed a great deal—to the development of agriculture and to the production of human food, animal feed and other products.

The average annual grain yields of wheat, maize, sorghum and soybean over the period 1930-1983 are shown in *figures 1 to 4* (Duvick, 1984). From these data, the average annual rates of increase in grain yield were calculated (*table 1*), showing a substantial rise in yield, in particular in maize and sorghum since 1955, but not in soybeans. The conspicuous gain in maize yields is further demonstrated in *figure 5* (Duvick, 1984).

Silvey (1981) calculated national average yields of wheat in England and Wales (almost entirely winter wheat) for the period 1947-1978. She separated the effect of varieties from other factors

Table 1

Average annual rates of gain in grain yield of four major crops of the United States of America, in three time periods[a]

Crop	1900-1930 kg/ha/year	1930-1955 kg/ha/year	1955-1982 kg/ha/year
Wheat	0	15	30
Maize	−3	57	144
Sorghum	−36[b]	22	70
Soybeans	—[c]	17	20

[a] Data obtained from various volumes of USDA's "Agricultural Statistics", U.S. Government Printing Office, Washington, D.C.

[b] For years 1919-1930.

[c] No data.

(Duvick, 1984)

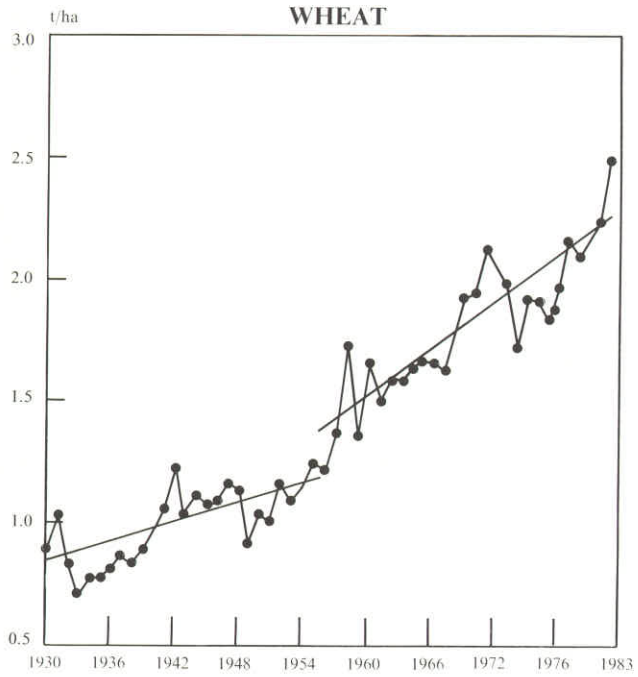


Figure 1. Annual average grain yield of all U.S. wheat, 1930-1983. Straight lines indicate linear regressions of yield on years, calculated for 1930-1955 and 1955-1983. (U.S. Department of Agriculture, 1930-1983) (Duvick, 1984)

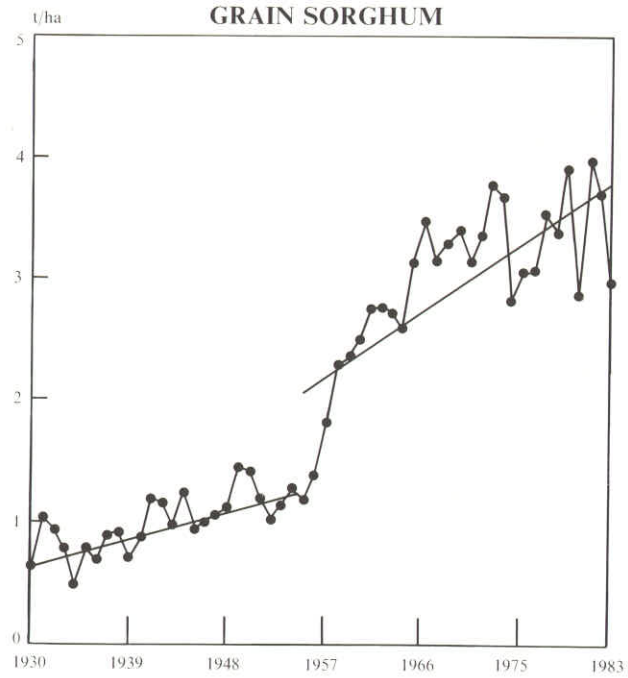


Figure 3. Annual average grain yield of U.S. sorghum, 1930-1983. Straight lines indicate linear regressions of yield on years, calculated for 1930-1955 and 1955-1983. (U.S. Department of Agriculture, 1930-1983) (Duvick, 1984)

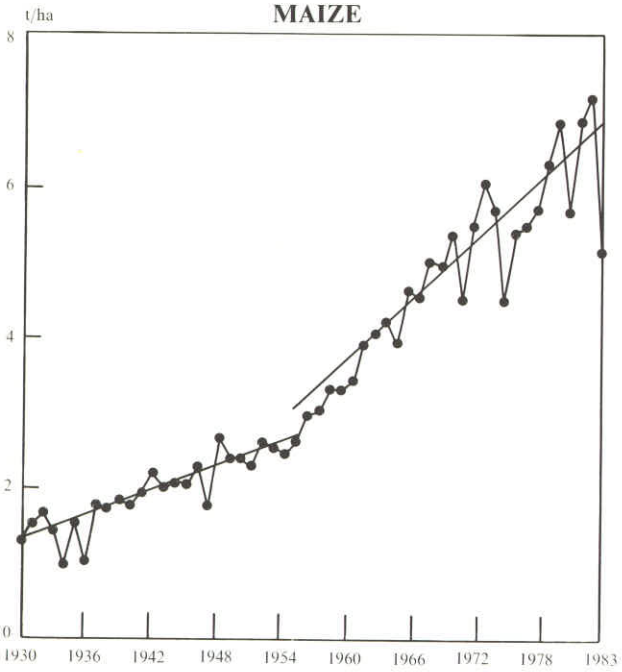


Figure 2. Annual average grain yield of U.S. corn (maize), 1930-1983. Straight lines indicate linear regressions of yield on years, calculated for 1930-1955 and 1955-1983. (U.S. Department of Agriculture, 1930-1983) (Duvick, 1984)

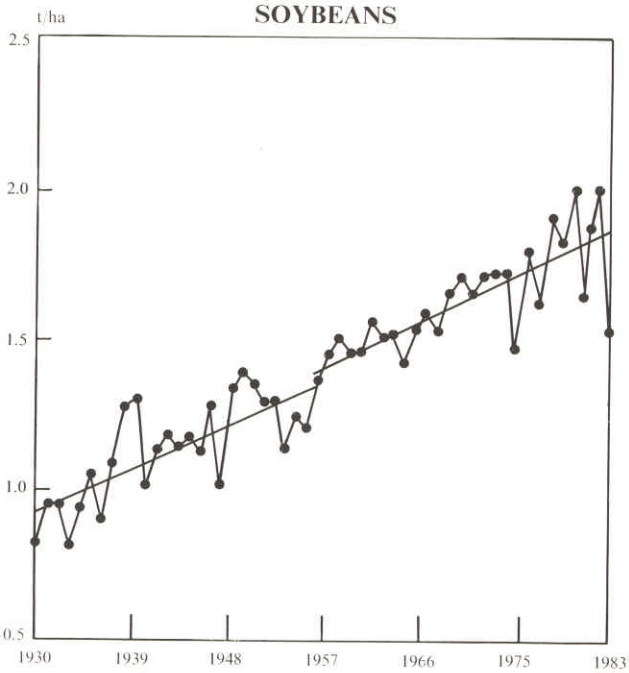


Figure 4. Annual average grain yield of U.S. soybeans, 1930-1983. Straight lines indicate linear regressions of yield on years, calculated for 1930-1955 and 1955-1983. (U.S. Department of Agriculture, 1930-1983) (Duvick, 1984)

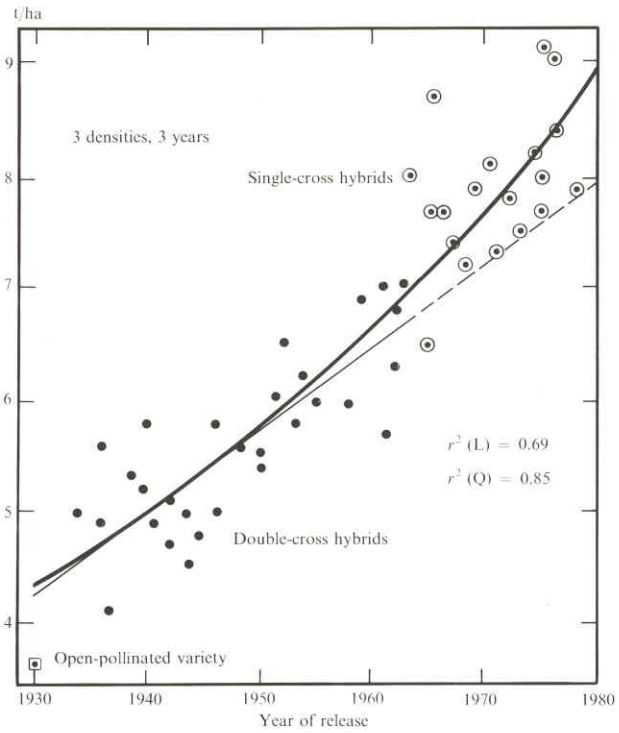


Figure 5. Yield of maize varieties.
(Duvick, 1984)

(*figure 6 and table 2*). In wheat, the new cultivars contributed 60% of the total yield increase, in barley 40% and in oats 30%, but in the period 1967-1978 these percentages were 85, 55 and 50, respectively. She also presented figures on the productivity of individual cultivars of winter and spring wheat (*table 3*) and barley (*table 4*). An annual increase brought about by new varieties of wheat was calculated at 3% per annum in the decade ending 1979 and at 1% for barley and oats.

For France, *table 5* gives a survey of the national average wheat yield (t/ha) over the century ending in 1983 (Ets C.C. Benoist 1884-1984). Here too, there is a conspicuous increase over the previous decade.

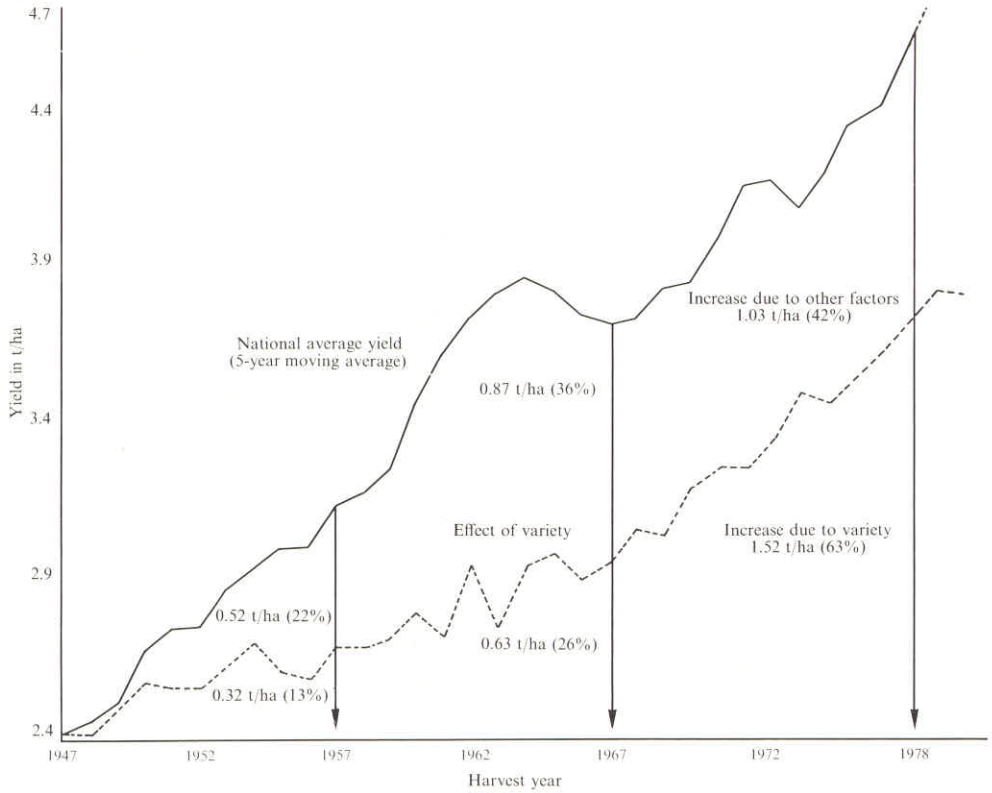


Figure 6. The increasing trend in the national yield of wheat in England and Wales (t/ha) and the estimated effect of variety in achieving the increase 1947-78. (Cumulative increases shown in t/ha are also given in brackets as a % of yield in 1947, i.e. 2.42 t/ha = 100%).
(Silvey, 1981)

Table 2

Effect of varieties and other factors in achieving the yield increase in wheat, barley and oats

Period	WHEAT 100% = 2.42 t/ha			BARLEY 100% = 2.31 t/ha			OATS 100% = 2.15 t/ha		
	% increase due to:								
	Variety	Other factors	Total	Variety	Other factors	Total	Variety	Other factors	Total
1947-57	13	22	35	16	15	31	3	17	20
1957-67	13	14	27	5	20	25	12	35	47
1967-78	37	6	43	11	9	20	10	10	20
Total in 31 years	63	42	105	32	44	76	25	62	87
1967-1979 (approx. nat. av.)	41	14	55	12	16	28	10	19	29
Total in 32 years (approx.)	67	50	117	33	51	84	25	71	96

(Silvey, 1981)

Table 3

Winter and spring wheat varieties popular between 1947 and 1980: Approximate yields relative to specified controls

Years when variety popularity ⩾ 5%	Variety	Yield as % Cappelle Desprez
Winter Wheat		
1947-54	Bersee	90
1954-75	Cappelle Desprez	100
1973-	Maris Huntsman	121
1977-	Flanders	
1977-	Hobbit	125
1979-	Mardler	
1980?	Armada, Bounty	123
	Brigand, Avalon	129
Spring Wheat		as % Kolibri
1947-61	Atle	75
1956-63	Koga II	85
1964-69	Opal, Kloka	93
1970-72	Kolibri	100
1974-75	Maris Dove	103
*1975-	Sappo	109
*1978-	Sicco, Timmo	116
*1980?	Highbury	117

* Spring wheat seed sales as a whole represent approximately only 5 % of the total wheat seed sales; the listed varieties are the most popular but have seed sales of less than 5 %. The varieties above the dotted lines have been included to provide a historical reference point. Yields for newer varieties are based on the 5-year Fitcon analyses used in preparing the Recommended Lists for 1980.

(Silvey, 1981)

Table 4

Spring and winter barley varieties popular between 1947 and 1980: Approximate yields relative to specified controls

Years when variety popularity ⩾ 5%	Variety	Yield as % Proctor
Spring Barley		
1947-55	Spratt Archer, Plumage Archer	80
1953-61	Herta	90
1955-74	Proctor	100
1967-76	Julia	107
1974-79	Mazurka, Aramir, Ark Royal	113
1978-	Georgie, Athos	117
1980?	Keg	111
	Goldmarker	120
	Triumph, Koru	125
Winter Barley		as % Maris Otter
1958-65	Pioneer	93
1967-	Maris Otter	100
1977-	Sonja	110
1979-	Igri	117

The varieties above the dotted lines have been included to provide a historical reference point. Yields for newer varieties are based on the 5-year Fitcon analyses used in preparing the Recommended Lists for 1980.

(Silvey, 1981)

Table 5

Average French wheat yields (in t/ha)

Periods		Periods	
1881-1888	1.16	1934-1938	1.56
1889-1893	1.15	1939-1943	1.37
1894-1898	1.19	1944-1948	1.41
1899-1903	1.37	1949-1953	1.89
1904-1908	1.38	1954-1958	2.23
1909-1913	1.32	1959-1963	2.65
1914-1918	1.15	1964-1968	3.33
1919-1923	1.47	1969-1973	4.05
1924-1928	1.41	1974-1978	4.36
1929-1933	1.54	1979-1983	5.05

(Benoist, C.C. Ets 1884-1984)

Table 6

National average grain yield (t/ha) in the Netherlands

	1971-75	1984
Winter wheat	5.2	7.9
Spring wheat	4.3	5.7
Winter barley	4.4	6.3
Spring barley	4.0	5.3
Spring oats	4.6	4.8
Winter rye	3.3	4.3

(Ned. Graancentrum, 1984)

Table 7

Yield increase (in %) as an effect of breeding in the Federal Republic of Germany in the periods 1952-69 and 1970-81

	1952-69		1970-81	
	Total	Annual	Total	Annual
Winter wheat	22	1.2	22	2.0
Winter barley	36	2.0	40	3.6
Spring barley	59	3.3	38	3.5
Winter rye	0	0	31	2.8
Grain maize	53	2.9	36	3.3
Silage maize	28	1.6	43	3.9
Main crop potatoes	15	0.8	85	7.7
Sugar beet (roots)	24	1.3	53	4.6
Sugar beet (sugar)	2	0.1	60	5.5

(Schuster *et al.*, 1982)

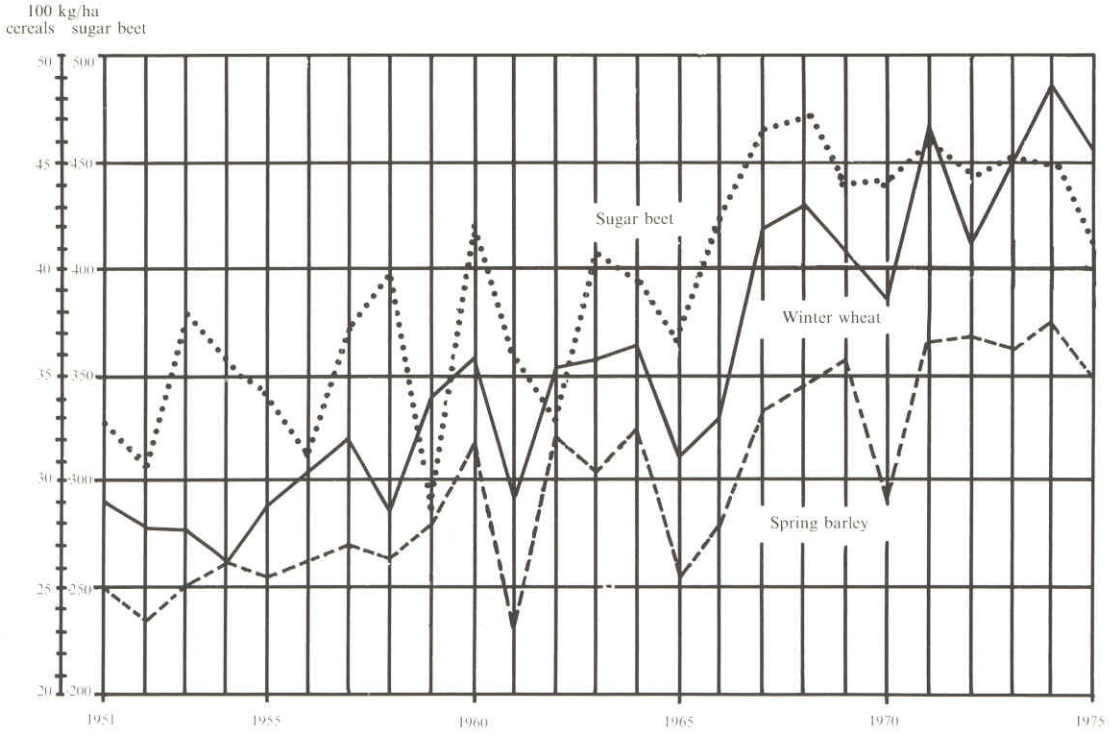


Figure 7. Average yields of sugar beet, winter wheat and spring barley in the Federal Republic of Germany between 1951 and 1975.

(Fischbeck, 1977)

A clear-cut increase in yields of sugar beet, winter wheat and spring barley is reported by Fischbeck (1977) for the Federal Republic of Germany over the period 1951-1975 (*figure 7*).

The same is true for the Netherlands (*table 6*) (Nederlands Graancentrum, 1984). Schuster *et al.* (1982) submitted data (*table 7*) on the calculated relative yield increase through breeding over the periods 1952-1969 and 1970-1981. These data can be expressed as relative average increases per annum.

A striking relative increase was obtained in winter rye, silage maize, main crop potatoes and sugar beet, in the last-mentioned crop in particular in respect of sugar yield. It follows that in the Federal Republic of Germany, as in England and Wales and also France, the relative increase in yield brought about by breeding has risen in recent years. As may be concluded from these data, there are at present no indications of a decreasing yield increase in newly developed cultivars of small cereals, wheat in particular.

De Wit (1965) has calculated the maximum yield of winter wheat, when grown at 50° latitude, at 11 t/ha with 14% grain moisture. Record yields of 8.3, 9.1 and 11.2 t/ha in 1962, 1964 and 1965, respectively, were reported from the United States of America with semi-dwarf cultivar 'Gaine' (Briggle and Vogel, 1968). Yields of winter wheat came very close to the theoretical maximum of de Wit in several individual fields in the Netherlands in recent years, and even exceeded it in 1986. Two cases—non-irrigated fields—have come to my knowledge to 10.9 and 11.6 t/ha (basis: 14% moisture) respectively. Another record is a yield of more than 11 t/ha of cleaned and graded seed obtained from an irrigated multiplication field. An absolute record is a farm yield of 17.36 t/ha obtained in the county of Fife in Scotland this year (*Farmers' Weekly*, October 24, 1986). It is stated that the weight has been verified. Without seriously doubting the validity of the statement, I might add, however, that no mention is made of the area being checked or of the actual moisture content. In order to match de Wit's maximum of 11 t/ha with 14% moisture, the 17.36 t/ha should have contained 80% water, which is not very likely!

In other words, the theoretical maximum has probably been amply exceeded. It would be interesting to know more about how this particular field was treated. 1986 seems to have been a favorable year for cereal crops on fertile soils in Great Britain and the Netherlands. This may be further illustrated with a few data from official trials in the Netherlands (*table 8*). These data, pertaining to the highest yielding trial and the highest yielding cultivar therein, show at the same time the prospects of the newest cultivars. These are very high yields indeed. One should realize, however, that yields in practice, that is from farm fields, are as a rule 20 to 30% lower than yields from reliable trials. That would make the farm-yields obtained in Scotland and the Netherlands even more remarkable.

Table 8

Yield* data extracted from official trial data of cereal and grain legumes in the Netherlands in 1986

	Average yield	Highest yielding cultivar
Winter barley	8.51	10.38
Winter wheat	10.63	12.22
Spring oats	9.12	9.76
Spring barley	8.68	9.72
Spring wheat	9.11	9.57
Field beans	7.21	7.64
Protein peas	7.87	8.58

* in t/ha at 16% moisture.

A few words on sugar beet. According to Quadt (1954), breeders of this crop in Germany succeeded in raising the sugar content by about 80% and in doubling the sugar yield per hectare between 1850 and 1950. It is generally acknowledged that, through further breeding since 1950, the crop has been adapted to mechanical harvesting, resistance to bolting has been greatly improved, and that monogerm seed requires less labor and juice purity has been enhanced. In this crop, great progress has indeed been achieved by several breeders in a number of countries.

De Wit (1965) calculated the maximum yield of sugar beet at 100 tonnes of roots with 18% dry matter (and 100 tonnes of leaves with 9% dry matter). In recent years, yields have come very close to his figures on fertile soils in the Netherlands and, according to some people, even exceeded that theoretical maximum.

2.2 In oil crops too, yields and oil content have been increased through breeding. For instance, a rise in the oil content of sunflower from 30 to 50% over a period of 50 years has been reported from the Soviet Union. In the United States of America, an increased oil content in safflower from 37 to 50% has been achieved.

A classic example of raising the oil content of maize by breeding is the result of a recurrent selection experiment at the University of Illinois

(*figure 8*). Oil content rose from 4.7 to 17% after 70 cycles of selection. Unfortunately, grain yield was reduced materially (Dudley *et al.*, 1974), but commercial hybrids with an acceptable grain yield and up to 8% oil have been obtained.

Edible oils vary considerably in their composition, depending on the crop species (*table 9*). The composition largely determines the nutritional and processing value. From a nutritional point of view, the polyunsaturated linoleic and linolenic acids are particularly important, because they reduce the blood cholesterol level in mammals. Rapeseed oil, originally containing almost 50% erucic acid, has for that very reason an excellent industrial quality. However, in mammals, erucic acid causes fatty depositions and myocardial lesions. In several countries—France is one of them—low-erucic-acid cultivars of winter and spring rapeseed have been developed and this has greatly increased cultivation of the crop.

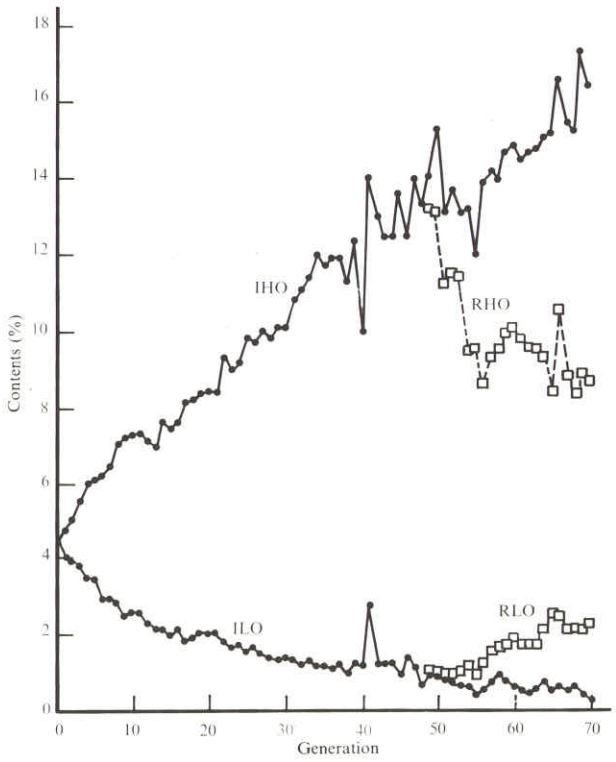


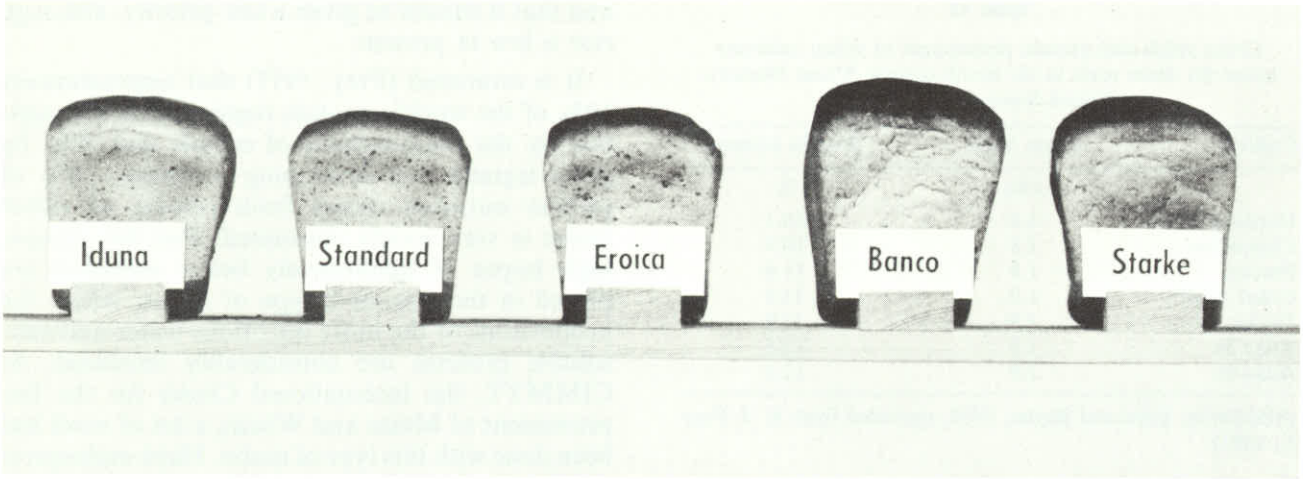
Figure 8. Mean oil content for IHO (Illinois high oil), ILO (Illinois low oil), RHO (reverse high oil) and RLO (reverse low oil) plotted against generations of selection. (Dudley *et al.*, 1974)

Table 9

Percentages of various fatty acids in the edible oils from various crops. (Adapted from Weiss, 1970; reprinted from K. J. Frey © 1981)

Crop	Palmitic	Stearic	Oleic	Linoleic	Linolenic	Eicosenoic	Erucic
Soybean	10.5	3.2	22.3	54.5	8.3	<1.0	. . .
Cotton seed	25.0	2.8	17.1	52.7	. . .	. . .	. . .
Corn	11.5	2.2	26.6	58.7	<1.0	. . .	. . .
Peanut	11.0	2.3	51.0	30.9	. . .	. . .	. . .
Safflower	6.7	2.7	12.9	77.5	. . .	<1.0	. . .
Sunflower	7.0	3.3	14.3	75.4	. . .	. . .	. . .
Rapeseed	4.0	1.3	17.4	12.7	5.3	10.4	45.6
"Tower" rapeseed[a]	4.3	1.7	59.1	22.8	8.2	<1.0	<1.0
Palm	46.8	3.8	37.6	10.0	. . .	. . .	. . .

[a] Adapted from Slinger (1977).



Selection for low erucic acid has been greatly facilitated by a new and very sensitive, reliable and rapid chemical technique, able to detect very small quantities that are present in the cotyledons. By sacrificing only one of the two cotyledons for the analysis, the seedling can still develop into a normal plant. The same technique is now being used for the selection of low-glucosinolate types of rapeseed. These will make the remainder of the grains more suitable for animal feed, after extraction of the oil. This outstanding technique has greatly reduced the costs of the breeding work, with the result that more breeding firms than ever have taken up rapeseed breeding.

In the endosperm of fourteen different mutant types of maize, total oil content varied from 5.2 to 18.4%. The opaque-2 mutant was the lowest in oil percentage. The oil composition also varied considerably, except for the stearic component.

2.3 As regards proteins, protein content and protein composition in wheat is probably the widest discussed problem and the subject of most research, mainly with a view to loaf volume, structure and appearance. It is the protein gluten in particular that determines those quality aspects. While this may be important, it should be realized that the level of nutritional value of gluten does not give it a special position compared with several other proteins. As with other proteins, it is broken down into amino acids in the digestive process and these are joined to the proper proteins inside the human body.

Table 10

Means and ranges of protein percentages in commercial lots of grain from cereals

Cereal	Protein percentage		Number of samples
	Mean	Range	
Corn	10.4	7.5-16.9	1875
Wheat	12.0	8.1-18.5	309
Sorghum	12.5	8.7-16.8	1160
Barley	13.1	8.5-21.2	1400
Oats	13.3	7.4-23.2	1850
Rye	13.4	9.0-18.2	112

(Miller, 1958; reprinted from K. J. Frey © 1981)

Among the small cereals, wheat is not the richest in proteins on average (*table 10*). Wheat breeders have learned that, as a rule, the highest-yielding selections do not have a high protein content and good baking quality. Some researchers found a negative correlation between these two properties (*table 11*), while others concluded from their results that such negative correlation did not exist in the material they tested (*table 12*). The varieties 'Atlas 50' and 'Atlas 66' were high in protein; both were derived by cross-breeding from cultivar 'Frondosa' and were selected for resistance to leaf rust. They had a higher protein content because of the link between these two properties that was later shown to exist. Their yield level equalled that of other cultivars of their time. Cultivar 'Lancota'

Table 11

Correlations between grain yield and protein percentages in the grain as reported by several researchers.

Crop	Correlation	Reference
Barley	−0.79**	Grant and McCalla, 1949
	−0.24*	Zubriski *et al.*, 1970
Corn	−0.48**	Frey *et al.*, 1951
	−0.33*	Dudley *et al.*, 1971
Oats	−0.45**	Jenkins, 1969
	−0.59**	Sraon *et al.*, 1975
Sorghum	−0.85**	Worker and Ruckman, 1968
	−0.26*	Malm, 1968
Wheat	−0.56**	Waldon, 1933
	−0.80**	Grant and McCalla, 1949
	−0.25**	Stuber *et al.*, 1962

*, ** denote significance at 0.05 and 0.01 levels, respectively.

(Frey, 1977; reprinted from K. J. Frey © 1981)

Table 12

Grain yields and protein percentages of wheat cultivars tested for three years in the South-eastern Wheat Nursery, United States of America

Cultivar	Grain Yield	Protein content
	t/ha	%
Hardired 47-12	1.8	10.1
Chancellor	1.8	10.9
Purcam	1.8	11.4
Coker 47-27	1.9	11.6
Taylor	1.9	11.9
Atlas 50	1.9	12.8
Atlas 66	1.9	13.3

(Middleton, Bode and Bayles, 1954; reprinted from K. J. Frey © 1981)

was developed from 'Atlas 66' by further cross-breeding; it yielded about 100% and was still the better cultivar for protein content in a test that included a modern British cultivar, though it was not one of the most productive (*table 13*).

Table 13

Yield and protein content of Lancota and several other cultivars of wheat when tested in the International Winter Wheat Performance Nursery grown at 25 sites in 1972 and 1973

Cultivar	Average Yield	Protein
	t/ha	%
Lancota	4.1	15.5
Zenith	4.0	14.4
Centurk	4.4	14.0
TAM 102	4.0	13.5
Maris Nimrod	4.3	13.2

(Johnson, Mattern and Kuhr, 1979; reprinted from K. J. Frey © 1981)

In the general experience of wheat breeders who do not select for a minimum or standard level of protein content or baking quality in an early phase of the selection cycle, the highest yielding selections are as a rule of poor baking quality. This does not mean that some progress in raising both yield and baking quality is impossible, and there is sufficient evidence to prove this.

At IRRI, the International Rice Research Institute in the Philippines, breeding of rice for increased yield and improved disease resistance has achieved remarkable results. A number of outstanding cultivars have been developed and are widely cultivated. Selections have been developed with (only) 1% more protein than 'IR 8' at the same yield level. However, that particular strain appeared to be so much more prone to disease that it could not be marketed. It was obtained through painstaking selection work over many years, screening a lot of material. It was concluded that breeding for protein content was extremely difficult and that it should be given a low priority, although rice is low in protein.

It is estimated (Frey, 1977) that approximately 50% of the world's protein requirements are satisfied by the consumption of cereals and 20% by grain legumes. In developing countries, 70% of protein nutrition comes from cereals, of which maize is very widely consumed. For this reason, high hopes of qualitatively better nutrition are placed in the opaque-2 type of maize, where the proportions of the more nutritious water-and-salt-soluble proteins are considerably increased. At CIMMYT, the International Center for the Improvement of Maize and Wheat, a lot of work has been done with this type of maize. Hard-endosperm opaque-2 selections were tested against "normal" cultivars on an international scale. In seven out of eleven countries, the yield of the best opaque-2 selection was equal to or better than the best "normal" control cultivar. It would therefore seem possible to raise the level of protein consumption while maintaining the carbohydrate intake, a possibility of the greatest importance for those developing countries where maize is a popular food.

The opaque gene in sorghum reduced grain weight by about 15% in isogenic lines. Nevertheless, through intensive selection in cross-bred progenies, opaque lines were obtained with a 100% yield level. The smaller grain appeared to be compensated by a larger number of grains.

Barley is used either for malting and brewing beer or as animal feed. In the first instance, a low protein content is demanded while in the second a high protein content is desirable. Mutants with a higher content of the amino acid lysine have been isolated. Grain yield appeared to be unsatisfactory, however, and, unfortunately, it proved to be extremely difficult to arrive at a 100% yield level while maintaining the high lysine content. There is no evidence that this combination has been realized in spite of intensive efforts and several breeding programs.

2.4 Vitamins are not usually considered to be food; they are nevertheless indispensable in a proper and well-balanced diet. Staple food products contain low concentrations; fresh vegetables and fruit are much richer and should therefore be consumed regularly and in varying composition. Not everyone has been, or is today, in a position to follow that advice. It was not so long ago that food consisted mainly of potatoes. The Irish people's great dependence on the potato came to light when, in 1845 and 1846, the crops were severely attacked by the blight fungus *Phytophthora infestans*, causing severe famine, death and large-scale

emigration. Ascorbic acid, or vitamin C, is certainly not lacking in a potato diet, and when potatoes ran out during long sea voyages, sailors got scurvy. Potatoes are an excellent food and some nutritionists say they are not fattening; they are an important source of vitamin C. The content is under genetic control. By experimental selection, the concentration could be doubled and even tripled. There is no record, however, of a potato breeding program having ascorbic acid as a priority objective. Yet it might be of importance in countries or regions where fresh vegetables and fruit are scarce or not available over a long period of time.

Pro-vitamin A is present in tomatoes. In the United States of America, a much higher concentration than that in market varieties was found in material derived from crosses with *Lycopersicum hirsutum*. However, the fruit color of these particular strains was not appealing. The cultivar 'Caro-red' was selected out of further backcrosses. It was agronomically acceptable and very rich in pro-vitamin A (even 10 times the usual level of market cultivars), but it still did not have the color required by processors and consumers. 'Caro-red' was not commercially accepted and became an obsolete variety. In later years, breeding for vitamin A was practically abandoned, an example of external appearance that has no connection at all with internal nutritional quality and prevents proper use of a crop's potential. In this respect, the carrot is luckier. White carrots contain only 1 µg carotene/g of dry weight, whereas the orange-colored cultivars carry 100-120 µg/g. A higher carotene content goes hand in hand with a deeper orange color, a very convenient correlation that allows the breeder to select visually for improved nutritional quality. F_1 hybrids with 140-160 µg/g have been obtained and it is assumed that the content may grow to 180 µg/g.

The core of the carrot often is—or rather was — yellow instead of orange because it contains less carotene. Selection for an orange-colored core has been able to raise substantially the carotene content of the whole carrot root.

2.5 A few words regarding forage quality. Advances have been achieved in the digestibility of forage crops, e.g. in coastal Bermudagrass (*Cynodon dactylon*) and pearl millet (*Pennisetum typhoides*) in the United States of America and in silage maize

in Europe. Assessing digestibility has been a circumstantial chemical procedure, costly and laborious to such an extent that many commercial breeders were deterred from carrying out such tests. It seems possible that this situation will improve since laboratory equipment has been developed that operates on the principle that different chemical substances reflect infrared rays of various wavelengths in different proportions. This ingenious technique will allow the breeder to test many more samples in much less time and probably at lower cost, although the apparatus itself is expensive. It is also used for assessing the protein content and composition in wheat.

2.6 It is a fact that many plants and plant products contain anti-nutritional or even poisonous substances. Some components can easily be removed or broken down by heating, e.g. by toasting in soybeans and field beans or by cooking in potatoes, peas, beans (both French and garden) and cassava. A well-known example is the occurrence of cyanogenic-glycosides in white clover, and there are many recorded cases of horses being poisoned. Harmful faveine is present in the field and garden bean and it is recommended not to eat the seed raw. Pythagoras, the well-known Greek scholar and mathematician, who was a vegetarian, apparently consumed too many raw field beans and he suffered from what was later recognized as favism.

