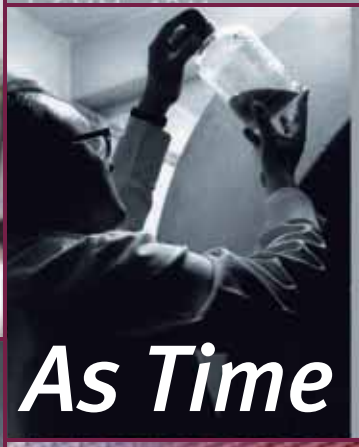

As Time Goes By

75 years

1930 - 2005

VETERINARY AND AGROCHEMICAL RESEARCH CENTRE

CODA-CERVA

As time Goes By

75 years

1930 - 2005

CODA - CERVA

◀ Legende cover :
Research in virology : A. Delangre (2002) / Serological diagnosis : J. Thoonen (1930) /
FMDV vaccine development : R. Strobbe (1970)

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75 years

1930 - 2005

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Introduction

1930

The year 1930 was a milestone in animal health. It was in that year that for the first time an official veterinary laboratory was recognised by a Royal Decree in Belgium with the task of supporting veterinary services and veterinary practices in the official confirmation of transmittable animal diseases and to do research into the prevention and treatment of these diseases. Around the same period, a chemical laboratory was started, charged with research into Congolese nature products. Both laboratories are at the base of CODA-CERVA.

In the course of 75 years the laboratory, that originally only had 2 researchers, developed into an internationally recognised scientific institute and reference laboratory with over 200 employees of which 60 are researchers. This growth was only possible due to the dedication of the employees of CODA-CERVA and thanks to the continued support of the Veterinary Services and later the Federal Agency for the Safety of the Food Chain and the Belgian and international research funds. Intensive cooperation with Belgian and foreign research institutes in numerous common research projects formed and form the foundation for the expertise acquired. CODA-CERVA is represented in the most important international institutions that relate to our domain such as DG SANCO of the European Union, the EFSA, the FAO, the OIE and the WHO.

Throughout all those years CODA-CERVA and its predecessors focussed on the development and implementation of increasingly sensitive, quick and cheap diagnostic tests and on the characterisation of pathogens, on the development, the control and the production of vaccines and on giving expert advice to the Belgian and international governments. As a result of a merger with the chemical laboratory in 1995, the focus was further extended to residues and contaminants in vegetable and animal products that threaten the food chain and to the impact of the environment. Whereas initially the research and service aimed at conservation and improvement of the food supply, the techniques developed now are increasingly used to guarantee public and animal health and to support the safety of the food chain. Many contagious diseases and toxi-infections in human after all have their origins in animals, so that the distinction between medical and veterinary microbiology is disappearing more and more.

In view of the increasing importance of transmittable diseases in the international movement of people and animals, during the last few years significant investments were made in heavy equipment and buildings. All the CODA-CERVA buildings have been adapted to meet the strictest norms with regard to biosecurity : at present CODA-CERVA has over 1800 m^2 of Biosafety level 3 (BSL3) laboratories and more than 5000 m^2 of BSL3 laboratories. Major investments are planned to also adapt the experimental centre of CODA-CERVA (3250 m^2) to the new requirements corresponding to BSL3. In addition, CODA-CERVA also meets the strictest quality requirements and was therefore accredited in accordance with the European quality norm ISO 17025.

CODA-CERVA is thus well prepared for continuing its most important mission, to further integrate itself at European level and to strengthen its cooperation with the human sector.

Dr. Johan E.Peeters / President - Director

I. The history of CODA-CERVA from its origins

1930

The Veterinary and Agrochemical Research Centre (CODA-CERVA) is the heir of a long tradition of policy-supporting research and services to the Belgian government with the aim of safeguarding agricultural production on the one hand through the identification and prophylaxis of transmittable animal diseases and on the other hand through the study of vegetable production. Initially this task was carried out in two different scientific institutes that were merged in 1995. Both institutes originated in the first quarter of the 20th century and were officially recognised around 1930. CODA-CERVA's history therefore consists of three chapters, corresponding to the two initial bodies and the current centre.

1. The veterinary departments

The first State veterinary laboratory of Belgium started after World War I (1914-1918), following the accidental introduction of rinderpest into Belgium. The Veterinary inspection service, directed at the time by Inspector General Henri De Roo, handled the situation with great difficulty because it was not backed up by technical services. This accident, like the propagation of dourine and of glanders that appeared in animals recovered in Germany after the 1914-1918 war, demonstrated the pressing necessity of providing Belgium with an official veterinary laboratory.

◀ General Inspector Henri de Roo, chief of the Veterinary Inspection Service (1929). He was also the first president of the World Organization for Animal Health (OIE).

to the present

In 1924, Inspector General De Roo gave two veterinary inspectors from the Ministry of Agriculture, Emile Leynen and René Willems, the task of organising a small veterinary diagnostic laboratory. These two veterinarians had been trained in laboratory work by Albert Bessemans, the director of the Central Laboratory of the Administration of Hygiene in Brussels. Starting in 1924, at the veterinary laboratory pathology samples were examined that came from animals suspected of having died of anthrax. Only a diagnosis confirmed by this laboratory authorised the granting of compensation. In addition, the laboratory was tasked with helping veterinary practitioners, free of charge, establish the diagnosis of various animal diseases, with the exception of rabies. The laboratory was called the State Veterinary Inspection Laboratory.

In 1930, a royal decree gave the first organic Regulation of the Laboratory for Diagnosis and Research concerning Contagious Diseases of Animals. Through this name change, the laboratory thus became a distinct public body, under the administrative control of the Veterinary Inspection service in the Livestock Farming and Veterinary Service administration. This administrative dependency remained without change until 1957. However, in 1944 the laboratory once again changed its name to become the State Laboratory for Veterinary Diagnosis and Research. At the same time, the mission of the body was defined by the legislature. This mission consisted of working together with the Veterinary Inspection service, as well as with the approved doctors of veterinary medicine, in the diagnosis and prophylaxis of diseases of domestic animals. In addition, its director had to conduct scientific research with a view to improving the resources in the fight against epizootics and to perfect new therapeutic and prophylactic methods. Finally, the laboratory could be tasked with monitoring and checking the manufacturing and flow of biological products used in veterinary medicine, as well as with the bacteriological and anatomo-pathological examination of food products of animal origin.

▲ The staff of the Veterinary Inspection Laboratory; From left to right :
R. Willems, M. Thirifays, E. Leynen, F. Burette, J. Thoonen and M. Bourdaud'huy (1930)

In 1957, on the initiative of Minister René Lefèbvre, the Ministry of Agriculture was reorganised and the laboratory, under the name of National Institute for Veterinary Research, passed under the authority of the Agronomy Research administration. This new general directorate created at the time brought together all the agronomy research bodies of the State. In addition to the NIDO-INRV there were the State Centres for Agronomy Research in Gembloux and in Ghent, the National Botanical Garden of Belgium in Meise, the Institute for Chemical Research in Tervuren, the Institute for Agricultural Economics and the Forestry and Hydrobiological Research Station. From then on the NIDO-INRV had to orient its work basically toward research.

The legislation on brucellosis envisaged the creation of veterinary laboratories in the provinces to take on a part of the diagnostic activities carried out until then by the NIDO-INRV. These provincial veterinary laboratories, called Regional Animal Health Centres, were created starting in 1960. They did not come directly under the control of the Ministry of Agriculture, but received official subsidies for their work connected with the fight against legal contagious diseases. The provincial veterinary laboratories did not achieve the entire expansion that was originally hoped for, so the NIDO-INRV continued to play an important role in the diagnosis of contagious diseases in animals.

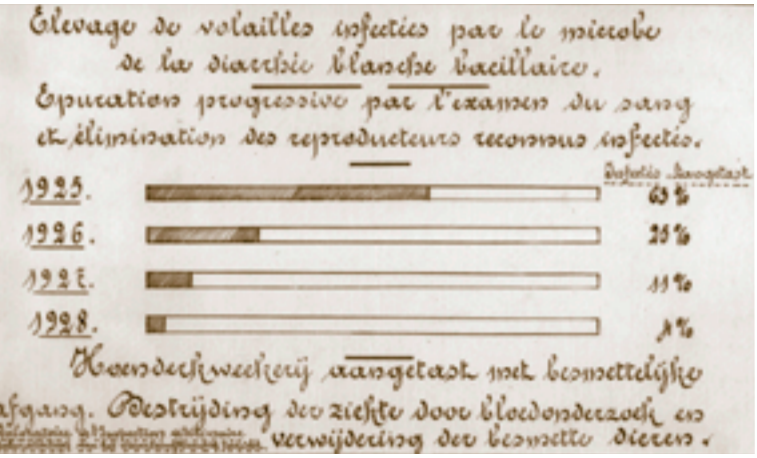
The researchers of the NIDO-INRV were kept busy above all with multiple problems in connection with contagious diseases of domestic animals. They left the mark of their work in numerous national and international scientific reviews. Starting in 1965, the NIDO-INRV published an annual Activity Report in which a good synthesis of the work that took place there is found. The most tangible results of this activity are noted above all in the very satisfactory health condition of our national animal husbandry. The NIDO-INRV was always found at the side of the Veterinary Inspection service in the front lines of the battle carried out against infectious diseases of domestic animals. It operated above all by concerning itself with the technical part of these battles : research, preparation and checking of vaccines, serums and antigens, performing diagnostics, epidemiological studies, destruction of animals and disinfecting of the sources of infection. The most important diseases that have been the object of these operations since its foundation are : anthracic conditions, infectious avian diseases (pullorum disease, avian influenza, Newcastle disease, Gumboro's disease, infectious bronchitis), diseases of rabbits (coccidiosis, colibacillosis, tularemia, myxomatosis, viral hemorrhagic disease), of fish and bees (acariasis, varroasis, "American foulbrood", infectious diseases of the reproductive system (brucellosis, salmonellosis, vibriosis, trichomoniasis), foot-and-mouth disease, bovine tuberculosis, botulism, enzootic bovine leucosis, infectious diseases of young cattle (colibacillosis, salmonellosis, respiratory and digestive viral diseases), illnesses in pigs (vesicular disease, swine erysipela, Aujeszky's disease, classical swine fever and African swine fever) and diseases of small ruminants. Many of these diseases have been or are on the way to being eradicated; the others are under control.

◀
Official visit of the World Organization for Animal Health (OIE) to the Foot-and-mouth vaccine production unit of NIDO-INRV in 1956. Next to René Willens, we identity Gaston Ramon, director of the Institut Pasteur of Paris.

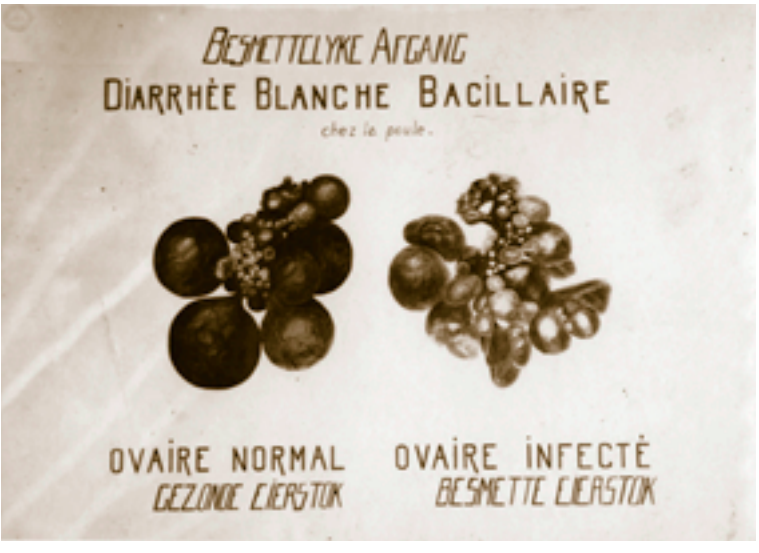
▲ Biochemistry laboratory : W. Dewitte (1980)

On 20 May 1980, the NIDO-INRV solemnly celebrated its fiftieth anniversary in the presence of Minister of Agriculture Albert Lavens. The 25 years that have followed this anniversary have been characterised by a series of events that have profoundly changed the administrative status, the mission, the financing and the working method of the NIDO-INRV, of the Veterinary Inspection and the Regional Animal Health Centres.

In the 1980s, the veterinary health policy in Belgium still had as a legal basis : articles 319 to 321 of the Penal Code of 1867, the law of 30 December 1882 on the Animal health policy for and the law of 4 April 1890 on the teaching and the practice of veterinary medicine. This legislation was no longer adapted to the new context of animal husbandry or to the directives of the supranational bodies; in addition, the Belgian state had budgetary difficulties that did not allow it to cover the costs of the fight against contagious diseases of animals by itself any longer. The old legal basis was therefore rescinded little by little and was completely renewed by the law of 4 August 1986 on the protection and welfare of animals, the law of 24 March 1987 on animal health and the law of 22 August 1991 on the practice of veterinary medicine. To this it is necessary to add the law of 15 July 1985 relating to the use of substances with a hormonal or an anti-hormonal effect, which gives veterinary inspectors the mission of looking for and noting infractions in these matters.



▼▲ Two didactic posters of Veterinary Inspection Laboratory dealing with the description of Salmonellosis in poultry (1930)



▲ Virology laboratory : A. De Smet and C. Mortier (1980)

The principal innovations of this new legislation concern four points :

1. The conditions that the associations and the provincial federations in the fight against animal diseases must satisfy to be approved by the Ministry of Agriculture to participate in the fight against contagious animal diseases. This was the creation of a legal basis for the accreditation of the Regional Animal Health Centres. They had been created from 1960 to 1963 in the aftermath of the reorganisation of the Ministry of Agriculture and in the framework of the fight against brucellosis. They were managed by the Provincial federations for the fight against animal diseases; over the course of the years these centres were concerned with other problems of health policy, but as they were not subsidised heavily by the State, they were not directly under the authority of the veterinary inspection service and/or of the NIDO-INRV. By becoming too autonomous, this important link in the fight against animal diseases ran the risk of harming the correct organisation of the new policy set up to fight against contagious diseases of animals.

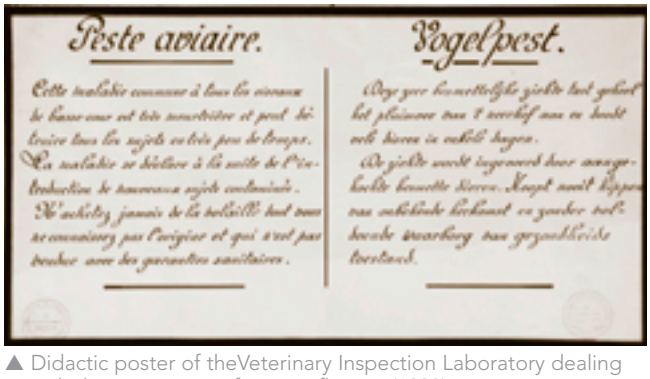
2. Measures adapted to fighting against contagious diseases of animals, including surveillance and sanctions. This was the establishment of a new policy for fighting against diseases adapted to the directives of supranational bodies.

3. Health policy measures aiming at animal species other than domestic farm animals : pets and wild animals. This was the solution to health problems arising following the introduction of new animal species (bison, game parks) and to the extension taken by medicine for animals kept as pets.

4. The creation of a Fund for the health and the production of animals, abbreviated as Health Fund. This was the solution recommended for solving the State's budgetary problems while giving more responsibility to the breeders.