Tannins are not very harmful, as may be concluded from the popularity of drinking tea. Some people like their typical bitter taste in garden beans, others prefer the milder taste of the white-flowering type that lacks tannins. The chemical(s) apparently play(s) an important role in resisting fungal attack of the seeds in the ripening stage, the purple-flowering types being much less prone to attack than the white-flowering types. This is a drawback to the selection of tannin-free field beans for protein production.

Several species more or less related to *Solanum tuberosum* have served as sources in breeding potatoes for resistance to diseases, Colorado beetle and cyst nematodes. When tested for value for cultivation and use, it appeared that, notwithstanding repeated backcrossing with cultivated varieties, too much solasodine was present in some clones. Solasodine does not induce resistance; the gene for solasodine occurred accidentally with the resistance gene.

An increasing number of products isolated from specific plant species are shown to have fungistatic and bacteriostatic properties. Experimental evidence has been published that some products are even capable of retarding or inhibiting development of cancer cells and tumors, e.g. from periwinkle (*Catharanthus roseus*) and hemp agrimony (*Eupatorium cannabinum*).

The pharmaceutical industry is very interested in these products, e.g. steroids from Mexican species of *Dioscorea* with their well-known and widely used contraceptive effect. Another interesting compound is gossypin—responsible for resistance to the boll weevil in cotton—which has a sterilizing effect on male semen. These are two examples of plant products that are considered to have a desirable effect in modern society, but there is also increasing evidence that plant substances that determine resistance to damaging organisms may be harmful to other, non-target organisms, for example mammals; some are even carcinogenic. It should, however, be realized that such effects become manifest when the substances are administered in much larger quantities and/or higher concentrations than occur in plants. The risk is remote, especially when eating a varied diet. But it should be borne in mind, in this respect, that breeders are invited to place even more emphasis on breeding for resistance so that farmers can reduce their use of plant-protecting chemicals.

3. This lecture would be incomplete without referring to the great importance of resistance to diseases, pests and stress situations for the realization of the genetic yield potential. This is not the place for this subject, nor is there time enough to deal with it in detail. Moreover, this has been done extensively by many others on previous occasions.

Some varieties may become more popular than others because of their outstanding performance. In some crops, this involves a risk of being attacked by (possibly) new pathotypes of some airborne disease agents. As a rule, other varieties are fortunately not attacked and will replace the unlucky cultivar(s) that selected its (their) own particular enemy and lost the fight. Well-known examples are yellow rust in wheat and Victoria-blight in maize. In several other crops and for other diseases, resistance appears to last much longer, e.g. in the case of bacterial halo blight in *Phaseolus* beans.

Many and diverse crop-protecting chemicals are available nowadays, but evidence of adaptation to the chemicals in the pathogens is increasing. It seems impossible to eradicate a pathogen completely, either by breeding for resistance, applying protective chemicals or using gene technology (until proven otherwise). Seemingly, a contest is taking place between equals, between nature and science, between natural spontaneous phenomena

and breeders' ingenuity and perseverance. From that contest between host and pathogen, the crop —thanks to continuous backing by the breeder— emerges as the winner, overtaking the disease for at least some time. Ongoing breeding work has created a number of varieties from which growers can make their choice. They would be well advised not to put all their eggs in one basket and to make use of an instrument to stabilize production, an instrument provided by plant breeders.

4. It goes without saying that the expression of the genetic yield potential of varieties is greatly dependent on climate, soil structure and crop nutrition. Although the weather is said to be very unpredictable, there are nonetheless consistent regional differences. Breeders have demonstrated that, by selecting drought-tolerant, frost-resistant and salt-tolerant cultivars, the effects of adverse weather and soil conditions, if not too extreme, can be countered to some extent. There is hope and expectation that more can be achieved in the future by selection at cell level. Of course, conditions can be so extreme that crops cannot develop at all.

Extreme political situations may prevent agriculture from producing sufficient food, or food is not allowed to be transported to regions in severe need. Plant breeders have no answer in such cases, but they are certainly able to respond to political decisions to stimulate cultivation of certain crops. A well-known historical case is the stimulating influence of the political situation in Napoleonic times on sugar beet breeding.

In recent years, the European Common Market has decided to stimulate cultivation of grain legumes for the production of proteins. Until then, the breeding of field beans and dry peas did not feature as a priority in the program of most breeders, but it was not completely abandoned either. Good varieties appeared to be ready and better varieties soon became available. The extent of the production shows that farmers have an active interest in these renewed old crops (*figure 9*). It is worth mentioning that the new semi-leafless pea has come on the market. It is characterized by a design that creates a drier micro-climate inside the crop canopy. Consequently, the pods and the seeds are less prone to attack by diseases. Moreover, the plants remain upright much longer than those of the "normal" type. Trials are taking place to find out whether the leaf area can be further reduced without loss of yield.

In field beans, the terminate stem mutant type attracts a lot of attention among breeders. It is

hoped that the energy which the "normal" type expends in building the non-flowering top above the fertile nodes will be used for more pods to set. On the other hand, it does not seem illogical to assume that, once that part of the stem has been formed, it will contribute to total assimilation and thus to yield. Further development will show which view is correct.

5. The possibility of producing sufficient food for the population is unequally divided over regions, countries and continents. Shortage may be temporary or permanent, e.g. caused by soils of very poor quality and/or too little precipitation. Countries that are blessed by a mild climate, fertile soils and

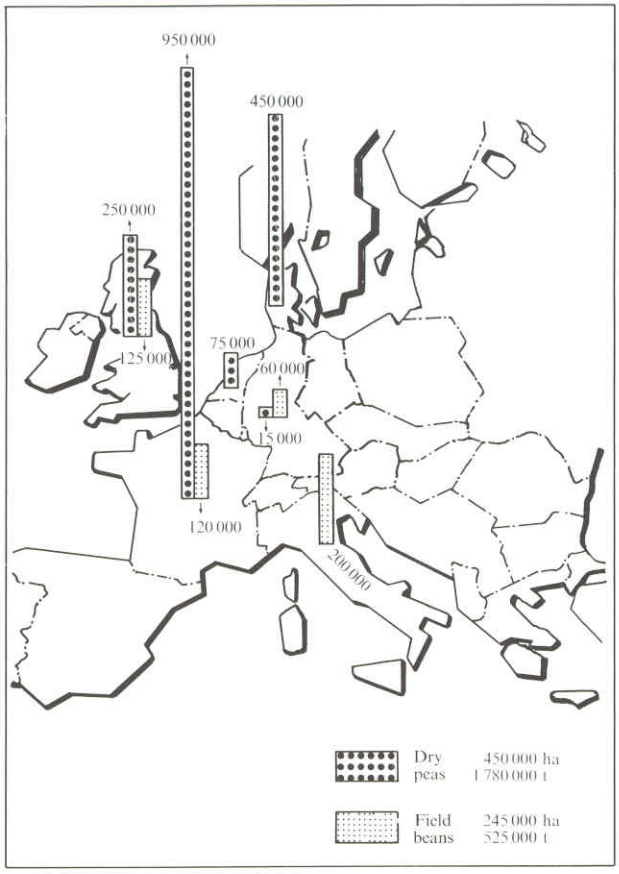


Figure 9. Production of dry peas and field beans in the EEC in 1985.

(Janssen, 1986)

sufficient precipitation fairly evenly distributed over the growing season are in a favored position. Since they have been in such a position for a long time, they have been able to develop their national agriculture to a much higher level, and breeders have made their contribution to raising that level. In some countries, this has eventually resulted in over-production of some products. This development has taken place not only in the European Common Market, but also elsewhere. Some organizations opposed to plant variety protection legislation blame plant breeders for this situation. Although it would be unrealistic to deny that plant breeding has played its role, it is very unfair to try and put the blame on plant breeding alone. Crop husbandry research has added a great deal too and political, economic and financial forces have also had an impact.

In Chapter 11 of the excellent book on plant breeding by K.J. Frey (1981), Burton claims that "without cultivated crops most of us would not exist because the world's native vegetation could feed less than 5% of today's world population," and "directly or indirectly, plant breeding deserves credit for most of man's food today."

The agricultural policy of the EEC was set up shortly after World War II. With food shortage and hunger still fresh in the mind, internal EEC food production sufficient to meet the needs of a growing population was one of the main objectives. A lot has changed since, and changed considerably. Population growth has slowed down, whereas food production (especially dairy products) has increased much more in percentage terms. It can certainly be stated that the EEC's agricultural policy has been very successful, but bearing in mind the over-production, the difficulty of finding sufficient export markets and the very expensive storage required, it seems necessary to revise that policy.

In fact, some measures have already been taken or are in the process of being taken or proposed, for example the promotion of production of wheat of better quality for making bread. This will only alleviate the internal EEC situation to a minor degree and it will increase the present over-production in other countries. Alternative proposals are under discussion, for example reducing production areas or granting financial aid per unit of land instead of per unit of product. In any event, policy makers say that limitation of production in the EEC, as already practised in the United States of America, is unavoidable unless new outlets emerge. The use of alcohol from cereals as fuel in combustion motors is one path where Brazil is said to have made considerable headway. A lot of course depends on oil prices, and these are presently at such a level that competition from cereal-alcohol is economically not feasible.

It is frustrating that measures have to be devised to limit production, while at the same time production of the same staple food is too low in some developing countries. According to FAO, around 30 million people per year die of sheer hunger. Food relief aid continues, but meets with various

difficulties (transport, politics). With long-term improvement in mind, promoting food production "on the spot" is considered to be a much wiser policy than importing food more or less regularly. If this policy were to succeed, agriculture worldwide would be able to produce sufficient food for the earth's present population. An adequate control of vermin and of fungi in food stocks by irradiation could make a considerable contribution (Odamtten, 1986).

If it is necessary to import and multiply improved varieties from elsewhere—varieties that can make efficient use of more fertilizer—this does not necessarily upset the sociological structure of the farming community, provided adequate credit facilities are created (Jain, India, about the Green Revolution, 1986). But what about the future? At the time of Christ's birth, the world's population must have been 15 million (a retrospective estimate, of course). Around 1650, the population had doubled. Two hundred years later, the next doubling had taken place. As a result of rapid development of agriculture and medical care, the next doubling only took 80 years. Another 45 years later, in 1975, the next doubling had occurred (Borlaug in K.J. Frey: Plant Breeding II). By now the population of this planet has grown to such numbers (ASSINSEL, 1981) that a continuing increase at the same rate should cause great concern. As a matter of fact, it does, as is evident from the measures taken in certain countries to control the birth rate.

Let us hope that concerted efforts will make and keep our world a clean and peaceful world, a place worth living in, with sufficient and suitable food for everyone. Plant breeders will have to contribute their share to these efforts, there will be work for them to do.

LITERATURE

1. ASSINSEL (1981) Feeding the 5,000 million.
2. BENOIST, C.C. Ets 1884-1984.
3. BRIGGLE, L.W. and VOGEL, O.A. (1968) Euphytica *17*, suppl. 1, 107-130.
4. BUNTING, A.H. and CURTIS, D.L. (1968) Nat. Resources Research *7*, 101-106.
5. DUDLEY, J.W. *et al.* (1974) Crop Sci. *17*, 111-117.
6. DUVICK, D.N. (1984) in J.P. GUSTAFSON Gene Manipulation in Plant Improvement, 17-31.
7. FARMERS' WEEKLY (1986) October 24.
8. FISCHBECK, G. (1977) Bayer. Landw. Jahrb., Sonderheft 1, 47-57.
9. FREY, K.J. (1981) Plant Breeding II, © Iowa Univ. Press, 2121 South Avenue, Ames, Iowa, USA.
10. JANSSEN, P.A. Zaadbelangen *40*, 94-95.
11. NED. GRAANCENTRUM (1984), 42.
12. ODAMTTEN, G.T. (1986) Dr. Thesis, Agricultural Univ., Wageningen.
13. QUADT, F. (1954) Z. f. Pfl.züchtung *33*, 1-16.
14. SCHUSTER, W. *et al.* (1982) Z. f. Acker- und Pfl.bau *151*, 368-387.
15. SILVEY, V. (1981) J. Nat. Inst. Agric. Bot. *15*, 399-412.
16. WIT, C.T. DE (1965) Versl. Ldbk. Onderz., 663.

LECTURE

by Mr. André Cauderon,

Perpetual Secretary of the Academy of Agriculture of France

PLANT BREEDING: A COMMON UNDERTAKING FOR PUBLIC LABORATORIES, BREEDING FIRMS AND USERS OF VARIETIES

The methods of breeding plants are highly diversified and the distribution of tasks complex. The earliest programs were generally carried out either by farmers or market gardeners engaged in seed production ("seedsmen"), or by teacher-researchers belonging to public bodies. Although, to begin with, these two groups were sometimes competitors, they progressively came to realize their complementarity. The balance evolves as a function of the changes that take place, whether they be scientific, technical, economic, legal or political. The respective roles of international opening up and standardization, of scientific progress and, finally, the growing involvement of variety users in plant breeding are discussed.

As a result, plant breeding is becoming more effective, but also more complex and costly. More groups are involved, but no single one can do everything.

1. More than ever, breeding firms and public research bodies need each other. Basic research laboratories are not only asked for the results of their research, but they must also constitute a structure open to dialogue where the concrete goals of firms represent a starting point that is just as important as scientific discovery. In addition to equal competence on the part of all those involved, such cooperation requires a capacity for synthesis that is a rare and often neglected quality.

2. Increasingly, the importance of plant breeding for the efficiency of the agricultural processing industries will make variety users full partners of the breeding firms as regards the orientation and execution of work and also its funding.

3. The administrative and legal organization of the sector, which depends on scientific, technical and economic developments, must guarantee the following:

- *appropriate remuneration that recognizes the contribution by creators who have worked satisfactorily;*
- *easy access to varieties for farmers;*
- *considerable freedom of action for research workers who are laying the foundations of new progress, and, in particular, the free use of genes.*

It is not easy to reconcile these aims, but the plant variety protection system has been rather successful. It constitutes a realistic framework, particularly for activities in developed countries. The work of the breeders, that is to say the creation of the "balanced genetic structures" constituted by varieties, is properly recognized, except in cases where backcrossing or mutation enables slightly modified versions of a higher variety to be obtained. In this connection, a code of conduct would be useful, based on the respective roles of protection and of technical and commercial regulation.

As far as the future is concerned, the system should be perfected and supplemented, taking into account new breeding techniques. Genetic engineering, which creates "bricks" and not "structures," should be recognized and remunerated, without however blocking preparation for the future: the law should be adjusted progressively to the realities of a practice that is as yet inadequately known.

4. Finally, it is essential not to restrict the debate to the corporate framework. Plant breeding is a powerful factor in general development. Over and above operations that are profitable for breeding firms, national action in favor of backward zones and international projects for the Third World should give more active support to breeding by the countries concerned themselves of the many local species neglected by scientific breeding, so as to maintain active and profitable farming based on the greatest possible number of species.

For thousands of years, farmers and gardeners cultivated, chose, propagated and exchanged plants, constantly developing varieties best adapted to their soils, techniques and requirements. Almost two centuries ago, this breeding by farmers began to disappear because science, technology and economics had made sufficient coordinated progress to allow plant breeding to become an independent specialized branch on the supply side of agriculture. Scientific progress increases breeding capacity, while technical development augments the effectiveness of the use of varieties by farmers and industrialists. Finally, the growth of the trade in seeds and agricultural products facilitates the profitability of this chain of action and ensures its continuity.

Progress in genetics has often been the principal catalyst for development. Together with crop production techniques, it has allowed the progressive control of factors limiting agricultural performance. Breeding has developed differently according to regions and plants. Initially, it concerned developed areas and greater attention was paid to widely-marketed species rather than less-widespread crops or crops for farm consumption. Moreover, preference was given to species that were very diversified or that belonged to a particularly rich genus since they immediately opened up a wider range, as well as to annual plants because they could be developed and assessed more rapidly, and, finally, to self-pollinated forms and to clones because they were easier to breed and propagate faithfully.

For example, bread wheat was the subject of much breeding work to improve its intensification and this led to remarkable technical and economic breakthroughs. In a number of very different countries, scientific and technical knowledge, genetic material, agro-industrial structures and professional competence have been accumulated, thus ensuring continued progress as well as the expansion of wheat and of the wheat industry. On the other hand, at least half of the hundred or so species still grown in the world have not benefited from sufficient scientific breeding efforts and this has contributed to their regression; the botanical basis of agriculture continues to diminish.

The Division of Work in Plant Breeding

Methods of breeding plants are extremely varied and the division of work is complex. The earliest programs were generally carried out either by farmers or market gardeners engaged in seed production ("seedsmen"), or by teacher-researchers belonging to public bodies. Although, to begin with, these two groups were sometimes competitors, they progressively came to realize their complementarity. Breeding firms have to seek financing through sales, so they keep away from activities with low profitability such as basic studies, long-term or hazardous programs, sectors with a small market or fields where it is easy to duplicate original works. Public bodies are well placed to carry out the study of the theoretical bases of improvement, the perfecting of its methods, the creation of basic genetic material, as well as the corresponding teaching; naturally, they must remain close to breeding, so as to link theory and practice in their teaching and in their cooperation with breeders, to explore the uncertain channels of breeding and, finally, to carry out themselves the breeding of species or interesting characteristics neglected by firms. However, the latter, provided that they are strong and close to agriculture, are best able to achieve the adaptation of commercial varieties to the varied and changing circumstances on the farms and the markets, as well as to supervise seed production and use. To the extent that firms effectively ensure the creation of commercial varieties of a species, public laboratories then abandon this activity and devote themselves to other aspects of improvement: work is not lacking.

Except in certain favorable cases, breeding is neither easy nor highly profitable. It is at the propagation stage that firms find a way to earn remuneration for their work and the financing of their new programs; this is the *de facto* or *de jure* exclusiveness of the variety-seed tandem. Such exclusiveness may be the result of general technical superiority of the firm, the possession of a confidential element in seed manufacture, a patent or a breeder's certificate, etc. It should be emphasized that plant variety protection is preferable to secrecy because it facilitates exchanges of better varieties while at the same time allowing free use of the genes for new improvements, and this is an important prerequisite for continued progress.

The development of legislation can contribute to intensifying research efforts. For example, experts consider that the recent interest shown by United States enterprises in the selection of self-pollinated cereals and soybean is a result of the 1970 Law, in conformity with the 1961 Paris Convention, which permits protection of their plant varieties. Technical progress also of course has important consequences. With regard to sunflower, the invention of a male-sterility system in France (1969) allowing the production of F_1 hybrid varieties led a number of enterprises in the world to embark very rapidly upon the breeding of this cross-pollinated species.

On the one hand—and this is an essential factor—hybrids perform better than the traditionally cultivated populations; on the other hand, the stability of the parental lines of hybrids gives their breeders the basis of protection, while the heterogeneity and instability of population varieties allows their unauthorized appropriation. Since the annual purchase of seed has become almost obligatory, the extension of the movement is understandable and it brings to mind the case of maize in the United States of America forty years previously. But of course nothing is proof against evolution: for example, widespread use of vegetative propagation *in vitro* would lead to the material possibility of propagating a plant of an F_1 variety of tomato, thus avoiding the purchase of seed.

Other less straightforward factors have also had a considerable influence on the division of work on plant breeding. International comparisons are instructive: in the nineteenth century, development of the breeding of widely cultivated species in Europe owed a lot to private enterprises—for example, Vilmorin, which is also very active in horticulture—while in the United States of America original breeding work was initially done by public bodies and this situation lasted almost up until the explosion of hybrid maize in the nineteen-thirties. It is not necessary to analyze these differences here, everyone knows the importance of the technical, economic and cultural context. The importance of certain persons who found themselves here and there by chance should also be emphasized.

The division of work should be perceived as an equilibrium that permits progress but develops constantly as a result of scientific, technical, economic, legal and political changes, etc. In the past, plant breeding was mainly carried out by public research bodies and breeding firms. We have referred to their present connection on which there is wide agreement. The two partners must progress together, each one carrying out its specific tasks, but in a coordinated manner. However, a corporate consensus does not prevent the external situation from evolving. Important changes are taking place before our eyes. Are they significant and are we able to envisage some of their consequences?

International Opening-up and Standardization

Scientific discoveries are published increasingly rapidly and are implemented immediately wherever possible. At the technical level, there has long been an exchange of samples of seeds of varieties taken as "genetic resources", but this only directly concerns the specialists. For a number of decades, farmers themselves have made increasing use of varieties or seeds created or produced in a far-off country. These increased exchanges also involve ideas, methods and working tools, while technical systems are disseminated together with the equipment that allows them to be used. This is the reason for the agricultural uniformity within each pedoclimatic zone. The prestige of those regions deemed to be the most advanced and of the best-known enterprises is added to the genuine superiority of the most effective systems, whether in connection with breeding, mechanization, crop protection or processing. For example, the maize systems created in the United States of America became widespread after 1945, with all their compounds, in particular the varieties. Certain hybrids of average earliness, but above all lines created by the Universities—'Wf9,' 'M14,' 'Ia153,' 'Oh43,' 'W64A,' 'B14'—have gone round the world, sometimes under other names. Several countries have made original contributions to this treasure house which is now common to breeders all over the world, for example, early lines such as 'F7' and 'F2.' Everywhere, innumerable local varieties are being replaced by a small number of international hybrids constituted on the basis of this treasure house. The pedological, climatic or parasitic particularities, as well as specific demands for the "quality" of products, preserve a certain regional originality, but breeding exerts permanent pressure to enlarge the zones of dissemination of varieties. It succeeds, for example, by creating cereals that are insensitive to photoperiodism and thus adapted to very different latitudes, by obtaining through mutagenesis or backcrossing a series of sister-varieties representing a range of earliness, colors, etc., around a basic cultivar recognized as excellent for its general characteristics, or by using a superior line in a number of hybrids. For the species that have been studied the most—in particular those whose seed is costly—this international genetic standardization is fairly advanced. It corresponds to the uniformization of agriculture and rapid circulation of information and goods.

These phenomena have important consequences for plant breeding. For example, access to very varied basic genetic material, which is to be found less and less among farmers or in nature, becomes a strategic matter. Linked to the scientific, technical and economic capabilities necessary for its development, it is even more appropriate to give diversity the name of "genetic resource." However, the more far-reaching effects are to be found in the field of orientation and organization. On the one hand, public laboratories and enterprises tend to grow and specialize, while on the other hand,

international networks for research, breeding, propagation and dissemination of varieties are constituted. Plant breeding has ceased to be a regional and corporate activity and has opened up to general economics.

Scientific Progress

The extension of knowledge regularly increases the complexity of the theoretical bases of breeding, whether it involves the assessment of the underlying material, definition of the objectives of breeding, creation of variability, orientation of a hereditary modification or specification of the criteria of choice among plants. Genetics remains the basic discipline, but it is becoming more wide-ranging: population genetics, cytogenetics, molecular genetics. Pathology and zoology have led to better understanding of the host-parasite interaction, the development of epidemics and the complex balances of biocenoses: all vital knowledge for breeding and its role in protecting crops. Progress in agronomy and physiology provides a more accurate picture of the production process, by describing the functioning of the soil, the plant cover or the chloroplasts. Product technology analyzes the quality characteristics and permits a precise assessment; by opening up new forms of processing, for example for the production of sugars from starch, it has a considerable influence on agriculture and plant breeding.

This progress, which throws light on the mechanisms of living systems, permits more effective and more rapid application of classic breeding methods. It also opens up new avenues, of which a certain number are already used in practice: the transfer to wheat of the genes of neighboring genera, the obtaining of doubled haploids in barley, the fusion of protoplasts in *Brassica*. Plant breeding methods are supplemented, enlarged and diversified. Private laboratories are set up, based on sophisticated technologies, for example genetic engineering, so as to achieve breakthroughs impossible by other means. Other enterprises are specialized in providing improved genetic material (lines, etc.) to companies that only carry out the final stages of breeding. To summarize, breeding strategies, methods and techniques are becoming more productive, but also more complex and more costly. Emphasis should be laid on the diversity of knowledge and know-how indispensable both for choosing the main orientations and for carrying out the detailed work. Although the creation of commercial varieties is increasingly being carried out by private enterprises, the latter more than ever have need of public research bodies which prepare the bases: breeding objectives, genetic material, breeding methods. It is essential that public authority not relax its efforts in this direction.

Biochemistry occupies a predominant place among the disciplines that have contributed to this development. It allows plant breeding to be perfected, but it also opens up possibilities for action to replace or supplement the possibilities of genetics. For example, growth regulators are in competition with the dwarfing genes for the shortening of cereals; gametocides and cytoplasm/genes systems both give access to male-sterility in wheat; fungicides and resistance genes are used in parallel. *The distribution of roles between genetics and chemistry, optimizing their interaction, has become essential for agriculture.* The transfer to cultivated varieties of resistance genes to herbicides illustrates this interaction, which is sufficient to explain why chemical enterprises entered the breeding industry. At the same time, basic research is increasingly involved in plant breeding, which was formerly connected mainly with agricultural research.

Participation in Plant Breeding on the Part of Variety Users

Traditionally, the breeder responsible for a program initially fixed its objectives and, towards the end of the program, he chose the small number of lines to be submitted to the users, who only became involved when the work was almost over. Breeders were usually excellent farmers and were well placed to detect the characteristics which development of growing techniques made desirable in varieties. They also tried to satisfy the demands or needs of the industrialists who processed the products, as well as those of the consumers, who were often close to agriculture. Breeders were reasonably well informed of the points of view of their potential clients, but they worked almost alone. They asked the questions and provided the answers. This power to orient agriculture and food was attenuated by the diversity and independence of those who exercised it at their risk and peril.

This situation has changed. First of all, public authority has established bodies to carry out experiments prior to marketing of varieties. Variety users—farmers and industrialists—are represented on these bodies and they are thus collectively involved in selecting the assessment criteria that govern registration of a new variety in official catalogues, and this choice is made in liaison with the breeders. In addition, more and more groups of variety users are able to participate individually in orienting breeding work by defining the desirable objectives, the corresponding criteria and suitable methods for

assessing varieties. For example, the technological characteristics of vegetables for canning, the ability of fruit to withstand handling and transport or the lasting quality of flowers. Furthermore, experimentation methods, techniques and equipment have improved considerably and important users such as groups of farmers, business firms, agro-food industrialists, consumer associations, etc., can themselves assess a large number of new varieties under their own conditions.

The improvement and miniaturization of seeders and harvesters has greatly increased the capacity for experimenting in the field. A few decades ago, a breeder could assess the output of a few dozen lines of cereals in his research station at the end of breeding, while today he can put several hundreds of lines in precise tests carried out on farms spread over several regions. Instead of experiments on a small number of lines at the end of breeding, from the beginning of the program he can study an abundance of material in several zones and assess its behavior in different environments. Breeding for regional adaptation is thus greatly facilitated and the assessment of new varieties considerably accelerated. The effectiveness, rapidity and flexibility of plant breeding are therefore greatly increased.

In addition, such decentralization facilitates the establishment of programs that involve bodies of variety users such as regional authorities, producers' cooperatives, marketing groups, agro-food factories, consumer associations, etc. in the breeding process. It is possible to reach agreement on creating varieties corresponding to specific requirements, dividing the tasks, with the local body taking part in orienting the program and assessing the plant material under study. The organization of the breeding of cauliflower in Brittany illustrates this form of cooperation.

The diversification and improvement of breeding methods facilitate such collaboration by adapting to the optimum the participation of each partner. For example, the "*bulbosum*" method allows the gametes of an F_1 barley plant to be doubled with immediate production of a series of pure lines representative of the segregation of the cross concerned. In a region where there are no breeders, an agricultural cooperative (or a malt factory), after having consulted a foreign breeder, can choose the barley lines (from as many different origins as possible) that are best adapted to its situation; it sends these lines to the breeder who carries out all possible crosses and, using the "*bulbosum*" method, creates a series of pure lines representative of the segregations of each F_1. It is then up to the agricultural cooperative to test these lines, which is technically simple. Consequently, selection will have

been wholly carried out on the spot. This is not a unique example; control of mutagenesis in woody plants allows the similar sharing of tasks between a laboratory and a nursery for the selection of ornamental species.

In a context of very active competition, variety users are today aware of the importance of plant breeding for the maintenance of the economic competitivity of their activities and their region. They should become even more active partners of breeding firms and they can give strong support to the latters' action, thus directly guaranteeing an increasing proportion of the financing of genetic progress.

Conclusions

Plant breeding is becoming more effective, but also more complex and costly. More groups are involved, but no single one can do everything.

1. More than ever, breeding firms and public research bodies need each other. Basic research laboratories are not only asked for the results of their research, but they must also constitute a structure open to dialogue where the concrete goals of firms represent a starting point that is just as important as scientific discovery. In addition to equal competence on the part of all those involved, such cooperation requires a capacity for synthesis that is a particularly valuable factor because the high degree of specialization of biologists isolates them from agriculture and breeding.

2. Increasingly, the importance of plant breeding for the efficiency of the agricultural processing industries will make variety users full partners of the breeding firms as regards the orientation and execution of work and also its funding. Nevertheless, medium-term or long-term programs must be protected from the enthusiasms and constraints of current events. Breeding firms, like public research

bodies, must maintain their freedom to prepare for the future.

3. The administrative and legal organization of the sector, which depends on scientific, technical and economic developments, must guarantee the following:

- appropriate remuneration that recognizes the contribution by creators who have worked satisfactorily;
- easy access to varieties for farmers;
- considerable freedom of action for research workers who are laying the foundations of new progress, and, in particular, the free use of genes.

It is not easy to reconcile these aims, but the plant variety protection system has been rather successful. It constitutes a realistic framework, particularly for activities in developed countries. The work of the breeders, that is to say the creation of the "balanced genetic structures" constituted by varieties, is properly recognized, except in cases where backcrossing or mutation enables slightly modified versions of a higher variety to be obtained. In this connection, a code of conduct based on an assessment of the genetic distances should be studied, differentiating the assessment criteria according to whether legal protection or economic regulations are concerned.

As far as the future is concerned, the system should be perfected and supplemented. It is necessary to take into consideration new techniques; for instance genetic engineering, which creates "bricks" and not "structures," should be recognized and remunerated, without however blocking access to variability, a token for preparing the future. Progressively, the law will have to be adapted to realities that are still not properly perceived. This will be made even easier when the "veterans" of plant breeding, from an agricultural tradition, and the "new" biotechnologists and biochemists know each other better. The two groups have very different habits and experiences!

4. Finally, it is essential not to restrict the debate to the corporate framework. Plant breeding is a powerful factor in general development. Over and above operations that are profitable for breeding firms, national action in favor of backward zones and international projects for the Third World should give more active support to breeding *by the countries concerned themselves* of the many local species neglected by scientific breeding. Support should be given to the programs carried out with this aim by a number of countries, by FAO and by the Group of International Agronomic Research Centers.

The diversity of agricultural plants, which is of value for ecological, economic and cultural reasons, is threatened by the current standardization movement. It is essential to save the genetic resources, and the support and coordination role played by the International Board for Plant Genetic Resources (IBPGR) is well known. It is also necessary to develop and extend breeding so as to maintain active and profitable farming based on the greatest possible number of species. This is a vast project which public plant breeding laboratories and breeding firms cannot and should not have to carry out alone. Nevertheless, they are capable of giving considerable support to the training of breeders and the launching of breeding programs in developing countries, thus affirming their commitment to the service of global equilibrium.

HISTORY
AND
DOCUMENTS

THE HISTORY OF PLANT VARIETY PROTECTION

CONTENTS

Plant variety protection law fits into the general framework of intellectual property law, which on December 10, 1948, was given formal recognition by the United Nations General Assembly in Article 27(2) of the Universal Declaration of Human Rights:

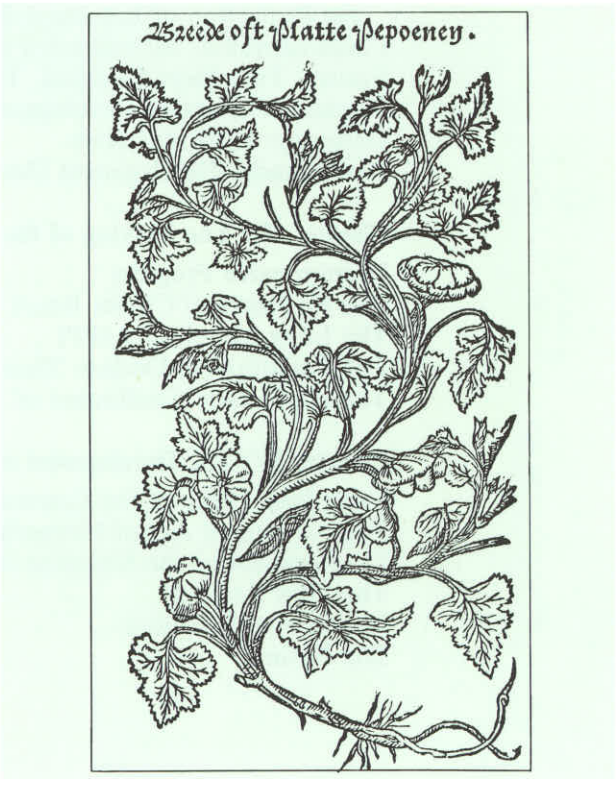
> *"Everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author."*

In historical perspective, plant variety protection law is an offshoot of patent law. As a matter of principle, therefore, its history could not be written without at least an outline, by way of background, of the history of its parent, apart from which it is important to highlight the heredity factor. Chapter I *will therefore draw such an outline, stopping at the point where plant variety protection law became a sufficiently precise concept for the first definite achievements to be made or at least attempted.*

Plant variety protection law is also a highly specialized branch of law owing to the narrowness of its subject matter and the specific features of the area of economic activity to which it relates: the subject matter—the variety—belongs to plant biology and genetics, and is a product of a human activity called "plant improvement" or more commonly "plant breeding." That activity is connected to the production and marketing of seed and seedlings, and through it to agriculture. Paradoxically—and contrary to a quite widely-held opinion—scientific and technical progress in the field of genetics has played only a minor part in the growth of plant variety protection law: the rediscovery in 1900 of Mendel's laws of heredity, by Correns, Tschermak and de Vries at the same time, was no more than a side issue for plant breeding, which was already rich with a wealth of empirical knowledge. The same was not true of the development of seed activity, and a need was soon felt for legislation to protect farmers, the specific consumers who buy the seed, against fraud of all kinds: seed is not only the symbol but also the material manifestation of the promise—and the uncertainties—of a harvest and, at the end of the chain, the feeding of the population. From the guarantee of a good harvest, subject of course to factors such as the technical skill of the farmer or climatic uncertainties, it was only a step to the promotion of the quantitative and qualitative improvement of that harvest by means of provisions designed to encourage plant breeding work. Some States tried to take that step between 1920 and 1950, but with varying degrees of success. Chapter II *reviews this period of history during which attempts were also made, again with varying degrees of success, to use industrial patents to protect the rights of the creators of new varieties, or breeders.*

Whereas the decade following the end of the Second World War witnessed world-shaking political, economic and social developments which had repercussions in Europe for patent law in the form of unprecedented harmonization and integration, breeders and those around them drew a relative blank in the field of plant variety protection. The momentum of the construction of a supranational Europe, together with the ineffectuality of efforts made at the national level, was one of the main factors that induced the breeders and their associates to look for a solution to their problem at the supranational level. That solution was eventually written into the International Convention for the Protection of New Varieties of Plants, which was brought into the world on December 2, 1961, by the signatures of plenipotentiaries from Belgium, France, the Federal Republic of Germany, Italy and the Netherlands. It took Governments nearly five years to achieve that result. An account of their work, and that of the professional organizations that contributed to its success, is given in Chapter III.

While it marked the beginning of a new era for breeders, agriculture and society, December 2, 1961, was not a culminating date. The Convention had yet



to be put into effect and had to win the accession of the greatest possible number of States. An administrative and financial shortcoming was rectified in 1972 by means of an Additional Act. Acceptance of the principle of plant variety protection by a certain number of States outside the Union framework, and also the difficulties encountered by other States in conforming to the principles of the Convention, subsequently led the member States to undertake an overall revision. The revision came about in 1978, and it triggered a great leap forward on the part of the Union, which today comprises seventeen member States, including practically all those of any agricultural significance. Its development in the course of the past quarter of a century is described in Chapter IV.

Finally, the twenty-five-year history of the Convention—and the 150-year history of the protection of new varieties of plants—could not be concluded without an outline of the prospects for the future. That is a doubly difficult task, as it entails making predictions and at the same time respecting the prerogatives of the member States whose precise responsibility it is to determine that future. The task is indeed all the more difficult since, for reasons of technological, economic and political evolution, UPOV is at present at a crossroads. Yet its twenty-five years of experience have certainly equipped it sufficiently to face the future.

CHAPTER I

The Family Tree[1]

Plant variety protection law is an offshoot of one of the two main stems of intellectual property law, industrial property. The other main stem is copyright, to which the subject of our study also has some striking similarities. In plant breeding terms, one could say that plant variety protection is the result of a mutation of patent law, itself a branch of industrial property.

Terminology and Custom

The orthodox approach is to embark on patent history by looking for its roots in the monopolies and privileges conferred by princes in feudal times. *Litterae patentes*—from which the word "patent" in English or German and its equivalents in other languages[2] originate—were letters open to the public, which made their owners subject to a particular legal regime. In view of the fact that those monopolies and privileges pursued very varied aims, often of little benefit to the population as a whole, the claimed parentage of plant variety protection might seem somewhat unsuitable, in spite of its antiquity. For is it wise to avail oneself, for instance, of measures taken by a feudal lord for fiscal reasons (the communal bakehouse, etc.) or by way of a favor to a courtier? The reply is indisputably affirmative.

A Precursor in Ancient Times

Before enlarging on this subject, however, we should go much further back in time to find a precursor of intellectual property: in about the seventh century B.C., the Greek colony of Sybaris, established in Southern Italy, which then formed part of Greater Greece, promulgated the following law:

[1] Much of the information provided in this Chapter has been drawn from the work by Yves Plasseraud and François Savignon, *L'Etat et l'invention—histoire des brevets*, published by *La documentation française*, to which the reader is referred for more detail.

[2] The French term *brevet* and its equivalents in other languages are derived from *bref* and, in Old French, *brievet escrit*, a term meaning abridged extracts or writings. The King's *brevets* were acts originating with the King, drawn up and countersigned by a Secretary of State, but they did not bear any seal and were not subject to registration.

> "If any caterer or cook should invent an original and refined dish, no person other than the inventor himself is allowed to use the recipe before one year has expired and, therefore, only the first person to have invented the dish may draw profit therefrom during that period, and this to the end that others, by their own assiduous application, may distinguish themselves with similar inventions."

This law reached us by courtesy of Athenaeus of Naukratis, who in his work *The Deipnosophists* quoted a passage from the historian Phylarchus in which the latter compared the austerity of life in Syracuse with the sophistication of Sybaris. This astonishingly modern law sets forth two fundamental principles of intellectual property law—the inventiveness requirement and the limitation of the exclusive rights in time—and also two purposes of that law—the protection of the material interests of the inventor and the promotion of inventive activity.

England and the Statute of Monopolies

But let us move forward again to seventeenth-century England. Forever short of money, the Crown had distributed a multitude of privileges under the reign of Elizabeth I (1558-1603) and had even extended them to the products of everyday trade. The guilds reacted by Parliamentary means. After a long struggle against the sovereign, James I, the Commons passed the famous *Statute of Monopolies* in 1623, the purpose of which was to declare totally contrary to the laws of the realm all monopolies and all commissions, grants of privilege, licenses, charters and letters patent. A general exception was made, however, in favor of "letters patent and grants of privileges [...] for the sole working or making of any manner of new manufactures within this realm, to the true and first inventor and inventors of such manufactures." In this text, which some consider to be also the forerunner of the laws against restrictive trade practices, the Commons thus acknowledged the usefulness of the temporary monopolies in the field of inventions dating back to the Middle Ages.

Venice, Mother of Patents

They were not the first, however: Venice could add to its title of Most Serene Republic that of Mother of Patents. For it was on March 19, 1474, that it enacted a law known as the *Parte Veneziana*, the text of which reads as follows:

> "There are in this City, and also there come to it temporarily by reason of its greatness and goodness, men from different places and with most clever minds, capable of devising and inventing all manner of ingenious contrivances. And should it be provided that others, having seen the works and contrivances invented by them, could not make them and take their honor, men of such kind would exert their minds, invent and make things which would be of no small utility and benefit to Our State.
>
> "Therefore, decision will be passed that, by authority of this Council, whoever may make in this City any new and ingenious contrivance not made heretofore in Our dominion, as soon as it is brought to perfection so that it can be used and exercised, shall give notice of the same to the Office of Our Provisioners of Common.
>
> "It being forbidden to any other in any territory and place of Ours to make any other contrivance in the form and resemblance thereof, without the consent and license of the author up to ten years.
>
> "And, however, should any person make it, the aforesaid author and inventor will have the liberty to cite him before any office of this City, by which office the said person, who has thus infringed, shall be forced to pay him the sum of one hundred ducats and the contrivance shall be immediately destroyed.
>
> "Our Seigniory being nevertheless in liberty, at its will, to take and use in its need any of the said contrivances and instruments, with this condition, however, that no others than the authors shall exercise them."

As a mercantile city open to the outside world, the City of the Doges justifies the principle of the exclusive right granted temporarily to the inventor with the concern to secure foreign knowledge at a time when the very powerful and very conservative guilds were tending to privilege collective solidarity at the expense of individual initiative, and in any event to reserve innovations to themselves, if possible, in the form of manufacturing secrets. So on the one hand there were inventors going from town to town, offering their "secrets" to the highest bidder, and on the other hand people trying to find out the "secrets" that had ensured the prosperity

of rival cities or countries; for instance, French popular imagery cultivates the legend of a certain Bernard Palissy (1510-1589), who went so far as to burn his own furniture in his desire to find out the processes by which Italian enamels were made. So what Venice wanted to do was attract the former and avoid the efforts of the latter.

From that point of view the Venetian measure is also surprisingly up to date. For even though the economic world has undergone profound changes, patent law remains an instrument of prime importance for the dissemination of technical know-how and for the transfer of technology. And, as a matter of fact, it is widely recognized as such today.

Decline and Revival

Yet both the *Parte Veneziana* and the Statute of Monopolies became obsolete, the former with the decline of the city and the latter because sovereigns lost no time in circumventing it and reverting to their wayward habits. It was even repealed in 1640 in the heat of the fight against royal absolutism (although in fact patents were reinstated in 1660, after the fall of Cromwell and the restoration of the monarchy). That did not however mark the demise of the underlying legal principle. On the contrary, it survived in many countries in the form of customary law, as it did have an unquestionable usefulness; and so the entry on "Manufactures" in the 1765 Encyclopaedia by Diderot and d'Alembert says that: "They must be protected by Government. Protection should have the purpose of facilitating the making of devices [...] by granting some privileges [...]."

The United States of America and Faith in Progress

It was precisely that conception that underlay the Patent Law of the United States of America, introduced on April 10, 1790. It is a conception that even has a place of honor in the Constitution of the United States of America, Article 1, Section 8 of which gives the Congress the power "to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries." It will be noted, however, that this Constitutional provision was intended not to create a right, as it already existed in certain colonies (the Commonwealth of Massachusetts granted the first patent as early as in 1641), but rather to transfer legislative competence.

France, Human Rights and the Social Contract

The French Patent Law is almost a contemporary, as it was promulgated on January 7, 1791. It too is the result of a revolutionary upheaval, yet reflects remarkable practical continuity. From being a privilege granted by the King, a gracious favor or concession, the exclusive right in "any new idea the manifestation or development of which may become useful to society" became indeed the expression of a human right and the result of a social contract.

Acting on the ideas of Montesquieu, Voltaire, Rousseau and other philosophers of the Enlightenment Era, the Constituent Assembly voted on August 26, 1789, on a Declaration of the Rights of Man and of the Citizen, which it then wrote in at the head of the Constitution on September 3, 1791. According to the Declaration, property was one of the natural and imprescriptible rights of man. In his Report to the Assembly on the patent law, the Chevalier de Boufflers wrote that "if such a thing as the true property of a man exists at all, it is his thought [...] Invention, which is the source of all art, is also the source of property; it is original property, all other property being mere convention [...]."

Such property could not be absolute, however; it had to be qualified: in exchange for the disclosure of the invention, society would protect the inventor during a given period "that he be not troubled by covetous or jealous competitors." While the Constituent Assembly had taken great care to distinguish itself from the *Ancien Régime* by invoking natural rights and the Social Contract, it nonetheless came to the same result as Louis XV did with respect to the limitation of the rights in time: in 1762, Louis had limited to fifteen years the privileges in matters of commerce and industry in response to quite pragmatic considerations, it being necessary to prevent the holders of privileges from resting on their laurels and to avoid the risk of their privileges becoming obstacles in the hands of incompetent heirs or purchasers, for instance.

Obstacles and Opposition

Persons of Rank and Economic Trends.— Exclusive rights in inventions thus evolved in several countries, under a variety of political regimes, under different economic circumstances and on the basis of different philosophical concepts (those concepts are incidentally also applicable to the protection of new varieties of plants). Yet it should not be assumed that the rights were received favorably in all quarters throughout the world; even if we disregard the objections that had more to do with power struggles, there was still a great deal of more or less virulent opposition, from ministers such as Colbert in France, under Louis XIV, or from economic schools of thought such as the physiocratic doctrine of Quesnay.

Germany and Austria: Survival of Medieval Structures.— It was probably in Germany and Austria that opposition was the strongest, partly owing to factors peculiar to those entities: in Austria privileges had often been confined to a province, or even to a town; Germany on the other hand was divided into a multitude of States. In both cases the privilege became an obstacle, in certain circumstances an additional obstacle, to trade. Because economic unity was achieved in Germany before political unity, in the form of the *Zollverein* established between 1828 and 1854 but actually organized in 1834, the various State patent systems suffered from the move to abolish domestic customs barriers.

The Free-Trade Movement.— The above trend grew moreover, throughout Europe, under the influence of the free-trade economists, and there was a great wave of opposition to patents as from the time of the 1862 Universal Exhibition in London. The movement was such that for instance the *Grande Encyclopédie Larousse* considered it necessary, in the edition published in the last decade of the nineteenth century, to follow the brief definition of the word *brevet* with a long argument in favor of the principle involved, ironically at a time when the wave of opposition had in fact receded.

The successes of the free-traders and their associates and allies of the moment were considerable: the German unitary patent was blocked until 1877; the Swiss people opposed Federal legislation in referendums taken in 1866 and 1882; and the Netherlands repealed its legislation in 1869. Those successes were to be short-lived, however.

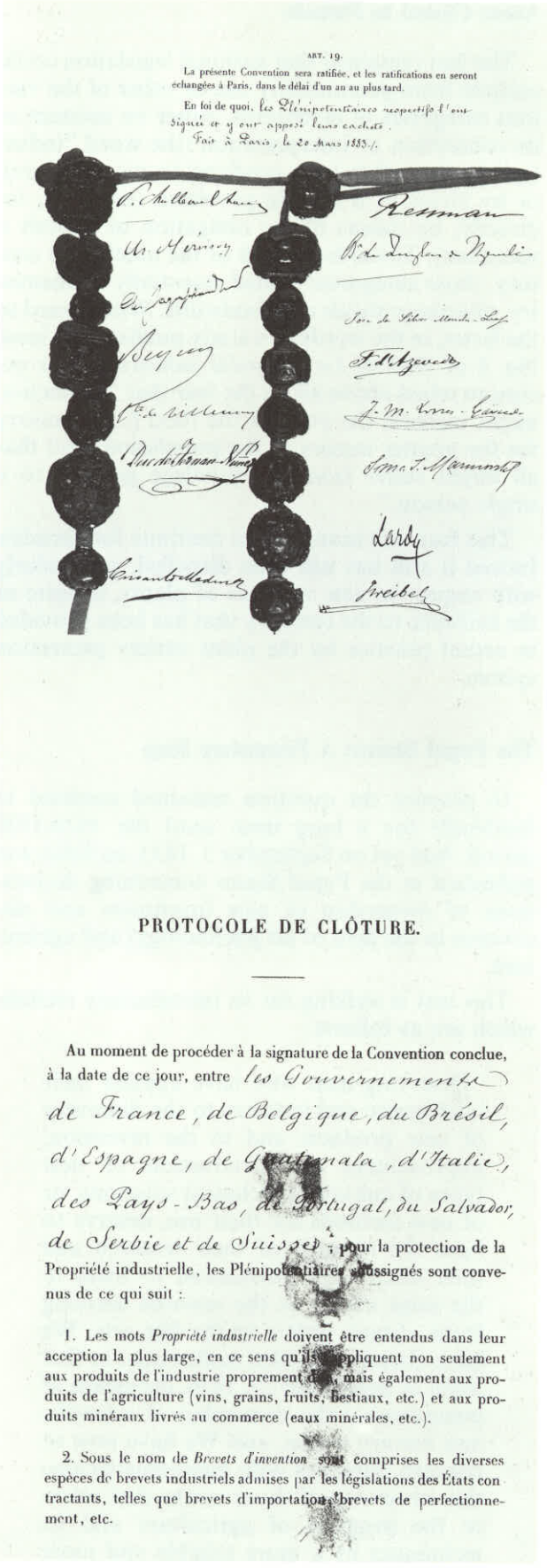
Industrial Property Asserts Itself

Indeed the 1873 International Exposition in Vienna was used as the opportunity to organize also an International Congress to consider the patent question. The Congress fell victim to circumstances however, namely a cholera epidemic and the economic slump that followed the bank crash of May 1, 1873. The idea was taken up again for the Paris Universal Exposition of 1878; that move had more success, as the World Congress on Industrial Property brought into existence an International Permanent Commission (which was itself to produce the International Association for the Protection of Industrial Property (AIPPI)) responsible for drawing up a text for the creation of an International Union. That text eventually became the Paris Convention for the Protection of Industrial Property on March 20, 1883, by virtue of its signature by eleven States, namely Belgium, Brazil, France, Guatemala, Italy, the Netherlands, Portugal, Salvador, Serbia, Spain and Switzerland. It abbreviated its name to Paris Convention, which obliged the other Convention, also concluded at Paris but three-quarters of a century later, to take the name of UPOV Convention.

The Paris Convention entered into force in July 1884. January 1885 saw the first issue of the review of the International Union for the Protection of Industrial Property, *La Propriété industrielle*, which opened with an article entitled "Our Program." Its most important paragraph was the following:

> "The establishment of the Union for the Protection of Industrial Property is an important milestone in the development of international law. Alongside the general Unions for posts, telegraphs, weights and measures, etc., which are

intended to satisfy essentially material interests, it represents an idea for an individual right, namely the right of the inventor or industrial designer in his work, the right of the manufacturer and trader in the name or mark that they have made honorably known through long years of conscientious work. It concerns itself with guaranteeing honesty in transactions not only between two individuals, but also between peoples. It aspires to make the whole world into one vast territory governed by a uniform law of justice and honesty, that of respect for property which is the product of individual work. Soon, we are convinced, it will be followed by a Union for the protection of authors' rights in the literary and artistic field, and in this way a complete body of international law will have been constituted on a subject matter that transcends all considerations of political frontiers and domestic laws: intellectual property in its fullest sense and in all its manifestations."



ART. 19.

La présente Convention sera ratifiée, et les ratifications en seront échangées à Paris, dans le délai d'un an au plus tard.

En foi de quoi, les Plénipotentiaires respectifs l'ont signée et y ont apposé leurs cachets.

Fait à Paris, le 20 Mars 1883.

PROTOCOLE DE CLÔTURE.

Au moment de procéder à la signature de la Convention conclue, à la date de ce jour, entre les Gouvernements de France, de Belgique, du Brésil, d'Espagne, de Guatemala, d'Italie, des Pays-Bas, de Portugal, du Salvador, de Serbie et de Suisse, pour la protection de la Propriété industrielle, les Plénipotentiaires soussignés sont convenus de ce qui suit :

1. Les mots *Propriété industrielle* doivent être entendus dans leur acception la plus large, en ce sens qu'ils s'appliquent non seulement aux produits de l'industrie proprement dite, mais également aux produits de l'agriculture (vins, grains, fruits, bestiaux, etc.) et aux produits minéraux livrés au commerce (eaux minérales, etc.).

2. Sous le nom de *Brevets d'invention* sont comprises les diverses espèces de brevets industriels admises par les législations des États contractants, telles que brevets d'importation, brevets de perfectionnement, etc.

CHAPTER II

The Origin of the Specific Right

Realism and Ambiguity of the 1883 Paris Convention

The participants in the Vienna Congress had conceived the ambitious project of proposing a sort of model law. Those at the Paris Congress eventually took the more pragmatic option of dealing with the essential concerns of the moment and of ensuring the future continuity of work on contentious issues. One of those was the question of the scope of the protection system in terms of its subject matter. It is true that the creators of the 1883 Paris Convention had added to it, at the time of signature, a Final Protocol which "shall be considered as an integral part of the Convention, and shall have the same force, validity and duration," and which specified the following: "The words 'industrial property' should be understood in the broadest sense; they relate not only to the products of industry in the strict sense but also to agricultural products (wines, grain, fruit, cattle, etc.) [...]."

Areas Closed to Patents

The fact remained that national legislation could exclude from patentability one or other of the various categories of inventions, either on account of its conception or interpretation (the word "industry" having often been confined to manufacture), or by virtue of a specific provision (or again, indirectly, by means of the obligation to deposit a specimen). Towards the end of the nineteenth century, those categories related essentially to chemistry, pharmaceuticals and foodstuffs. With regard to the latter, in the words of a study published in issue No. 6 of 1885 of *La Propriété industrielle*, the exclusion relied above all on the fear that "protection might increase the price of the food [...] necessary for the greater masses of the population, and that all might suffer from the privilege granted to a single person."

This fear was moreover to continue for decades. Indeed it still has not been dispelled, particularly with respect to new varieties of plants, in spite of the evidence to the contrary that has been provided in actual practice by the plant variety protection system.

The Papal States: A Premature Step

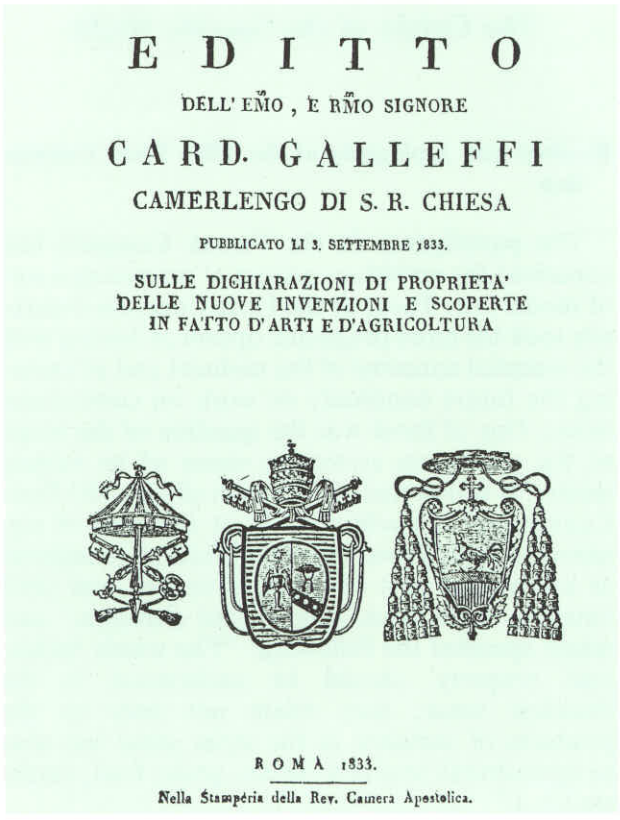
In practice the question remained confined to foodstuffs for a long time, until the 1920-1930 period. And yet on September 3, 1833, an Edict was published in the Papal States concerning declarations of ownership of new inventions and discoveries in the field of art [technology] and agriculture.

This text is striking for its introductory recitals, which are as follows:

> "Deserving men who have applied their intelligence and industry to the discovery of new products and to the invention, improvement or introduction of new types of culture or technical solutions, or of new methods for their use, deserve to have the rewards of their research and their discoveries guaranteed to them to the same extent as the rewards deriving from science, letters or the fine arts. We have already provided sufficiently, in Our Edict of September 23, 1826, for means of guaranteeing the ownership of scientific and literary works, and We have now to concern ourselves with guaranteeing also the ownership of those works that relate to the progress of agriculture and its techniques by a more reliable and more expeditious method than that practised hitherto with respect to the grant of specific exclusive privileges."

Analysis of the above text is hampered somewhat by its use of general terms whose exact meaning in the context of the Edict escapes us today. The fact remains, however, that a person who for instance discovered a natural product or found or introduced an important new type of agricultural plant in the Papal States was granted an exclusive property right. That right related to the working of its subject matter (which for convenience we shall refer to as the invention). The owner of the right was even guaranteed undisturbed enjoyment thereof, as in practice third parties were prohibited from challenging it and obstructing the working of the invention.

The duration of the right was from five to fifteen years; it was reduced to three to six years in the case of the introduction of new methods and useful improvements that had already been the subject of disclosure in written publications. This provision is a good illustration of the legislator's concern to use the Edict to encourage the development of agriculture. The actual duration of the right—and its territorial scope—were determined in both cases by the importance of the invention, the capital necessary for its implementation and the benefit expected from that implementation.



EDITTO

DELL' EMO, E RMO SIGNORE

CARD. GALLEFFI

CAMERLENGO DI S. R. CHIESA

PUBBLICATO LI 3. SETTEMBRE 1833.

SULLE DICHIARAZIONI DI PROPRIETA'
DELLE NUOVE INVENZIONI E SCOPERTE
IN FATTO D'ARTI E D'AGRICOLTURA

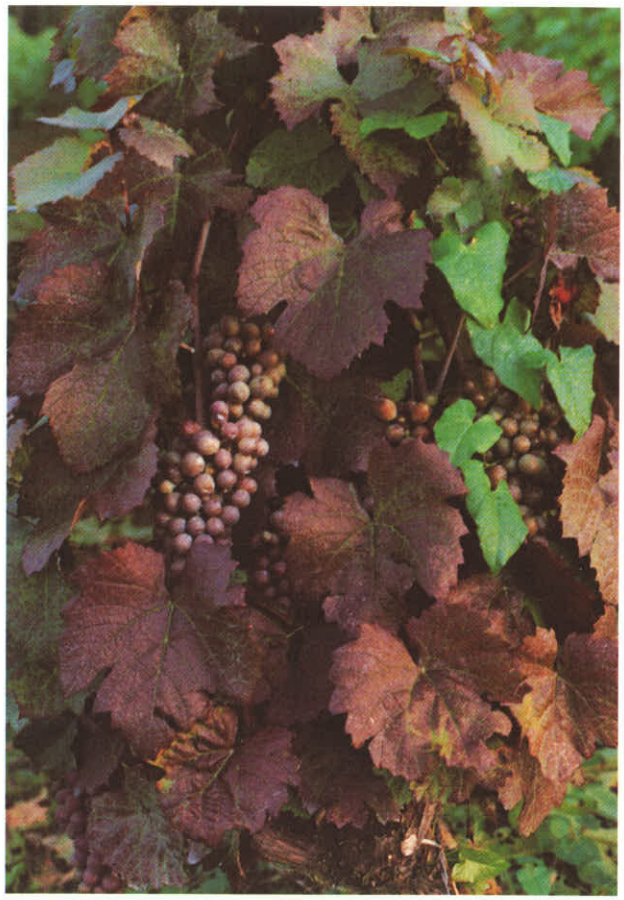
ROMA 1833.

Nella Stamperia della Rev. Camera Apostolica.

The legislator was very conscious of the balance between the private and the public interest. The owner was relieved of his right in the case of failure to work within the year following the grant of the right, or again if the working of the invention had an adverse effect on the economic activity concerned. Moreover, the right was not to be contrary to public safety, health and well-being.

One of the prerequisites of the grant of the right was the disclosure of the invention in a description that was sufficiently clear, complete and precise for any farmer or craftsman to carry it out.

In spite of its general character, this text is widely considered to be the forerunner of the protection of new varieties of plants. It was of no practical importance, however. According to Bernard Laclavière (who was responsible for the question of plant variety protection at the Ministry of Agriculture of France during the nineteen-fifties, and became the General Secretary of the 1957-1961 Diplomatic Conference), the text in the Vatican library bears an anonymous annotation to the effect that the Edict was never put into effect. The most likely explanation is that it did not meet any particular need felt by the Papal States.



Progress of Plant Breeding and Genetics

Vegetatively Propagated Plants.— The problem was not that the area concerned, namely plant breeding, was still too undeveloped for protection to be contemplated. At the end of the nineteenth century, which was when the Paris Convention came into being, vineyards were plagued with phylloxera, first in France, then in Europe and finally in a large part of the rest of the world. The only economically effective countermeasure was found in the creation of hybrid rootstocks from American species or of direct productive hybrids of European vines and American species. In the case of rootstocks, one individual had to be endowed with a wide variety of properties taken from complementary parent material (mainly resistance to lime, drought, humidity, acidity and salinity). Thus a whole range of material had to be created according to predetermined objectives. It should be mentioned in passing that the general concept of the fight against phylloxera is striking for its modernity: phylloxera is endemic in North America and it was from there that the resistance sources were drawn.

That is the first case in the history of mankind of plant breeding being resorted to systematically to ensure the salvation of a whole area of agriculture in an emergency. The statistics speak for themselves: phylloxera appeared in Southern France in 1863; between 1873 and 1879 it attacked half the vineyards of France and destroyed those of the Languedoc, Charentes and Beaujolais regions; by 1890 wine output had been reduced by two-thirds, and the value of operating vineyards, which previously had ranged from 10,000 to 20,000 francs per hectare had dropped to less than 1,000 francs. Such a calamity justified recourse to all kinds of incentive.

At a time when Pasteur was filing patents for his inventions and discoveries in the field of the life sciences, no thought was given to patents or another form of protection for the rootstocks that were going to save wine growing. The names of the rootstocks have preserved for us the names of their breeders, some of whom made fortunes because they had business sense and resources, while others, for various, often anecdotal reasons (even family squabbles!), lost everything to the nurserymen.

This same period—corresponding to the time of the Paris Convention—also witnessed a lessening of the extraordinary enthusiasm of the Belgian "pip and stone sowers." The first of them was an abbot of Mons, Nicolas Hardenpont, and the most illustrious of them was certainly Jean-Baptiste Van

Mons, the "Titan of Pomology." From 1758 onwards they produced more than a thousand varieties of pears and hundreds of varieties of apples, plums and cherries. These figures are quite simply fantastic. The range grown today still includes a whole series of varieties that originated with them.

Seed-Propagated Plants.— Considerable progress had also been made with seed-propagated plants since Thomas Fairchild achieved the first cross between two carnation species in 1719, and since Koelreuter published his observations on hybridization around 1761. In the case of wheat, the first attested selection followed by offspring testing, carried out by Le Couteur in Jersey, dates back to 1800. John Goss appears to have been the first to cross peas to produce new types, new varieties, that were more interesting for the grower. That was in about 1820. Towards the middle of the nineteenth century a great deal of plant breeding work was going on and was producing quite impressive results.

Mendel and the Laws of Heredity.— It is now a proven fact that it was on the basis of the findings of his predecessors, who were concerned with the deepening of knowledge, or with improving the plant material used in agriculture or horticulture, or indeed with both, that Johann (or Gregor, to give him his monastic name) Mendel "discovered" the laws of heredity. In particular Mendel followed John Goss's record of his experiment item by item. Contrary to general opinion, the achievement of Mendel, whose findings were published in 1865, lies not so much in the content of the laws, but rather in their formulation in statistical form, the quality of his experimental work, the exactness of his account... and his courtesy towards his predecessors. The laws were already "in the air" and were widely applied, in empirical fashion, by breeders. They had not yet captured the attention of the scientific community, however. Their "rediscovery" in 1900, by the German K.E. Correns, the Austrian E. von Tschermak and the Dutchman Hugo de Vries all at the same time, was therefore more a side issue than a revolution for plant breeding.

With regard to the exploitation of heterosis, or hybrid vigor, with hybrid varieties, it is also claimed that Darwin's monumental *Cross- and Self-Fertilisation in the Vegetable Kingdom* was responsible for inspiring W.J. Beal of Michigan when he suggested using hybrid seed produced on the basis of what at the time were populations. There too, however, it is possible to doubt the inspirational role of Darwin—and consequently to regard Beal's contribution as being all the more remarkable—as the work was published in 1876, whereas Beal was engaged in experiments between 1877 and 1882.

A Green Revolution and the Start of an Industry and a Tradition.— The nineteenth century witnessed a phenomenal boom in agriculture. The craftsmen changed into agricultural machine builders, especially after 1830, with the improvement of traditional equipment such as plows and the introduction of first mechanical, then electric motive power and also new machines such as threshers. The empirical knowledge of plant nutrition became scientific thanks to the work of men such as Sir Humphry Davy, and then John Bennett Lawes and J.H. Gilbert in England, Justus von Liebig in Germany and Jean-Baptiste Boussingault in France. At the same time the use of fertilizers spread and a chemical fertilizer industry established itself. In other words agriculture came out of its self-sufficient corner and became part of the economic world.

One of the striking changes was that it began to rely more and more on particularly competent, specialized farmers for its supplies of seed, whereupon those farmers launched into breeding programs in order to serve their customers still better. Thus it was that the seed trade and an associated

plant breeding activity evolved, both with a strictly commercial bent. It was also in the second half of the nineteenth century that breeders' associations were set up (the Swedish Seed Association, for instance, was founded in 1886), seed testing systems introduced (the Swedish one in 1876) and national research institutes established (the Austrian Federal Institute of Agriculture and Seed Testing dates back to 1881, for instance).

United States of America: A Limited Solution

Luther Burbank.— Of the great figures of the time, many of which have founded dynasties still very much alive today, we shall mention only one because he has pride of place in the history of plant variety protection, namely Luther Burbank. Burbank was a highly talented breeder of the United States of America; he has been nicknamed the Edison of Horticulture. Yet he certainly did not have Edison's business sense. He sold his varieties, and often for paltry sums—125 dollars for the famous 'Burbank' potato in about 1880. By way of comparison, the equally famous 'Golden Delicious' apple was sold by a farmer to the Stark nurseries for 51,000 dollars in 1914. What is remarkable is that Burbank sold his products together with the proprietary rights, even though there was no provision for them in any text.

Luther Burbank was an ardent promoter of those rights. Towards the end of the nineteen-twenties, there was a movement that advocated protection for plants, animals and their products on the lines of that afforded by patents. Secretary of State Hyde was in favor of it. Luther Burbank had used to the full the argument of equality with the inventor in the field of technology and also with the author, which moreover had been expressed in the preamble to the Edict of the Papal States. That argument was presented as follows before the House of Representatives:

> "A man can patent a mousetrap or copyright a nasty song, but if he gives to the world a new fruit that will add millions to the value of the earth's annual harvests, he will be fortunate if he is rewarded by so much as having his name connected with the result."

The Plant Patent.— Congress remained very reticent, however, but it did agree to open the patent route to varieties propagated by vegetative means, but not by tubers. That exception in practice covers potatoes and Jerusalem artichokes, according to the congressional documents, which give as the reason the fact that multiplication is effected with material identical to what is consumed. Yet the right granted was in principle intended to relate solely to the vegetative propagation of the plant (the provision was not very well worded, as it could give the impression that the right was an addition to the right to apply, use or dispose of the invention or discovery). The real reason was clear: major food species had to be kept out of the system. That too was the reason for the limitation to vegetatively propagated plants, according to an article on the history of the US Patent Office published in 1936 in the *Journal of the Patent Office Society*: the writers of the law wanted to prevent grain monopolies.

Be that as it may, the Law of May 23, 1930, broke the ice, even though only three countries followed its example (Cuba in 1937, the Republic of Korea in 1973 and South Africa in 1952). After two amendments, in 1952 and 1954, it took the

form of a specific chapter of the title on patents of the US Code, comprising four sections. Its provisions are often regarded as constituting a "Plant Patents Act." The first three sections read as follows (the fourth has to do with procedure):

> *"Section 161. Patents for Plants*
>
> "Whoever invents or discovers and asexually reproduces any distinct and new variety of plant, including cultivated sports, mutants, hybrids, and newly found seedlings, other than a tuber propagated plant or a plant found in an uncultivated state, may obtain a patent therefor, subject to the conditions and requirements of title.

Patented Aug. 18, 1931

Plant Pat. 1

UNITED STATES PATENT OFFICE

HENRY F. BOSENBERG, OF NEW BRUNSWICK, NEW JERSEY, ASSIGNOR TO LOUIS C. SCHUBERT, OF NEW BRUNSWICK, NEW JERSEY

CLIMBING OR TRAILING ROSE

Application filed August 6, 1930. Serial No. 473,410.

My invention relates to improvements in roses of the type known as climbing or trailing roses in which the central or main stalks acquire considerable length and when given moderate support "climb" and branch out in various directions.

In roses it is very desirable to have a long period of blooming. This has been acquired in non-climbing roses of the type ordinarily called monthly roses or everblooming roses. My invention now gives the true everblooming character to climbing roses.

The following description and accompanying illustrations apply to my improvements upon the well known variety Dr. Van Fleet, with which my new plant is identical as respects color and form of flower, general climbing qualities, foliage and hardiness, but from which it differs radically in flowering habits —but the same everblooming habits may be attained by breeding this new quality into other varieties of climbing roses.

Figure I shows (1) a flower that is just dropping its petals, (2) a bud about to open, (3) a terminal bud just forming on a large side shoot, and (4) a new shoot which has not yet finished its growth and formed buds at its terminus. This shoot would not appear on the branch illustrated until several weeks later than the stage of development shown, when it would grow out ordinarily from the axil of the first or second leaf below the bloomed-off flower. (5) shows a second way in which new flowering shoots form, by branching off on a short stem immediately or closely adjacent to the blossom that has just finished blooming. Figure II shows a further method of branching and bud formation in cases where the bloom has been cut off, but the formation of new flowering shoots is not dependent upon pruning off the old blossoms. It is evident that this succession of blooms continuously or intermittently supplied by new shoots branching out throughout the summer and fall gives the true everblooming character. When grown in the latitude of New Brunswick, New Jersey, my new climbing rose named "The New Dawn" and illustrated herewith in exact drawings from photographs, provides a succession of blossoms on a single plant from about the end of May to the middle of November, or until stopped by frost.

No claim is made as to novelty in color or other physical characteristics of the individual blossoms, nor as to the foliage or growing habits of this rose other than as described above.

I claim:

A climbing rose as herein shown and described, characterized by its everblooming habit.

In testimony whereof I affix my signature hereunto.

HENRY F. BOSENBERG.

Aug. 18, 1931. H. F. BOSENBERG **Plant Pat. 1**

CLIMBING OR TRAILING ROSE

Filed Aug. 6, 1930

Fig. 1

Fig 2

INVENTOR,
Henry F. Bosenberg.
Per Agent.
Orville M. Kile

"The provisions of this title relating to patents for inventions shall apply to patents for plants, except as otherwise provided.

"Section 162. Description, Claim

"No plant patent shall be declared invalid for noncompliance with Section 112 of this title if the description is as complete as is reasonably possible.

"The claim in the specification shall be in formal terms to the plant shown and described.

"Section 163. Grant

"In the case of a plant patent the grant shall be of the right to exclude others from asexually reproducing the plant or selling or using the plant so reproduced."

The Investigations of the International Bureau of the Union for the Protection of Industrial Property

Interest Grows...— The International Bureau of the Union for the Protection of Industrial Property was entrusted with monitoring the development of the situation regarding industrial property, and it passed on the information it had gathered in its review *La Propriété industrielle*. The energy and ability of the staff of the International Bureau is such that the review is a gold mine for historical research, and this study is indebted to it. The adoption of the amendment to the US Code appears to coincide with a new appreciation of the true dimension of the problem of new plant varieties. For it is since that time that the International Bureau has had a regular section entitled "Plant Varieties" in the annual index of the review (the articles concerned being published, like the others, as either "News Items" or "General Studies").

...but Scepticism Predominates.— The reception that was given to the American move could hardly be described as enthusiastic, however. Yet that was a reflection of the mood of the time. The May 1931 issue contained a text by Francesco Todaro, Director of the Institute of Cereal Growing in Bologna, Italy, which had originally been published in the review of the International Institute of Agriculture. The plant patent was attacked on four fronts: it did not do justice to *all* breeders; it lacked efficacy owing to the difficulty of reporting unlawful propagation (although Todaro asserted later that his Institute was quite capable of identifying wheat varieties!); it was contrary to the public interest in that it delayed the dissemination of varieties; the patent offices were not the appropriate framework. Whereupon Todaro proposed the charging of a fee for marketed seed, or even for harvested material, and the redistribution of fees to breeders in proportion to the importance of their varieties. It should be mentioned that this solution has recently been adopted in Finland and in Norway, where the narrowness of the market permits such a simple solution.

Todaro went on to say that even that solution would be difficult to implement. The only way out was for the authorities to intervene directly in plant variety creation through the establishment of agricultural institutes and the introduction of awards (diplomas for merit and honorary distinctions) for the few private breeders. Clearly this study was strongly influenced by the ideology which in Italy presided over the "wheat war."

In April 1932 an unsigned general study took stock of the world situation in a manner that could be considered objective in view of the circumstances at that time. With great wisdom, it ended with the following words:

"Nowhere, for the moment, does experience afford a sufficient wealth of material for any sure solution to the problems surrounding the new law in the making to emerge [...] Before that, technical difficulties have to be clarified, the needs of interested parties have to be defined and a practical means has to be found of recognizing the specific qualities of seed, the degree of conservation of those qualities throughout successive generations and so on. It is thus the technical people who now have the floor. Legislation will have no difficulty in translating their desires, once they have been clearly worked out, into legal provisions."

Finally, in January 1933, the International Bureau published a study which is probably a summary of the one by Robert Cook which appeared in *The American Mercury* in May 1932. The author first considered the difficulty of describing a variety. "A spirit-level is always a spirit-level; a shaft is always a shaft and even a complex chemical compound always retains the same molecular structure. On the other hand, as soon as conditions change, a plant changes. Thus the Washington orange tree, which is the basis of the industry in California, is useless if it is transplanted to Florida, where a completely different species has to be grown. It follows that a verbal description, and even high-quality color plates are not sufficient when a new plant variety has to be defined with the necessary exactness."

The study drew the conclusion that a return to the system of depositing samples was called for: "The sample of the product would be valuable because, while it is true that plants may vary from one climate to the next, and even from year to year, it is equally true that two plants of the same species growing side by side, or two cuttings taken from the same nursery, are instantly recognizable to the experienced eye."

The author then analyzed with great perceptiveness the fact that the discovery of a new form (notably a mutant) deserved to be rewarded according to the same criteria as the results of hybridization. He pointed out by way of conclusion that the work of the legislator had still to be confirmed by the courts:

> "The courts have yet to loosen up the stiffness of the principle according to which the inventor must, in exchange for the rights conferred on him, disclose his invention to society in such a way that any person 'having skill in the art' can carry it out, and also apply broadly the theory whereby 'products of nature' are regarded as excluded from patentability... In a word, the law may be a good sower, but case law has yet to be a hospitable soil!"

1911: A Lack of Mental Preparedness.— In many respects the International Bureau had also been a good sower; but it had sown seeds of reflection, not of action, slow-growing seeds which in addition were of rival species. In any event they were all to be affected by a highly unfavorable climate.

Yet the International Bureau had already sown a seed two decades earlier: in 1911 it had concerned itself with the question of the protection of new plant varieties by publishing a condensed version, with extracts and a commentary, of the report that Louis Blanc, a horticulturist of Lausanne (Switzerland), had presented to the *Congrès pomologique de France*. The matter had in fact already been submitted to the Congress in 1904 by Martinet, the Director of the Federal Seed Testing Station of Mont-Calme, in Lausanne; but there seems to have been no response on the part of the industrial property experts.

The proposal by Louis Blanc was a very cautious one, reflecting the nature of the socio-political problem raised. On the one hand he was suggesting the possibility of granting the breeder sole distribution rights in the variety, and on the other advocating the issue of merit certificates by a central body. While tests were being carried out by that body, the breeder could propagate the variety in such a way as to be able to launch it on the market as soon as the certificate was granted.

> "The certificate would be the best recommendation and the most effective and trustworthy advertisement for the benefit of purchasers from all countries, and would thus assure the breeder of an important monopoly of justified revenue, at

the same time affording buyers all the guarantees of authenticity. It is certain that an international institution of that kind would contribute greatly towards bringing order to the trade in new fruit varieties, at the same time giving researchers the incentive of assured reward and a deserved and guaranteed profit if the novelty is a good one."

In its commentary, the International Bureau had pointed to certain problems arising from the specific character of new plant varieties. It concluded as follows:

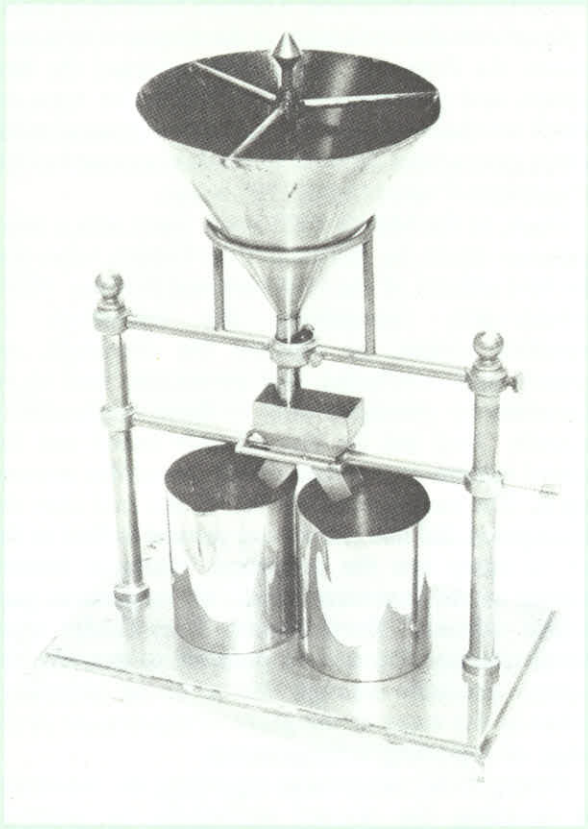
"The above observations are in no way intended to combat the idea of new plant variety protection. We merely wished to alert those concerned to the question whether that protection should not be made subject to rules different from those laid down for other creations of the human intellect. The raising of the question is moreover timely, as for some years a most interesting movement, both scientific and technical, has been afoot in the agricultural field and has opened up a vast new area of discovery precisely for plant creations."