▲ Footh and mouth disease in a cow

In actual fact, the Health Fund had already been foreseen in the governmental declaration of the coalition in power; it had been created by a special Royal Decree of 5 August 1986. The law of 24 March 1987 rescinded this royal decree and included it in the law. The goal was to limit the expenditures of the State in the sectors of health policy for animals and the improvement of animal husbandry. In order to do this, two basic principles were introduced : co-financing and co-management of the fight against contagious diseases of animals. This means that the sectors (cattle breeders, swine breeders, poultry breeders, etc.), in concert with the Veterinary Inspection service of the State, carry out health programmes. The State finances the system through a public grant; the sectors finance the system through an obligatory contribution collected from all the breeders in the country. The money available serves for fighting against diseases, equitably compensating breeders who are harmed, improving the surveillance in the field (sanitary teams) and financing



▲ Didactic poster of theVeterinary Inspection Laboratory dealing with the prevention of avian influenza (1930)

the infrastructures for diagnosis and the actual animal husbandry. The initial idea of this achievement was that if the results of a programme to fight disease prove to be insufficient, the professional circles involved will cover the economic consequences of it (increase in the contributions, increased risks for the value of the livestock); if on the contrary the fight against contagious diseases proves to be effective, it will be possible to consider a decrease in the contributions. Another consequence of co-financing was to include the professional circles in the establishment of the programmes to fight against diseases; thus a new decision-making level was created. The veterinarians therefore have lost the monopoly on the management of the fight against contagious diseases, and the breeders have acquired a degree of responsibility in this matter.

The Health Fund has the objective of intervening in the financing of compensation and subsidies concerning the fight against contagious diseases of animals, looking for prohibited substances and the improvement of the quality of food products of animal origin. The Health Fund gave itself three objectives to start with : the creation of a Coordination Centre for Veterinary Diagnostics (CCDD-CCDV) in consultation with the INRV, the creation of a department of identification of livestock (SANITEL) and the creation of an epidemiological-surveillance department.

In 1991 an Central Association for Animal Health (CDV-ACSA) was created with the aim of relaying concrete actions of the Health Fund in the field. This association, established as an non-profit organisation, has as its mission :

1. The organisation of the identification and registration of animals in cooperation with the provincial federation, through the centralised management and the development of SANITEL. By SANITEL a system of computerised management of the permanent inventory of bovine livestock, pig livestock and poultry livestock is understood.
2. The implementation of programmes of the Health Fund within the framework of animal health (epidemiological-surveillance) and of the fight against the use of hormones, as well as concerning animal protection.

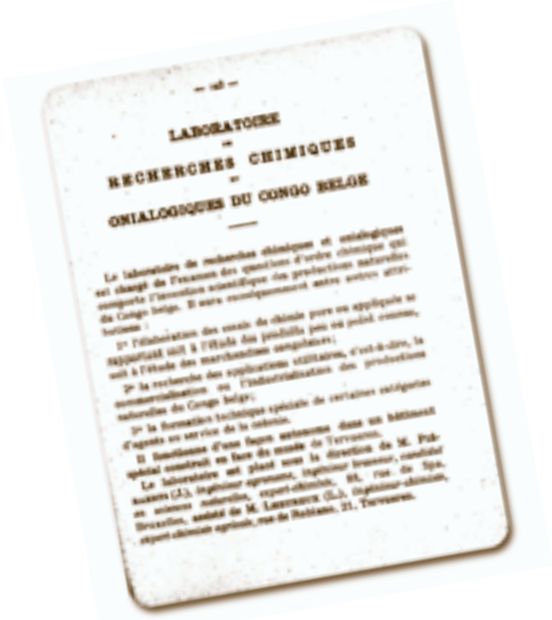
In 1992, the Regional Animal Health Centres of the North of the country, which had functioned formerly in an autonomous way at the provincial level, were regrouped within the CDV. In 1999 the CDV merged with the Provincial Veterinary Labs, resulting in the Dierengezondheidszorg Vlaanderen (DGZ). The laboratories in Flanders specialised at their former sites or disappeared. In 2002, the Screening Centres of the South of the country were regrouped within a single structure for the Walloon Region of Belgium called the Association régionale de santé et d'identification animales (ARSIA : Regional Association for Animal Health and Identification). All the laboratories of Wallonia remained on their former sites, but specialised in specific areas at the regional level.

Over the years the activities of CDV-ACSA have been amalgamated little by little with the activities of the federations of the fight against animal diseases. The CDV-ACSA was dissolved in 2004, to be replaced by its components, a part of the Federal Agency for the Safety of the Food Chain (FAVV-AFSCA), ARSIA and DGZ.

The experience gained in the campaigns for the eradication of leucosis, brucellosis and swine fever revealed the need for better coordination between the eight provincial veterinary laboratories, the NIDO-INRV and the veterinary Services. For this reason, the CCDD-CCDV was created within the NIDO-INRV, by the Royal Decree of 10.01.1995. This Centre is managed by the Legal Entity of the NIDO-INRV and is financed by the Health Fund. It is concerned with epidemiological surveillance programmes, coordinates the quality control of the services provided by the provincial laboratories, and carries out programmes requested by the Health Fund.

In addition, since 1995 the Health Fund has granted to the veterinary departments of the CODA-CERVA

- an annual flat-rate grant to support research and maintain the diagnostic resources at an appropriate level;
- the reimbursement of the operating costs of stamping out and other services provided in relation to the fight against contagious diseases;
- the financing of the programmes requested.



LABORATOIRE
DE
RECHERCHES CHIMIQUES
ET
ONIALOGIQUES DU CONGO BELGE

▲ Publication of the creation of the chemical laboratory at Tervuren (Annual of the Ministry for the Colonies, 1928)

2. The agro-chemical departments

In 1911 a chemistry laboratory was founded at the economics department of the then Museum for Belgian Congo. Its task was to study the raw materials and production possibilities of Congolese natural products with an eye to awarding concessions to private companies. The employees were two university graduates – department head Professor Joseph Pieraerts and an assistant. After the First World War, the laboratory moved into its new buildings on Molenstraat opposite the main buildings of the museum. The research above all focussed on products with a vegetable origin.

In April 1928 a Royal Decree under the Ministry for the Colonies established the laboratory as a department with its own management under the name "Laboratory for chemical and onialogical research for Belgian Congo". The director was Mr Joseph Pieraerts, who succeeded in turning the new institute into an active centre for scientific research.

▲ The first director, Prof. J. Pieraerts, and his researchteam (1929)

The new unit's task was to research all the chemical problems relating to the scientific inventory of Congolese natural products. In addition to the purely chemical aspects, this task also comprised the study of the possibilities for selling Congolese products in trade in industry. The list of work states about sixty publications that above all relate to the chemistry of Congolese plants.
Later the programme was extended further and in addition to aforementioned specialities also included the study of sugars, alkaloids, fats, medicinal plants, insecticides, tropical soil micro-organisms and tropical soil science.

The War years brought an unavoidable change to the activities, since contact with the Congo had been broken. During this period various overviews were published founded on thorough literature study and the Colonial Centre for Documentation and Coordination of Chemical Research was founded. After the War, this centre would coordinate and promote all the chemical work carried out in Belgium on colonial products. The period immediately after the Second World War was characterised by a strong development in scientific research. Interest in the products of the Congo also increased sharply.

◀ R. Vanderstappen with X-ray diffraction equipment (± 1960)

The most important study topics were the origin and evolution of laterite soils, fundamental studies into lipids, problems with native food in connection with protein input, the study of Congolese types of wood from a chemical and technological viewpoint, medicinal plants with in particular the isolation and determination of the structure of alkaloids, the isolation and study of antibiotics secreted by tropical fungi and insecticides with a vegetable origin. The laboratory developed into a unit with very specialised researchers and was supplied with technical very well equipped laboratories. Various scientific missions to the then colony were led by researchers.