That was the seed sown by Louis Blanc and *La Propriété industrielle*; it was to germinate a decade later, after the upheavals of the First World War.

Bernard Frey-Godet, a Visionary.— As soon as the hostilities came to an end, a certain number of States either planned or took steps in the direction indicated above. *La Propriété industrielle* reported the first moves, and published the first legislative texts (to which we shall return later) and also a general study which gave a brief account of the development of the situation in France (April 1922 issue).

Then, in the March 1923 issue, there was a posthumous study by Bernard Frey-Godet, who was the first official of the International Bureau. While unreservedly recognizing the legitimacy of breeders' claims, he rejected the copyright approach and concluded that protection had to be governed by principles akin to those applicable to patents. And yet he immediately ruled out the patent system on account of the principles governing it. The major obstacle lay in the fact that the description did not enable any person skilled in the art to carry out the invention "without himself having to do inventive work, or to possess particular talents." Furthermore, Frey-Godet wondered whether it was even possible to describe the variety precisely enough for it to be identified, either at the stage of the grant of the title or at the stage of reporting infringements.

Owing to his misgivings regarding the feasibility of ensuring the desired monopoly by granting breeders "the exclusive right to produce and sell the new variety," Frey-Godet fell back on a partial solution, already outlined by Louis Blanc, which



consisted in giving "the right to be the only one to sell [the new plant product] under the fancy name that he [the creator of that product] has given it." Analysis in greater depth finally led him to state certain principles that might govern a system of "denomination marks for new plant varieties." They are the following:

"(1) No examination of the new product for novelty and merit.

"(2) Registration of the denomination given to the new creation, with a descriptive indication of the type of product to which it applies.

"(3) The validity of the registration is not affected, as it would be in the case of a trademark, by the fact that the name given to the product constitutes, from the moment of filing, the usual and necessary denomination thereof.

"(4) The right to the mark is based on priority of registration.

"(5) Registration must be for a limited period, and must not be renewable."

Czechoslovakia: Moralization of the Seed Trade

While Frey-Godet was slaving away in his ivory tower, his ideas had been put into practice for the first time by Czechoslovakia: the Law of March 17, 1921, on the recognition of the originality of types, seeds and seedlings, and the testing of horticultural matter created specific designations ("original material," "approved seed," "approved seedling," "registered material"). This was not particularly original in itself, as, at the time, official control marks were starting to be introduced in order to moralize the seed market. However, the Law also provided that individuals and establishments that produced original material were the only ones allowed to make use of a registered mark. Thus protection was introduced, albeit in very imperfect form, by way of exclusive rights in a denomination associated with a guarantee of quality.

France: Two Steps Forward, Two Steps Back

A Decree that Remained a Dead Letter.— A comparable system was to be introduced in France by the Decree of December 5, 1922, Concerning the Introduction of a Register for Newly-Bred Plants and the Setting-up of a Seed Control Committee: registration afforded entitlement to the use of an official mark that was to be defined by ministerial order, the exclusive rights being granted for twelve

years (Article 6). The applicant could in addition claim the exclusive use of a variety denomination (Article 8(1)). Unless expressly prohibited by the inventor, the multiplication and marketing of seed was always allowed (Article 8(2)). Finally, the inventor had the right to reserve for himself the notice "seed registered in the Register of Newly-Bred Plants." However, under its Article 11, wheat was the only species to which the Decree applied directly, with the possibility of extension to other species by order of the Minister for Agriculture. The implementation conditions were also to be laid down by order.

This Decree remained a dead letter. According to Bernard Laclavière, it never operated because it was devoid of legal foundation; it certainly was never extended to species other than wheat. According to a correspondent of the International Bureau, Albert Vaunois, twenty-two wheat varieties were submitted in the space of eight years, but no final certificate was ever issued, as the varieties lacked stability.

Ingenuity and Discipline.— Yet the system was subsequently applied in practice by breeders who rather cleverly resorted to three different legislative sources: the legislation on the Catalogue of Cultivated Species (Decree of November 14, 1932), the legislation on the seed trade, introduced from 1937 onwards under the 1905 Law on the Repression of Fraud, and trademark legislation. The effect of these texts was that the seed multiplier was obliged on the one hand to use the denomination entered in the Catalogue in connection with marketing, and on the other hand to apply for a trademark license for that use. This legal expedient was successful thanks to the voluntary self-discipline exercised by the professionals of the variety sector concerned (mainly for agricultural crops and vegetables, the only ones covered by the Catalogue), and also thanks to a lenient administration. Evidence of this is the fact that, in April 1952, Bernard Laclavière had alluded in the *Revue du Ministère de l'agriculture* to the precedent of the "Aspirin" trademark, which had become public property after its registration in the pharmaceutical code, and drawn the conclusion that "in the interest of *bona fide* farmers, it is our wish that no dispute on this matter be brought before the courts." His wish was fulfilled until 1964.

In that year the Supreme Court of Appeal had to rule on the case of Boret v. Sève, and held that the denomination "Superproduction Sève" could no longer be an exclusive trademark preserve owing to the fact that it had been entered in the Catalogue and that its use had become legally enforceable for the designation of certain seed on the market.

Parliamentary Indecision.— But we have to revert to 1921, that is, one year before the Decree Concerning the Introduction of a Register for Newly-Bred Plants and the Setting-up of a Seed Control Committee. In order to secure an exclusive market for a variety of carnation that he had bred, a flower grower from the South-East of France removed all the buds from the stems of cut flowers marketed by him, thereby preventing competitors from taking cuttings from them. It should be mentioned that the practice was also quite widespread in Italy, notably in the province of Imperia, where it started and where it was written into contracts for the "rental" of carnations concluded between breeders and producers (*contratti d'affitto del garofano*). It should also be mentioned that the problem underlying the practice was influential in the drafting of the UPOV Convention, because it gave rise to the third sentence of Article 5(1).

A rival nevertheless succeeded in procuring plants, and set about competing with the first grower. The Nice Commercial Tribunal replied to the latter that "the creator of a flower has no proprietary right in his creation, as no law recognizes the existence of such a right." Although coming merely from a lower and specialized court, the decision of March 23, 1921, *in re* Valuy v. Brun was striking for its consequences.

On June 21 of the same year, Deputy Ricolfi tabled a legislative proposal for the "creation or regularization of horticultural patents." To that end Humbert Ricolfi proposed measures to introduce horticultural patents and protect trademarks and denominations relating to plants. The project failed to pass through Parliament, but it did result in the Decree referred to earlier.

Ricolfi tried again in 1925, this time with a number of his colleagues, tabling a legislative proposal for the creation within the Ministry of Agriculture of a National Office of Agricultural and Horticultural Property. The Office was to keep one register for the recording of patents (with terms of five to twenty-five years) and another for the filing of horticultural trademarks and denominations. In an article on the reform of the 1844 patent legislation and the draft adopted by the Chamber of Deputies on April 7, 1927, *La Propriété industrielle* (June 1927 issue) pointed out that the Government seemed to have considered the question settled either by the 1922 Decree or by Article 66 of its 1924 draft law on patents for inventions. The latter provided that "the provisions of this Law shall apply to inventions and discoveries made in the field of agriculture and horticulture."

It should be noted in passing that the remote position of this provision—whereas the definition of patentable inventions and subject matter excluded from patentability was at the very beginning of the text—seems to indicate that the legislator did not attach a great deal of importance to the subject. Indeed, on an observation to that effect made by de Monicault, the rapporteur, Marcel Plaisant, one of the most eminent advocates of intellectual property law at the time, replied that anyone who consulted the law was expected to read it in its entirety!

Ricolfi tried once more in 1928, again with several of his colleagues. In doing so he was responding to the wishes expressed by many associations and echoed by the assembly of presidents of chambers of agriculture. According to opinions prevailing at the time, protection had to involve the use of designations. That meant opening a register of marks and agricultural and horticultural descriptions (the marks "consisting either of the name of the horticulturist or of a fanciful name or image, or of an indication of qualities specific to the product, or of an emblem or any other sign serving to distinguish it" and being renewable every twenty-five years), and also a register of new varieties and strains, for the purpose of determining anticipation. The proposal was rejected owing to the persuasiveness of Marcel Plaisant, who regarded it as a duplication of the Patent Law. In 1930, when the Patent Law was revised, he also persuaded Deputy Nomblot to withdraw an amendment submitted on behalf of the Agriculture Commission, the effect of which would have been to specify in Article 1 that the Law applied to plants.

Recourse to Patent Law.— This succession of minor occurrences cannot even claim to have established that patents were applicable to new plant varieties: the agricultural and horticultural world remained sceptical. It was only from 1949 onwards that patents were filed in France, and then almost exclusively for roses and carnations. According to Bernard Laclavière, the celebrated rose breeder Francis Meilland (who had already tested the usefulness of American plant patents) secured the assistance of the Ministry of Agriculture and the Industrial Property Office for the drafting of a patent for a red rose. That patent became a model for subsequent applications.

In other publications, Bernard Laclavière mentions that applicants were for the most part Italian and claimed the priority of Italian applications. This fact is to be linked with the decision of the Appeal Board of the Central Patent Office of Italy, taken on April 9, 1948, recognizing patentability in the plant world (the dispute in question related to a process for the "formation of plants having several different root systems"). It is also to be linked with the fact that it was the same Francis Meilland who obtained the first Italian patent for a variety, on November 5, 1951. Finally, it is to be linked with the fact that the question of the patentability of plant varieties had been considered by a joint Franco-Italian commission in December 1950.

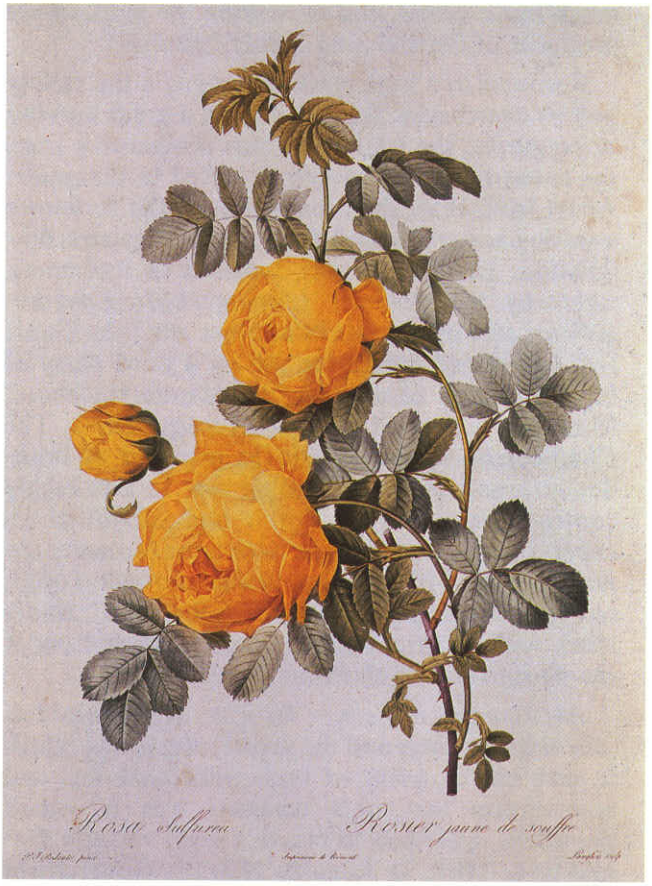
The French law, like the Italian or the Belgian, which is dealt with below, was certainly applicable: there was no provision to the contrary in its text —which fact had been further confirmed on September 23, 1949, by the Minister for Industry and Trade in reply to a written question from Deputy Solange Lamblin. However, the patent eventually granted (in any case without examination and without Government guarantee) did not carry very much weight. Breeders therefore used it for want of anything better, but had few illusions about it.

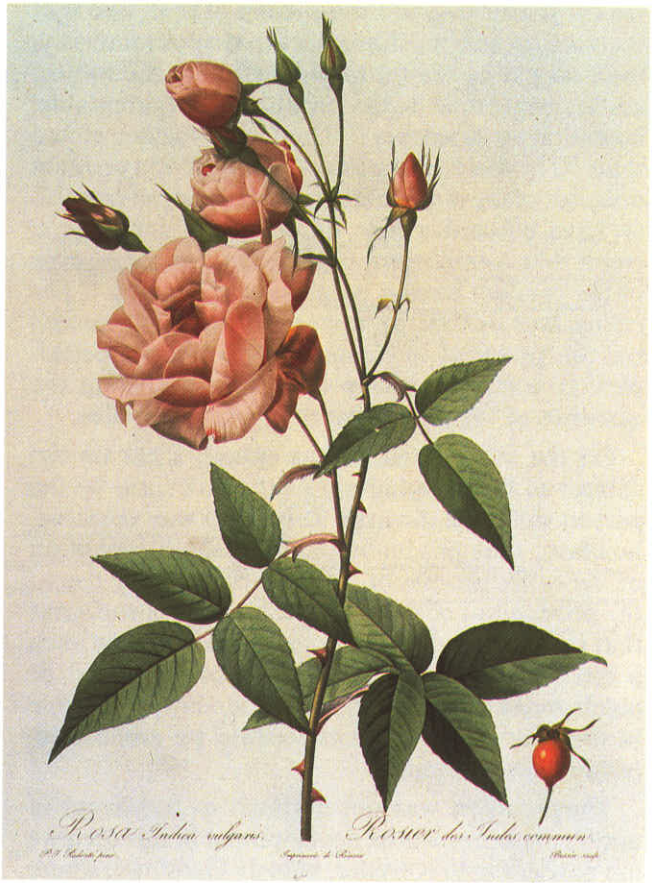
Belgium: A Parallel Development

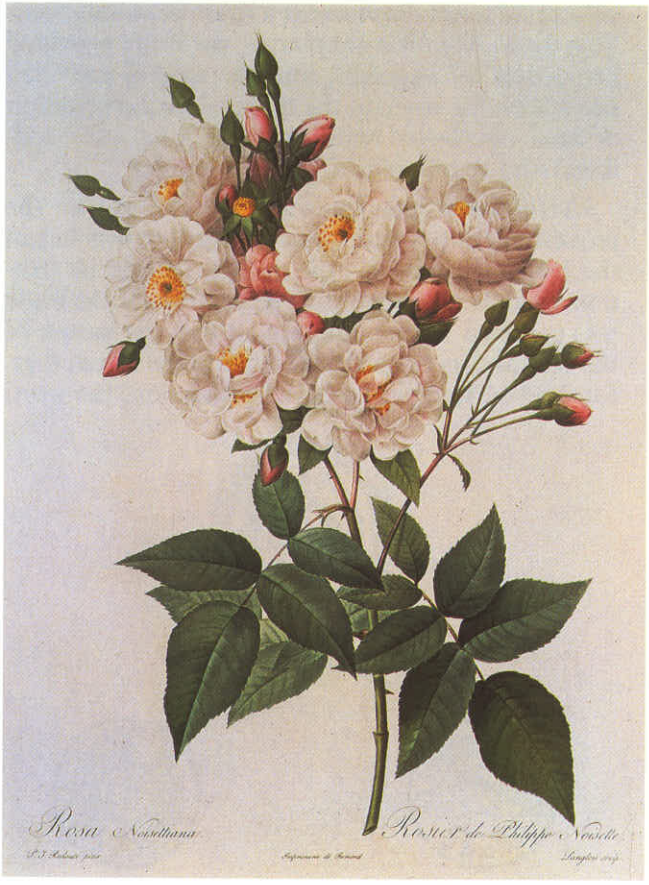
In 1933, J. Maehaut, R. de Kerchove d'Exaerde and P. Voulois tabled a legislative proposal with a view to the creation of horticultural property. The general terms in which their text was couched bore a certain resemblance to the Edict of the Papal States, as it applied to "any development, invention or discovery in the field of horticulture" relating "either to cuttings and plantlets, or to flowers, or to fruit, or to plants and trees, etc." One of the original features of their text was the fact that, for a development, invention or discovery to be patentable, it was necessary and sufficient for there to be novelty in the result.

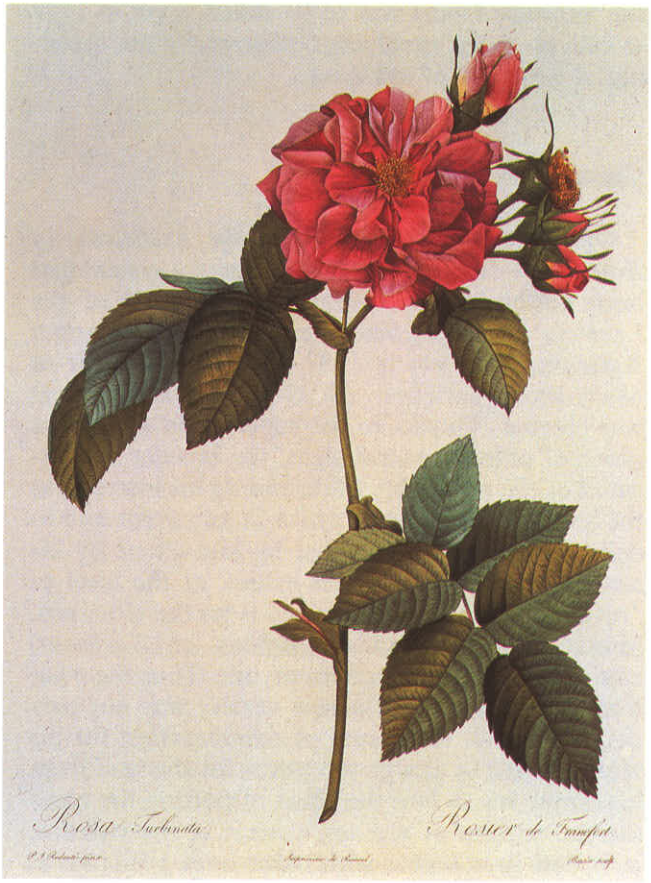
The proposal, which was submitted again in 1936, was not accepted for the same reasons as in France, under the influence this time of Thomas Braun.

The practice of filing patents spread, but only as from 1950. Then, in 1958—when the work on the UPOV Convention had already started—the First Instance Court of Termonde had to rule on the patentability of rose varieties. The grounds for its affirmative decision of May 2 are interesting. The underlying principle is that products of nature cannot constitute patentable inventions or discoveries when they are raw materials or purely natural phenomena. "That is not however true of the combination of raw materials or the application of certain natural phenomena to the production of a new, composite product, where the human intervention is such that without it the products could not have occurred in nature. If it is established that the human intervention was essential and necessary


Rosa Sulfurea
Rosier jaune de soufre


Rosa Indica vulgaris
Rosier des Indes commun


Rosa Noisettiana
Rosier de Philippe Noisette


Rosa Turbinata
Rosier de Tonnerre

for the production of these species of rose, and that the roses could not have occurred spontaneously, there would be reason to conclude that the subject matter concerned is the product of a [patentable] invention or discovery." The Court further stated that: "The mere alteration of the form of a product does not make it patentable. The alteration has also to have effected a new industrial or commercial result that is important to the extent of the essence of the product having been changed thereby." The ruling thus opened up important areas of research for the practical implementation of those principles. It was a long way from finally settling the question of the patentability of plant varieties.

On the other hand, it was entirely clear on the subject of the carrying out of the invention by the person skilled in the art: "It is in no way required, however, that production should entail repetition of the entire process of treatments that gave rise to the production of the first specimen; it is sufficient that the new products be actually obtained on such a scale that they are susceptible of industrial or commercial exploitation, which is always possible in the case of the roses concerned by asexual reproduction methods."

That opinion was not destined to be shared in another country whose development in this area we are now going to consider, namely Germany, where the Supreme Court was to be called upon in 1969 to rule on a case involving a process for the breeding of a variety of red dove.

Germany: A Motive Role

Official Control Signs Go to the Assistance of Breeders.— In Germany, a seed control system had been established in 1895 under the aegis of the Farmers' Union; it was taken over by the German Agriculture Society in 1897. In 1905 a register of newly-bred varieties (*DLG-Hochzucht-Register*) was created. Thanks to the supervision of the use made of official control signs, the breeder was assured of the possibility of defending his interests at the level of "elite" seed (which in any event had to come from crops supervised by himself or by his associates) and, to a lesser extent, at the level of "original" seed directly derived from the elite seed. Subsequent generations (*Nachbau* or *Nachsaat*) could be freely produced by anyone. Thus the position of the breeder of a new variety was not particularly good: to be sure of remuneration for his work, he had to charge top prices for the seed from his crops, which had the effect of putting the commercial success of the new variety in the balance, as it had to compete with older ones available at much lower prices, and of making the work of the producer of derived seed highly lucrative.

Recourse to a trademark to designate the variety had its drawbacks. At the time, in a great number of countries, the trademark was inseparable from the enterprise whose goods it served to designate. Apart from that, the breeder risked the forfeiture awaiting any trademark that became a generic designation. In 1920 he was deprived of trademark rights by the *Oberstes Landesgericht (Kammergericht)* of Prussia, but in another way: the Court had considered lawful the use by a third party of the compound expression "Substantia-Nachbau" to designate derived seed of a turnip variety. The Chamber of Agriculture of the province of Brandenburg had played a leading role in this highly controversial decision. For it had submitted an expert opinion according to which the farmer could not, in the case in point, confuse (top-quality) original seed marketed under the "Substantia" trademark with (inferior) derived seed marketed under the designation "Substantia-Nachbau."

An Abortive Project.— In spite of its considerable shortcomings and the severe criticism to which it gave rise in terms of both trademark law and competition law, this decision was to set a precedent, and then to create a legal vacuum that had to be filled. In January 1930 the Government submitted to the Parliament a draft Seed and Seedlings Law. The first chapter of the draft provided protection for breeders, and the second provided protection for users in the form of the certification of seed (the latter word covering here also seedlings) and regulation of the seed trade.

Certification was optional, carried out at the request of the producer, and its purpose was to test the seed's trueness to type and purity and its freedom from health problems. Regulation of the trade was confined to the requirement that the nature of the seed and its origin be specified. Apart from that, for derived seed that escaped protection, the word

Absaat or *Nachbau* had to be added to the variety denomination or to the breeder's references, in the event of the denomination or the references being used; and then the obligation applied only if the written form was used for marketing.

Protection was available for new varieties, that were distinguishable from existing varieties by important characteristics that were inheritable or transferable by vegetative propagation and also capable of being shown experimentally. In the case of varieties obtained by a mere selection within an existing variety, they had in addition to reflect important or substantial (*erheblich*) progress. Such progress could also be accepted if its expression was limited geographically.

The entry of a variety in the register of protected varieties conferred the right to use additions to the variety denomination that served to indicate its status of original, registered variety. This was authorized only for the duration of protection, namely twenty years (with the possibility of extension to thirty years). Apart from that, the entry had the effect of making the owner's authorization necessary for the use of the breeder's references (surname or trade name or the name of the property) or of the variety denomination in connection with the marketing of derived seed. However, that rule was confined on the one hand to such marketing as made use of the written form and on the other hand to the first two generations of derived seed marketed as such. In the case of potatoes, it applied also to the third generation if the material was certified. It thus did not apply to subsequent generations or to seed marketed under another denomination or no denomination at all.

It should also be mentioned that an exception was made in favor of direct exchanges between seed producers and users, relating to quantities to be specified, where the firm's own facilities were used for transport.

Clearly the Government was in a dilemma: it did want to recognize the contribution of breeders and give them better opportunities of contributing to the progress of agriculture, but on the other hand it was reluctant to block or even restrict sources of cheap seed, albeit often of inferior quality. In this connection the discussions seem to have made much of "degenerescence" over successive generations — of the fact that later generations no longer possess the properties of the original seed — as a means of justifying the limitation of the breeder's right to two or three derived generations.

The draft did not find favor with those concerned, and never passed into law. One of the reasons for that was its relation to trademark law. The draft authorized registration of the variety denomination as a trademark; the Government seems to have been intent on allowing breeders to avail themselves of a national trademark to secure international registration under the Madrid Agreement, and thereby win a measure of protection abroad (indeed this question even played a part in the revision of the UPOV Convention in 1978!). Progress was arguably made in that, contrary to the ordinary trademark legislation of the time, the draft authorized the transfer of the mark to a third party without transfer of the enterprise at the same time. However, those concerned were highly critical of the fact that it prohibited the assertion of trademark rights to oppose third-party use of the mark by virtue of the provisions of the Seed and Seedlings Law. It should be noted at this point that the principle in question was eventually written into the 1961 text of the Convention.

Other drafts were yet to come, but priority went to the regulation of the seed trade by authoritarian measures which indirectly benefited breeders, particularly on account of the elimination of the unfair competition practised by producers of derived seed and the prevention of the "variety chaos" resulting from the proliferation of denominations. It was not until 1950 that the question arose again.

Commitment to Patents.— The failure of the proposed specific system, to which they had made a substantial contribution, was to make German breeders and their legal allies turn their attention to patents.

A leading role was played in this development, as indeed in the development of plant variety protection in general, by Franz and Freda Wuesthoff. Freda Wuesthoff, who was born in 1896, became the first woman patent agent in 1927. She was moreover the only one until 1950. After the Second World War she was one of the first in Germany to stand up against the threat of nuclear war, and she became one of the figureheads of the peace movement. Her early death in 1956 prevented her from completing her work and seeing the introduction of effective protection for new varieties of plants at the international level, for which she had fought so hard.

At the AIPPI Congress held in London in 1932, Franz Wuesthoff, on behalf of the German group, pointed out that there had been a divergence in the development of the situation: on the one hand there was the American solution, with the important limitations that we have seen, and on the other the (draft) German solution. He proposed to AIPPI that it consider which of the two solutions was the most likely to solve the specific problems

presented by the protection of new plant varieties, at the same time bearing in mind that it was necessary to start out along both routes. According to his way of thinking, the patent had to be available for inventions that produced plants with entirely new characteristics, and a specific right had to be provided to protect lesser creations, possibly in the form of exclusive rights in the use of the denomination. He concluded by asking the national groups to make representations to their governments with a view to the introduction without delay "of legislative provisions whereby protection may be afforded to new plant varieties that is identical or comparable to patent protection."

From Theory to Practice.— The Wuesthoffs were to be given the opportunity of experimenting with direct recourse to patenting. For Article 1 of the Patent Law established the principle that "patents shall be granted for inventions that are susceptible of industrial working." It was to be deduced from this very broad wording that inventions relating to the plant breeding sector were also patentable. Now Erwin Bauer and von Sengbusch had produced an alkaloid-free lupin, which thus became usable as fodder for livestock, and not merely as green manure. So in theory at least, great progress had been made (in practice, the lupin is even today an entirely secondary crop). Yet the lupin was no longer patentable for an indisputable reason, which was that the invention had been disclosed. A patent application was then filed for an improvement on the same lupin with respect to its oil content. The patent was granted on December 30, 1934, after the matter had been brought before the appeal body (*Beschwerdesenat*). And on the previous October 31 a patent had been granted for tobacco seeds. So the way was now open.

Yet it was not followed owing to opposition from the *Reichsnährstand.* Patent applications resumed after the Second World War, but circumstances had changed. More and more theoretical objections were made to patenting, as a result of which tricks had to be resorted to. In fact that had been done ever since 1934: in order to circumvent the obstacle of the non-patentability of natural products, the claim was made not in respect of the oil-bearing lupin itself, which had been produced by mere selection in an existing population, but in respect of the seed. The effect of that was that the soundness of the patents granted was doubly questionable, on account of both the objections and the tricks. These titles were therefore seldom resorted to.

The 1953 Seed Law.— They were resorted to even less in 1953, after the enactment of the Law of June 27 on the Protection of Varieties and the Seeds of Cultivated Plants (Seed Law): according to Article 68 of this Law, rights deriving from other legislative sources and accruing to a variety protected under the Seed Law could only be exercised to the extent that they were not at variance with the provisions of the same Seed Law. Thus cumulative protection was not actually prohibited, but simply made uninteresting.

That was a backward step in comparison with the draft of September 1, 1950, which provided for exclusion from patentability of plants subject to the Seed Law (this formula was to be taken up again later, in 1968). However, the draft had raised the problem, and then sparked off the controversy, whereupon the controversy in its turn had engendered doubt. So the role of the patent became confined to that of a second best for plants that were not covered by the Seed Law, notably ornamental plants. Then came the celebrated "red dove" decision handed down in 1969 by the Supreme Court, and the analysis of it by H.G. Hesse, both of which finally made the patentability of animal breeds and plant varieties a matter of pure theory, at least until the advent of "biotechnology." That, however, would take us to the period following the birth of the UPOV Convention, and even involve us in the outlook for the future.

The Seed Law played a substantial part in the making of the UPOV Convention. It would therefore be instructive to analyze some of its provisions.

Under Article 1, the purpose of protection was to promote the creation of useful (*wertvoll*) new varieties of cultivated plants. The Law thus relied on the principle of usefulness in preference to that of justice.

Consequently protection was reserved for varieties produced by breeding or improvement (*Züchtung*), which were of agronomic value (Article 2(1) and (4)). Agronomic value was to be taken to mean the fact, for the variety, of possessing an essential property (assessed for instance in relation to yield potential or reliability, product quality and pest or disease resistance) enabling it to meet the requirements of agriculture and making it useful for the increase or improvement of yield in a geographical area of given size. Article 3(2) provided for an exception, however, for non-food plants and for varieties intended for export.

In addition the variety had to be "individualized" and stable. The individualization criterion corresponds more or less to the present concept of distinctness written into Article 6(1)(a) of the UPOV Convention, and also to the distinctness concept in the 1930 draft. However, unlike its predecessor and its successor, it did not resort to the epithet "important" for the characteristics. Yet that was offset by the requirement of agronomic value.

With regard to stability, paragraph (3) of Article 2 provided that the characteristics had to be inheritable by sexual reproduction with a degree of reliability corresponding to the requirements of plant breeding, or alternatively transferable by vegetative propagation. An exception was written into Article 3(1) for varieties produced with sufficient uniformity and regularity through the crossing of specific components, in other words hybrids, synthetic varieties, etc. In that case the product of the cross had to show specific (*besondere*) yield potential in relation to other varieties of the same species.

The scope of protection was defined in Article 6, which gave the owner the exclusive right to produce seed of the protected variety for the purposes of the seed trade, to offer them for sale and to market them. So protection was now immediate, and no longer contingent on use of the denomination. Export of one of the first generations of multiplication (*Hochzuchtsaatgut*) was subject to specific authorization by the breeder. Conversely—and this is a throwback to the past—the production and marketing of certified derived seed could be carried out without restriction, but against payment of remuneration to the breeder, when certification was provided for (Article 13). Finally, Article 6 stated the principle of the freedom of use of the seed of a protected variety for the creation of a new variety.

Anyone who marketed seed of the protected variety had, under Article 7, to use the variety denomination. Paragraph (3) of this Article provided that, if the denomination was the subject of a trademark registered in favor of the owner of protection, the latter could not prohibit the use of the denomination where such use was compulsory, by virtue of the provision written into the previous sentence, or alternatively permitted, in the case of certified derived seed. This provision was severely criticized by the lawyers as being contrary to the fundamental principles of trademark law. Yet that did not prevent it from giving rise to provisions that were similar in principle in Article 13 of the UPOV Convention.

Netherlands: Development Does not Stop for War

In spite of the smallness of the territory, agriculture is one of the mainstays of the Dutch economy. Like other countries, but with their characteristic sense of the common good, the Dutch began by organizing market structures. The first important encouragement given to breeders was unquestionably the creation of the Institute for Agricultural Plant Breeding in Wageningen in 1912. Then in 1932 the Netherlands General Department for the Control of Agricultural Seed and Potato Seedlings (NAK) was set up. Soon afterwards a system of bonuses was introduced.

At the beginning of 1940 a commission was set up under the chairmanship of the Director General of Agriculture, A. Roebroek, whose task was to put together a draft for the legal regulation of breeders' property. With unusual efficiency, and that in spite of the chaos caused by German invasion and occupation, the Commission handed in its report towards the end of the same year. But it was not until July 5, 1942, that the Secretary-General for Agriculture and Fishery and the Secretary-General for Justice published the text known by the name of 1941 Breeders Ordinance.

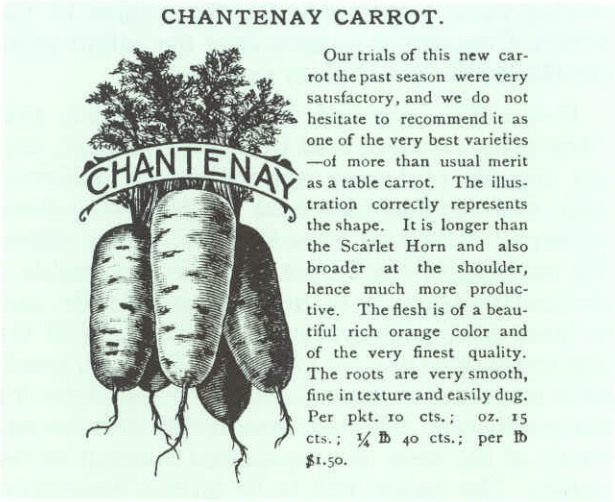
This text was concerned both with breeders' rights and with the regulation of the seed trade. From the latter point of view it introduced, for certain species, a system for the cataloguing of varieties passed for marketing. The seed of those varieties could only be marketed under a registered denomination; in addition they had to be tested. When seed of an inferior category was tested, a fee was charged for the benefit of a fund to remunerate breeders.

In the case of species that were not subject to cataloguing, the breeder was granted the exclusive right for twenty-five years to market the seed of his variety (mandatory use of the registered denomination was also provided for varieties of such species). In the case of the other species, the right related only to the first generation of seed ("original" or

"elite" seed) and to the grant of a royalty drawn from the remuneration fund.

The 1941 Ordinance was very conservative regarding agricultural crops, as the breeder's right was confined to the first generations, for which moreover maintenance breeding work had to be done, which the breeder himself generally is best placed to do: in that respect, the exclusive right granted corresponds to a large extent to a biological necessity and to a most useful public policy measure. On the other hand, the Ordinance contained a new feature for plants that were not of vital importance, particularly ornamentals, in that it provided a real exclusive right comparable to the one granted under the patent system.

Unfortunately the Dutch example was not followed after the war.


CHANTENAY CARROT.

Our trials of this new carrot the past season were very satisfactory, and we do not hesitate to recommend it as one of the very best varieties —of more than usual merit as a table carrot. The illustration correctly represents the shape. It is longer than the Scarlet Horn and also broader at the shoulder, hence much more productive. The flesh is of a beautiful rich orange color and of the very finest quality. The roots are very smooth, fine in texture and easily dug. Per pkt. 10 cts.; oz. 15 cts.; ¼ lb 40 cts.; per lb $1.50.

CHAPTER III

The Making of the UPOV Convention

Unimpressive Progress

The progress made by the middle of the nineteen-fifties was, as we have seen in the previous chapter, not at all impressive. Breeders were not completely defenseless, of course. Wherever they went, they could always take advantage of the *de facto* protection afforded them in certain cases by the biology of the species and the particular reproductive features of the variety. They also had the advantage of a *de facto* monopoly of the first seed or the first elements of vegetative propagation. That did not amount to very much, however.

The rules governing the variety and seed trade, especially when they could be combined with mutually beneficial contractual relations with seed multipliers, also gave breeders the possibility of deriving income from their investments. Yet there too there were still wide gaps, either in relation to the actual species involved or owing to the inflexibility of the practical set-up, or again because that set-up paid dividends to unfair competition.

Real protection for new plant varieties, in a more or less developed form, existed in only two countries of Western Europe, which after all is the birthplace of the UPOV Convention, namely the Federal Republic of Germany and the Netherlands. Patent protection was available in a limited number of countries, and even in them was a matter of controversy. A curious sideline is that in Spain recourse was even had to utility model legislation for rose varieties. In other countries the patent route was closed on account of the actual wording of the law or its interpretation by patent offices, legal writers or case law.

In this connection it is particularly fitting to mention the decision of the Swiss Federal Tribunal, handed down on January 27, 1953, on the subject of the very same rose variety produced by Francis Meilland that was mentioned earlier: the patent was eventually refused on the ground that the production process did not lend itself to repetition —classical methods of reproduction or propagation, for instance by grafting, cutting or layering, were not regarded as allowing the invention to be applied industrially within the meaning of the patent law. So, from similar, even identical legislative starting-points, opposing situations were arrived at. In certain cases deadlock resulted.

The Professional Circles React

Faced with this situation, the professional circles concerned realized that a solution to the problem was only going to be found in an international dimension, in which the principles that were to govern the protection of new plant varieties would be defined. Two organizations provided the driving force in this respect: AIPPI, already mentioned, and the International Association of Plant Breeders for the Protection of Plant Varieties (ASSINSEL).

The Long March of AIPPI

Premature and Abortive Steps.— In fact AIPPI had been concerning itself with the protection of new plant varieties since 1932: we saw earlier the part played by Franz Wuesthoff on behalf of the

German group. The response was just about non-existent, however: the London Congress confined itself to noting Franz Wuesthoff's report, which related to a question that was not on the program, and deciding that the matter could be considered at a later date. That indeed was a better result than it might have been: speaking on behalf of the British group, William Henry Ballantyne had received thunderous applause when he had pointed out that, if one were to start advocating amendments to the Paris Convention to cover plants, clothes and everything else imaginable, the result would be the complete ruin of all patent legislation.

The matter was not taken up again until 1939, when the Executive Committee decided to include it in the program of the 1940 Congress. The Congress was not able to meet before 1947, whereupon, for want of a sufficient number of reports, it was decided that consideration of the matter would continue later. There had been only two reports. That from the United Kingdom found for the non-patentability of varieties under its legal system, and was pleased with its finding: it is obvious, in retrospect, that the problem was being approached from the wrong side. Italy's report contained a certain number of pertinent questions, and eventually found for the desirability of *sui generis* protection for the variety and its name, to be overseen by the Ministry of Agriculture.

Vienna, 1952.— The question was not taken up at the 1950 Congress, even though it was mentioned in the report submitted by the Netherlands group. In 1952 however, at the Vienna Congress, it was given high priority. It was moreover dealt with in a surprisingly positive and pertinent way, even though some of the reports and interventions still showed reluctance or failure to recognize the subject for what it was. The unanimous view was that plant varieties should also be protected, but there was some discussion on the best way of doing so. The German group, whose spokesmen were the Wuesthoffs, favored a mixed system: patents for major breakthroughs, and special protection for "ordinary" new varieties. The Danish, French and Italian groups preferred the use of patents with appropriate adaptation measures. Those of Luxembourg, the Netherlands, Switzerland and the United Kingdom advocated a specific system.

Eventually the Congress unanimously adopted the following text (based on a text proposed by 146 votes to 26 at a working meeting):

> "The Congress expresses the view that, in order to achieve effective protection for new plant varieties, the legislation of the countries of the Union must:
>
> "1. Provide, in so far as it is not yet granted, for patent or equivalent protection for plants that possess important new properties, with a view to their exploitation, provided that their propagation is assured;
>
> "2. Place on an equal footing an invention's suitability for use in agriculture, forestry, market gardening and other comparable fields, and an invention's suitability for use in industry as provided in the patent laws of many countries."

Italian Drafts and Dutch Concerns.— It is appropriate at this stage to make a digression in order to go into the details of the report by the Italian group, as it included the text of a draft law to complement the Patent Law and make it more specific. For we know that Italy is the only country among those responsible for the origins of the UPOV Convention to have used the patent route for the protection of plant varieties.

It was thus provided, in thirteen articles, that "new plant varieties, bred by whatever means, that are capable of having agricultural or industrial uses, and the processes used for producing those varieties," would be considered inventions within the meaning of the Patent Law "if they enable a particular variety to be produced constantly, and to have stable characteristics, on the basis of the description given by the inventor." The right granted in respect of varieties consisted of sole rights for the production, sale and introduction into the territory of the State of propagating material of the variety. The variety had to be given a denomination, which was not to be used for another variety (in a later draft it was also provided that the denomination could not be the subject of a trademark application). The draft also concerned itself with the case of bud-mutations (sports), which were to belong to the person who identified them and reproduced them. Finally, the draft provided for forfeiture, notably, in the case of loss of the variety or of unavailability of propagating material for it (later the variety's failure to maintain purity—an expression corresponding to homogeneity—was to be added).

However, this project was not applicable to varieties reproduced by sexual means (by seed). The text in question was thus no more than a variant of the Plant Patents Act of the United States of America. The Italian group's report pointed out moreover that the draft corresponded for the most part to the text drawn up by the joint Franco-Italian commission mentioned in the previous

chapter, and only differed from it for the purpose "of defining better its interpretative and non-innovative nature." Under such circumstances it seems somewhat surprising that the French group should have argued in favor of the patent, in view of the fact that its membership included Ernest Tourneur, the President of ASSINSEL, an association whose base consisted of breeders of sexually reproduced plants, and that its report had been drafted with the assistance of Bernard Laclavière, from the French Ministry of Agriculture, whose interest for that particular category of plants is well known.

Finally, it should be pointed out that the Dutch group, having realized that protection was and would for a long time be confined territorially to a limited number of countries, had a strong desire to be able to make use of the principle of reciprocity. Its spokesman at the time was G.H.C. Bodenhausen, the future Director of the United International Bureaux for the Protection of Industrial, Literary and Artistic Property (BIRPI).

Brussels, 1954.— Tradition has it that the UPOV Convention rests half on the "formal wish" passed by AIPPI in Vienna. As we have just seen, it only "expressed a view." The truth of the matter is that the resolution was adopted only at the meeting of the Executive Committee held in Locarno in May 1953. There it was considered that the wording of the French text of the Vienna decision was unsatisfactory, whereupon it proposed the following formulation which was submitted to the Brussels Congress in 1954:

> "The Congress expresses the wish that, in the legislation of each country of the Union:
>
> "1. Inventions relating to the plant kingdom be assimilated, with respect to their legal protection, to industrial inventions, in accordance with Article 1(3) of the text of the Union Convention for the Protection of Industrial Property;
>
> "2. For plants that possess definable new characteristics, in so far as their faithful reproducibility is assured, there be provision for protection, where it is not yet granted, by the patent law, amended where appropriate, or by any other legislative or regulatory measure."

Discussions were difficult at the Brussels Congress. The initial objective seems to have been lost from sight, or perhaps it was the general and ambiguous character of the basic texts that dissipated the great enthusiasm of Vienna at the outset.

In its report, the German group elaborated on its earlier position by demanding the removal of the reference to the Union Convention in point 1 of the resolution submitted for approval, and the insertion in point 2 of "for protection as effective as patent protection" before "by any other administrative or regulatory measure." The German group was thus moving very noticeably in the direction of the special law. In that respect it was falling into line with the Dutch group, although the latter was able to subscribe to a non-limitative compromise text and was proposing one that gave preference to a special law.

The French group took an equivocal position. On the one hand it noted that there would never be unanimity on a text to which there was opposition, and that the proposed text interfered with the construction or development of the legislative or regulatory edifice of the various countries; in practice it concluded from this that only point 1 of the resolution submitted for approval should be kept; and, to provide better assurance of patent protection, it proposed amendments to be made to the Paris Convention. On the other hand it reported its "desire to bring about rapidly the adoption by AIPPI of the principle according to which inventions in the plant kingdom need to be given protection that in no way falls short of that of other industrial inventions, the manner in which such protection is to be provided remaining reserved [...]."

Finally, the Danish and Italian groups stood firm in their positions in favor of patents. We should add that, in the course of the discussion, it was mentioned that a joint International Chamber of Commerce (ICC)/AIPPI committee had settled on a text advocating that every State "provide inventions relating to the plant kingdom with legal protection comparable to and as effective as that of industrial inventions."

At the end of a discussion which in retrospect looks like a sequence of monologues, the working meeting adopted point 1 of the resolution submitted by a large majority and rejected point 2 and also the proposals for amendment of the Paris Convention. There was thus a clear statement in favor of the patent.

However, the closing plenary session unanimously (by tradition) adopted a completely different resolution, the wording of which follows:

> "The Congress expresses the wish that, in the legislation of each of the countries of the Union, inventions relating to the plant kingdom be assimilated, with respect to legal protection, to industrial inventions and that new plant varieties be also protected."

Epilogue.— Analytical interpretation of the above text leads one to believe that AIPPI had pronounced categorically in favor of *sui generis* protection for new plant varieties, because they were distinguished from "inventions relating to the plant kingdom." In fact that interpretation was not taken up by the instigators of the 1957-1961 Diplomatic Conference, who referred rather to the earlier formulation emerging from the Vienna Conference, which provided both options.

This wish was submitted to the Lisbon Diplomatic Conference which, in 1958, was entrusted with revising the Paris Convention for the Protection of Industrial Property. Opinions of the ICC were also submitted which were substantively similar to the texts adopted by AIPPI and considered earlier, as was the wish that a catalogue of variety designations used in trade be drawn up, in order to make that trade easier and more ethical. Yet no delegation of any member State asked for those questions to be included in the agenda (even though the work that was to culminate in the UPOV Convention was already well in hand, and progress was being made towards the special Convention solution). They were not considered, therefore.

Then in 1961, when AIPPI was consulted on the draft of the UPOV Convention, the reply of its Executive Committee mentioned among other things that "the rights to be granted by the draft Convention are within the scope of Article 1 of the Paris International Convention, 1883."

Somewhat later, AIPPI was consulted on the draft of the European Patent Convention. It did not oppose the provision that excluded plant varieties, animal breeds and essentially biological processes for the production of plants or animals from patentability (according to the European patent system); on the other hand it sought and won the addition of an exception to the exclusion in favor of microbiological processes and products obtained by such processes.

Ultimately AIPPI played a constructive part in the making of the UPOV Convention, through its insistence on new plant varieties being protected. The stands it took were an inspiration for other organizations, including the ICC, which was also very active. Yet in fact it was in self-defense that it opened the way to a specific protection system distinct from the Paris Convention. It was sufficiently active to promote awareness of the problem, but not active enough to win credence for its point of view, if it so much as had one.

Its inadequacy can be judged by the fact that its work did not generate any real debate on the protection of new plant varieties outside its own

area, judging in particular by the articles published by *La Propriété industrielle* in the nineteen-fifties: the first appeared in 1955, but they referred to national situations. Then in 1956 there was a study by Freda Wuesthoff, which could be regarded as her legacy. And the next article was to be an account of the first session of the Paris Conference for the Protection of New Varieties of Plants.

There are two phrases in Freda Wuesthoff's "legacy" that are worthy of our attention: "The question of how best to protect new varieties of plants is a new problem in the field of industrial property rights"; and, above all: "It might be worth while to mention a certain number of things whose importance we have realized in the course of our work in this area: 1. The need to learn the language of the breeders of new varieties [...]."

The Practitioners Declare Their Legitimate Aspirations

The First Steps.— This language was that of the members of the International Association of Professional Plant Breeders for the Protection of Plant Varieties (ASSINSEL), an Association which, as its name suggests, has set itself a very definite objective (the adjective "professional" was to be removed later).

To tell the truth, however, ASSINSEL was preceded by other bodies of directly concerned professionals. As we saw in the previous chapter, the first event of which we have any record was the *Congrès pomologique de France* in 1904, and then again in 1911. The International Union of the Horticultural Profession seems to have considered the question at its Congresses in Luxembourg (1911), London (1912) and Ghent (1913). The International Institute of Agriculture also considered it in 1927; at that time it was mentioned that the protection of the denomination alone was not sufficient, and that a way had to be found of obliging "any grower who engaged in reproduction of those breeds [varieties] for the purposes of sale to pay a royalty to the producer [breeder]."

ASSINSEL Is Set Up.— The first steps were not very energetic ones, however. During the nineteen-thirties, the International Federation of Breeders of Staple Crops was concerned more with technical problems. In 1931 it had expressed a wish that new varieties be assimilated to industrial inventions. Yet the wish was lucky to be even published.

In 1936 certain breeders came to terms with the fact that international professional structures were in no position to effect any progress in this area. So

they worked towards the creation of a new organization, taking advantage of the International Breeders' Congress that was held in Leeuwarden in the Netherlands in 1936 and the Congress of the International Organization of Agricultural Industries, which was also held in the Netherlands, but in 1937.

ASSINSEL was then founded in Amsterdam on November 17, 1938. Ernest Tourneur—whose name has already been mentioned in connection with the work of AIPPI—was elected President, and Th. Boersma Secretary.

The first ASSINSEL Congress was held in Paris on July 8 and 9, 1939; the report on that Congress, which was widely publicized, ended with the following three-point resolution:

> "(a) To accept internationally the filing of trademarks and appellations as a means of protection (pending introduction of a patent),
>
> "(b) To adopt the principle of a license to be drawn up by ASSINSEL for the purposes of multiplication and sale,
>
> "(c) To accept internationally the definition of the word 'original': seed produced, offered or sold by the breeder of the variety or under his control by his licensees or successors in title."

The Nudge from ASSINSEL.— As in the case of the other organizations, the war brought the work to a halt, and it did not resume until 1946. Over the years, ASSINSEL was gradually establishing itself as the representative organization of breeders. At the same time it was beginning to realize that the patent route it was insisting on was a blind alley. Consequently, at the Congress held in Semmering in Austria in 1956, it passed an emphatic resolution calling for the organization of an international conference to consider the question of protecting new plant varieties officially, and if possible to lay down principles to govern that protection. In addition, France was approached for the organization of such a conference. That of course was because it was known in advance that the request would be favorably received. Things were finally about to start moving; and thereafter there would be nothing to stop them.

The Diplomatic Conference of 1957-1961

The Participants.— France itself was all the more receptive to the invitation because it knew that a great many States were prepared to take part in the work. It had moreover limited participation to those States known to share the same concerns and the same hopes; it had therefore set aside the United States of America, for instance, which had confined itself to plant patents for vegetatively reproduced varieties, with at best only a minor part to play as foods, and also the States of Eastern Europe, which at the time were starting to deal with the problem within the framework of industrial property legislation, by means of either inventors' certificates or patents.

It is therefore no surprise that ten of the twelve States invited replied favorably to the invitation circulated through the ambassadors of France on February 22, 1957. The invitation was to an international conference to open on May 7, 1957. It lasted until May 11, and in effect became the first session of the International (Diplomatic) Conference for the Protection of New Varieties of Plants.

Whereas the representatives of Denmark, Norway and Switzerland availed themselves of observer status, and Spain sent only agricultural attachés from its Paris embassy, the other States (Austria, Belgium, the Federal Republic of Germany, Italy, the Netherlands and Sweden) sent delegations that were often numerically large and included real experts in the field. The Government of the United Kingdom was unable to take part in the first session, but fully endorsed its conclusions and took an active part in subsequent work. Finally, Finland was represented only at the second and last session of the Conference, which was held from November 21 to December 2, 1961. It should be pointed out, however, that the Nordic countries worked together throughout this time, in such a way that Finland was associated with the work in practice.

It is impossible to mention here all those who contributed to the work that resulted in the Convention, even though they were relatively few in number. Many of them were remarkably industrious, however: one person was present throughout the duration of the work; he was Hans Schade of the Federal Republic of Germany. If one disregards the Drafting Committee, which was necessarily restricted and had very specific terms of reference, one notes that five other persons were involved in the whole of the substantive work; ten more took part in both sessions of the Conference and in the four meetings of the Committee of Experts; finally, two more persons missed one of the main meetings. The following are the names of those who may be considered the founders of the UPOV Convention, with the titles that they held in 1961:

Belgium

Emile Larose, Director, Plant Breeding Station, Gembloux[3]

Joseph de Reuse, Head of Legal Section, Industrial Property Service, Brussels[4]

France

Jean Bustarret, Inspector General of Agronomic Research, Paris[4]

Bernard Laclavière, Civil Administrator, Ministry of Agriculture; Head of General Affairs Department, National Institute of Agronomic Research, Paris[4]

René Mayer, Director, Central Genetics and Plant Breeding Station, Versailles[3]

Germany (Federal Republic of)

Josef Murmann, *Ministerialrat*, Ministry of Food, Agriculture and Forestry, Bonn[3]

Klaus Pfanner, *Oberregierungsrat*, Ministry of Justice, Bonn[4]

Ludwig Pielen, *Ministerialrat*, Ministry of Food, Agriculture and Forestry, Bonn[3]

Hans Schade, President of the Senate, German Patent Office, Munich[4]

Italy

Ugo de Cillis, Director, National Genetics Institute for Cereal Growing, Rome[5]

Netherlands

F.E. Nijdam, Director, Institute for Agricultural Plant Breeding, Wageningen[3]

J.C. Van Leeuwen, Deputy Head of the Legal Affairs Directorate, Ministry of Agriculture and Fisheries[6]

A.M.P.A. Bloemarts, Secretary of the Plant Breeders' Rights Board[4]

Sweden

Gunnar Nilsson-Leissener, Director, Central Seed Testing Station, Stockholm[3]

Switzerland

René Gallay, Director, Federal Agricultural Testing Stations, Lausanne, Montcalme[3]

[3] Took part in the sessions of the Conference and in the meetings of the Committee of Experts.

[4] Took part in all the substantive meetings (the Drafting Committee not being counted).

[5] Did not participate in the first meeting of the Committee of Experts.

[6] Took part in the sessions of the Conference, in the meetings of the Committee of Experts and in the meeting of the Group of Legal Experts on the Relations Between the Paris Convention for the Protection of Industrial Property and the Preliminary Draft of the Convention for the Protection of New Varieties of Plants.

United Kingdom

Leslie Smith, Ministry of Agriculture, London[7]

United International Bureaux for the Protection of Industrial, Literary and Artistic Property (BIRPI)

Giulio Ronga, Head of Legal Division[8]

Food and Agriculture Organization of the United Nations (FAO)

Emmanuel Abensour, Head, Legislative Research Branch, Department of Public Relations and Legal Affairs, Rome[9]

Seven more persons should be added to the above eighteen on account of the contribution that they made to the history of UPOV:

Dirk Böringer, member of the Delegation of the Federal Republic of Germany, at present President of the Federal Plant Varieties Office

Henri Ferru, Director of the National Institute of Agronomic Research of France, President of the Conference

Claude Hutin, who later became Chairman of the Technical Committee of UPOV

René Royon, then and now Secretary-General of the International Community of Breeders of Asexually Reproduced Ornamental and Fruit Tree Varieties (CIOPORA)

Halvor Skov, Head of the Delegation of Denmark, who later became the first Vice Secretary-General of UPOV, then, after having resumed his position in the national administration, was elected President of the Council of UPOV, and then President of the Diplomatic Conference of 1978

Ernest Tourneur, then President of ASSINSEL, above all for his earlier work

André de Vilmorin, then President of the International Federation of the Seed Trade (FIS)

Context.— This evocation of the founders of the Convention automatically triggers the recollection that many of them contributed during the nineteen-fifties and nineteen-sixties to other work at the international and in particular the European level, and that they were the makers of other Conventions in the intellectual property field. The fact is that the decade following the end of the Second World War was the setting for awe-inspiring political, economic and social development. Europe set itself in motion. The Marshall Plan gave rise in 1948 to the Organisation for European Economic Co-operation (OEEC—which was later to become the Organisation for Economic Co-operation and Development). The OEEC soon took an interest in the seed trade, and established minimum standards for the certification of seed intended for international trade. In July 1954 an international conference held under the auspices of its European Productivity Agency even recommended to member States that they assure breeders of equitable remuneration for their work as a measure capable of increasing crop outputs.

The Council of Europe received its baptism the following year, on May 5, 1949. The first stage of European integration, which is still going on today, was in 1951, when the European Coal and Steel Community (ECSC) was created. The Rome Treaty establishing the European Economic Community (EEC) was signed on March 25, 1957.

In the intellectual property field, unprecedented harmonization and integration was soon to start, under the aegis of the Council of Europe and on the initiative of the French Senator Longchambon, who proposed an ambitious plan in 1949. While the plan itself did not win the support of any of the members of the Council of Europe's Committee of Experts on Patents, which met for the first time from January 15 to 17, 1951, it triggered work in a number of directions. That work achieved fruition in several areas, two of them very close to that of plant variety protection, by virtue of a provision that has already been mentioned in connection with the work of AIPPI.

[7] Did not participate in the first session of the Conference.

[8] Took part in the sessions of the Conference, in the meetings of the Committee of Experts and in the meeting of the Group of Legal Experts on the Relations Between the Paris Convention for the Protection of Industrial Property and the Preliminary Draft of the Convention for the Protection of New Varieties of Plants.

[9] Took part in the sessions of the Conference and in the meetings of the Committee of Experts.

On November 27, 1963, the Convention on the Unification of Certain Points of Substantive Law on Patents for Invention was adopted in Strasbourg. Article 2 of that Convention provided that "the Contracting States shall not be bound to provide for the grant of patents in respect of [...] plant or animal varieties or essentially biological processes for the production of plants or animals; this provision does not apply to micro-biological processes and the products thereof." In addition, it afforded Contracting States the option of not providing, for a transitional period, for the grant of patents in respect of food and pharmaceutical products, as such, or agricultural or horticultural processes. So there once again were exclusions from patentability that dated back to the very beginnings of the Paris Convention!

On October 5, 1973, the Convention on the Grant of European Patents (European Patent Convention) was signed in Munich. It provided in its Article 53 that "European patents shall not be granted in respect of: [...] (b) plant or animal varieties or essentially biological processes for the production of plants or animals; this provision does not apply to microbiological processes or the products thereof."

Many of those who took part in the work on the protection of new varieties of plants (more especially the officials of patent offices and ministries of justice) also participated in the work undertaken within the framework of the Council of Europe. Thus the solution that emerged from the combination of these Conventions is not the result of a combination of circumstances or the effect of any particular ambition of agricultural circles, but rather the result of a carefully considered decision and the effect of collaboration between the governmental circles concerned.

Many of the same people also took part in the work on the revision of the Paris Convention, notably at the Lisbon Diplomatic Conference held from October 6 to 31, 1958. A number of events are significant in that respect. In 1955 a meeting of experts responsible for preparing that Conference agreed not to include the question of new varieties of plants in the Conference agenda because, in the experts' opinion, it was not yet ready for inclusion. As we saw above, AIPPI and the ICC tried in vain to have it included. The International Bureau of BIRPI itself tried, also in vain, to keep the International Convention for the Protection of New Varieties of Plants within the framework of the Paris Convention, by giving it the form of a special agreement. Equally vain was its attempt to make the representatives of member States—mainly patent office directors—aware of the risk of drift, and then of the actual drift towards a specialized Convention and Union. Thus those responsible for industrial property in the Paris Union as a whole, through their resistance, left the coast clear for the Paris Conference and the UPOV Convention.

With regard to context, it should finally be mentioned that the failure of the initiative taken by the Assembly of the FAO in 1946 had been forgotten when the work of the Conference began in 1957. For a commission had considered the matter and actually come to a favorable conclusion. When, however, the Belgian delegation proposed that the Conference should not confine itself to the consideration of national legislation but also write a

draft as a preliminary to a code, the FAO backtracked on a proposal from its Technical Activities Committee. It said at the time that "it is the duty of governments to make discoveries in the agricultural field available in all countries; too many obstacles would prevent the constitution of reserves; research institutes are national, and the true nature of reproduction militates against the patent." The intentions were no doubt good ones; the opinion on the patentability of varieties was indeed correct, albeit perhaps excessive; yet to judge on the basis of patents alone was like throwing the helve after the hatchet, and likening a protection system to an obstacle to the dissemination of knowledge and the safety of food was certainly a short-sighted judgement. The error was clearly highlighted by circumstances.

The Work. *First Session of the Conference.*— It opened on May 7, 1957, with an address by Kleber Loustau, Under-Secretary of State for Agriculture, who was at pains among other things to show the inanity of the objections raised a decade earlier

within FAO. The participants reported on the situation in their countries, and then considered a certain number of questions written into a memorandum which had been appended to the letters of invitation.

The conclusions were set down in the Final Act adopted on May 11, 1957. The following is significant:

- The Conference recognized the legitimacy of breeders' rights;
- It worked out the technical conditions to which the grant of a title of protection was subject: the variety had to be distinct from pre-existing varieties, sufficiently homogeneous and stable in its essential characteristics; the artificial or natural origin of the initial variation that gave rise to it was of no consequence;
- It defined the fundamental right of the breeder, which had to do with the trading of seed and seedlings of the variety; reserved the question of extension to the marketed product (foliage, flowers or fruit) in the case of ornamentals; and stated the principle of the free use of the variety as parent material in breeding work;
- It acknowledged the principle of the independence of protection in relation to the systems governing seed and seedlings; and it stated the principle according to which a variety not entered in the catalogue of varieties passed for marketing could also be protected (in other words, in practice, the fact of not having sufficient value for cultivation and use for entry in the catalogue was no bar to protection);
- It considered that the foregoing principles should be written into an international Convention; set up a Committee of Experts; and entrusted France with taking care of the continuation of the work.

Working Meetings.— The Committee of Experts then held four meetings, under the chairmanship of Jean Bustarret. Other meetings were also held. The chronological pattern was as follows:

Paris, April 22-25, 1958	Committee of Experts, first meeting
Paris, September 16-19, 1958	Committee of Experts, second meeting
Paris, January 8-9, 1959	Drafting Committee
Paris, April 2-3, 1959	Drafting Committee
Munich, June 30-July 3, 1959	Committee of Experts, third meeting
Paris, November 4, 1959	Group of Legal Experts on the Relations Between Protection of the Names of New Plant Varieties and Trademark Protection
Paris, January 18-19, 1960	Group of Legal Experts on the Relations Between the Paris Convention for the Protection of Industrial Property and the Preliminary Draft of the Convention for the Protection of New Varieties of Plants
Paris, January 20-23, 1960	Drafting Committee
Rome, February 15-20, 1960	Committee of Experts, fourth meeting
Paris, April 20-22, 1960	Drafting Committee

It is of course not the purpose of this article to relate in detail the work of the various bodies, the conclusions of which are to be found in the UPOV Convention. We shall therefore confine ourselves to pointing out the most important aspects.

First Meeting of the Committee of Experts.— With regard to the distinctness of the new variety in relation to existing varieties, it was for the first time a question of the variety being "clearly distinguishable by one or more important characteristics." The adverb and the second adjective, which was adopted "in spite of its imprecision, because it does not seem possible to protect a variety that has only minimal differences" were later on the subject of some highly important work on the part of UPOV. The Committee of Experts went back to the origin of the variety to be protected, and agreed that the mere selection of a genotype from among those included within a pre-existing variety would not be a creative act affording a right to protection (that limitation was finally discarded at the second session of the Conference). It also reconsidered the usefulness criterion, and discarded it again. Finally, the experts agreed on the need to place the breeder under the obligation to ensure maintenance breeding of the variety during the period of protection. That obligation—which is also one justification for the plant variety protection system—was subsequently written into the Convention in the form of a ground for forfeiture in the event of failure to comply.

Second Meeting of the Committee of Experts.— The Committee dealt with a number of questions that had a bearing on the relation of breeders' rights to the Paris Convention for the Protection of Industrial Property. It did not reach any definite conclusions on the nature of the right, which, it nevertheless noted, "has such specific features that it does not correspond exactly to any existing right." It therefore recognized that one should "avoid transposing to the international plane provisions of existing legislation that have been created to deal with specific situations, but which cannot be made generally applicable."

It noted that the question of the right of priority did not arise in the same way for new varieties of plants as it did for industrial inventions. It therefore agreed to adopt the principles governing that right in the Paris Convention, but to adapt them: the breeder who claimed the right of priority within the Convention time limit of twelve months would be granted an additional period of four years within which to provide the additional documents and the plant material for testing. In addition, he would be granted a period of five years within which to file applications in other countries (without claiming priority); in that case no disclosure or exploitation that occurred during the intervening period could be held against him if it concerned his own variety. The latter provision was later to give rise to the concept of "commercial novelty," which was eventually written into Article 6(1)(b) of the Convention at the second session of the Conference.

First Two Meetings of the Drafting Committee. — In order that the discussion might progress, the Drafting Committee drew up a text incorporating also administrative and treaty law provisions. At this point the bias towards a Union outside the framework of the Paris Union (but not necessarily outside the BIRPI framework) was beginning to show.

Third Meeting of the Committee of Experts.— The Committee of Experts pronounced in favor of adopting the principle of assimilation (national treatment for foreigners) in the case of genera and species entered in an annexed protocol, and at least reciprocity in the case of other genera and species.

Group of Legal Experts on the Relations Between Protection of the Names of New Plant Varieties and Trademark Protection.— This Group adopted provisions conceived according to the following principles: a variety has to be identified by a name that must not be misleading; that name has to be filed and registered in all member States (except where it is inappropriate or unacceptable); the name has to be used in any act of marketing involving reproductive or vegetative propagating material, even after the period of protection has expired; the name may not be used to designate another variety of the same or a related species, or by a third party as a trademark for identical or similar goods; if the name is also filed as a trademark in favor of the breeder, the latter may not invoke it to prohibit the use of the name by third parties wherever those third parties are obliged to use it.

The Group did not consider it wise to extend in the Convention itself the obligation to use the name to acts of marketing involving the product. On the other hand it referred to the usefulness of filing the name as a trademark with a view to securing international registration, "as a means of obtaining protection in countries that do not accede to the Convention."

Group of Legal Experts on the Relations Between the Paris Convention for the Protection of Industrial Property and the Preliminary Draft of the Convention for the Protection of New Varieties of Plants. — This Group eventually found for the creation, by the preliminary draft of the Convention, "of a new title of protection together with specific conditions, but this does not rule out the coexistence or adaptation of titles already in existence." On the question of the dual system of protection and the maintenance of patents, the Group considered that it should not be brought up in the Convention. It acknowledged that certain countries might protect new varieties of plants by adapting patents, in which case they would be bound by two Conventions. On the other hand the experts insisted on the fact that, "while each country should remain entirely free regarding the system of protection that it adopts, it is desirable that in each of them, for one and the same species or group of species, there be just one category of protection."

Finally, with regard to the administration of the Convention, the experts pronounced in favor of an independent Union nevertheless operating at BIRPI.

Third Meeting of the Drafting Committee.— The Committee suggested the insertion of a principle the effect of which would be that the subjection of a variety to testing (by implication official), its submission for inclusion or its actual inclusion in an official register could not be invoked against its breeder.

Second Session of the Conference.— The second session was held from November 21 to December 2, 1961. Previously the parties concerned had been consulted and had submitted a great many highly constructive remarks and proposals.

The most important question was that of the relation of the new title of protection to the patent, and of the new Convention to the Paris Convention. The General Committee referred the matter to the Legal Committee, which came to conclusions very similar to those of the Group of Legal Experts mentioned earlier. The reopening of the debate was due to the insistence of Italy on there being no provision in the Convention that was incompatible with the Paris Convention. That debate produced two amendments: the inclusion of Article 2(1) ("Each member State of the Union may recognize the right of the breeder provided for in this Convention by the grant either of a special title of protection or of a patent. Nevertheless, a member State of the Union whose national law admits of protection under both these forms may only provide one of them for one and the same botanical genus or species"); and the insertion of a paragraph at the end of Article 4 allowing a State to declare that it will apply Articles 2 and 3 of the Paris Convention.

With regard to the definition of the contents of the right, it was made clear in Article 5(1) that vegetative propagating material was deemed to include whole plants. Moreover a provision was added to cover the taking, for propagation purposes, of buds or cuttings from cut flowers intended for sale to the public.

With regard to the conditions of protection, the Conference again rejected the insertion of a usefulness criterion, proposed by Denmark, and removed the condition that the new variety had to be the result of effective work on the part of the breeder and not the mere selection of a genotype from those included within a pre-existing variety. After some difficult discussions, it replaced a provision involving the priority concept with the concept of "commercial novelty," the effect of which was that, to be protected in a State, the variety was expected not to have been offered for sale on the territory of that State, or for more than four years on the territory of any other State (this provision was made more complex in 1978).

CHAPTER IV

The Development of the Union

Entry into Force of the Convention

The Convention was signed on December 2, 1961, by the plenipotentiaries of Belgium, France, the Federal Republic of Germany, Italy and the Netherlands. On November 26, 1962, the signatures of Denmark and the United Kingdom were added, and that of Switzerland on November 30, 1962.

However, for the wishes voiced more than half a century previously to reach fruition, the Convention had yet to be brought into force and be given a truly international foundation.

The entry into force came about on August 10, 1968, following ratification by the United Kingdom on September 17, 1965, by the Netherlands on August 8, 1967, and by the Federal Republic of Germany on July 11, 1968.

For the United Kingdom that was the culmination of work that had been going on since July 1954, when a Committee on Transactions in Seeds was entrusted with examining and advising on "the working of the Seeds Act, 1920, and the contractual relationship between the buyers and sellers of seed [...]." The Committee set about considering the question of the protection of new varieties of plants in July 1957, and so carried on its work in parallel with that of the Paris Conference. Leslie Smith, the Committee Secretary, represented the United Kingdom in the work of the Paris Conference, and so maintained the link between the two. The Committee handed in a remarkably well documented report in July 1960. Thereupon Parliament passed a Plant Varieties and Seeds Act in March 1964, which made ratification possible.

For the Netherlands and the Federal Republic of Germany, it was a matter simply of revising existing laws, as the actual principle of plant variety protection had already been written into earlier laws.

Those three countries were followed by two other signatory States, Denmark and France, which deposited their instruments of ratification on September 6, 1968, and September 3, 1971, respectively. Then Sweden, which had not signed the Convention, deposited an instrument of accession on November 17, 1971.

The Additional Act of November 10, 1972

Following the example of other intellectual property Conventions, the UPOV Convention provided in its Article 27 that it was "reviewed periodically with a view to the introduction of amendments designed to improve the working of the Union," and that, unless the Council decided otherwise, "for this purpose, conferences shall be held every five years [...]." The first revision was thus to take place in 1972.

Experience had already shown that the distribution of the financial burden caused by the expenses of the Union was too rough. For according to Article 26(2) the member States were divided into three classes, corresponding to one, three and five contribution units.

The purpose of the Diplomatic Conference that was held from November 7 to 10, 1972, was therefore to introduce a five-class contribution system, with a span of contributions rising continuously from one to five, the Council being empowered to authorize a State to contribute a half-unit only. In addition, it was planned that a penalty for delay in the payment of contributions would also be introduced, in the form of the withdrawal of voting rights.

This objective was achieved on November 10, 1972, when an Additional Act was signed by the following eight States: Belgium, Denmark, France, Germany (Federal Republic of), Italy, Netherlands, Switzerland, United Kingdom. Sweden signed on January 11, 1973.

The ratifications of and accessions to the 1961 Convention that followed therefore related also to the Additional Act. In chronological order the deposits made were the following: Belgium (ratification on November 5, 1976), Italy (ratification on June 1, 1977), Switzerland (ratification on June 10, 1977), South Africa (accession on October 7, 1977), Israel (accession on November 12, 1979), Spain (accession on April 18, 1980).

The Additional Act itself was to enter into force on February 11, 1977. At that time the work on a new revision of the Convention was already well in hand.

Development of the Situation in the Other States

The Price of Success.— The key to the success of the Paris Diplomatic Conference was certainly the fact that invitations were limited to the circle of States that shared the same concerns and the same hopes. However, as the above account of developments shows, UPOV was not able to attract more than twelve States within the space of 19 years,

from 1961 to 1980, on the basis of the 1961 Convention as amended by the 1972 Additional Act; of the twelve, ten had taken part in the 1957-1961 Diplomatic Conference and eight had signed the 1961 Convention. So in two decades UPOV had not really managed to expand beyond the circle of its founders.

Perhaps one should also regard the limitation on invitations, which did benefit the gestation of UPOV, as a handicap to its subsequent growth, all the more so since the fact of creating a new Union, independent of the Unions administered by BIRPI, removed the means of promoting it with all the necessary vigor. And yet BIRPI did publicize it well, notably through *La Propriété industrielle* (and from 1962 onwards in its English edition *Industrial Property*), by reproducing the new Convention and the national laws based on it and by making its columns available for general studies.

Moreover, in the face of the uncertainties that in the past had surrounded the very feasibility of protection for new varieties of plants, mainly because the discussions turned on their patentability, the founders of the Convention set themselves the objective of introducing by means of the Convention a sort of skeleton law to show how such protection should be designed and to ensure a degree of uniformity in legislation. The objective had indeed been achieved, but the provisions of the Convention were to prove ill-suited to a number of interested States.

The Implications of Economic Systems.— Several planned-economy States—Bulgaria, Romania and the Soviet Union—being aware of the function of legislation on discoveries, inventions and rationalization proposals as an inducement to scientific and technological progress, and hence economic progress, granted protection to new plant varieties and new animal breeds under that legislation. On account of the economic organization of those countries, their legislation provides, alongside the patent, for a title called an inventor's certificate. Briefly, this title serves to certify that the subject matter of the application is recognized as being an invention, to attest the priority and status of the inventor, to reserve the exclusive rights in the working of the invention to the State and to assure the inventor of his right to a reward and to certain other rights and prerogatives.

Now, owing among other things to the weight of State research in the plant breeding field, and above all the nutritional importance of plant varieties and animal breeds, their protection has been provided for by means of inventors' certificates alone. Consequently those States have not been able to join UPOV, as it is impossible for them to grant the breeder the exclusive right to the exploitation of the variety provided for in Article 5 of the Convention, which is perfectly suited to market economies.

Two other planned-economy States nevertheless drew inspiration from the UPOV Convention. Hungary also made use of patent legislation, but at the same time based itself on the provisions of the Convention, which has since enabled it to become a member of UPOV. As for the German Democratic Republic, it opted for special legislation: in 1972 it adopted an Ordinance on the Legal Protection of New Varieties of Plants in the German Democratic Republic. Yet it introduced two titles of protection: one affording economic protection (*Wirtschaftssortenschutz*) and the other affording protection of exclusive rights (*Ausschliessungssortenschutz*). The former is the mandatory title for varieties bred within State enterprises or cooperatives or with the support of the community, but may also be chosen by other breeders; the right to exploit the variety belongs to its owner and to those enterprises and bodies that the Minister for Agriculture has authorized to make use of it. The latter title confers the right of exploitation on the owner alone.

The Weight of Legal Traditions: Argentina, Chile.— Two States of Latin America came up against other provisions of the Convention. They were Argentina, which in 1973 adopted a Law on Seeds and Phytogenetic Creations, and Chile, which in 1977 adopted a Decree-Law on Seeds. Even though the differences in relation to the provisions of the Convention are not as fundamental as in the case of Bulgaria, Romania, the Soviet Union and the other States that have adopted comparable legislative provisions, they nonetheless rely, in certain respects, on a solid industrial property tradition; any amendment of those provisions thus becomes difficult.

The Weight of Government Priorities: Kenya.— In its famous report, the Committee on Transactions in Seeds which was the initiator of plant variety protection in the United Kingdom justified that protection with two arguments: equity (putting breeders on the same footing as inventors and authors) and the promotion of investment in plant breeding, which was a guarantee of progress for 127agriculture, and hence for society as a whole. Kenya, which had taken over from the United Kingdom its traditions in the legal field, also legislated in 1972 on plant variety protection, and moreover drew inspiration from the United Kingdom Act. However, being very logically moved by the need to do everything to further economic development, the legislator saw fit to include among the

conditions of protection the requirement that the variety be superior, in one or more characteristics, to the existing range of varieties. Without that condition the law of Kenya (which in fact has not yet been brought into force) would be entirely in keeping with the Convention.

The Weight of History and Other Constraints: the United States of America.— On December 24, 1970, the United States of America enacted a Plant Variety Protection Act which is complementary, with respect to sexually reproduced varieties, to the Plant Patents Act which, as we have seen, was first devised in 1930. In that case too, priority was given in certain respects to domestic pressures (rationality of the legislative order, needs and desires of the parties concerned, traditions, etc.) rather than to strict conformity with the UPOV Convention.

In particular the demarcation of the two systems of protection was determined not by botanical genera or species, as provided in Article 2(1) of the Convention, but by the manner of reproduction or propagation. Apart from that conceptual difference, there arose afterwards the problem of those species for which both types of propagation were possible and could indeed be used indiscriminately for one and the same variety. Respect for the legislation already in place resulted in the potato being excluded from protection, whereas the Convention required it to be covered. It also resulted in different novelty conditions being introduced and in the term of protection being set at seventeen years, which was going to present problems in the case of trees, for which the founders of the Convention had provided a minimum term of eighteen years. Opposition and also the argument of "biological protection" caused the exclusion from protection of first-generation hybrids and also certain "soup" vegetable species on account of obstruction from a firm that produced dehydrated preparations. Finally, among the important differences, one could also mention the fact that the examination prior to the grant of protection certificates is based on data provided by the breeder—and not on official tests as required by the interpretation placed by the founders of the Convention on its Article 7—and the fact that the Act does not contain any provision concerning variety denominations (but such provisions do derive from other law texts).

The 1978 Revision

Preparatory Work.— The member States of UPOV had already realized in 1973 that there was a need to revise the substantive provisions of the Convention and to ascertain whether they were not too stringent for States that otherwise were favorably disposed towards introducing a system of plant variety protection and acceding to UPOV, but had difficulty in conforming to the Convention. Moreover, no sooner had the 1972 revision been completed than the one that in the normal course of events was due in 1977 had to be prepared. The 1973 ordinary session of the Council was a forum in which the matter was considered in a spirit of frankness, notably with the representatives of the United States of America. Another opportunity of expressing themselves was to be given to all parties concerned at a meeting between member and non-member States (and international non-governmental organizations) which was held from October 21 to 23, 1974. And then the Council, at its eighth ordinary session which it held immediately afterwards, from October 24 to 26, set up a Committee of Experts for the Interpretation and Revision of the Convention.