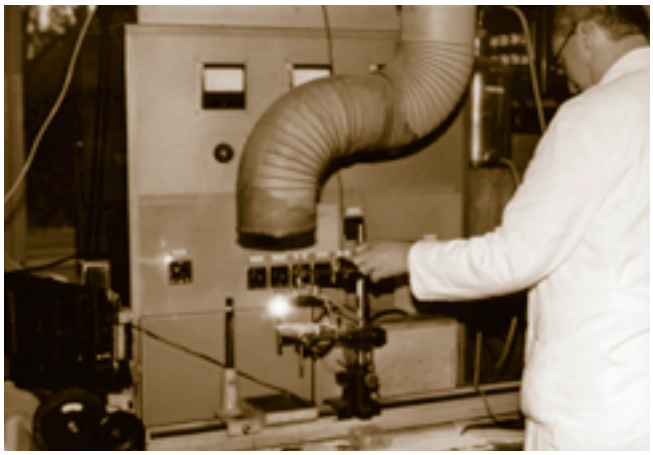
After the independence of the Congo in 1960 the laboratory was transferred to the Ministry for Agriculture, under the name Laboratory for Chemical Research (Royal Decree 3 March 1961) and added to the Directorate General for Agricultural Research.

Thus the research was aimed at chemical problems that confronted agriculture at national level. The main topics were :

- study of the quality of vegetable products;
- mechanism of herbicides;
- study of alkaloids and vegetable colourings;
- chemical study of native wood;
- study of vegetarian diet and fertilization;
- special studies into clays and phosphates;
- research into organic matter in the soil;
- geochemical studies of the soil.

In 1965 the statute of scientific institute took force; due to the Royal Decree of 20 April 1965 the name was adjusted to "Institute for Chemical Research" (ISO-IRC) and the Institute was classified as an institute for scientific research of the first level and the graduate staff was given the scientific statute that also applies to university staff.
In the years 1968 – 1969 serious problems began to surface in connection with the pollution of the rural environment and the sea. In view of the acute nature of the environmental problems, a workgroup was set up to study the pollution in agriculture (1971) with the task of studying the problems with regard to pollution of the soil, water and crops and proposing solutions. From this viewpoint, various national and international research programmes were worked on : from 1971 until 1975 the national R&D programme on pollution of the sea and waterways; from 1973 until 1976 on the one concerning protection of the groundwater; in 1976 a start was made on an R&D programme on air and in 1977 on a programme about the economics of waste substances and by-products. In 1975 a European programme on animal wastes was started.

▼ G. Ledent operating the UV-emission spectrometer (1976)



Since its origin, the laboratory has been specialised in chemical analysis techniques; in the period 1977-1985 the analytical capacity and know-how of the institute were further strengthened on the one hand by means of the recruitment of a number of researchers and on the other hand by means of investment credits which made it possible to purchase expensive analysis equipment (GC-MS, ICP-OES, mobile measuring station for air pollution, …). In 1984 the agro-chemical departments acquired the legal personality, which allowed them to attract externally financed projects under their own management, offer services to third parties and employ staff on the patrimony acquired.

Since the beginning of the nineteen seventies, the need for larger and safer laboratories has increased. Even when the administrative departments moved to the former director's home and a new library building had been constructed, the research departments were still partly housed in the basement and attic and the safety of the laboratories left a lot to be desired. At the end of the seventies, the Ministry for Agriculture and the Building Agency approved the plan to have the concrete shell of a building on the opposite side of the Leuvensesteenweg finished for the institute. The Royal Museum for Central Africa, for which the building had been intended since 1957, also profited from this dynamism and at the beginning of 1992 the ISO-IRC and a few scientific departments of the Museum were able to move into the new building. At last the Institute had spacious and safe laboratories.

▶ The mobile laboratory for environmental measurements (1978)

3. The creation of a new research centre

By the royal decree of 20 June 1997, with retroactive effect to 1 September 1995, the NIDO-INRV was merged with the ISO-IRC to result in a larger establishment called The Veterinary and Agrochemical Research Centre CODA-CERVA. By merging two formerly autonomous institutions within the administration of Agronomy Research, an establishment was created that had the size, especially in Civil Service professional staff, corresponding to the criteria considered indispensable for being able to function as an autonomous unit of the federal State.

▲ His Royal Highness Prince Philippe visiting the Histopathology laboratory (S. Roels) in 1998

On 29 January 1998, CODA-CERVA received a visit from His Royal Highness Prince Philippe, accompanied by Minister of Agriculture Karel Pinxten and numerous other people. On this occasion the director, Johan Peeters, presented the work programme of CODA-CERVA and its role in guaranteeing high quality agricultural products for the consumer.

Starting in 1997, the population of Belgium was severely traumatised by a series of food crises (dioxins, mad cow, avian influenza in Asia) to the point of modifying the deal in the elections of 13 June 1999. The Government that stemmed from this vote committed itself to better protect the health of the consumers in a sustainable way. On the initiative of Minister of Consumer Protection, Public Health and the Environment Magda Aelvoet, on 4 February 2000 the Government promulgated a law creating the Federal Agency for the Safety of the Food Chain (FAVV-AFSCA). The goal was to gather into a single administrative body all the inspection and control services of the State from the first to the last stage in the food chain. These different services were formerly scattered over various ministries and semi-public bodies, preventing effective functioning.

Since the creation of the FAVV-AFSCA had stripped the Ministry of Small Traders and Agriculture of many of its services acting at the federal level, it proved necessary to carry out an institutional reform to regionalise this ministry (special law of 13 July 2001). On the date of 1 January 2002, the services falling under Agriculture were therefore divided up, mainly to the benefit of the ministries of Agriculture of the Flemish and Walloon regions, the FAVV-AFSCA Federal Public Service of Public Health, Safety of the Food Chain and Environment.

This latter entity had been created by the Royal Decree of 23 May 2001; this therefore meant a profound reorganisation of the federal ministry of Public Health.

Starting on 1 October 2002, CODA-CERVA, just as the General Inspection of the Veterinary Services, formerly Veterinary Inspection of the federal ministry of Agriculture regionalised, passed, temporarily at first, then definitively, under the supervision of the federal ministry of Public Health in the "FPS Public Health, Food Chain Safety and Environment". Consequently, CODA-CERVA reoriented its activities by concentrating on studies concerning the safety of food production, public health and animal health in four areas :

1. Transmissible epizootic, enzootic and emerging diseases in animals.
2. Zoonoses and emerging infectious diseases that threaten the public health.
3. Residues, contaminants, genetically modified organisms and the environment, within the framework of safe food production.
4. Epizootiology (surveillance, risk analysis and molecular epizootiology).

To guarantee recognition of the services of CODA-CERVA within the European context, between 1996 and 2001 the employees of CODA-CERVA, put in a great effort to implement a quality system in accordance with the European norm EN 45001. A central dispatching was set up to sent research samples to the departments. A computerised Laboratory Information Management System (LIMS) was installed for the centralised management of the research results and relations with clients. The accounts and reports to and from the departments were also computerised. On 21 December 2001 CODA-CERVA was accredited for 35 analyses, including all the analyses for list A diseases and the most important list B diseases. On the basis of its quality system, CODA-CERVA was recognised in May 2004 as a European control laboratory for veterinary vaccines and on 19/05/05 CODA-CERVA was awarded accreditation in accordance with the new norm ISO 17025.

Between 2000 and 2005, CODA-CERVA saw intensive construction activity, in which the old-fashioned laboratories were adapted to the strict biosecurity requirements of the European Union : the laboratories of the "epizootic diseases" departments were adapted to the requirements of biosafety level 3 (BSL-3). Building G was completely renewed and reconstructed in accordance with the "box-in-the-box" principle as a BSL-3 complex for the departments "Small livestock diseases" and "Bacterial diseases". Finally, a BSL-3 orientation laboratory, a BSL-3 laboratory animal area and a completely renewed autopsy room were built. In 2005 the adaptation of the experimental centre of Machelen to the BSL3 standards and the installation of a water purification system were contracted out.