That Committee held a total of six sessions between February 1975 and September 1977, some of them with the assistance of concerned non-member States and international non-governmental organizations. The following States were represented at one or other of those sessions (some of them were to become members of UPOV on the basis of the 1961 Convention as amended by the Additional Act): Australia, Canada, Hungary, Ireland, Japan, New Zealand, Poland, South Africa, Spain, United States of America. In December 1977, the Council took the last preparatory steps with a view to the holding of a Diplomatic Conference from October 9 to 23, 1978. Thereafter two bodies considered certain outstanding items in the course of 1978.

In addition, several members of the Committee undertook a study tour of the United States of America and Canada in September 1975. The purpose of the visit to the United States of America was to examine the dual system of plant variety protection that existed in that country, to gather information on the prospects of its accession to the Union and to consider matters of common interest with governmental and professional circles. The visit to Canada, where the question of protection of new plant varieties was currently under consideration, allowed talks to be had with the Department of Agriculture and with breeders' organizations.

The 1978 Diplomatic Conference.— The object of the Conference, according to its Rules of Procedure, was to "negotiate and adopt [...] a revised text of the Convention." With that in mind, the Council of UPOV had proposed very liberal

Rules of Procedure, which were adopted: "observer" States were given the possibility of participating fully in the work, notably in the form of the right to become members of subsidiary bodies and the right to submit amendment proposals. Voting rights remained the prerogative of member States, however, as that was the rule laid down by the Convention to be revised; yet non-member States were able to sign the Convention that was to emerge from the discussions, and, according to the draft submitted and adopted on that point, they were also able to contribute subsequently to its entry into force.

Invitations were distributed very widely, and the following 27 non-member States took part in the Conference: Argentina, Australia, Bangladesh, Brazil, Bulgaria, Canada, Finland, Hungary, Iran, Iraq, Ireland, Ivory Coast, Japan, Libyan Arab Jamahiriya, Luxembourg, Mexico, Morocco, New Zealand, Norway, Panama, Peru, Saudi Arabia, Senegal, Spain, Thailand, United States of America, Yugoslavia.

The discussions were thorough: every article of the Convention was considered, and no fewer than 64 amendment proposals were examined. At the end of those discussions, on October 23, 1978, the Conference adopted a Revised Text and two recommendations by a unanimous vote of the ten member States.

The Revised Text was signed on the same day by the plenipotentiaries of the following ten States: Belgium, Denmark, France, Germany (Federal Republic of), Italy, Netherlands, South Africa, Switzerland, United Kingdom, United States of America. Nine of them were members of the Union; the tenth, the United States of America, was not yet.

Four years to the day had passed since the decision was taken to create the Committee of Experts for the Interpretation and Revision of the Convention.

The Revised Text of the Convention of October 23, 1978.— From the point of view of the substantive provisions, the Revised Text adopted in 1978 ultimately differs little from the one drawn up in 1961, seventeen years previously. The latter had thus proved itself. For the "old" member States, the only essential amendment consisted in the prolongation from four to six years of the period during which a variety may have been marketed abroad without its novelty being affected, in the case of vines, trees and their rootstocks.

The provision on priority was refined. In the earlier version, it allowed an unscrupulous breeder to make use of the time limits granted him to "finish off" a variety without fear of being overtaken by the competition. He had only to file an application in a State that was of no interest to him and claim its priority in the other States. The Convention now provides that the additional documents and the plant material necessary for testing may be demanded prematurely in the event of withdrawal or rejection of the first application. The rules on variety denominations were also revised, although the fundamental principles remained unchanged.

Other amendments were designed rather to facilitate the accession of States that were not yet members. In this respect it was unavoidably necessary to sacrifice somewhat the ideal of the founders of the 1961 Convention, which had been to bring about some uniformity in national legislation. Two methods were used: the exception for limited use and the relaxation of generally-applicable provisions.

An exception to Article 2(1) of the Convention was written into Article 37 to allow the United States of America to retain their dual system of protection and the demarcation of the areas of application of each law according to the manner of propagation of the variety; it had been realized in the course of the discussions that the possibility of cumulative protection was more theoretical than practical, so that the spirit of Article 2(1) was in fact respected. An exception was also made for the patentability criteria and the term of protection, as it was highly improbable that the United States of America would be able to amend the whole Patent Act—which was applied annually to thousands of inventions—in order to bring the Plant Patents Act —which was applied to a few hundred varieties— into line with the Convention. In fact those exceptions had been designed so that other States could take advantage of them, but in fact none did.

One important relaxation for all member States was the removal of the list of genera and species to which they were obliged to apply the Convention; the list included only species from temperate climates. Another consisted in States being given the possibility of providing for a one-year "period of grace," in other words of protecting also varieties that had already been marketed on their territory for a period not exceeding one year prior to the filing of the application.

Finally, some interpretation was done, notably with regard to Article 7 and the manner in which the testing of varieties was to be conducted.

The most important amendment, however, is to be found among the provisions that have to do with the law governing treaties and international organizations. As we have seen, the 1961 Diplomatic

Conference created an independent Union operating at BIRPI. According to traditional principles in this area, which date back to the second part of the nineteenth century, the Office of the new Union, like BIRPI itself, was placed under the supervision of the Swiss Confederation. Yet the cooperation agreement with BIRPI had stirred up doubts as to the real status of UPOV. And BIRPI's transformation into WIPO had also given rise to reflection on that status. It was therefore decided that the Union should be given a status comparable to that of its elder: it was endowed with legal personality and also, on the territory of each member State of the Union, the legal capacity necessary to achieve its aim and carry out its functions, and it was provided that it would enter into a headquarters agreement with the Swiss Confederation.

Even though the word "Union," which suggests a restricted circle of States moved by a common will, was retained, the transformation strengthened the world vocation of UPOV.

The provision under which the procedures for technical and administrative cooperation between UPOV and BIRPI (which in the meantime had become WIPO) were to be governed by rules established by the Government of the Swiss Confederation in agreement with the Unions concerned was deleted. The cooperation itself was not thereby affected, however.

It is at present governed by an agreement signed on November 26, 1982. According to that agreement, WIPO provides UPOV with logistical support against indemnification: among other things, it provides office space and the materials and staff necessary for the holding of meetings; it takes care of personnel and financial administration and also the reproduction of documents and the sale of publications; it makes mail and telecommunications services available. In view of this very close cooperation, the agreement provides also that the Council of UPOV appoints the Director General of WIPO to the post of Secretary-General of UPOV. Finally, subject to certain general provisions, the WIPO texts governing staff status and finances apply *mutatis mutandis* to the staff and finances of UPOV.

The Present Situation

A New Start.— The revised Convention remained open for signature until October 31, 1979. Six States signed it during that period: Sweden (on December 6, 1978), Mexico (on July 25, 1979), New Zealand (on July 25, 1979), Ireland (on September

27, 1979), Japan (on October 17, 1979), Canada (on October 31, 1979). The number of signatures thus rose to sixteen.

The instruments of ratification or acceptance came in relatively quickly: New Zealand and the United States of America confirmed their signature already in 1980 (on November 3 and 12 respectively). Ireland, Switzerland, South Africa and Denmark did so in 1981 (on May 19, June 17, July 21 and October 8, respectively). On the deposit of Denmark's instrument of ratification, the required conditions were met for the entry into force of the Revised Text, which became effective on November 8, 1981.

Instruments have since been deposited by the following States: Japan (on August 3, 1982), Sweden (on December 1, 1982), France (on February 17, 1983), Hungary (on March 16, 1983), United Kingdom (on August 24, 1983), Israel (on April 12, 1984), Netherlands (on August 2, 1984), Federal Republic of Germany (on March 12, 1986), Italy (on April 28, 1986).

Seventeen Member States: Few or Many?— On the twenty-fifth anniversary date of the Convention, December 2, 1986, UPOV thus comprised the following seventeen member States:

Belgium	Japan
Denmark	Netherlands
France	New Zealand
Germany (Federal Republic of)	South Africa
Hungary	Spain
Ireland	Sweden
Israel	Switzerland
Italy	United Kingdom
	United States of America

It therefore does not yet have the full complement of States that registered their agreement on the 1978 Convention by affixing their signature to it. Canada and Mexico are still missing (as are Belgium and Spain, which are members of the Union by virtue of the 1961 Convention). This state of affairs—and the mere fact that UPOV comprises seventeen States, whereas there are 171 today—can be assessed in a number of different ways.

Some points of detail should be explained, however. For one thing, certain States are in the process of drawing up legislation according to the principles of the Convention, and are planning to become members of UPOV in due course. For another thing, there are a relatively large number of other States that have adhered to the principle that the breeder of a new variety should be granted an intellectual property right in that variety, and have done so not only in a spirit of justice and equity but also in the amply justified hope of thereby contributing to the progress of agriculture and general well-being.

Some others should be added to those reviewed above, notably the most recent, Australia. Its history is exemplary, moreover, in that it illustrates the many stumbling-blocks that may stand in the way of the introduction of national legislation.

It was the 1961 UPOV Convention and the national laws based on it that attracted attention in the nineteen-sixties. Yet it was not until 1971 that a Commonwealth Plant Breeding Conference proposed that a recommendation for the introduction of plant variety protection should be submitted to the Standing Committee of the Australian Agricultural Council. However, the Committee considered at the outset that the matter was within the jurisdiction of each State. After other steps had been taken by professionals and additional work undertaken in official circles, which culminated in 1976, the same Council submitted a favorable recommendation to the Commonwealth Government.

A Bill was published in 1979. It came up against considerable opposition from certain groups. A Bill amended in such a way that it no longer applied to staple crops—which took the sting out of most of the objections—was then submitted to the House of Representatives on May 7, 1981, and passed in April 1982. The period of almost a year made for very thorough discussion and therefore a carefully considered decision. As the opposition did not back down, the Senate referred the Bill to its Standing Committee on National Resources. At the end of the thirty-second session of Parliament, however, the Bill was guillotined and so a new one had to be submitted.

In the absence of a new Bill, the new Standing Committee embarked on the fundamental principles of protection, and specifically those that had given rise to so much controversy. Once again discarding the objections put forward by the above groups, but in the interest of placating them, it recommended the adoption of a law applicable to horticultural, ornamental and fodder plants only, and an examination of the implications of protection for the financing of research into staple crops. Finally, the 1986 Bill managed to complete all the stages of parliamentary procedure. So, if one takes the first official initiative as the starting point, it will have taken half a generation for the Bill to reach fruition.

If one measures it in terms of units of time such as these, which is not unreasonable, the growth of UPOV becomes quite creditable.

The Future

Of course there is no way of being content with seventeen member States, or even a few dozen, in the case of a Union that has set itself the objective, in practice, of promoting in a very specific area the implementation of Article 27(2) of the Universal Declaration of Human Rights:

> "Everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author."

The Union therefore has to work towards recognition of this principle everywhere and in all walks of life. What it really has to do is continue the job that it has started.

In the present member States, and in others, the balance of national legislation needs to be reconsidered in the light of profound mutations of all kinds. We would point out that certain categories of breeders have never been satisfied by this balance in a number of countries. With each one of its achievements, plant breeding becomes more and more costly; the productive farmer may become his own supplier of high-quality seed and seedlings, and even the "biological" or "natural" protection inherent in hybrid varieties may be profitably circumvented nowadays by means of micropropagation. Should one, under such circumstances, extend breeders' rights beyond the exclusivity of mere marketing of seed and seedlings? And how is the resulting new balance to be reconciled with the absolute necessity, which the founders of the 1961 Convention had duly taken into account, for developing countries to protect their self-supporting agriculture, or at least enable it to be modernized gently?

Economic mutations and scientific and technological mutations have combined to give a new face to the plant breeding sector and the seed and seedlings production and marketing sector. The breeder, who is essentially a product of the agricultural world and imbued with its traditions, is no longer alone. His new colleagues are involved in basic research (or more basic research) or in an industry in search of diversification in the field of renewable or environment-friendly goods, or alternatively in search of more profitability for those of its structures that are already devoted to agriculture. They sometimes perceive things in a different way, and that difference makes it essential to rethink certain basic facts, even if that means going

back to the initial position. At least then it will have been thoroughly explained and reaffirmed.

"Biotechnology" and in particular "genetic engineering" are also keywords for reflection and discussion. In fact, they are areas that will sometimes be competitors but much more often clients and suppliers of the sector which one is now obliged, for want of a better expression, to call "conventional plant breeding."

While the founders of the Convention succeeded in striking a balance between the needs and desires of breeders on the one hand and of farmers and other variety users, and more generally society itself, on the other, it is now for the managers of the same Convention to strike an equally satisfactory and, if possible, equally durable balance between all the interests at stake today.

By the time this article comes off the press, they will certainly have officially decided to undertake a new revision of the Convention. Their greatest asset will be their profound knowledge of agriculture, of plant breeding in the broadest sense of the word and of law, combined with the wisdom that stems from responsibility for an area vital to mankind.

André Heitz
Senior Officer, Office of UPOV

SUMMARY OF THE INTERNATIONAL CONVENTION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

This Chapter gives a brief summary of the main provisions of the International Convention for the Protection of New Varieties of Plants of December 2, 1961, as revised at Geneva on November 10, 1972, and on October 23, 1978 (hereinafter referred to as "the Convention").

Persons Entitled to Protection.— The right to protection accrues:

(i) to the breeder of a new variety, whatever the origin, artificial or natural, of the initial variation from which the variety is derived (i.e., also to the discoverer of a variety),

(ii) to the successor in title of the breeder.

Right to National Treatment.— As far as the recognition and protection of the right of the breeder are concerned, each member State of the Union instituted by the Convention must give to the nationals and residents of the other member States (whether natural or legal persons) the same treatment as its laws provide for its own nationals.

A member State may, however, depart from the national treatment principle and have recourse to that of reciprocity. The effect of reciprocity is that nationals and residents of another member State may be granted protection, in respect of a variety belonging to a given taxon (i.e., a unit of botanical classification such as the genus or the species), only if the other State also applies the Convention to that taxon.

Exclusive Right.— The Convention provides that prior authorization of the owner of the title of protection is required for:

(i) the production, for purposes of commercial marketing, of the reproductive or vegetative propagating material, as such, of the variety,

(ii) the offering for sale of such material,

(iii) the marketing of such material,

(iv) the repeated use of the protected variety for the commercial production of another variety, and

(v) the commercial use of ornamental plants or parts thereof as propagating material in the production of ornamental plants or cut flowers.

On the other hand, the authorization of the owner of the title of protection is not required when the protected variety is taken as the initial source of variation for creating other varieties.

Member States are free to grant more extensive rights to breeders, especially to extend the protection also to the marketed product.

Right of Priority.— The breeder (or his successor in title) may file his first application for protection of a given variety in any of the member States. If he files an application for the same variety in any other member State within twelve months of the filing of the first application, he will benefit—on request—from the right of priority in respect of this "later" application. There are two main effects: any application for the same variety filed by another person within the period between the breeder's first and later applications and any use of the variety occurring within that period will not affect the rights of the breeder.

Right to the Protection of the Denomination, Registration and Use of Denominations.— At the time when protection is granted, a denomination is fixed for the variety and registered as its generic designation.

The registered denomination of a variety is protected, that is to say, in essence, it may not be used, in any member State, as the denomination of another variety of the same or a closely related botanical species. Member States also have to ensure that other rights in the designation registered as the denomination of a variety do not hamper the free use of that denomination in connection with that variety, even after the protection has expired.

The denomination is proposed by the breeder but it must conform to the requirements prescribed in the Convention. In particular: it must enable the variety to be identified; it must not be liable to mislead or to lead to confusion concerning the characteristics, value or identity of the variety or the identity of the breeder; it must be different from every denomination which designates, in any member State, an existing variety of the same botanical or a closely related species; prior rights of

third parties must not be affected. As a rule, the variety must be registered under the same denomination by the competent authorities of all member States.

Those authorities must ascertain that the proposed denomination conforms to the prescribed requirements. If the denomination does not conform, they will invite the breeder to choose another denomination. In order to avoid synonyms, the member States exchange information on proposed and registered variety denominations.

Any person who offers for sale or markets propagating material of a protected variety is required to use the denomination of the variety, and to do so even after protection has expired. A trademark, trade name or similar indication may, however, be associated with the variety denomination.

Taxa to Which the Convention Applies.— The Convention may be applied to all botanical taxa. Member States have to endeavor to apply the Convention progressively to the largest possible number of taxa. Member States must apply the Convention to at least five taxa when they become bound by the Convention, and must subsequently increase that number to at least ten within three years, to at least eighteen within six years and to at least twenty-four within eight years. The Council of UPOV may, at the request of a State wishing to become a member of UPOV, reduce those minimum numbers or extend those periods, in order to take account of special economic or ecological conditions prevailing in that State. For a State already a member of UPOV which encounters special difficulties, the Council of UPOV may extend the said periods.

Conditions of Protection; Examination; Duration.— The Convention enumerates the conditions to be fulfilled by each variety for which protection is sought. It does not permit the grant of protection to be made subject to other conditions except formalities and payment of fees. The conditions are as follows:

(i) the variety must be clearly distinguishable by one or more important characteristics from any other variety whose existence is a matter of common knowledge.

(ii) the variety must not—or, where the law of a State so provides, must not for longer than one year—have been offered for sale or marketed with the consent of the breeder in the State where the application is filed, nor for longer than four years (six years in the case of grapevines and trees, including rootstocks) in any other State,

(iii) the variety must be sufficiently homogeneous, having regard to the particular features of its sexual reproduction or vegetative propagation,

(iv) the variety must be stable in its essential characteristics,

(v) the variety must be given a denomination.

The Convention allows protection to be granted only after the competent authority has ascertained that the variety fulfills the above conditions. The examination must take into account the particularities of the taxon concerned.

The Convention requires that the term of protection, counted from the date of issue of the title of protection, be at least eighteen years for grapevines and trees, including rootstocks, and at least fifteen years for all other plants.

Independence of Protection.— No member State may make the protection of a given variety dependent on the grant of protection to the same variety in any other State.

Similarly, no member State may make the protection of a given variety dependent on compliance with the provisions of its legislation concerning the production, certification and marketing of seeds and propagating material.

Forms of Protection.— The Convention leaves each member State free to grant protection to varieties by means of a "special title of protection"—that is to say, a title specially created for new plant varieties—or a patent. Both forms of protection cannot, however, be provided for one and the same botanical genus or species. A derogation has been provided, however, in Article 37 of the Convention; but, in practice, no non-member State may avail itself of it anymore since the required circumstances no longer exist.

Restrictions for Reasons of Public Interest.— The Convention allows the free exercise of the exclusive rights provided for in the Convention to be restricted only "for reasons of public interest." When the public interest consists of ensuring the widespread distribution of the variety, a State which introduces the restriction must take all measures necessary to ensure that the breeder receives "equitable remuneration."

Implementation of the Convention.— Each State party to the Convention is required to adopt all measures necessary for the application of the Convention. In particular, each member State must

afford appropriate legal remedies for the effective defense of the rights provided for in the Convention.

Each member State must set up a special authority for the protection of new plant varieties or must entrust such protection to an existing authority.

Furthermore, each member State must ensure that the public is informed of matters concerning the protection of new plant varieties; such information must, as a minimum, consist of the periodical publication of the list of titles of protection (special titles or patents) issued.

The Convention finally provides that contracts may be concluded between the competent authorities of the member States for "the joint utilization of the services" of the authorities competent for the examination of varieties and the assembling of the necessary reference collections and documents.

The Union; Becoming a Member of the Union.— The States party to the Convention constitute the International Union for the Protection of New Varieties of Plants, which is also referred to in all languages as "UPOV," an abbreviation based on the initials of its name in French: *Union internationale pour la protection des obtentions végétales.*

Any non-member State, not having signed the Convention, may join the Union by depositing an instrument of accession, but, before doing so, must ask the UPOV Council to advise it as to the conformity of its laws with the provisions of the Convention. Only if the decision of the Council is positive may an instrument of accession be deposited. The Convention, in its latest form, remained open for signature until October 31, 1979. Those non-member States that have signed it have only, in order to join the Union, to deposit an instrument of ratification, acceptance or approval, there being no need for such States to first seek the advice of the Council (this applies to Canada and Mexico).

Instruments of ratification, acceptance, approval or accession must be deposited with the Secretary-General of UPOV, who is entrusted under the Convention with all depositary functions.

The Convention states expressly that the Union has legal personality and enjoys on the territory of each member State, in conformity with the laws of that State, such legal capacity as may be necessary for the fulfillment of the objectives of the Union and for the exercise of its functions. A headquarters agreement has been concluded with the Swiss Confederation.

The Organs of the Union.— The Union has two permanent organs: the Council and the Office.

The Council consists of the representatives of the member States. Each member State has one vote in the Council. The Council elects from among its members a President and at least one Vice-President. The President holds office for three years.

The Council holds an ordinary session each year. It may be convened for extraordinary sessions.

The main administrative tasks of the Council are:

(i) to adopt and amend its rules of procedure and the administrative and financial regulations of the Union,

(ii) to examine and approve the budget of the Union and to fix the amount of the contributions,

(iii) to give all necessary directions to the Secretary-General of the Union for the accomplishment of the tasks of the Union,

(iv) to examine the annual report on the activities of the Union, and to approve the accounts of the Union,

(v) to lay down the program for the future work of the Union,

(vi) to fix the date and place of conferences for the revision of the Convention.

The main substantive tasks of the Council are:

(i) to study appropriate measures to safeguard the interests and to encourage the development of the Union,

(ii) to prepare the revisions of the Convention,

(iii) in general, to take all necessary decisions to ensure the efficient functioning of the Union.

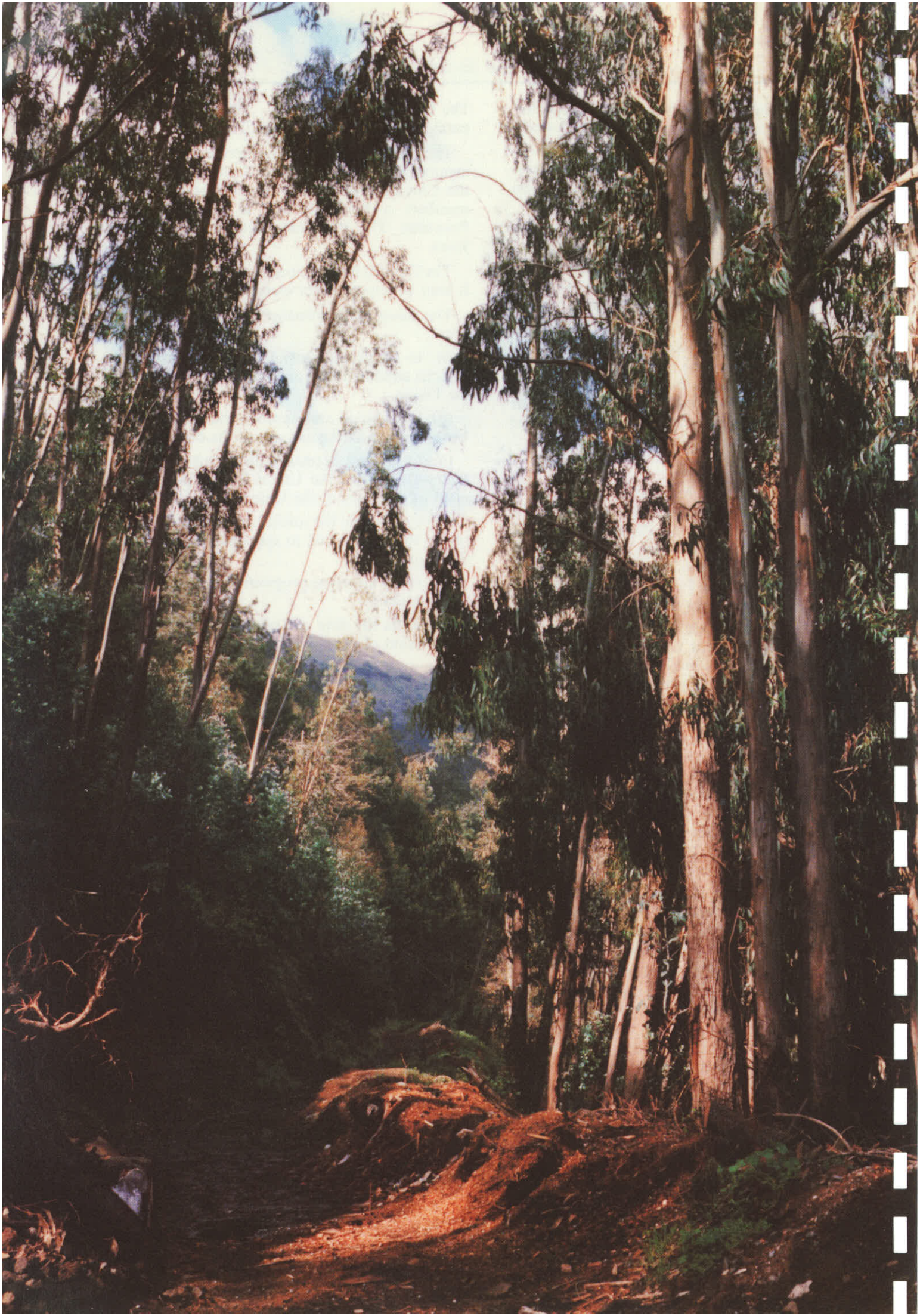
The Office of the Union—also called its Secretariat General—is under the direction of the Secretary-General.

The task of the Office is to carry out the duties and tasks entrusted to it by the Council.

The Office has its seat in Geneva.

The Finances of the Union.— The Union is mainly financed by the contributions that its member States have undertaken to pay.

The contributions serve to cover the expenses of the Union, which are mainly occasioned by the sessions of the Council and other meetings, and by the cost of the Office.



TEXTS OF THE INTERNATIONAL CONVENTION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Original Text of December 2, 1961

International Convention for the Protection of New Varieties of Plants

signed at Paris on December 2, 1961

THE CONTRACTING STATES,

Convinced of the importance attaching to the protection of new varieties of plants not only for the development of agriculture in their territory but also for safeguarding the interests of breeders,

Conscious of the special problems arising from the recognition and protection of the right of the creator in this field and particularly of the limitations that the requirements of the public interest may impose on the free exercise of such a right,

Deeming it highly desirable that these problems to which very many States rightly attach importance should be resolved by each of them in accordance with uniform and clearly defined principles,

Anxious to reach an agreement on these principles to which other States having the same interests may be able to adhere,

Have agreed as follows:

Article 1

[Purpose of the Convention; Constitution of a Union; Seat of the Union]

(1) The purpose of this Convention is to recognise and to ensure to the breeder of a new plant variety, or to his successor in title, a right the content and the conditions of exercise of which are defined hereinafter.

(2) The States parties to this Convention, hereinafter referred to as member States of the Union, constitute a Union for the Protection of New Varieties of Plants.

(3) The seat of the Union and its permanent organs shall be at Geneva.

Article 2

[Forms of Protection; Meaning of " Variety "]

(1) Each member State of the Union may recognise the right of the breeder provided for in this Convention by the grant either of a special title of protection or of a patent. Nevertheless, a member State of the Union whose national law admits of protection under both these forms may provide only one of them for one and the same botanical genus or species.

(2) For the purposes of this Convention, the word " variety " applies to any cultivar, clone, line, stock or hybrid which is capable of cultivation and which satisfies the provisions of subparagraphs (1)*(c)* and *(d)* of Article 6.

Article 3

[National Treatment]

(1) Without prejudice to the rights specially provided for in this Convention, natural and legal persons resident or having their headquarters in one of the member States of the Union shall, in so far as the recognition and protection of the breeder's right are concerned, enjoy in the other member States of the Union the same treatment as is accorded or may hereafter be accorded by the respective laws of such States to their own nationals, provided that such persons comply with the conditions and formalities imposed on such nationals.

(2) Nationals of member States of the Union not resident or having their headquarters in one of those States shall likewise enjoy the same rights provided that they fulfil such obligations as may be imposed on them for the purpose of enabling the new varieties which they have bred to be examined and the multiplication of such varieties to be controlled.

Article 4

[Botanical Genera and Species Which Must or May Be Protected; Reciprocity; Possibility of Declaring that Articles 2 and 3 of the Paris Convention for the Protection of Industrial Property Are Applicable]

(1) This Convention may be applied to all botanical genera and species.

(2) The member States of the Union undertake to adopt all measures necessary for the progressive application of the provisions of this Convention to the largest possible number of botanical genera and species.

(3) Each member State of the Union shall, on the entry into force of this Convention in its territory, apply the provisions of the Convention to at least five of the genera named in the list annexed to the Convention.

Each member State further undertakes to apply the said provisions to the other genera in the list, within the following periods from the date of the entry into force of the Convention in its territory:

(a) within three years, to at least two genera;

(b) within six years, to at least four genera;

(c) within eight years, to all the genera named in the list.

(4) Any member State of the Union protecting a genus or species not included in the list shall be entitled either to limit the benefit of such protection to the nationals of member States of the Union protecting the same genus or species and to natural and legal persons resident or having their headquarters in any of those States, or to extend the benefit of such protection to the nationals of other member States of the Union or to member States of the Paris Union for the Protection of Industrial Property and to natural and legal persons resident or having their headquarters in any of those States.

(5) Any member State of the Union may, on signing this Convention or on depositing its instrument of ratification or accession, declare that, with regard to the protection of new varieties of plants, it will apply Articles 2 and 3 of the Paris Convention for the Protection of Industrial Property.

Article 5

[Rights Protected; Scope of Protection]

(1) The effect of the right granted to the breeder of a new plant variety or his successor in title is that his prior authorisation shall be required for the production, for purposes of commercial marketing, of the reproductive or vegetative propagating material, as such, of the new variety, and for the offering for sale or marketing of such material. Vegetative propagating material shall be deemed to include whole plants. The breeder's right shall extend to ornamental plants or parts thereof normally marketed for purposes other than propagation when they are used commercially as propagating material in the production of ornamental plants or cut flowers.

(2) The authorisation given by the breeder or his successor in title may be made subject to such conditions as he may specify.

(3) Authorisation by the breeder or his successor in title shall not be required either for the utilisation of the new variety as an initial source of variation for the purpose of creating other new varieties or for the marketing of such varieties. Such authorisation shall be required, however, when the repeated use of the new variety is necessary for the commercial production of another variety.

(4) Any member State of the Union may, either under its own law or by means of special agreements under Article 29, grant to breeders, in respect of certain botanical genera or species, a more extensive right than that set out in paragraph (1) of this Article, extending in particular to the marketed product. A member State of the Union which grants such a right may limit the benefit of it to the nationals of member States of the Union which grant an identical right and to natural and legal persons resident or having their headquarters in any of those States.

Article 6

[Conditions Required for Protection]

(1) The breeder of a new variety or his successor in title shall benefit from the protection provided for in this Convention when the following conditions are satisfied:

(a) Whatever may be the origin, artificial or natural, of the initial variation from which it has resulted, the new variety must be clearly distinguishable by one or more important characteristics from any other variety whose existence is a matter of common knowledge at the time when protection is applied for. Common knowledge may be established by reference to various factors such as: cultivation or marketing already in progress, entry in an official register of varieties already made or in the course of being made, inclusion in a reference collection or a precise description in a publication.

A new variety may be defined and distinguished by morphological or physiological characteristics. In all cases, such characteristics must be capable of precise description and recognition.

(b) The fact that a variety has been entered in trials, or has been submitted for registration or entered in an official register, shall not prejudice the breeder of such variety or his successor in title.

At the time of the application for protection in a member State of the Union, the new variety must not have been offered for sale or marketed, with the agreement of the breeder or his successor in title, in the territory of that State, or for longer than four years in the territory of any other State.

(c) The new variety must be sufficiently homogeneous, having regard to the particular features of its sexual reproduction or vegetative propagation.

(d) The new variety must be stable in its essential characteristics, that is to say, it must remain true to its description after repeated reproduction or propagation or, where the breeder has defined a particular cycle of reproduction or multiplication, at the end of each cycle.

(e) The new variety shall be given a denomination in accordance with the provisions of Article 13.

(2) Provided that the breeder or his successor in title shall have complied with the formalities provided for by the national law of each country, including the payment of fees, the grant of protection in respect of a new variety may not be made subject to conditions other than those set forth above.

Article 7

[Official Examination of New Varieties; Provisional Protection]

(1) Protection shall be granted only after examination of the new plant variety in the light of the criteria defined in Article 6. Such examination shall be adapted to each botanical genus or species having regard to its normal manner of reproduction or multiplication.

(2) For the purposes of such examination, the competent authorities of each country may require the breeder or his successor in title to furnish all the necessary information, documents, propagating material or seeds.

(3) During the period between the filing of the application for protection of a new plant variety and the decision thereon, any member State of the Union may take measures to protect the breeder or his successor in title against wrongful acts by third parties.

Article 8

[Period of Protection]

(1) The right conferred on the breeder of a new plant variety or his successor in title shall be granted for a limited period. This period may not be less than fifteen years. For plants such as vines, fruit trees and their rootstocks, forest trees and ornamental trees, the minimum period shall be eighteen years.

(2) The period of protection in a member State of the Union shall run from the date of the issue of the title of protection.

(3) Each member State of the Union may adopt longer periods than those indicated above and may fix different periods for some classes of plants, in order to take account, in particular, of the requirements of regulations concerning the production and marketing of seeds and propagating material.

Article 9

[Restrictions in the Exercise of Rights Protected]

The free exercise of the exclusive right accorded to the breeder or his successor in title may not be restricted otherwise than for reasons of public interest.

When any such restriction is made in order to ensure the widespread distribution of new varieties, the member State of the Union concerned shall take all measures necessary to ensure that the breeder or his successor in title receives equitable remuneration.

Article 10

[Nullity and Forfeiture of the Rights Protected]

(1) The right of the breeder shall be declared null and void, in accordance with the provisions of the national law of each member State of the Union, if it is established that the conditions laid down in subparagraphs *(a)* and *(b)* of paragraph (1) of Article 6 were not effectively complied with at the time when the title of protection was issued.

(2) The breeder or his successor in title shall forfeit his right when he is no longer in a position to provide the competent authority with reproductive or propagating material capable of producing the new variety with its morphological and physiological characteristics as defined when the right was granted.

(3) The right of the breeder or his successor in title may become forfeit if:

(a) after being requested to do so and within a prescribed period, he does not provide the competent authority with the reproductive or propagating material, the documents and the information deemed necessary for checking the new variety, or he does not allow inspection of the measures which have been taken for the maintenance of the variety; or

(b) he has failed to pay within the prescribed period such fees as may be payable to keep his rights in force.

(4) The right of the breeder may not be annulled and the right of the breeder or his successor in title may not become forfeit except on the grounds set out in this Article.

Article 11

[Free Choice of the Member State in Which the First Application is Filed; Application in Other Member States; Independence of Protection in Different Member States]

(1) The breeder or his successor in title may choose the member State of the Union in which he wishes to make his first application for protection of his right in respect of a new variety.

(2) The breeder or his successor in title may apply to other member States of the Union for protection of his right without waiting for the issue to him of a title of protection by the member State of the Union in which he made his first application.

(3) The protection applied for in different member States of the Union by natural or legal persons entitled to benefit under this Convention shall be independent of the protection obtained for the same new variety in other States whether or not such States are members of the Union.

Article 12

[Right of Priority]

(1) Any breeder or his successor in title who has duly filed an application for protection of a new variety in one of the member States of the Union shall, for the purposes of filing in the other member States of the Union, enjoy a right of priority for a period of twelve months. This period shall run from the date of filing of the first application. The day of filing shall not be included in such period.

(2) To benefit from the provisions of the preceding paragraph, the further filing must include an application for protection of the new variety, a claim in respect of the priority of the first application and, within a period of three months, a copy of the documents which constitute that application, certified to be a true copy by the authority which received it.

(3) The breeder or his successor in title shall be allowed a period of four years after the expiration of the period of priority in which to furnish, to the member State of the Union with which he has filed an application for protection in accordance with the terms of paragraph (2), the additional documents and material required by the laws and regulations of that State.

(4) Such matters as the filing of another application or the publication or use of the subject of the application, occurring within the period provided for in paragraph (1), shall not constitute grounds for objection to an application filed in accordance with the foregoing conditions. Such matters may not give rise to any right in favour of a third party or to any right of personal possession.

Article 13

[Denomination of New Varieties of Plants]

(1) A new variety shall be given a denomination.

(2) Such denomination must enable the new variety to be identified; in particular, it may not consist solely of figures.

The denomination must not be liable to mislead or to cause confusion concerning the characteristics, value or identity of the new variety or the identity of the breeder. In particular, it must be different from every denomination which designates, in any member State of the Union, existing varieties of the same or a closely related botanical species.

(3) The breeder or his successor in title may not submit as the denomination of a new variety either a designation in respect of which he enjoys the protection, in a member State of the Union, accorded to trade marks, and which applies to products which are identical or similar within the meaning of trade mark law, or a designation liable to cause confusion with such a mark, unless he undertakes to renounce his right to the mark as from the registration of the denomination of the new variety.

If the breeder or his successor in title nevertheless submits such a denomination, he may not, as from the time when it is registered, continue to assert his right to the trade mark in respect of the above-mentioned products.

(4) The denomination of the new variety shall be submitted by the breeder or his successor in title to the authority referred to in Article 30. If it is found that such denomination does not satisfy the requirements of the preceding paragraphs, the authority shall refuse to register it and shall require the breeder or his successor in title to propose another denomination within a prescribed period. The denomination shall be registered at the same time as the title of protection is issued in accordance with the provisions of Article 7.

(5) A new variety must be submitted in member States of the Union under the same denomination. The competent authority for the issue of the title of protection in each member State of the Union shall register the denomination so submitted, unless it considers that denomination unsuitable in that State. In this case, it may require the breeder or his successor in title to submit a translation of the original denomination or another suitable denomination.

(6) When the denomination of a new variety is submitted to the competent authority of a member State of the Union, the latter shall communicate it to the Office of the Union referred to in Article 15, which shall notify it to the competent authorities of the other member States of the Union. Any member State of the Union may address its objections, if any, through the said Office, to the State which communicated the denomination.

The competent authority of each member State of the Union shall notify each registration of the denomination of a new variety and each refusal of registration to the Office of the Union, which shall inform the competent authorities of the other member States of the Union. Registrations shall also be communicated by the Office to the member States of the Paris Union for the Protection of Industrial Property.

(7) Any person in a member State of the Union who offers for sale or markets reproductive or vegetative propagating material of a new variety shall be obliged to use the denomination of that new variety, even after the expiration of the protection of that variety, in so far as, in accordance with the provisions of paragraph (10), prior rights do not prevent such use.

(8) From the date of issue of a title of protection to a breeder or his successor in title in a member State of the Union:

(a) the denomination of the new variety may not be used, in any member State of the Union, as the denomination of another variety of the same or a closely related botanical species;

(b) the denomination of the new variety shall be regarded as the generic name for that variety. Consequently, subject to the provisions of paragraph (10), no person may, in any member State of the Union, apply for the registration of, or obtain protection as a trade mark for, a denomination identical to or liable to cause confusion with such denomination, in respect of identical or similar products within the meaning of trade mark law.

(9) It shall be permitted, in respect of the same product, to add a trade mark to the denomination of the new variety.

(10) Prior rights of third parties in respect of signs used to distinguish their products or enterprises shall not be affected. If, by reason of a prior right, the use of the denomination of a new variety is forbidden to a person who, in accordance with the provisions of paragraph (7), is obliged to use it, the competent authority shall, if need be, require the breeder or his successor in title to submit another denomination for the new variety.