To fulfil its mission, CODA-CERVA receives a basic allocation coming in the past from the Ministry of Agriculture and currently from the federal public service Public Health, Food Chain Safety and Environment.
Starting in 1961, a Legal Entity (RP-PJ) was grafted onto the veterinary departments of CODA-CERVA. It manages capital consisting of remuneration paid for service rendered and of profits coming from the sale of products and vaccines manufactured or from their control and their distribution. The essential part of this capital came from the sale of the foot-and-mouth disease vaccines manufactured by the NIDO-INRV from 1946 to 1991 to cover all the needs of the country. In addition, the financing of the RP-PJ was filled out with funds allocated by various public and private national and international bodies.
Since 1995, the year of the creation of the Coordination Centre for Veterinary Diagnostics, CODA-CERVA has had at its disposal significant financing coming from the Health Fund, which allows the operation of this centre as well as an endowment to the veterinary departments.
The external financing, national and international, of CODA-CERVA has made it possible to increase the number of research projects in a significant way in the last few years.

II. The mission
and the activities of CODA-CERVA

1. The first mission of the veterinary departments of CODA-CERVA

The mission of the State Veterinary Inspection Laboratory was partially defined in the "Instructions concerning the operation of the veterinary laboratory" that appeared in 1925 in the Health bulletin. However, this text did not have the force of law.

The first statute or organic regulation of the laboratory was given by the Royal Decree of 14-07-1930. It consists of eight articles that essentially concerned the number of people working in the laboratory, their qualifications and the conditions of appointment.

This Decree of 1930 is very short and quite incomplete; in particular, it does not define the mission of the laboratory. It was rescinded by the Decree of Secretary General Emile De Winter of 24-04-1944. This latter decree, issued in a period of war, was recognised as invalid after the liberation, like all the decrees issued between 1940 and 1945 by the secretaries general. A little later, however, a Decree of the Regent, dated 22-01-1947, maintained the Decree of the Secretary General of 24-04-1944, with the exception of the articles relating to the Civil Service professional staff and to the salaries.

The mission of the laboratory was therefore specified from 1944 on in these terms :

"The State laboratory for veterinary diagnosis and research is a scientific establishment which has the mission of cooperating with the Veterinary Inspection Service as well as with approved doctors of veterinary medicine, in the diagnosis and the prophylaxis of diseases of domestic animals. In addition, its director will have scientific research carried out with a view to improving the means of fighting against epizootic diseases and perfecting new methods of therapy and prophylaxis. The laboratory may be tasked with the checking, manufacturing and the flow of biological products used in veterinary medicine as well the bacteriological and anatomopathological examination of food products of animal origin."

over time

Originally the laboratory of the State Veterinary Inspection consisted only of a single laboratory in which the few members of the staff worked on all the problems. The first complete activity report of the laboratory that has come down to us dates from 1928. It teaches us that at the time the following were carried out there :


Laboratoire de l'Inspection Vétérinaire de l'Etat
Laboratorium van het Staatsveeartsenijtoezicht
Résultat de l'examen
Uitslag van het onderzoek
Dépôt leucocytaire très exagéré.
Germes très rares ; après de nombreux examens nous avons trouvé le bacille de Koch.
Carughem Bruxelles
Carughem-Brussel, 16.12.24
Le Directeur du Laboratoire,
De Bestuurder van het Laboratorium,

▲ Results of laboratory examinations that were sent to the veterinary practitioners (1929)

▶ Dourine : paralysis of the ear, the nose and the lip (1928)

1. Diagnostics : anthracoid conditions; serological examinations : brucellosis, abortions in mares, pullorum disease, tuberculosis and glanders; bacteriological, histological and parasitological examinations; bacteriological analyses of meat and milk; chemical analyses (urine, flours, water, gestation), toxicological and haematological examinations; autopsies.

2. Research studies on : anthracoid conditions; abortions of Bovidae and Equidae : brucellosis, vibriosis, trichomoniasis, sterility, vaccination; diseases of Bovidae and Equidae at a young age : bacteriological, hygiene, vaccination; mastitis : autovaccines; foot-and-mouth disease : vaccines and serotherapy; diseases of sheep : contagious echtyma; diseases of swine : swine erysipela, swine fever, variola; diseases of poultry : roup, cholera, avian influenza, tuberculosis, pullorum disease, trichomoniasis, parasitic and alimentary diseases, vaccination; diseases of rabbits : coccidiosis, treponematosis; and diseases of bees.

▲ Didactic poster of the Veterinary Inspection Laboratory showing the positive reaction after tuberculination of a chicken (1929)

▲ Rabbit coccidiosis :
cage equipment enabling the separation from the feaces (1930)

Gradually as the recruitment of new scientific units proceeded, the services were individualised. Thus just before the war of 1940-45, in addition to the general laboratory, there was a "chemistry" service as well as a "reproduction pathology" service. After the war, "manufacturing of anti-foot-and-mouth disease vaccine", "avian pathology" and "bacteriological checking of milk" services appeared in succession. Then, following the restructuring of the Ministry of Agriculture, when the scientific staff had gradually become larger, the number of services gradually increased. The royal decrees of 1965 organising the NIDO-INRV in four veterinary departments and in seven sections did not modify the previous situation a great deal.

In addition to its research activities, each service provides in its domain the carrying out of diagnostics and, if need be, the production and control of biological products. These latter tasks are sometimes so major that they constitute the basic essentials of the services' activities.

The creation of federations to fight against livestock diseases in 1960 and the provincial laboratories had, among other objectives, the undertaking of routine activities carried out until then by the veterinary departments of CODA-CERVA in order to allow its staff to concentrate better on research. These activities were only taken up gradually within these federations. Although new, this organisation made possible the implementation, under the scientific and technical supervision of CODA-CERVA, of numerous serological screening campaigns against the major livestock diseases, these campaigns serving as a monitoring tool for the service of the Veterinary Inspection, of programmes for the eradication of these diseases, then for the maintenance of the "unharmed" certification of our country. In this organisation CODA-CERVA has already occupied the place of reference laboratory for many years.

2. The first mission of the agrochemical departments of CODA-CERVA

- In the colonial period (1928 – 1960) the then laboratory, that depended on the Ministry for the Colonies, was charged with researching any issue of a chemical nature that comprises complete scientific description of the natural products of the Belgian Congo. The mission was described as follows :
  - "determining the testing of a theoretical or applied nature, which relate to either the study of little known or unknown products or to the study of Congolese goods;
  - searching for utilitarian applications, that is to say turning the natural products of the Belgian Congo into trade or industrial products;
  - special technical training for the Colonies department of some classes of civil servants".

- In the decision of 3 March 1961 in which the laboratory was transferred to the Ministry for Agriculture it was assigned to 2 agro-chemical departments and 5 sections. Its task was reformulated and it remained unchanged until 1995 :
  - chemical and physical chemical study of soils and their constituents, in order to determine the type and properties that have an impact on the vegetation, especially the fertilization, the soil improvers and culturing techniques with an eye to increasing the fertility of the soil;
  - chemical study of plants and of the metabolism of their components in function of the growth condition, in order to improve the yield of the cultures and the quality of the agricultural products;
  - study of the micro-organisms in as far as the products that they produce can play a role in the behaviour of soils and plants or can be a source of substances that are important for agriculture and agricultural industries;
  - chemical studies with an eye to the valorisation of industrial agricultural products.

3. The creation of CODA-CERVA : a new look at the mission

The restructuring of the scientific institutes of the Ministry for Agriculture led to the creation of CODA-CERVA from the merger of the four veterinary departments and the two agro-chemical departments.
In this Royal Decree, the powers of each of the five scientific institutes of the Ministry for Merchants and Agriculture were described anew.
They were described as follows for the newly established CODA-CERVA :
"This institute is in particular authorised to offer scientific and technical support to solve problems concerning :

- combating animal diseases;
- protecting human health;
- protecting the quality of the agricultural ecosystems;
- guaranteeing the safety of the animal and vegetable productions with regard to zoonoses and residues;
- using the by-products of agriculture."

On the scientific level and the provision of service, CODA-CERVA evolved more and more from an organisation putting the accent on the producer and the profitability of productions toward a centre that takes into consideration more the interests of the consumer and the safety of agricultural products. Thus the agrochemical departments would be involved more in the problems of residues and contaminants, and the veterinary departments would take into account more and more the zoonotic aspect of animal diseases, while maintaining marked attention to the other animal diseases, and principally the epizootic diseases, at the basis of the creation of the centre.

The years 2002 and 2003 were transition years in the accomplishment of the mission at the time of the transition of the former Ministry of Agriculture to the new Federal Public Service of Public Health, Safety of the Food Chain and Environment. These were the transition years that led to the new objective, which consists of putting scientific competency concerning transmissible diseases, residues and contaminants in agriculture as a priority in service of safer food production, animal health and public health.

The researchers of CODA-CERVA redefined its mission, a mission that remains to a great extent faithful to that which we have been fulfilling since 1930, if it is only that the attention paid to the aspects of "public health" and of "food safety" have been strengthened.
In the framework of sustainable and socially acceptable agriculture, the VAR, through scientific research, expert advice, and the provision of services, contributes to a pro-active policy as regards safe food production, animal health, and public health on the federal and international levels.

The VAR's core activities consist of policy supporting scientific research, expert advice, and the efficient provision of services in :

- Epidemic, endemic, and emerging transmittable diseases in animals.
- Zoonotic and emerging infectious diseases threatening public health.
- Residues, contaminants, genetically modified organisms and environment in the framework of safe food production.
- Epidemiology : surveillance, risk analysis, and molecular epidemiology.

The long-term objectives have been set with more precision. Thus, CODA-CERVA aims principally :

- to be recognised at the national and international levels as a centre of expertise for applied scientific research;
- to become THE Belgian reference laboratory for all microbial diseases of animal origin, for prions and for certain residues and contaminants;
- to become the preferred contact of the Government thanks to its competencies on the subjects of transmissible animal diseases, of zoonoses, of emerging infectious diseases and of the safety of primary food production for the consumer;
- to become a point of contact for the correct and impartial dissemination of information on these subjects.

4. The major activities of CODA-CERVA in the course of time

4.1. The activities in leading and coordinating veterinary diagnostics

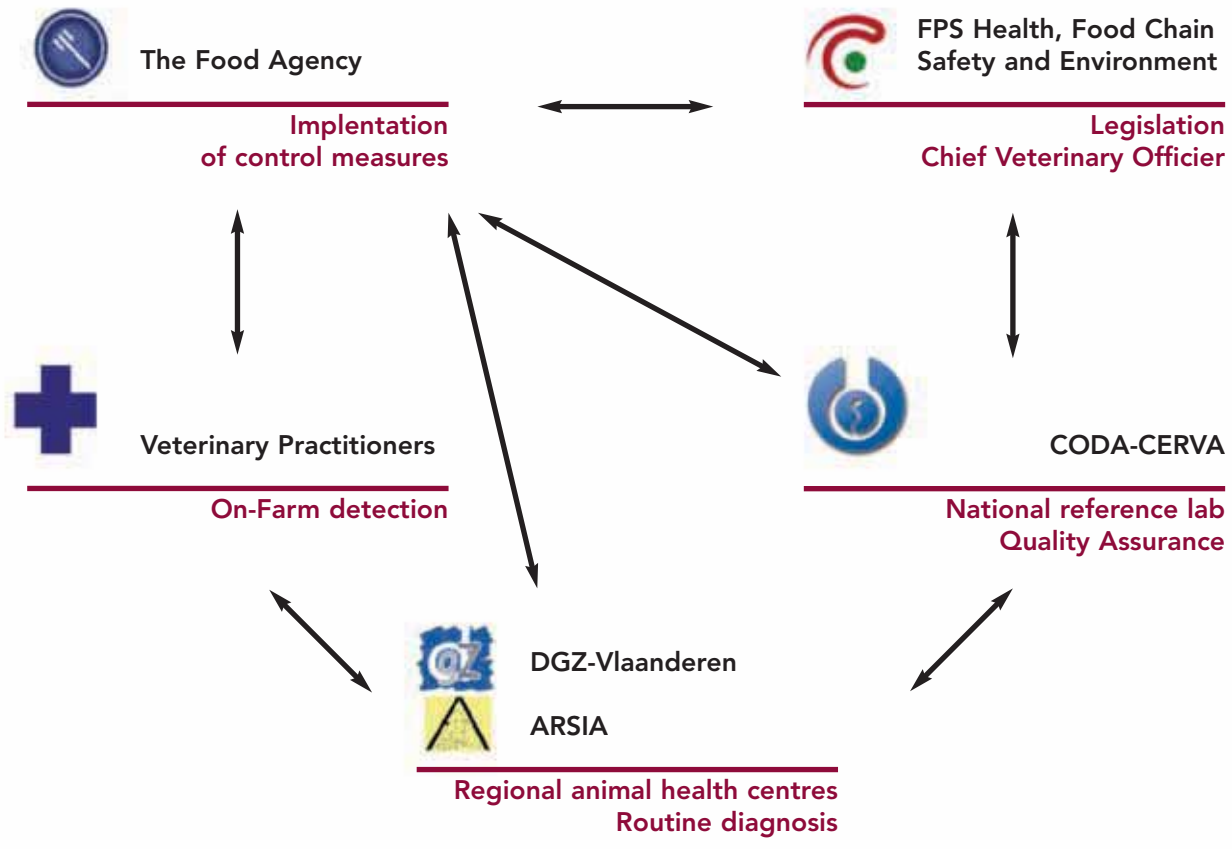
Although when it originated CODA-CERVA was the only diagnostic laboratory working in Belgium and recognised internationally, the development of Regional animal health centres and later the authorisation of other diagnostic laboratories necessitated the technical coordination of their activities concerning the diagnosis of legal contagious diseases in order for all these activities to be recognised at international level thanks to a leading laboratory. Thanks to the acknowledgement of their expertise in research and the quality of the services that they supply, several departments of CODA-CERVA are recognised as the reference laboratory for Belgium and the Grand Duchy of Luxembourg.

CODA-CERVA is one of the partners in the control of livestock diseases that is organised by the Belgian government. As an EU Member State, Belgium is obligated to implement EU directives related to animal disease control and food safety. Therefore, the Federal Public Service Health, Food Chain Safety and Environment transposes these directives into Belgian legislation. Moreover, it represents Belgium in several international organisations, such as the EC, the OIE, the FAO, etc. FAVV-AFSCA implements control measures related to animal disease control and food safety which are based on the legislation prescribed by the Federal Public Service. As a tool for optimising the control of animal diseases, FAVV-AFSCA appoints veterinary practitioners to implement several on-farm control methods, such as the early detection of diseases. In the event that a veterinary practitioner suspects the presence of a notifiable disease on a farm, he/she will inform the Official Veterinarians of FAVV-AFSCA and provide relevant samples to the regional animal health centres of DGZ-Vlaanderen or ARSIA. The latter centres will try to confirm the presence of the disease on the farm by laboratory diagnosis and will inform FAVV-AFSCA and the veterinary practitioner as to the result. The specialists of the regional animal health centres can provide more details or advice on the disease in question when required. On the other hand, they can also consult the experts of CODA-CERVA in the event that no clear diagnostic result can be obtained and a second opinion

is required. Through its reference laboratories and its Coordination Centre for Veterinary Diagnostics, CODA-CERVA coordinates the quality system (IS0 17025) which is implemented in all laboratories that are involved in the diagnosis of notifiable animal diseases in Belgium in order to standardise the diagnostic procedures and results throughout the country. Due to the presence of high-level biosafety facilities, CODA-CERVA is the only diagnostic laboratory in Belgium that is allowed to handle and analyse samples for highly contagious diseases such as classical swine fever, foot-and-mouth disease or avian influenza. The experts of CODA-CERVA will also provide advice to the Federal Public Service and FAVV-AFSCA on the legislation and implementation of animal disease control programmes.

CODA-CERVA was designated by the European Commission as the federal reference laboratory for the identification of pathogenic organisms listed by the OIE (foot-and-mouth disease, African and classical swine fever, vesicular disease, avian influenza, pseudo-fowl pest, bovine leucosis, etc.) and for zoonotic organisms that involve certain risks for human beings (salmonellosis, brucellosis, tuberculosis, EHEC, anthrax, trichinosis, etc.).