Article 14

[Protection Independent of Measures Regulating Production, Certification and Marketing]

(1) The right accorded to the breeder in pursuance of the provisions of this Convention shall be independent of the measures taken by each member State of the Union to regulate the production, certification and marketing of seeds and propagating material.

(2) However, such measures shall, as far as possible, avoid hindering the application of the provisions of this Convention.

Article 15

[Organs of the Union]

The permanent organs of the Union shall be:

(a) the Council;

(b) the Secretariat General, entitled the Office of the International Union for the Protection of New Varieties of Plants. That Office shall be under the high authority of the Swiss Confederation.

Article 16

[Composition of the Council; Votes]

(1) The Council shall consist of representatives of the member States of the Union. Each member State of the Union shall appoint one representative to the Council and an alternate.

(2) Representatives or alternates may be accompanied by assistants or advisers.

(3) Each member State of the Union shall have one vote in the Council.

Article 17

[Observers in Meetings of the Council]

(1) States which have signed but not yet ratified this Convention shall be invited as observers to meetings of the Council. Their representatives shall be entitled to speak in a consultative capacity.

(2) Other observers or experts may also be invited to such meetings.

Article 18
[Officers of the Council]

(1) The Council shall elect a President and a first Vice-President from among its members. It may elect other Vice-Presidents. The first Vice-President shall take the place of the President if the latter is unable to officiate.

(2) The President shall hold office for three years.

Article 19
[Meetings of the Council]

(1) Meetings of the Council shall be convened by its President.

(2) A regular session of the Council shall be held annually. In addition, the President may convene the Council at his discretion; he shall convene it, within a period of three months, if a third of the member States of the Union so request.

Article 20
[Rules of Procedure of the Council; Administrative and Financial Regulations of the Union]

(1) The Council shall lay down its rules of procedure.

(2) The Council shall adopt the administrative and financial regulations of the Union, after having consulted the Government of the Swiss Confederation. The Government of the Swiss Confederation shall be responsible for ensuring that the regulations are carried out.

(3) A majority of three-quarters of the member States of the Union shall be required for the adoption of such rules and regulations and any amendments to them.

Article 21
[Duties of the Council]

The duties of the Council shall be to:

(a) study appropriate measures to safeguard the interests and to encourage the development of the Union;
(b) examine the annual report on the activities of the Union and lay down the programme for its future work;
(c) give to the Secretary-General, whose functions are set out in Article 23, all necessary directions, including those concerning relations with national authorities;
(d) examine and approve the budget of the Union and fix the contribution of each member State in accordance with the provisions of Article 26;
(e) examine and approve the accounts presented by the Secretary-General;
(f) fix, in accordance with the provisions of Article 27, the date and place of the conferences referred to in that Article and take the measures necessary for their preparation;
(g) make proposals to the Government of the Swiss Confederation concerning the appointment of the Secretary-General and senior officials; and
(h) in general, take all necessary decisions to ensure the efficient functioning of the Union.

Article 22
[Majorities Required for Decisions of the Council]

The Council's decisions shall be taken by a simple majority of the members present, except in the cases provided for in Articles 20, 27, 28 and 32, and for the vote on the budget and the fixing of the contributions of each member State. In these last two cases, the majority required shall be three-quarters of the members present.

Article 23
[Tasks of the Office of the Union; Responsibilities of the Secretary-General; Appointment of Staff]

(1) The Office of the Union shall have the task of carrying out all the duties and tasks entrusted to it by the Council. It shall be under the direction of the Secretary-General.

(2) The Secretary-General shall be responsible to the Council; he shall be responsible for carrying out the decisions of the Council.

He shall submit the budget for the approval of the Council and shall be responsible for its implementation.

He shall make an annual report to the Council on his administration and a report on the activities and financial position of the Union.

(3) The Secretary-General and the senior officials shall be appointed, on the proposal of the Council, by the Government of the Swiss Confederation, which shall determine the terms of their appointment.

The terms of service and the remuneration of other grades in the Office of the Union shall be determined by the administrative and financial regulations.

Article 24
[Supervisory Function of the Swiss Government]

The Government of the Swiss Confederation shall supervise the expenditure and accounts of the Office of the International Union for the Protection of New Varieties of Plants. It shall submit an annual report on its supervisory function to the Council.

Article 25
[Cooperation with the Unions Administered by BIRPI]

The procedures for technical and administrative cooperation between the Union for the Protection of New Varieties of Plants and the Unions administered by the United International Bureaux for the Protection of Industrial, Literary and Artistic Property shall be governed by rules established by the Government of the Swiss Confederation in agreement with the Unions concerned.

Article 26
[Finances]

(1) The expenses of the Union shall be met from:

(a) annual contributions of member States of the Union;
(b) payments received for services rendered; and
(c) miscellaneous receipts.

(2) For the purpose of determining the amount of their annual contributions, the member States of the Union shall be divided into three classes:

First class	five units
Second class	three units
Third class	one unit

Each member State of the Union shall contribute in proportion to the number of units of the class to which it belongs.

(3) For each budgetary period, the value of the unit of contribution shall be obtained by dividing the total expenditure to be met from the contributions of member States by the total number of units.

(4) Each member State of the Union shall indicate, on joining the Union, the class in which it wishes to be placed. Any member State of the Union may, however, subsequently declare that it wishes to be placed in another class.

Such declaration must be made at least six months before the end of the financial year preceding that in which the change of class is to take effect.

Article 27

[Revision of the Convention]

(1) This Convention shall be reviewed periodically with a view to the introduction of amendments designed to improve the working of the Union.

(2) For this purpose, conferences shall be held every five years, unless the Council, by a majority of five-sixths of the members present, considers that the convening of such a conference should be brought forward or postponed.

(3) The proceedings of a conference shall be effective only if at least half of the member States of the Union are represented at it.

A majority of five-sixths of the member States of the Union represented at the conference shall be required for the adoption of a revised text of the Convention.

(4) The revised text shall enter into force, in respect of member States of the Union which have ratified it, when it has been ratified by five-sixths of the member States of the Union. It shall enter into force thirty days after the deposit of the last of the instruments of ratification. If, however, a majority of five-sixths of the member States of the Union represented at the conference considers that the revised text includes amendments of such a kind as to preclude, for member States of the Union which do not ratify the revised text, the possibility of continuing to be bound by the former text in respect of the other member States of the Union, the revised text shall enter into force two years after the deposit of the last of the instruments of ratification. In such case, the former text shall, from the date of such entry into force, cease to bind the States which have ratified the revised text.

Article 28

[Languages To Be Used by the Office and in the Council]

(1) The English, French and German languages shall be used by the Office of the Union in carrying out its duties.

(2) Meetings of the Council and of revision conferences shall be held in the three languages.

(3) If the need arises, the Council may decide, by a majority of three-quarters of the members present, that further languages shall be used.

Article 29

[Special Agreements for the Protection of New Varieties of Plants]

Member States of the Union reserve the right to conclude among themselves special agreements for the protection of new varieties of plants, in so far as such agreements do not contravene the provisions of this Convention.

Member States of the Union which have not taken part in making such agreements shall be allowed to accede to them at their request.

Article 30

[Implementation of the Convention on the Domestic Level; Special Agreements on the Joint Utilisation of Examination Services]

(1) Each member State of the Union shall undertake to adopt all measures necessary for the application of this Convention.

In particular, each member State shall undertake to:

(a) ensure to nationals of the other member States of the Union appropriate legal remedies for the effective defence of the rights provided for in this Convention;

(b) set up a special authority for the protection of new varieties of plants or to entrust their protection to an existing authority; and

(c) ensure that the public is informed of matters concerning such protection, including as a minimum the periodical publication of the list of titles of protection issued.

(2) Special agreements may also be concluded between member States of the Union, with a view to the joint utilisation of the services of the authorities entrusted with the examination of new varieties in accordance with the provisions of Article 7 and with assembling the necessary reference collections and documents.

(3) It shall be understood that, on depositing its instrument of ratification or accession, each member State must be in a position, under its own domestic law, to give effect to the provisions of this Convention.

Article 31

[Signature and Ratification; Entry Into Force]

(1) This Convention shall be open for signature until December 2, 1962, by States represented at the Paris Conference for the Protection of New Varieties of Plants.

(2) This Convention shall be subject to ratification; instruments of ratification shall be deposited with the Government of the French Republic, which shall notify such deposit to the other signatory States.

(3) When the Convention has been ratified by at least three States, it shall enter into force in respect of those States thirty days after the deposit of the third instrument of ratification. It shall enter into force, in respect of each State which ratifies thereafter, thirty days after the deposit of its instrument of ratification.

Article 32
[Accession; Entry Into Force]

(1) This Convention shall be open to accession by non-signatory States in accordance with the provisions of paragraphs (3) and (4) of this Article.

(2) Applications for accession shall be addressed to the Government of the Swiss Confederation, which shall notify them to the member States of the Union.

(3) Applications for accession shall be considered by the Council having particular regard to the provisions of Article 30.

Having regard to the nature of the decision to be taken and to the difference in the rule adopted for revision conferences, accession by a non-signatory State shall be accepted if a majority of four-fifths of the members present vote in favour of its application.

Three-quarters of the member States of the Union must be represented when the vote is taken.

(4) In the case of a favourable decision, the instrument of accession shall be deposited with the Government of the Swiss Confederation, which shall notify the member States of the Union of such deposit.

Accession shall take effect thirty days after the deposit of such instrument.

Article 33
[Communications Indicating the Genera and Species Eligible for Protection]

(1) When ratifying this Convention, in the case of a signatory State, or when submitting an application for accession, in the case of any other State, each State shall give, in the first case to the Government of the French Republic and in the second case to the Government of the Swiss Confederation, the list of genera or species in respect of which it undertakes to apply the provisions of the Convention in accordance with the requirements of Article 4. In addition, it shall specify, in the case of genera or species referred to in paragraph (4) of that Article, whether it intends to avail itself of the option of limitation available under that provision.

(2) Each member State of the Union which subsequently decides to apply the provisions of this Convention to other genera or species shall communicate the same information as is required under paragraph (1) of this Article to the Government of the Swiss Confederation and to the Office of the Union, at least thirty days before its decision takes effect.

(3) The Government of the French Republic or the Government of the Swiss Confederation, as the case may be, shall immediately communicate to all the member States of the Union the information referred to in paragraphs (1) and (2) of this Article.

Article 34
[Territories]

(1) Every member State of the Union, either on signing or on ratifying or acceding to this Convention, shall declare whether the Convention applies to all or to a part of its territories or to one or more or to all of the States or territories for which it is responsible.

This declaration may be supplemented at any time thereafter by notification to the Government of the Swiss Confederation. Such notification shall take effect thirty days after it has been received by that Government.

(2) The Government which has received the declarations or notifications referred to in paragraph (1) of this Article shall communicate them to all member States of the Union.

Article 35
[Transitional Limitation of the Requirement of Novelty]

Notwithstanding the provisions of Article 6, any member State of the Union may, without thereby creating an obligation for other member States of the Union, limit the requirement of novelty laid down in that Article, with regard to varieties of recent creation existing at the date of entry into force of this Convention in respect of such State.

Article 36
[Transitional Rules Concerning the Relationship Between Variety Denominations and Trade Marks]

(1) If, at the date of entry into force of this Convention in respect of a member State of the Union, the breeder of a new variety protected in that State, or his successor in title, enjoys in that State the protection of the denomination of that variety as a trade mark for identical or similar products within the meaning of trade mark law, he may either renounce the protection in respect of the trade mark or submit a new denomination for the variety in the place of the previous denomination. If a new denomination has not been submitted within a period of six months, the breeder or his successor in title may not continue to assert his right to the trade mark for the above-mentioned products.

(2) If a new denomination is registered for the variety, the breeder or his successor in title may not prohibit the use of the previous denomination by persons obliged to use it before the entry into force of this Convention, until a period of one year has expired from the publication of the registration of the new denomination.

Article 37
[Preservation of Existing Rights]

This Convention shall not affect existing rights under the national laws of member States of the Union or under agreements concluded between such States.

Article 38
[Settlement of Disputes]

(1) Any dispute between two or more member States of the Union concerning the interpretation or application of this Convention which is not settled by negotiation shall, at the request of one of the States concerned, be submitted to the Council, which shall endeavour to bring about agreement between the member States concerned.

(2) If such agreement is not reached within six months from the date when the dispute was submitted to the Council, the dispute shall be referred to an arbitration tribunal at the request of one of the parties concerned.

(3) The tribunal shall consist of three arbitrators.

Where two member States are parties to a dispute, each of those States shall appoint an arbitrator.

Where more than two member States are parties to a dispute, two of the arbitrators shall be appointed by agreement among the States concerned.

If the States concerned have not appointed the arbitrators within a period of two months from the date on which the request for convening the tribunal was notified to them by the Office of the Union, any of the member States concerned may request the President of the International Court of Justice to make the necessary appointments.

In all cases, the third arbitrator shall be appointed by the President of the International Court of Justice.

If the President is a national of one of the member States parties to the dispute, the Vice-President shall make the appointments referred to above, unless he is himself also a national of one of the member States parties to the dispute. In this last case, the appointments shall be made by the member of the Court who is not a national of one of the member States parties to the dispute and who has been selected by the President to make the appointments.

(4) The award of the tribunal shall be final and binding on the member States concerned.

(5) The tribunal shall determine its own procedure, unless the member States concerned agree otherwise.

(6) Each of the member States parties to the dispute shall bear the costs of its representation before the arbitration tribunal; other costs shall be borne in equal parts by each of the States.

Article 39

[Reservations]

Signature and ratification of and accession to this Convention shall not be subject to any reservation.

Article 40

[Duration and Denunciation of the Convention; Discontinuation of the Application of the Convention to Territories]

(1) This Convention shall be of unlimited duration.

(2) Subject to the provisions of paragraph (4) of Article 27, if a member State of the Union denounces this Convention, such denunciation shall take effect one year after the date on which notification of denunciation is made by the Government of the Swiss Confederation to the other member States of the Union.

(3) Any member State may at any time declare that the Convention shall cease to apply to certain of its territories or to States or territories in respect of which it has made a declaration in accordance with the provisions of Article 34. Such declaration shall take effect one year after the date on which notification thereof is made by the Government of the Swiss Confederation to the other member States of the Union.

(4) Such denunciations and declarations shall not affect rights acquired by reason of this Convention prior to the expiration of the time limit laid down in paragraphs (2) and (3) of this Article.

Article 41

[Copies of the Convention; Language and Official Translations of the Convention]

(1) This Convention is drawn up in a single copy in the French language. That copy is deposited in the archives of the Government of the French Republic.

(2) A certified true copy shall be forwarded by that Government to the Governments of all signatory States.

(3) Official translations of this Convention shall be made in the Dutch, English, German, Italian and Spanish languages.

IN WITNESS WHEREOF, the Plenipotentiaries duly authorised thereto, having communicated their Full Powers found to be in good and due form, have signed this Convention and have affixed thereto their seals.

DONE at Paris, this second day of December, 1961.

For the Federal Republic of Germany

G. v. HAEFTEN
JOSEPH MURMANN
HANS SCHADE

For Belgium

A. BAYOT

For France

HENRI FERRU

For Italy

In my capacity as Plenipotentiary, I declare that the Government of the Italian Republic, by virtue of the option afforded by paragraph (5) of Article 4 of the present Convention, decides to apply Articles 2 and 3 of the Convention of Paris for the Protection of Industrial Property with regard to the protection of plant varieties.

TALAMO

For the Netherlands

F. E. NIJDAM

For the United Kingdom of Great Britain and Northern Ireland

November 26, 1962

PIERSON DIXON

For Denmark

At the time of signing this Convention I declare that my signature does not bind Greenland and the Faroe Islands.
November 26, 1962

E. BARTELS

For Switzerland

November 30, 1962

AGOSTINO SOLDATI

ANNEX

List referred to in Article 4, paragraph (3)

Species to be protected in each genus

1.	Wheat	Triticum aestivum L. ssp. vulgare (VILL, HOST) MAC KAY Triticum durum DESF.
2.	Barley	Hordeum vulgare L. s. lat.
3.	Oats	Avena sativa L. Avena byzantina C. KOCH
	or Rice . . .	Oryza sativa L.
4.	Maize	Zea Mays L.
5.	Potato	Solanum tuberosum L.
6.	Peas	Pisum sativum L.
7.	Beans	Phaseolus vulgaris L. Phaseolus coccineus L.
8.	Lucerne . . .	Medicago sativa L. Medicago varia MARTYN
9.	Red Clover . .	Trifolium pratense L.
10.	Ryegrass . . .	Lolium sp.
11.	Lettuce . . .	Lactuca sativa L.
12.	Apples . . .	Malus domestica BORKH
13.	Roses	Rosa hort.
	or Carnations .	Dianthus caryophyllus L.

If two optional genera are chosen — numbers 3 or 13 above — they shall be counted as one genus only.

Recommendation

The Conference,

Having regard to Articles 7 and 30 of the Convention,

Having regard to the fact that the examination of new varieties of plants will constitute for each of the member States of the Union an onerous task from a technical and financial point of view, which it is possible and desirable to alleviate by organising such examination on an international basis,

Having regard to the fact that such international co-operation will result in the possibility of extending the Union to include a larger number of States and to cover a larger number of botanical genera and species,

Recommends the States represented at the Conference to undertake as soon as possible the necessary studies for organising the examination on an international basis and for making the agreements provided for in Article 30 of the Convention.

Declaration

The signatory States declare it to be their common intention to extend the provisions of the Convention, as soon as it comes into force, to at least 15 genera and species the list of which will be drawn up by them by mutual agreement.

For the Fedral Republic of Germany

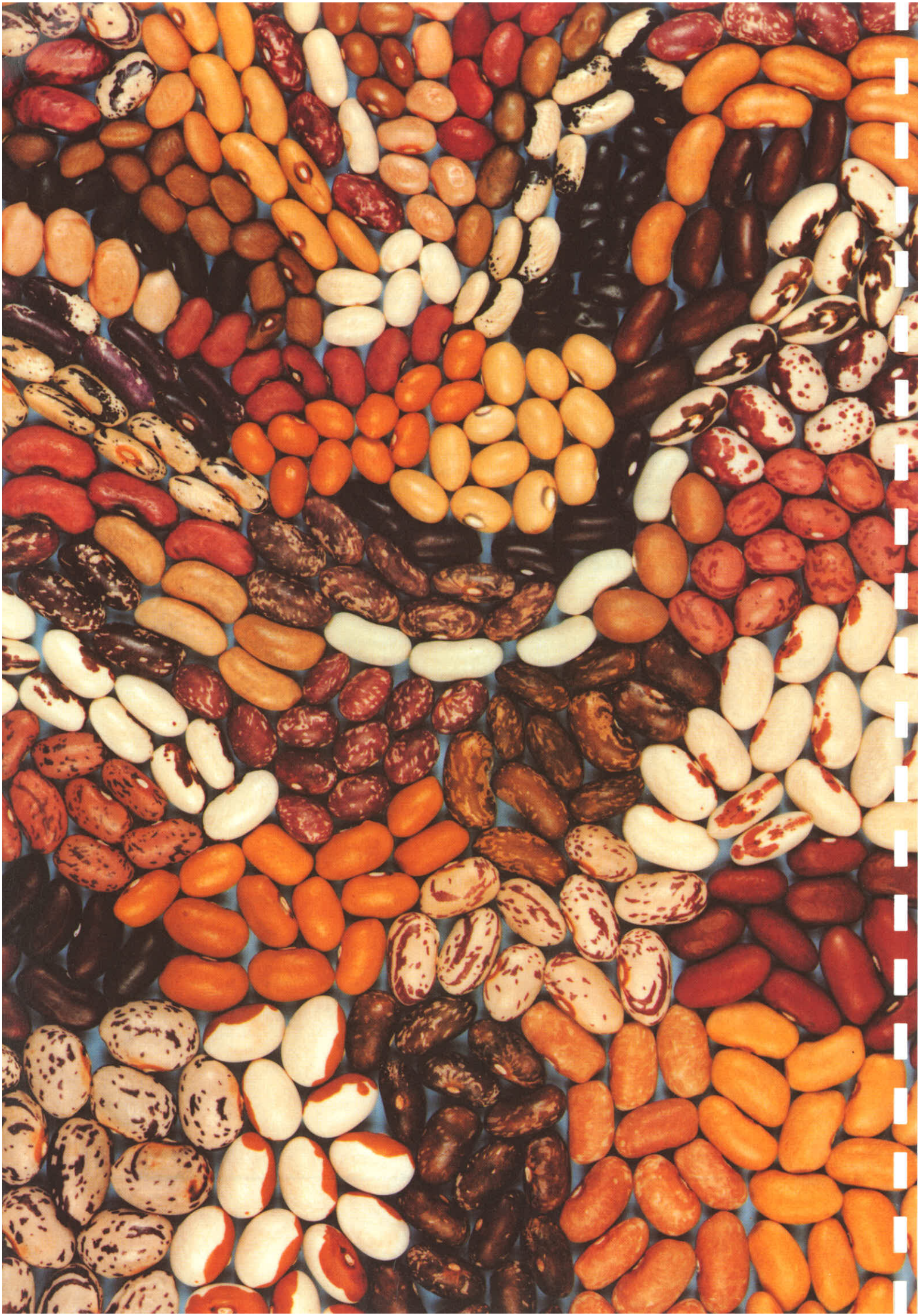
G. v. HAEFTEN
JOSEPH MURMANN
HANS SCHADE

For France

HENRI FERRU

For the Netherlands

F. E. NIJDAM



Additional Act of November 10, 1972

Additional Act of November 10, 1972, Amending the International Convention for the Protection of New Varieties of Plants

THE CONTRACTING STATES,

Considering that in the light of the experience gained since the entry into force of the International Convention for the Protection of New Varieties of Plants, of December 2, 1961, the system of contributions of member States of the Union provided for by that Convention does not allow for sufficient differentiation among the member States of the Union as to the share in the total of the contributions that should be allotted to each of them,

Considering further that it is desirable to amend the provisions of that Convention on the contributions of member States of the Union and, in the event of arrears in the payment of such contributions, on the right to vote,

Having regard to the provisions of Article 27 of the said Convention,

Have agreed as follows:

Article I

[Amended Version of Article 22 of the Convention (Majorities Required for Decisions of the Council)] [1]

Article 22 of the International Convention for the Protection of New Varieties of Plants, of December 2, 1961 (hereinafter referred to as the Convention), shall be replaced by the following text:

" Decisions of the Council shall be taken by a simple majority of the members present, except in the cases provided for in Articles 20, 27, 28 and 32, for the vote on the budget, for the fixing of the contributions of each member State of the Union, for the faculty provided for in paragraph (5) of Article 26 concerning payment of one-half of the contribution corresponding to Class V and for any decision regarding voting rights under paragraph (6) of Article 26. In these last four cases, the majority required shall be three-quarters of the members present. "

Article II

[Amended Version of Article 26 of the Convention (Finances)]

Article 26 of the Convention shall be replaced by the following text:

" (1) The expenses of the Union shall be met from:

(a) annual contributions of member States of the Union;

(b) payments received for services rendered;

(c) miscellaneous receipts.

" (2) For the purpose of determining the amounts of their annual contributions, the member States of the Union shall be divided into five classes:

Class I	5 units
Class II	4 units
Class III	3 units
Class IV	2 units
Class V	1 unit

" Each member State of the Union shall contribute in proportion to the number of units of the class to which it belongs.

" (3) For each budgetary period, the value of the unit of contribution shall be obtained by dividing the total expenditure to be met from the contributions of member States of the Union by the total number of units.

" (4) Each member State of the Union shall indicate, on joining the Union, the class in which it wishes to be placed. Any member State of the Union may, however, subsequently declare that it wishes to be placed in another class.

" Such declaration must be addressed to the Secretary-General of the Union at least six months before the end of the financial year preceding that in which the change of class is to take effect.

" (5) At the request of a member State of the Union or of a State applying for accession to the Convention according to Article 32 and indicating the wish to be placed in Class V, the Council may, in order to take account of exceptional circumstances, decide to allow such State to pay only one-half of the contribution corresponding to Class V. Such decision will stand until the State concerned waives the faculty granted or declares that it wishes to be placed in another class or until the Council revokes its decision.

" (6) A member State of the Union which is in arrears in the payment of its contributions may not exercise its right to vote in the Council if the amount of its arrears equals or exceeds the amount of the contributions due from it for the preceding two full years, but it shall not be relieved of its obligations under this Convention, nor shall it be deprived of any other rights thereunder. However, the Council may allow such a State to continue to exercise its right to vote if, and as long as, the Council is satisfied that the delay in payment is due to exceptional and unavoidable circumstances. "

Article III

[Applicability of Paragraph (6) of the Amended Version of Article 26 of the Convention]

The provisions of paragraph (6) of Article 26 shall apply only if all member States of the Union have ratified or acceded to this Additional Act.

Article IV
[Contribution Classes of Member States]

Member States of the Union shall be placed in the class under this Additional Act which contains the same number of units as the class they have chosen under the Convention, unless, at the moment of depositing their instrument of ratification or accession, they express the wish to be placed in another class under this Additional Act.

Article V
[Signature; Ratification; Accession]

(1) This Additional Act shall be open for signature until April 1, 1973, by member States of the Union and by signatory States of the Convention.

(2) This Additional Act shall be subject to ratification.

(3) This Additional Act shall be open to accession by non-signatory States in accordance with the provisions of paragraphs (2) and (3) of Article 32 of the Convention.

(4) After the entry into force of this Additional Act, a State may accede to the Convention only if it accedes to this Additional Act at the same time.

(5) Instruments of ratification of or accession to this Additional Act by States which have ratified the Convention or which ratify it at the same time as they ratify or accede to this Additional Act shall be deposited with the Government of the French Republic. Instruments of ratification of or accession to this Additional Act by States which have acceded to the Convention or which accede to it at the same time as they ratify or accede to this Additional Act shall be deposited with the Government of the Swiss Confederation.

Article VI
[Entry Into Force]

(1) This Additional Act shall enter into force in accordance with the first and second sentences of paragraph (4) of Article 27 of the Convention.

(2) With respect to any State which deposits its instrument of ratification of or accession to this Additional Act after the date of its entry into force, this Additional Act shall enter into force thirty days after the deposit of such instrument.

Article VII
[Reservations]

No reservations to this Additional Act are permitted.

Article VIII
[Original Copy of the Additional Act; Language and Official Translations of the Additional Act; Notifications; Registration of the Additional Act]

(1) This Additional Act shall be signed in a single original in the French language, which shall be deposited in the archives of the Government of the French Republic.

(2) Official translations of this Additional Act shall be established by the Secretary-General of the Union, after consultation with the interested Governments, in Dutch, English, German, Italian and Spanish, and in such other languages as the Council of the Union may designate. In the latter event, the Secretary-General of the Union shall also establish an official translation of the Convention in the language so designated.

(3) The Secretary-General of the Union shall transmit two copies, certified by the Government of the French Republic, of the signed text of this Additional Act to the Governments of the States referred to in paragraph (1) of Article V, and on request to the Government of any other State.

(4) The Secretary-General of the Union shall register this Additional Act with the Secretariat of the United Nations.

(5) The Government of the French Republic shall notify the Secretary-General of the Union of the signatures of this Additional Act and of the deposit with that Government of instruments of ratification or accession. The Government of the Swiss Confederation shall notify the Secretary-General of the Union of the deposit with that Government of instruments of ratification or accession.

(6) The Secretary-General of the Union shall inform the member States of the Union and the signatory States of the Convention of the notifications received pursuant to the preceding paragraph and of the entry into force of this Additional Act.

IN WITNESS WHEREOF, the undersigned, being duly authorised thereto, have signed this Additional Act.

DONE at Geneva, this tenth day of November, one thousand nine hundred and seventy-two.

Revised Text of October 23, 1978

International Convention for the Protection of New Varieties of Plants

of December 2, 1961, as revised at Geneva on November 10, 1972, and on October 23, 1978

TABLE OF CONTENTS

THE CONTRACTING PARTIES,

Considering that the International Convention for the Protection of New Varieties of Plants of December 2, 1961, amended by the Additional Act of November 10, 1972, has proved a valuable instrument for international cooperation in the field of the protection of the rights of the breeders,

Reaffirming the principles contained in the Preamble to the Convention to the effect that:

(a) they are convinced of the importance attaching to the protection of new varieties of plants not only for the development of agriculture in their territory but also for safeguarding the interests of breeders,

(b) they are conscious of the special problems arising from the recognition and protection of the rights of breeders and particularly of the limitations that the requirements of the public interest may impose on the free exercise of such a right,

(c) they deem it highly desirable that these problems, to which very many States rightly attach importance, should be resolved by each of them in accordance with uniform and clearly defined principles,

Considering that the idea of protecting the rights of breeders has gained general acceptance in many States which have not yet acceded to the Convention,

Considering that certain amendments in the Convention are necessary in order to facilitate the joining of the Union by these States,

Considering that some provisions concerning the administration of the Union created by the Convention require amendment in the light of experience,

Considering that these objectives may be best achieved by a new revision of the Convention,

Have agreed as follows:

Article 1

Purpose of the Convention; Constitution of a Union; Seat of the Union

(1) The purpose of this Convention is to recognise and to ensure to the breeder of a new plant variety or to his successor in title (both hereinafter referred to as "the breeder") a right under the conditions hereinafter defined.

(2) The States parties to this Convention (hereinafter referred to as "the member States of the Union") constitute a Union for the Protection of New Varieties of Plants.

(3) The seat of the Union and its permanent organs shall be at Geneva.

Article 2

Forms of Protection

(1) Each member State of the Union may recognise the right of the breeder provided for in this Convention by the grant either of a special title of protection or of a patent. Nevertheless, a member State of the Union whose national law admits of protection under both these forms may provide only one of them for one and the same botanical genus or species.

(2) Each member State of the Union may limit the application of this Convention within a genus or species to varieties with a particular manner of reproduction or multiplication, or a certain end-use.

Article 3

National Treatment; Reciprocity

(1) Without prejudice to the rights specially provided for in this Convention, natural and legal persons resident or having their registered office in one of the member States of the Union shall, in so far as the recognition and protection of the right of the breeder are concerned, enjoy in the other member States of the Union the same treatment as is accorded or may hereafter be accorded by the respective laws of such States to their own nationals, provided that such persons comply with the conditions and formalities imposed on such nationals.

(2) Nationals of member States of the Union not resident or having their registered office in one of those States shall likewise enjoy the same rights provided that they fulfil such obligations as may be imposed on them for the purpose of enabling the varieties which they have bred to be examined and the multiplication of such varieties to be checked.

(3) Notwithstanding the provisions of paragraphs (1) and (2), any member State of the Union applying this Convention to a given genus or species shall be entitled to limit the benefit of the protection to the nationals of those member States of the Union which apply this Convention to that genus or species and to natural and legal persons resident or having their registered office in any of those States.

Article 4

Botanical Genera and Species Which Must or May be Protected

(1) This Convention may be applied to all botanical genera and species.

(2) The member States of the Union undertake to adopt all measures necessary for the progressive application of the provisions of this Convention to the largest possible number of botanical genera and species.

(3) *(a)* Each member State of the Union shall, on the entry into force of this Convention in its territory, apply the provisions of this Convention to at least five genera or species.

(b) Subsequently, each member State of the Union shall apply the said provisions to additional genera or species within the following periods from the date of the entry into force of this Convention in its territory:

(i) within three years, to at least ten genera or species in all;

(ii) within six years, to at least eighteen genera or species in all;

(iii) within eight years, to at least twenty-four genera or species in all.

(c) If a member State of the Union has limited the application of this Convention within a genus or species in accordance with the provisions of Article 2(2), that genus or species shall nevertheless, for the purposes of subparagraphs *(a)* and *(b)*, be considered as one genus or species.

(4) At the request of any State intending to ratify, accept, approve or accede to this Convention, the Council may, in order to take account of special economic or ecological conditions prevailing in that State, decide, for the purpose of that State, to reduce the minimum numbers referred to in paragraph (3), or to extend the periods referred to in that paragraph, or to do both.

(5) At the request of any member State of the Union, the Council may, in order to take account of special difficulties encountered by that State in the fulfilment of the obligations under paragraph (3)*(b)*, decide, for the purposes of that State, to extend the periods referred to in paragraph (3)*(b)*.

Article 5

Rights Protected; Scope of Protection

(1) The effect of the right granted to the breeder is that his prior authorisation shall be required for

— the production for purposes of commercial marketing

— the offering for sale

— the marketing

of the reproductive or vegetative propagating material, as such, of the variety.

Vegetative propagating material shall be deemed to include whole plants. The right of the breeder shall extend to ornamental plants or parts thereof normally marketed for purposes other than propagation when they are used commercially as propagating material in the production of ornamental plants or cut flowers.

(2) The authorisation given by the breeder may be made subject to such conditions as he may specify.

(3) Authorisation by the breeder shall not be required either for the utilisation of the variety as an initial source of variation for the purpose of creating other varieties or for the marketing of such varieties. Such authorisation shall be required, however, when the repeated use of the variety is necessary for the commercial production of another variety.

(4) Any member State of the Union may, either under its own law or by means of special agreements under Article 29, grant to breeders, in respect of certain botanical genera or species, a more extensive right than that set out in paragraph (1), extending in particular to the marketed product. A member State of the Union which grants such a right may limit the benefit of it to the nationals of member States of the Union which grant an identical right and to natural and legal persons resident or having their registered office in any of those States.

Article 6

Conditions Required for Protection

(1) The breeder shall benefit from the protection provided for in this Convention when the following conditions are satisfied:

(a) Whatever may be the origin, artificial or natural, of the initial variation from which it has resulted, the variety must be clearly distinguishable by one or more important characteristics from any other variety whose existence is a matter of common knowledge at the time when protection is applied for. Common knowledge may be established by reference to various factors such as: cultivation or marketing already in progress, entry in an official register of varieties already made or in the course of being made, inclusion in a reference collection, or precise description in a publication. The characteristics which permit a variety to be defined and distinguished must be capable of precise recognition and description.

(b) At the date on which the application for protection in a member State of the Union is filed, the variety

(i) must not—or, where the law of that State so provides, must not for longer than one year—have been offered for sale or marketed, with the agreement of the breeder, in the territory of that State, and

(ii) must not have been offered for sale or marketed, with the agreement of the breeder, in the territory of any other State for longer than six years in the case of vines, forest trees, fruit trees and ornamental trees, including, in each case, their rootstocks, or for longer than four years in the case of all other plants.

Trials of the variety not involving offering for sale or marketing shall not affect the right to protection. The fact that the variety has become a matter of common knowledge in ways other than through offering for sale or marketing shall also not affect the right of the breeder to protection.

(c) The variety must be sufficiently homogeneous, having regard to the particular features of its sexual reproduction or vegetative propagation.

(d) The variety must be stable in its essential characteristics, that is to say, it must remain true to its description after repeated reproduction or propagation or, where the breeder has defined a particular cycle of reproduction or multiplication, at the end of each cycle.

(e) The variety shall be given a denomination as provided in Article 13.

(2) Provided that the breeder shall have complied with the formalities provided for by the national law of the member State of the Union in which the application for protection was filed, including the payment of fees, the grant of protection may not be made subject to conditions other than those set forth above.

Article 7

Official Examination of Varieties; Provisional Protection

(1) Protection shall be granted after examination of the variety in the light of the criteria defined in Article 6. Such examination shall be appropriate to each botanical genus or species.

(2) For the purposes of such examination, the competent authorities of each member State of the Union may require the breeder to furnish all the necessary information, documents, propagating material or seeds.

(3) Any member State of the Union may provide measures to protect the breeder against abusive acts of third parties committed during the period between the filing of the application for protection and the decision thereon.

Article 8

Period of Protection

The right conferred on the breeder shall be granted for a limited period. This period may not be less than fifteen years, computed from the date of issue of the title of protection. For vines, forest trees, fruit trees and ornamental trees, including, in each case, their rootstocks, the period of protection may not be less than eighteen years, computed from the said date.

Article 9

Restrictions in the Exercise of Rights Protected

(1) The free exercise of the exclusive right accorded to the breeder may not be restricted otherwise than for reasons of public interest.

(2) When any such restriction is made in order to ensure the widespread distribution of the variety, the member State of the Union concerned shall take all measures necessary to ensure that the breeder receives equitable remuneration.

Article 10

Nullity and Forfeiture of the Rights Protected

(1) The right of the breeder shall be declared null and void, in accordance with the provisions of the national law of each member State of the Union, if it is established that the conditions laid down in Article 6 (1) *(a)* and *(b)* were not effectively complied with at the time when the title of protection was issued.

(2) The right of the breeder shall become forfeit when he is no longer in a position to provide the competent authority with reproductive or propagating material capable of producing the variety with its characteristics as defined when the protection was granted.

(3) The right of the breeder may become forfeit if:

(a) after being requested to do so and within a prescribed period, he does not provide the competent

authority with the reproductive or propagating material, the documents and the information deemed necessary for checking the variety, or he does not allow inspection of the measures which have been taken for the maintenance of the variety; or

(b) he has failed to pay within the prescribed period such fees as may be payable to keep his rights in force.

(4) The right of the breeder may not be annulled or become forfeit except on the grounds set out in this Article.

Article 11

Free Choice of the Member State in Which the First Application is Filed; Application in Other Member States; Independence of Protection in Different Member States

(1) The breeder may choose the member State of the Union in which he wishes to file his first application for protection.

(2) The breeder may apply to other member States of the Union for protection of his right without waiting for the issue to him of a title of protection by the member State of the Union in which he filed his first application.

(3) The protection applied for in different member States of the Union by natural or legal persons entitled to benefit under this Convention shall be independent of the protection obtained for the same variety in other States whether or not such States are members of the Union.

Article 12

Right of Priority

(1) Any breeder who has duly filed an application for protection in one of the member States of the Union shall, for the purpose of filing in the other member States of the Union, enjoy a right of priority for a period of twelve months. This period shall be computed from the date of filing of the first application. The day of filing shall not be included in such period.

(2) To benefit from the provisions of paragraph (1), the further filing must include an application for protection, a claim in respect of the priority of the first application and, within a period of three months, a copy of the documents which constitute that application, certified to be a true copy by the authority which received it.

(3) The breeder shall be allowed a period of four years after the expiration of the period of priority in which to furnish, to the member State of the Union with which he has filed an application for protection in accordance with the terms of paragraph (2), the additional documents and material required by the laws and regulations of that State. Nevertheless, that State may require the additional documents and material to be furnished within an adequate period in the case where the application whose priority is claimed is rejected or withdrawn.

(4) Such matters as the filing of another application or the publication or use of the subject of the application, occurring within the period provided for in paragraph (1), shall not constitute grounds for objection to an application filed in accordance with the foregoing conditions. Such matters may not give rise to any right in favour of a third party or to any right of personal possession.

Article 13

Variety Denomination

(1) The variety shall be designated by a denomination destined to be its generic designation. Each member State of the Union shall ensure that subject to paragraph (4) no rights in the designation registered as the denomination of the variety shall hamper the free use of the denomination in connection with the variety, even after the expiration of the protection.