Partners in animal disease control



4.2. The fight against epizootic diseases : an example of the effective collaboration of CODA-CERVA with its partners

It was further to the epidemic of rinderpest in Belgium, from which all of Europe feared contagion, that the Veterinary Inspection Laboratory was created. From its origin to the present time, CODA-CERVA has always played a key role concerning the fight against epizootic diseases by supporting the work of putting health policy rules into practice in the field. As an example, the history of the first decades of the veterinary departments of CODA-CERVA is inseparable from the history of the fight carried out in Belgium against foot-and-mouth disease.

In 1924, the very year of the foundation of the Veterinary Inspection Laboratory, the number of sources of foot-and-mouth disease in Belgium was more than 37,000. This meant that the problem of foot-and-mouth disease was immediately forced to the attention of the founders of CODA-CERVA. Starting in 1924, Emile Leynen undertook experiments on guinea pigs aimed at making a formalinised vaccine from foot-and-mouth disease virus products. This research fit into the line followed by all the foreign researchers of the time, with whom Emile Leynen and René Willems were in contact, moreover.

In 1937, an epizootic spread of foot-and-mouth disease broke out in Belgium and the spread of the disease was so rapid that the public authorities could no longer intervene through serotherapy alone. Other procedures to combat it were developed. Research studies were therefore initiated by René Willems and the conclusions of these studies were that only passive immunisation followed up with aphtisation yielded results. The laboratory therefore set itself to making serum from convalescents. An entire organisation had been set up to be able to send back to the veterinarian the serum coming from the blood that they themselves had sent. In fact it was already known that the epizootic spread of 1937 was due to at least two types of virus and it was important to use the serum corresponding to the type in question. The laboratory prepared this serum from convalescents from 1937 to 1945 at the rate of around 30,000 litres per year.

In the meantime, progress had been made in the search for vaccines against foot-and-mouth disease, and from the beginning of the war of 1940-45, Waldmann produced vaccine industrially on the island of Riemst in Germany. Starting in 1942, large quantities of the Waldmann vaccine were purchased, and it was therefore possible to judge the value of this product in Belgium. In 1946 it was decided to undertake the production of this type of vaccine in Belgium. Starting in 1948, the production became industrial. The number of doses of vaccines made increased from year to year to reach 300,000 trivalent doses in 1950. The first vaccines purchased abroad or produced in Belgium served to administer vaccinations in a ring around the sources of contagion.

In 1951, the country was once again ravaged by a serious epizootic spread of the disease; more than 50,000 sources of contagion were counted that year. This circumstance led to the release of large amounts of credit dedicated to the extension of the installations, and as from 1952, the annual production of vaccines reached a million doses. Achieving the eradication of the disease through vaccination was then envisaged. First the breeders were invited to have their animals vaccinated voluntarily. Then in 1955 vaccination was made obligatory for holders of milk cows that supplied milk or cream to a dairy company. However, this non-systematic vaccination of animals was not sufficiently effective. That is why starting in 1961, the generalised annual vaccination of all Bovidae aged more than six months was made compulsory in Belgium. From 1961, the institute managed to produce the 2,500,000 trivalent vaccine doses necessary to cover the country's needs.

▲ R. Willems in the years '50.

▲ Foot-and-mouth (FMDV) vaccine production : the harvest of the epithelia by R. Strobbe and J. Debecq (1965).

▲ FMDV vaccine production : preparation of aluminium hydroxide by J. Vandenbosch and sterilization by H. Dewitte (1965)

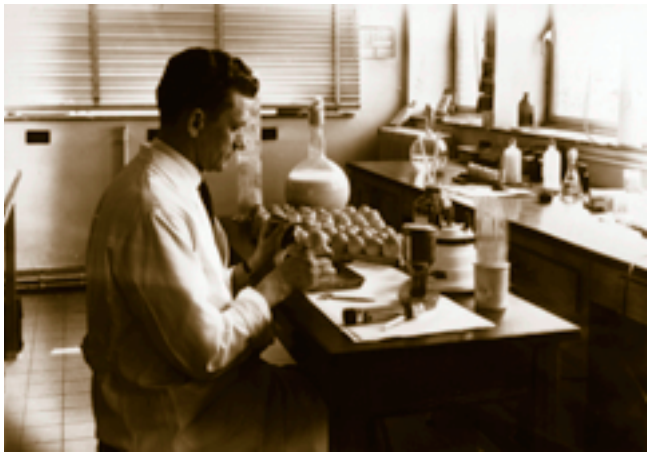
Since 1965 then, especially to avoid a possible propagation of foot-and-mouth disease in receptive species that had not been vaccinated, the prophylactic measures were rounded off with the slaughter on order (stamping-out) of animals that were affected and of animals suspected of being contaminated.

The stopping of vaccination against foot-and-mouth disease imposed in 1992 by the European Union changed the fate of CODA-CERVA. Medical prophylaxis gave way to hygienic prophylaxis based on the early detection of germ carriers. CODA-CERVA is not going to stop perfecting itself thanks to new, ever more high-performance methods of screening. In addition, our partners in the Veterinary Inspection service and then the FAVV-AFSCA will be able to count on the availability of our staff, capable of establishing an initial diagnosis in the hours that follow the arrival of samples, 24 hours a day, 7 days a week. The return of foot-and-mouth disease in Europe, in 2001 made it possible to put our skills to the test and to demonstrate our effectiveness.

▲ FMDV vaccine production : washing (M. Van Montagu) and filling of the vaccine vials by L. Degieter and M. Rubin (1968)

Classical swine fever also counts among the epizootics that have marked the history of CODA-CERVA several times. This disease was the origin of the creation of the "swine virus" section then directed by Joseph Leunen. It was in 1968 that the slaughter by order in the sources of contagion of swine fever was decided; following the example of the fight against foot-and-mouth disease, the slaughter of animals that were affected or suspected of being affected was the indispensable complement to vaccination. At that time a new method was developed based on immunodepression to measure the residual virulence of the attenuated vaccines used at the time. These controls make it possible no longer to accept as a vaccine anything but the "Chinese" strain, or other strains that have the same attenuation qualities. Between the years 1975 and 1980 a period of temporary improvement was observed on this front; while in 1980 a new epizootic began, and cases of swine fever were being discovered until 1988, the year of the stopping of vaccination. A new epizootic of classic swine fever began once again on 15 January 1990 and affected 113 sources of infection located in the densest region of swine breeding. In 1990 the packaging of serums in "micronic" blocks had already been perfected and we were the first laboratory after the laboratory that produced the reactant in Lelystad to apply diagnosis by ELISA on a large scale. This made it possible for the first time to make a semi-automatic serological diagnosis of classical swine fever. Thanks to the close cooperation between the Regional animal health centres, the Veterinary Inspection and CODA-CERVA, samples were taken for the first time on the farms at the time of stamping out in order to perform epidemiological analyses. These two new parameters were taken as a model in the fight against swine fever in other countries in the European Union and certainly made it possible to limit losses during future epidemics in Belgium. In addition they constituted the basis for future epidemiological analyses in 1993-1994 and then in 1997-1998. It was the same dynamism and the same rapid reactions that made it possible to follow the evolution of swine fever very closely in wild boars and to adapt the fighting strategy in this direction.