(2) The denomination must enable the variety to be identified. It may not consist solely of figures except where this is an established practice for designating varieties. It must not be liable to mislead or to cause confusion concerning the characteristics, value or identity of the variety or the identity of the breeder. In particular, it must be different from every denomination which designates, in any member State of the Union, an existing variety of the same botanical species or of a closely related species.

(3) The denomination of the variety shall be submitted by the breeder to the authority referred to in Article 30(1)*(b)*. If it is found that such denomination does not satisfy the requirements of paragraph (2), that authority shall refuse to register it and shall require the breeder to propose another denomination within a prescribed period. The denomination shall be registered at the same time as the title of protection is issued in accordance with the provisions of Article 7.

(4) Prior rights of third parties shall not be affected. If, by reason of a prior right, the use of the denomination of a variety is forbidden to a person who, in accordance with the provisions of paragraph (7), is obliged to use it, the authority referred to

in Article 30(1)*(b)* shall require the breeder to submit another denomination for the variety.

(5) A variety must be submitted in member States of the Union under the same denomination. The authority referred to in Article 30 (1) *(b)* shall register the denomination so submitted, unless it considers that denomination unsuitable in its State. In the latter case, it may require the breeder to submit another denomination.

(6) The authority referred to in Article 30 (1) *(b)* shall ensure that all the other such authorities are informed of matters concerning variety denominations, in particular the submission, registration and cancellation of denominations. Any authority referred to in Article 30(1)*(b)* may address its observations, if any, on the registration of a denomination to the authority which communicated that denomination.

(7) Any person who, in a member State of the Union, offers for sale or markets reproductive or vegetative propagating material of a variety protected in that State shall be obliged to use the denomination of that variety, even after the expiration of the protection of that variety, in so far as, in accordance with the provisions of paragraph (4), prior rights do not prevent such use.

(8) When the variety is offered for sale or marketed, it shall be permitted to associate a trade mark, trade name or other similar indication with a registered variety denomination. If such an indication is so associated, the denomination must nevertheless be easily recognizable.

Article 14

Protection Independent of Measures Regulating Production, Certification and Marketing

(1) The right accorded to the breeder in pursuance of the provisions of this Convention shall be independent of the measures taken by each member State of the Union to regulate the production, certification and marketing of seeds and propagating material.

(2) However, such measures shall, as far as possible, avoid hindering the application of the provisions of this Convention.

Article 15

Organs of the Union

The permanent organs of the Union shall be:
(a) the Council;
(b) the Secretariat General, entitled the Office of the International Union for the Protection of New Varieties of Plants.

Article 16

Composition of the Council; Votes

(1) The Council shall consist of the representatives of the member States of the Union. Each member State of the Union shall appoint one representative to the Council and one alternate.

(2) Representatives or alternates may be accompanied by assistants or advisers.

(3) Each member State of the Union shall have one vote in the Council.

Article 17

Observers in Meetings of the Council

(1) States not members of the Union which have signed this Act shall be invited as observers to meetings of the Council.

(2) Other observers or experts may also be invited to such meetings.

Article 18

President and Vice-Presidents of the Council

(1) The Council shall elect a President and a first Vice-President from among its members. It may elect other Vice-Presidents. The first Vice-President shall take the place of the President if the latter is unable to officiate.

(2) The President shall hold office for three years.

Article 19

Sessions of the Council

(1) The Council shall meet upon convocation by its President.

(2) An ordinary session of the Council shall be held annually. In addition, the President may convene the Council at his discretion; he shall convene it, within a period of three months, if one-third of the member States of the Union so request.

Article 20

Rules of Procedure of the Council; Administrative and Financial Regulations of the Union

The Council shall establish its rules of procedure and the administrative and financial regulations of the Union.

Article 21

Tasks of the Council

The tasks of the Council shall be to:

(a) study appropriate measures to safeguard the interests and to encourage the development of the Union;

(b) appoint the Secretary-General and, if it finds it necessary, a Vice Secretary-General and determine the terms of appointment of each;

(c) examine the annual report on the activities of the Union and lay down the programme for its future work;

(d) give to the Secretary-General, whose functions are set out in Article 23, all necessary directions for the accomplishment of the tasks of the Union;

(e) examine and approve the budget of the Union and fix the contribution of each member State of the Union in accordance with the provisions of Article 26;

(f) examine and approve the accounts presented by the Secretary-General;

(g) fix, in accordance with the provisions of Article 27, the date and place of the conferences referred to in that Article and take the measures necessary for their preparation; and

(h) in general, take all necessary decisions to ensure the efficient functioning of the Union.

Article 22

Majorities Required for Decisions of the Council

Any decision of the Council shall require a simple majority of the votes of the members present and voting, provided that any decision of the Council under Articles 4(4), 20, 21*(e)*, 26(5)*(b)*, 27(1), 28(3) or 32(3) shall require three-fourths of the votes of the members present and voting. Abstentions shall not be considered as votes.

Article 23

Tasks of the Office of the Union; Responsibilities of the Secretary-General; Appointment of Staff

(1) The Office of the Union shall carry out all the duties and tasks entrusted to it by the Council. It shall be under the direction of the Secretary-General.

(2) The Secretary-General shall be responsible to the Council; he shall be responsible for carrying out the decisions of the Council. He shall submit the budget for the approval of the Council and shall be responsible for its implementation. He shall make an annual report to the Council on his administration and a report on the activities and financial position of the Union.

(3) Subject to the provisions of Article 21*(b)*, the conditions of appointment and employment of the staff necessary for the efficient performance of the tasks of the Office of the Union shall be fixed in the administrative and financial regulations referred to in Article 20.

Article 24

Legal Status

(1) The Union shall have legal personality.

(2) The Union shall enjoy on the territory of each member State of the Union, in conformity with the laws of that State, such legal capacity as may be necessary for the fulfilment of the objectives of the Union and for the exercise of its functions.

(3) The Union shall conclude a headquarters agreement with the Swiss Confederation.

Article 25

Auditing of the Accounts

The auditing of the accounts of the Union shall be effected by a member State of the Union as provided in the administrative and financial regulations referred to in Article 20. Such State shall be designated, with its agreement, by the Council.

Article 26

Finances

(1) The expenses of the Union shall be met from:

— the annual contributions of the member States of the Union;

— payments received for services rendered;
— miscellaneous receipts.

(2)*(a)* The share of each member State of the Union in the total amount of the annual contributions shall be determined by reference to the total expenditure to be met from the contributions of the member States of the Union and to the number of contribution units applicable to it under paragraph (3). The said share shall be computed according to paragraph (4).

(b) The number of contribution units shall be expressed in whole numbers or fractions thereof, provided that such number shall not be less than one-fifth.

(3)*(a)* As far as any State is concerned which is a member State of the Union on the date on which this Act enters into force with respect to that State, the number of contribution units applicable to it shall be the same as was applicable to it, immediately before the said date, according to the Convention of 1961 as amended by the Additional Act of 1972.

(b) As far as any other State is concerned, that State shall, on joining the Union, indicate, in a declaration addressed to the Secretary-General, the number of contribution units applicable to it.

(c) Any member State of the Union may, at any time, indicate, in a declaration addressed to the Secretary-General, a number of contribution units different from the number applicable to it under subparagraph *(a)* or *(b)*. Such declaration, if made during the first six months of a calendar year, shall take effect from the beginning of the subsequent calendar year; otherwise it shall take effect from the beginning of the second calendar year which follows the year in which the declaration was made.

(4)*(a)* For each budgetary period, the amount corresponding to one contribution unit shall be obtained by dividing the total amount of the expenditure to be met in that period from the contributions of the member States of the Union by the total number of units applicable to those States.

(b) The amount of the contribution of each member State of the Union shall be obtained by multiplying the amount corresponding to one contribution unit by the number of contribution units applicable to that State.

(5)*(a)* A member State of the Union which is in arrears in the payment of its contributions may not, subject to paragraph *(b)*, exercise its right to vote in the Council if the amount of its arrears equals or exceeds the amount of the contributions due from it for the preceding two full years. The suspension of the right to vote does not relieve such State of its obligations under this Convention and does not deprive it of any other rights thereunder.

(b) The Council may allow the said State to continue to exercise its right to vote if, and as long as, the Council is satisfied that the delay in payment is due to exceptional and unavoidable circumstances.

Article 27

Revision of the Convention

(1) This Convention may be revised by a conference of the member States of the Union. The convocation of such conference shall be decided by the Council.

(2) The proceedings of a conference shall be effective only if at least half of the member States of the Union are represented at it. A majority of five-sixths of the member States of the Union represented at the conference shall be required for the adoption of a revised text of the Convention.

Article 28

Languages Used by the Office and in Meetings of the Council

(1) The English, French and German languages shall be used by the Office of the Union in carrying out its duties.

(2) Meetings of the Council and of revision conferences shall be held in the three languages.

(3) If the need arises, the Council may decide that further languages shall be used.

Article 29

Special Agreements for the Protection of New Varieties of Plants

Member States of the Union reserve the right to conclude among themselves special agreements for the protection of new varieties of plants, in so far as such agreements do not contravene the provisions of this Convention.

Article 30

Implementation of the Convention on the Domestic Level; Contracts on the Joint Utilisation of Examination Services

(1) Each member State of the Union shall adopt all measures necessary for the application of this Convention; in particular, it shall:

(a) provide for appropriate legal remedies for the effective defence of the rights provided for in this Convention;

(b) set up a special authority for the protection of new varieties of plants or entrust such protection to an existing authority;

(c) ensure that the public is informed of matters concerning such protection, including as a minimum the periodical publication of the list of titles of protection issued.

(2) Contracts may be concluded between the competent authorities of the member States of the Union, with a view to the joint utilisation of the services of the authorities entrusted with the examination of varieties in accordance with the provisions of Article 7 and with assembling the necessary reference collections and documents.

(3) It shall be understood that, on depositing its instrument of ratification, acceptance, approval or accession, each State must be in a position, under its own domestic law, to give effect to the provisions of this Convention.

Article 31

Signature

This Act shall be open for signature by any member State of the Union and any other State which was represented in the Diplomatic Conference adopting this Act. It shall remain open for signature until October 31, 1979.

Article 32

Ratification, Acceptance or Approval; Accession

(1) Any State shall express its consent to be bound by this Act by the deposit of:

(a) its instrument of ratification, acceptance or approval, if it has signed this Act; or

(b) its instrument of accession, if it has not signed this Act.

(2) Instruments of ratification, acceptance, approval or accession shall be deposited with the Secretary-General.

(3) Any State which is not a member of the Union and which has not signed this Act shall, before depositing its instrument of accession, ask the Council to advise it in respect of the conformity of its laws with the provisions of this Act. If the decision embodying the advice is positive, the instrument of accession may be deposited.

Article 33

Entry Into Force; Closing of Earlier Texts

(1) This Act shall enter into force one month after the following two conditions are fulfilled:

(a) the number of instruments of ratification, acceptance, approval or accession deposited is not less than five; and

(b) at least three of the said instruments are instruments deposited by States parties to the Convention of 1961.

(2) With respect to any State which deposits its instrument of ratification, acceptance, approval or accession after the conditions referred to in paragraph (1)*(a)* and *(b)* have been fulfilled, this Act shall enter into force one month after the deposit of the instrument of the said State.

(3) Once this Act enters into force according to paragraph (1), no State may accede to the Convention of 1961 as amended by the Additional Act of 1972.

Article 34

Relations Between States Bound by Different Texts

(1) Any member State of the Union which, on the day on which this Act enters into force with respect to that State, is bound by the Convention of 1961 as amended by the Additional Act of 1972 shall, in its relations with any other member State of the Union which is not bound by this Act, continue to apply, until the present Act enters into force also with respect to that other State, the said Convention as amended by the said Additional Act.

(2) Any member State of the Union not bound by this Act ("the former State") may declare, in a notification addressed to the Secretary-General, that it will apply the Convention of 1961 as amended by the Additional Act of 1972 in its relations with any State bound by this Act which becomes a member of the Union through ratification, acceptance or approval of or accession to this Act ("the latter State"). As from the beginning of one month after the date of any such notification and until the entry into force of this Act with respect to the former State, the former State shall apply the Convention of 1961 as amended by the Additional Act of 1972 in its relations with any such latter State, whereas any such latter State shall apply this Act in its relations with the former State.

Article 35

Communications Concerning the Genera and Species Protected; Information to be Published

(1) When depositing its instrument of ratification, acceptance or approval of or accession to this Act, each State which is not a member of the Union shall notify the Secretary-General of the list of genera and species to which, on the entry into force of this Act with respect to that State, it will apply the provisions of this Convention.

(2) The Secretary-General shall, on the basis of communications received from each member State of the Union concerned, publish information on:

(a) the extension of the application of the provisions of this Convention to additional genera and species after the entry into force of this Act with respect to that State;

(b) any use of the faculty provided for in Article 3(3);

(c) the use of any faculty granted by the Council pursuant to Article 4(4) or (5);

(d) any use of the faculty provided for in Article 5(4), first sentence, with an indication of the nature of the more extensive rights and with a specification of the genera and species to which such rights apply;

(e) any use of the faculty provided for in Article 5(4), second sentence;

(f) the fact that the law of the said State contains a provision as permitted under Article 6(1)*(b)*(i), and the length of the period permitted;

(g) the length of the period referred to in Article 8 if such period is longer than the fifteen years and the eighteen years, respectively, referred to in that Article.

Article 36

Territories

(1) Any State may declare in its instrument of ratification, acceptance, approval or accession, or may inform the Secretary-General by written notification any time thereafter, that this Act shall be applicable to all or part of the territories designated in the declaration or notification.

(2) Any State which has made such a declaration or given such a notification may, at any time, notify the Secretary-General that this Act shall cease to be applicable to all or part of such territories.

(3) *(a)* Any declaration made under paragraph (1) shall take effect on the same date as the ratification, acceptance, approval, or accession in the instrument of which it was included, and any notification given under that paragraph shall take effect three months after its notification by the Secretary-General.

(b) Any notification given under paragraph (2) shall take effect twelve months after its receipt by the Secretary-General.

Article 37

Exceptional Rules for Protection Under Two Forms

(1) Notwithstanding the provisions of Article 2(1), any State which, prior to the end of the period during which this Act is open for signature, provides for protection under the different forms referred to in Article 2(1) for one and the same genus or species, may continue to do so if, at the time of signing this Act or of depositing its instrument of ratification, acceptance or approval of or accession to this Act, it notifies the Secretary-General of that fact.

(2) Where, in a member State of the Union to which paragraph (1) applies, protection is sought under patent legislation, the said State may apply the patentability criteria and the period of protection of the patent legislation to the varieties protected thereunder, notwithstanding the provisions of Articles 6(1)*(a)* and *(b)* and 8.

(3) The said State may, at any time, notify the Secretary-General of the withdrawal of the notification it has given under paragraph (1). Such withdrawal shall take effect on the date which the State shall indicate in its notification of withdrawal.

Article 38

Transitional Limitation of the Requirement of Novelty

Notwithstanding the provisions of Article 6, any member State of the Union may, without thereby creating an obligation for other member States of the Union, limit the requirement of novelty laid down in that Article, with regard to varieties of recent creation existing at the date on which such State applies the provisions of this Convention for the first time to the genus or species to which such varieties belong.

Article 39

Preservation of Existing Rights

This Convention shall not affect existing rights under the national laws of member States of the Union or under agreements concluded between such States.

Article 40

Reservations

No reservations to this Convention are permitted.

Article 41

Duration and Denunciation of the Convention

(1) This Convention is of unlimited duration.

(2) Any member State of the Union may denounce this Convention by notification addressed to the Secretary-General. The Secretary-General shall promptly notify all member States of the Union of the receipt of that notification.

(3) The denunciation shall take effect at the end of the calendar year following the year in which the notification was received by the Secretary-General.

(4) The denunciation shall not affect any rights acquired in a variety by reason of this Convention prior to the date on which the denunciation becomes effective.

Article 42

Languages; Depositary Functions

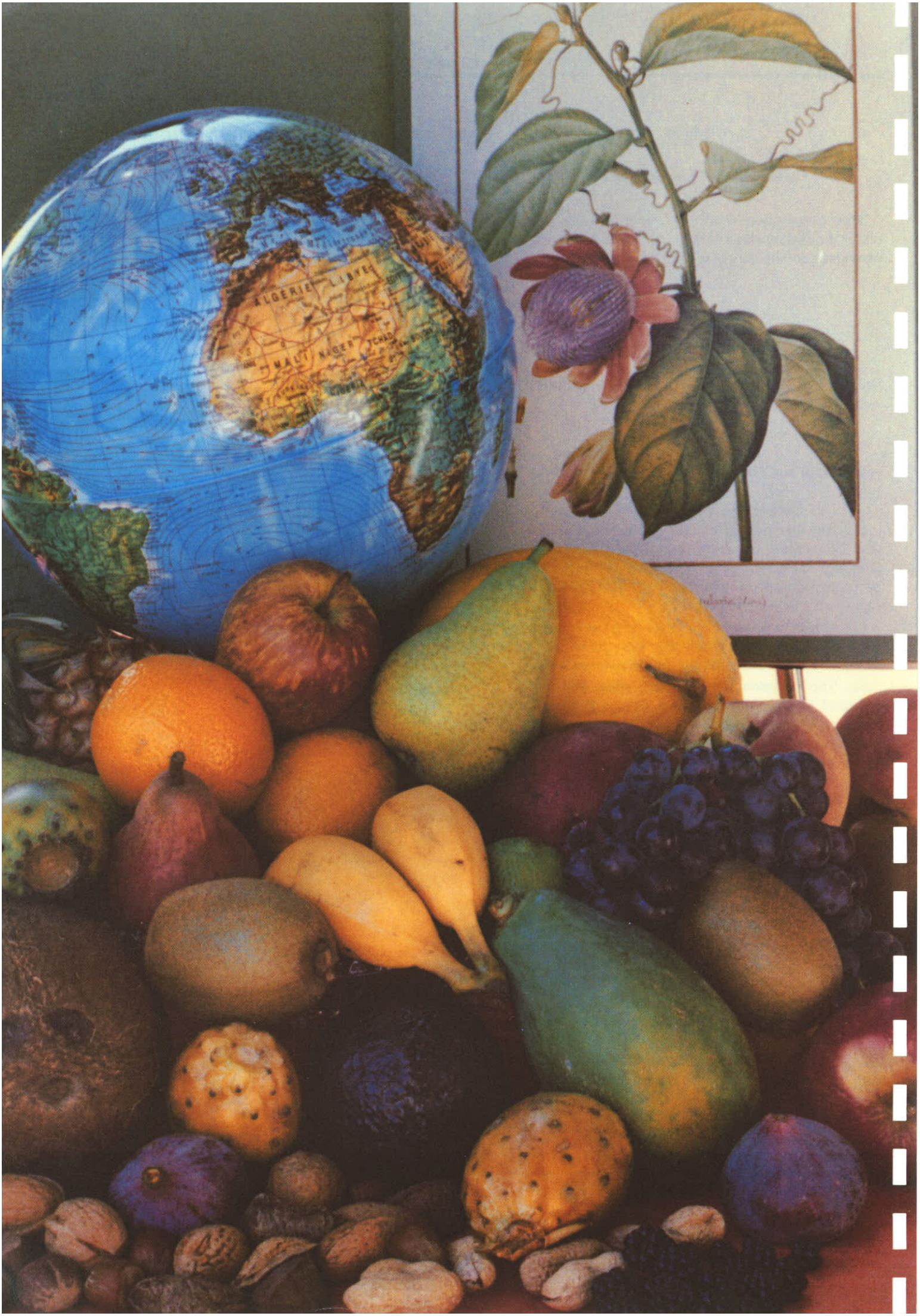
(1) This Act shall be signed in a single original in the French, English and German languages, the French text prevailing in case of any discrepancy among the various texts. The original shall be deposited with the Secretary-General.

(2) The Secretary-General shall transmit two certified copies of this Act to the Governments of all States which were represented in the Diplomatic Conference that adopted it and, on request, to the Government of any other State.

(3) The Secretary-General shall, after consultation with the Governments of the interested States which were represented in the said Conference, establish official texts in the Arabic, Dutch, Italian, Japanese and Spanish languages and such other languages as the Council may designate.

(4) The Secretary-General shall register this Act with the Secretariat of the United Nations.

(5) The Secretary-General shall notify the Governments of the member States of the Union and of the States which, without being members of the Union, were represented in the Diplomatic Conference that adopted it of the signatures of this Act, the deposit of instruments of ratification, acceptance, approval and accession, any notification received under Articles 34(2), 36(1) and (2), 37(1) and (3) or 41(2) and any declaration made under Article 36(1).


ALGERIE
LIBYE
MALI
NIGER
TCHAD

LIST OF THE MEMBER STATES OF THE INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

as at December 2, 1986

STATE	Date of Entry into Force		
	Convention of 1961	Additional Act of 1972	Revised Text of 1978
Belgium	December 5, 1976	February 11, 1977	—
Denmark	October 6, 1968	February 11, 1977	November 8, 1981
France	October 3, 1971	February 11, 1977	March 17, 1983
Germany (Federal Republic of)	August 10, 1968	February 11, 1977	April 12, 1986
Hungary	—	—	April 16, 1983
Ireland	—	—	November 8, 1981
Israel	December 12, 1979	December 12, 1979	May 12, 1984
Italy	July 1, 1977	July 1, 1977	May 28, 1986
Japan	—	—	September 3, 1982
Netherlands	August 10, 1968	February 11, 1977	September 2, 1984
New Zealand	—	—	November 8, 1981
South Africa	November 6, 1977	November 6, 1977	November 8, 1981
Spain	May 18, 1980	May 18, 1980	—
Sweden	December 17, 1971	February 11, 1977	January 1, 1983
Switzerland	July 10, 1977	July 10, 1977	November 8, 1981
United Kingdom	August 10, 1968	July 31, 1980	September 24, 1983
United States of America	—	—	November 8, 1981

LIST OF THE REPRESENTATIVES AND ALTERNATE REPRESENTATIVES OF THE MEMBER STATES ON THE COUNCIL OF THE INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

as at December 2, 1986

Belgium	Mr. J. Rigot (President of the Council) Mr. W.J.G. Van Ormelingen
Denmark	— Mr. F. Espenhain
France	Mr. G. Geoffroy Mr. M. Simon
Germany (Federal Republic of)	Dr. D. Böringer Mr. W. Burr
Hungary	Dr. B. Szalóczy Dr. J. Bobrovszky
Ireland	Mr. J.K. O'Donohoe Mr. D. Feeley
Israel	Dr. M. Hoffman Mr. I. Navé
Italy	Mrs. M.-G. Del Gallo Rossoni Dr. B. Palestini
Japan	Mr. M. Kakibaya Mr. K. Araki
Netherlands	Mr. W.F.S. Duffhues Mr. M. Heuver
New Zealand	Mr. F.W. Whitmore Mr. P.N. Baigent
South Africa	Dr. A.D. Nieuwoudt Mr. J.U. Rietmann
Spain	— Mr. R. Lopez de Haro y Wood
Sweden	Mr. S. Mejegård Professor L. Kåhre
Switzerland	— Mr. R. Guy
United Kingdom	Mr. J. Harvey Mr. D.M. Hallam
United States of America	Mr. S.D. Schlosser (Vice-president of the Council) —


JAPAN
INSTITUTE
OF
INVENTION
&
INNOVATION
1980

LIST OF THE OFFICERS AND STAFF OF THE OFFICE OF THE INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

as at December 2, 1986

Secretary-General: Bogsch, Arpad (United States of America)

Vice Secretary-General: Gfeller, Walter (Switzerland)

Staff of the Professional Category:
Thiele-Wittig, Max-Heinrich (Federal Republic of Germany); Heitz, André (France); Tabata, Makoto (Japan)

Staff of the General Service Category:
Stoffel, Elfriede Rosi (Switzerland); Huber, Pia (Federal Republic of Germany); Hutchins, Julie (United Kingdom); Goddet, Marie-Claude (France); Pereiras, Denise (France)

LIST OF ILLUSTRATIONS

Page 20: A capitulum ("flower") of sunflower (*Helianthus annuus* L.). Photograph from the Coopérative agricole du Bassin de l'Adour ("Coop de Pau"), France.

Page 22: Portrait of Georg H.C. Bodenhausen, Secretary-General of UPOV from 1969 to 1973.

Page 22: Portrait of Ludwig Pielen, President of the Council of UPOV from 1972 to 1974.

Page 22: Portrait of Leslie Smith, President of the Council of UPOV from 1969 to 1971.

Page 22: Portrait of Claude Hutin, Director of Research at the *Groupe d'étude et de contrôle des variétés et des semences* (GEVES—the Plant Variety and Seed Study and Control Group) of France, who represented the Organisation for Economic Co-operation and Development (OECD) at the 1961 session of the Diplomatic Conference.

Page 22: Portrait of René Royon, Secretary-General of the International Community of Breeders of Asexually Reproduced Ornamental and Fruit-Tree Varieties (CIOPORA), which he represented at the 1961 session of the Diplomatic Conference.

Page 23: Portrait of Dirk Böringer, President of the *Bundessortenamt* (Federal Office of Plant Varieties) of the Federal Republic of Germany, a member of the Delegation of the Federal Republic of Germany to the 1961 session of the Diplomatic Conference.

Page 23: Portrait of Bernard Laclavière, Secretary General of the 1957-1961 Diplomatic Conference, President of the Council of UPOV from 1975 to 1977.

Page 23: Portrait of Jean Rigot, President of the Council of UPOV from 1984 to 1986.

Page 23: Portrait of Halvor Skov, Vice Secretary-General of UPOV from 1970 to 1974, President of the Council of UPOV from 1978 to 1980.

Page 23: Portrait of Walter Gfeller, Vice Secretary-General of UPOV, President of the Council of UPOV from 1981 to 1983.

Page 24: Portrait of Heribert Mast, Vice Secretary-General of UPOV from 1974 to 1986.

Page 24: A sprig of *Lonicera periclymenum* L. (honeysuckle) 'Belgica' with fruit. Drawing by Frits Schneider, reproduced from *Klim-, Slinger- en Leiplanten.*

Page 35: Bread-making test with flour from five different wheat varieties. Photograph reproduced from *Weibullsholm 1870-1970*, a publication commemorating the centenary of the Weibull breeding company, Sweden.

Page 37: Comparison of two varieties of endive (*Cichorium endivia* L.) with respect to the time of bolting. Photograph from RIVRO, Netherlands.

Page 39: Germination in a growth chamber of various potato varieties (*Solanum tuberosum* L.). Photograph from RIVRO, Netherlands.

The characteristics of the lightsprout, particularly its shape and color, are excellent means of identifying potato varieties.

Page 42: Field of maize (*Zea mays* L.) with bagged ears or tassels for artificial pollination. Photograph from the Coopérative agricole du Bassin de l'Adour ("Coop de Pau"), France.

Page 47: Use of gametocides in rape (*Brassica napus* L. ssp. *oleifera* (Metzg.) Sinsk). Photograph from Ciba-Geigy, Basle, Switzerland.

Gametocides are molecules that suppress the male function of flowers, for example by preventing the formation of pollen or by killing it. They prepare the way for producing hybrid seed. From left to right: untreated flower, fully open; untreated flower at the beginning of flowering (the anthers appear first); treated flower (the stigma appears first).

Page 48: Occurrence of a yellow-blooming mutation on a red-blooming elatior begonia. Photograph from BSA, Federal Republic of Germany.

Page 50: Inflorescence of poinsettia (*Euphorbia pulcherrima* Willd. ex Klotzsch). Photograph from the *Planteyhedsnaevnet* (Board for Plant Novelties), Denmark.

The "petals" of poinsettia are in fact bracts (transformed leaves around the inflorescence). The true flowers are very small.

Page 51: The fields of the Elysium (detail) pictured in the tomb of Sen-Nedjem at Deir el-Medineh in Upper Egypt (thirteenth century B.C.). Photograph by Gisèle Heitz.

The upper panel depicts the harvesting of flax (*Linum usitatissimum* L.), which is done traditionally by pulling up. The lower panel depicts three kinds of tree: doom palms (*Hyphaene thebaica* (L.) Mart.) with large fruit, date palms (*Phoenix dactylifera* L.) with small fruit in hanging bunches, and a kind of fig, *Ficus sycomorus* L., the sycamore of Scripture. The chevrons represent water in the irrigation channels.
On the same wall, there is also a representation of ploughing with a swing plough drawn by two oxen and of sowing in the furrow behind the plough, and of the harvesting of a species of wheat, einkorn, with sickles.

Page 52: Growing of shiitake (*Lentinus elodes* (Berk.) Sing.). Photograph from the Seed and Seedlings Division of the Ministry of Agriculture of Japan.

Page 54: A squash plant (*Cucurbita pepo* L.). Engraving from the *Herbarius oft Cruydt-Boeck* (botanical treatise) of Rembert Dodoens (Rembertus Dodonaeus) (1644 edition). Archives of the Conservatory of the Geneva Botanic Gardens.

Throughout the Middle Ages, botanists habitually referred to the *Materia medica* of the Greek physician Dioscorides (first century A.D.) in the form transcribed by the monks, that is to say with the errors of text and illustration that had accumulated over the years. Otto Brunfels was the first to break away from this custom in 1530: his *Herbarium vitae eicones* contained wood engravings done from nature. However, it was the work of Dodoens (born in Mechlin, Belgium) that had the greatest impact on account of its size and the fullness of its information. It was based on a classification of plants and gave a full description, together with notes on the mode of growing and on usage. Written in the vernacular, it was reproduced a number of times between 1554 and 1644 and was translated into French by another famous physician and botanist, Charles de l'Ecluse (Clusius).

Page 55: A spinach plant (*Spinacia oleracea* L.). Engraving from the *Herbarius oft Cruydt-Boeck* of Rembert Dodoens. Reproduced from Zaadbelangen, the journal of various Dutch agricultural and horticultural associations.

Page 57: "The Botany Lesson of Jean-Jacques Rousseau." Photograph from the Conservatory of the Geneva Botanic Gardens.

In common with all the thinkers of his time, Rousseau had a multiplicity of interests. His passion for botany led to a work which is remarkable for its pedagogical qualities.

Page 59: First page and signature page of the 1883 Paris Convention for the Protection of Industrial Property. Reproduced from *1883—Paris Convention Centenary—1983*, published by WIPO.

Page 60: First page of the Edict of the Papal States on declarations of ownership of new inventions and discoveries in the field of the arts [technology] and agriculture of September 3, 1833. Communicated by BSA, Federal Republic of Germany.

Page 61: Grapevine plant (*Vitis vinifera* L.) in the Lake Geneva area. Photograph by André Heitz.

Page 62: Pear tree (*Pyrus communis* L.). Photograph by André Heitz.

Page 63: Portrait of Johann (Gregor) Mendel (1822-1884). Archives of the Conservatory of the Geneva Botanic Gardens.

This portrait was taken around 1862. Mendel published the results of his work in 1865.

Page 64: The first plant patent issued in the United States of America, on August 18, 1931. Archives of the United States Patent and Trademark Office.

Page 66: Harvesting with reapers and binders drawn by a tracked vehicle. Photograph reproduced from *Weibullsholm 1870-1970*.

Page 67: Threshing with a steam-engine. Photograph reproduced from *Weibullsholm 1870-1970*.

Page 68: The first seed sample divider. Photograph by K.F. Berggren reproduced from *Swedish Seed Testing 100 Years*.

The seed poured into the funnel falls onto an alternating distributor which divides the seed between two recipients.

Page 68: "Seed Examiner." Photograph by K.F. Berggren reproduced from *Swedish Seed Testing 100 Years*.

This apparatus was built in 1895 by O. Sternquist, Director of the Seed Testing Institute in Stockholm, to help in testing the purity of seed. It comprises a feed hopper, a revolving table, a magnifying glass, a recipient for the impurities and a device enabling them to be separated.

Page 71: Old-fashioned roses. Paintings by Pierre-Joseph Redouté. From left to right and from top to bottom, using the former designations: *Rosa sulfurea* (sulphur yellow rose) (Library of the Natural History Museum in Paris, photograph from Giraudon), *Rosa indica vulgaris* (common Indian rose), *Rosa noisettiana* (Philippe Noisette rose), *Rosa turbinata* (Frankfurt rose) (Museum of the Royal Horticultural Society of the United Kingdom, photograph from Bridgeman-Giraudon).

The Empress Joséphine (Napoleon's first wife) put together in the magnificent gardens of Malmaison an extraordinary collection of 169 species and varieties of rose. In order to do so, even a corner of the continental blockade (which, by the way, was to encourage the growing of sugar-beet) was lifted to enable various varieties and species to be imported from nurseries in Britain. Shortly before her death, in 1814, she requested Pierre-Joseph Redouté (1759-1840), the "Raphael of flowers," to record their passing beauty. Redouté carried out this commission between 1817 and 1824. "Les roses" was published with a text by Claude-Antoine Thory.

Page 72: Official control signs of the *Deutsche Landwirtschaftsgesellschaft* (German Agricultural Society). Reproduced from *Gewerblicher Rechtsschutz und Urheberrecht*.

Page 73: Modern roses. Photographs reproduced from *Carta dei Fiori*, published by the Chamber of Commerce, Industry, Craft Trades and Agriculture of the province of Imperia (Italy).

Page 75: Freda and Franz Wuesthoff at "La Madonnina" near Arolo, on Lake Maggiore.

Page 77: Extract from the commercial catalogue for the 1888 campaign of W. Atlee Burpee and Co., United States of America. Reproduced from a 1975 reprint.

W. Atlee Burpee and Co. is one of the firms that has been breeding, producing and marketing seed for more than one hundred years. Since the size of the country meant that its customers were far apart, it was one of the first firms to introduce mail-order selling of seed. It had therefore to produce an attractive catalogue. The 1888 edition is a remarkable example.

The article on the 'Chantenay' variety of carrot, which is still grown today, illustrates the international nature of the seed trade which was already quite pronounced at that time, and also the highly detailed knowledge already shown of variety description.

Page 79: Castration of a wheat flower. Photograph from the *Station fédérale de recherches agronomiques de Changins* (RAC—Federal Agronomic Research Station in Changins), Nyon, Switzerland.

This photograph and the nine that follow (up to page 83) illustrate various stages in the creation of a new wheat variety by a conventional breeding method. This begins by marrying two varieties. In order to do so, the male organs of the mother plant are removed to avoid self-fertilization (castration).

Page 79: Mother plants in the nursery. Photograph from the *Station fédérale de recherches agronomiques de Changins* (RAC—Federal Agronomic Research Station in Changins), Nyon, Switzerland.

The four thousand ears that are castrated each year are pollinated and then bagged to avoid any foreign pollination.

Page 79: Sowing of lines with the "sowing board." Photograph from the Etablissements Florimond Desprez, France.

Certain generations resulting from crossing are sown in "ear-lines" (each line is formed of grains from the same ear). Such is the case for the first generation. The plants that result will all be identical; any segregations will appear only as from the following generation.

Page 81: F_2 infection nurseries. Photograph from the *Station fédérale de recherches agronomiques de Changins* (RAC—Federal Agronomic Research Station in Changins), Nyon, Switzerland.

As of F_2 (second generation after crossing), RAC carries out a selection on the basis of resistance to disease. The F_2 seeds are sown separately between strips of disease-sensitive varieties which are artificially infected. The diseases are thus given every facility.

Page 81: Selection of F_2 plants. Photograph from the *Station fédérale de recherches agronomiques de Changins* (RAC—Federal Agronomic Research Station in Changins), Nyon, Switzerland.

Only the healthy plants—those which have therefore resisted to the diseases—which correspond to the desired agronomic type are selected. They are identified by a label.

Page 81: F_3 lines. Photograph from the *Station fédérale de recherches agronomiques de Changins* (RAC—Federal Agronomic Research Station in Changins), Nyon, Switzerland.

The offspring of the F_2 ears that have been selected are sown in lines. They are once more infected. Again, selection is by eye.

Page 83: Control varieties. Photograph from the *Station fédérale de recherches agronomiques de Changins* (RAC—Federal Agronomic Research Station in Changins), Nyon, Switzerland.

Varieties known for their resistance (to the right) or their sensitivity (to the left) to disease are sown at regular intervals to facilitate comparison and observation.

Page 83: Sowing with a mini-seeder. Photograph from BSA, Federal Republic of Germany.

As from F_6, sufficient seed is available to carry out yield testing in a complex trials arrangement. These trials are facilitated by the use of miniaturized machines.

Page 83: Trial plots. Photograph from the *Station fédérale de recherches agronomiques de Changins* (RAC—Federal Agronomic Research Station in Changins), Nyon, Switzerland.

Page 83: Harvesting the trial plots with a miniature harvester at the Moyencourt farm of Etablissements C.C. Benoist at Orgerus, France. Photograph by Madison France.

Page 84: Portrait of Ernest Tourneur, President of the International Association of Plant Breeders for the Protection of Plant Varieties (ASSINSEL) in 1961 and ASSINSEL representative at the 1961 session of the Diplomatic Conference. Photograph reproduced from a publication produced in his memory by his friends and collaborators of ASSINSEL.

"The energy and perseverance he has shown in the development of his own undertaking and his untiring efforts in the cause of plant variety protection will ever remain an example to us."

Page 85: Portrait of André de Vilmorin, President of the International Federation of the Seed Trade (FIS) in 1961 and representative of FIS at the 1961 session of the Diplomatic Conference. Photograph reproduced from *International Federation of the Seed Trade—A 50 Year Old Family—1924-1974.*

Page 88: Litchi (*Litchi chinensis* Sonn.). Photograph from the Ministry of Agriculture of South Africa.

As a result of plant variety protection, subtropical fruit trees, such as litchi, grown in North-Eastern South Africa, now enjoy much more breeding work.

Page 93: Strawberries (*Fragaria x ananassa* Duch.). Photograph from BSA, Federal Republic of Germany.

Page 95: A bouquet of China-asters (*Callistephus chinensis* (L.) Nees). Photograph by André Heitz.

Page 96: A sprig of *Campsis radicans* (L.) Seem. (common trumpet creeper). Drawing by Frits Schneider, reproduced from *Klim-, Slinger- en Leiplanten.*

Page 100: Forest of eucalyptus in Madeira. Photograph by Gisèle Heitz.

On account of its qualities, eucalyptus, originating in Australia, has been introduced into various parts of the world, particularly as a forest tree. In Madeira, it has been used to reconstitute some upper woodlands.

Page 110: Expression of genetic variability in French bean seed (*Phaseolus vulgaris* L.). Photograph from RIVRO, Netherlands.

Page 124: The world's fruit. Photograph by André Heitz.

The background is a parchment from the Collection of the French National Natural History Museum from the hand of Pierre-Joseph Redouté, representing granadilla (*Passiflora quadrangularis* L.).

Page 126: Varieties of gerbera. Waterpainting by A. Koorneef, RIVRO, Netherlands.

Page 128: Stone lantern. Gift from the Japan Institute of Invention and Innovation to WIPO. Photograph by B. Davoudi.

Page 129: The Secretary-General and staff of UPOV. Photograph by Susan Farkas.

Page 130: Testing of chrysanthemum varieties for which protection has been sought. Photograph from the Plant Variety Rights Office (PVRO) of the United Kingdom.

UPOVUPOVUPOVUPOVUPOVUPOVUPOVUPOVUPOVUPOVUPOVUPOVUP