▲ Robotic equipment for serological analysis in epizootic disease screening (2004)



▲ Virological diagnosis of avian epizootics by inoculation to embryonic eggs by J. Mus in 1967

▲ Virological diagnosis of avian epizootics by inoculation to embryonic eggs by M. Decaesstecker in 2004

When, between 1970 and 1972, Newcastle disease, which had made its first appearance in Belgium in 1949, once again ravaged our poultry farms, CODA-CERVA reacted by setting up a unit for the diagnosis of avian virology and by rapidly controlling the technique of isolation of eyed eggs. In 1992, this laboratory was designated by the EU as the reference laboratory for Newcastle disease and avian influenza for Belgium and the Grand Duchy of Luxembourg. Thus, in 1994, the avian virology section was able to cope effectively with another major epidemic of Newcastle disease that devastated the Belgian industrial farms. When an epidemic of avian flu broke out in Hong-Kong in 1997, the veterinary world was in commotion. In effect, for the first time an avian influenza virus (H5N1) seemed to have been transmitted directly from the chicken to a human being, without passing through a pig, a passage that seemed obligatory up until then. Fortunately the virus proved to be transmissible from the sick chicken to a human being, and not from one human being to another. Avian influenza remains a major priority by virtue of its regular presence in different spots in the world. The onset of a very severe epidemic in The Netherlands in 2003 put the staff of CODA-CERVA and the FAVV-AFSCA on a war footing. The virus crossed the border, but thanks to our combined efforts, the epidemic was quickly stamped out in a limited region of our country. Very recently, finally, the rapid isolation by the laboratory of a strain of H5N1 virus from eagles smuggled in from Thailand and seized at the Brussels National Airport, as well as the associated surveillance measures, allowed us to avoid a possible dissemination of this hypervirulent virus which has currently necessitated the slaughtering of more than 100 million birds and caused the death of more than 50 people in South-East Asia.

These different examples dealing with the fight against epizootics show that CODA-CERVA has always been at the side of the Veterinary Inspection, then of the FAVV-AFSCA, in the front lines of the battles that have been carried out against many other infectious diseases of domestic animals. CODA-CERVA has intervened above all by taking in hand the technical part of these campaigns : research, preparation and monitoring of vaccines, serums and diagnostic antigens, performing diagnostics, and supervision of diagnostic tests in other authorised laboratories, epidemiological studies, destruction of animals and disinfection of sources of infection.

4.3. The fight against Zoonotic agents

At the start of its activities, the Institute focused on the diagnosis and possible prophylaxis of animal diseases, as a service towards veterinary practitioners and owners of food producing animals. Our researchers' interest in *Mycobacterium* infections and brucellosis therefore, was mainly based on animal health, i.e. pulmonary lesions in cattle and abortion in ruminants, respectively. Similarly, salmonellosis and *Escherichia coli* infections were initially studied for their association with diarrhoea in young animals. However, during recent years, more emphasis has been put on the possible impact these bacteria may have on public health, and the study of microbacterial agents (bacteria, viruses, prions) that may pass from animals to humans (i.e. zoonoses) has become a main activity of the Institute. As a consequence, the Institute nowadays harbours the national reference laboratory for a number of these agents (animal tuberculosis, animal and human brucellosis, animal and human tularaemia, salmonellosis, zoonotic *E. coli*, anthrax, avian influenza, TSE).

In Belgium as well as in the rest of Western Europe, bovine tuberculosis was of main interest since it was known that milk from infected cattle could contaminate people. Besides imposing hygiene measures and medical surveillance, official control programmes in cattle were set up. Post-mortem examination of the carcasses in the slaughterhouses and the systematic skin testing of living animals was started. CODA-CERVA was designated to perform bacteriological examinations on samples from suspected animals. In recent years, CODA-CERVA has evaluated better diagnostic tools i.e. the development of new blood tests (IFN-gamma) and tests for the molecular identification of isolates (PCR). The molecular fingerprinting of all isolates identified since 1995 rises new questions on the epidemiology and the control of the remaining positive herds detected. Human infection with *Brucella* often occurred by drinking unpasteurised milk. Likewize, veterinarians and people handling cattle were often subject to long lasting periods of inactivity due to their direct contact with *Brucella* leading to a general weakness in humans. The zoonotic concern of *Brucella*, and the considerable economic consequences for infected animals (abortion) and man (inactivity) was successfully counteracted by the Veterinary Services in collaboration with diagnostic laboratories and CODA-CERVA in intensive official programmes that included standardised serological testing, bacterial isolation and typing... The identification of a reservoir of *Brucella suis* 2 in wild boars in Belgium encouraged CODA-CERVA to remain vigilant against swine brucellosis. Since 2003, Belgium has been officially free from bovine brucellosis and tuberculosis (Commission Decision 2003/467/EC).

The typing with specific antisera of *Salmonella* isolates from food producing animals is essential to trace the infection in a population (uptake of contaminated feed, contact with other animals), but also to compare with clinical isolates from man. *Salmonella* in humans is frequently found after eating of contaminated eggs, poultry or pork meat. Therefore, CODA-CERVA publishes yearly a report on the various *Salmonella* serotypes that were detected in animals, feed and foods. This report is of interest for professionals active in the field of food microbiology and food safety. In recent years, the study of zoonotic *E. coli* (e.g. *E. coli* O157) has led to the identification of toxin variants, which may result in a more accurate diagnosis of this life threatening infection in humans.

Also antimicrobial susceptibility of Salmonella, as well as of E. coli, is a major topic of CODA-CERVA. After the publication of the Swann report in 1969, and also since the Microbial Threat conference in Copenhagen in 1998, the impact of the veterinary use of antimicrobials as compared to the use of such molecules in human medicine on the selection of resistant bacteria important for public health, has been widely discussed. Therefore, CODA-CERVA follows the antimicrobial susceptibility of Salmonella and E. coli of animal origin, which reflects the use of these drugs in animal husbandry.

After the discovery of the first cases of bovine bpongiform encephalopathy or BSE in the United Kingdom in 1986, CODA-CERVA introduced the diagnosis of BSE on suspected bovines using histopathological examination of the brainstem. Later on, more appropriate tests were introduced such as Scrapie Associated Fibril (SAF) examination in electron microscopy, immunohistochemistry, western blot analysis and rapid ELISA tests.

The first case in Belgium, out of a total of 130 cases until September 2005, was discovered in 1997.

Since the onset of the BSE crisis in 1996, after the confirmation of the link between BSE and a new prion disease in humans, variant Creutzfeldt-Jakob disease (vCJD), CODA-CERVA came to the front, at the Belgian as well as at EU level, in combating this new, unknown threat. Indeed, BSE is, yet at present, a huge challenge for the protection of human health due to the many unknown factors making, certainly in the beginning, a reliable estimation of the extent of the vCJD epidemic in humans impossible.

CODA-CERVA plays a leading role in the epidemiological monitoring and research on prion diseases in cattle, small ruminants and cervids. As BSE National Reference laboratory, it has a crucial task in the validation of the rapid BSE tests that have been applied in the EU, for the protection of human health, on all cattle above 30 months since January 2001, in the supervision of the 16 private BSE testing

laboratories, as well as in the confirmation of all BSE diagnoses in Belgium and Grand Duchy of Luxemburg. In 2005, a discriminatory test scrapie – BSE for small ruminants was successfully implemented.

As reference laboratory for genotyping CODA-CERVA plays a major role in the selection of the Belgian sheep population towards resistance for prion diseases, in order to protect optimally the human population in case BSE would be present in sheep. After the detection of BSE in goats in 2004, a number of diagnostic and research activities are now focussed on that species.

At EU level, CODA-CERVA participated in a number of TSE research projects, and was selected because of its expertise, in all EU TSE/BSE working groups of the former Scientific Veterinary Committee of the EC since 1987, in the former TSE/BSE ad hoc group of the Scientific Steering Committee of the EC (1997-2003) as well as in the Scientific Panel of Biological Hazards and its TSE/BSE working parties of the European Food Safety Authority since 2003.

CODA-CERVA is also involved in diagnosis and identification of emerging infectious diseases. Since the terrorist's attacks in New York and Washington DC on September 11th in 2001, the Belgian authorities have identified more than 1550 suspected packages that had to be analysed as for their content of *Bacillus anthracis*, the causative agent of anthrax. As CODA-CERVA is the only Belgian laboratory that disposes of the essential permits and infrastructure to analyse these samples, this task was taken up to serve public health. Although not a single sample was found positive, the continuous danger prompted CODA-CERVA to start research on rapid molecular tests that may detect and identify microbial agents that can be used by bioterrorists or may be introduced by the globalisation of international trade and transport of people and goods. The set-up of an 'orientation laboratory', a BSL3 laboratory that aims at the fast preliminary detection and subsequent identification of emerging infections, is a result of this new task.

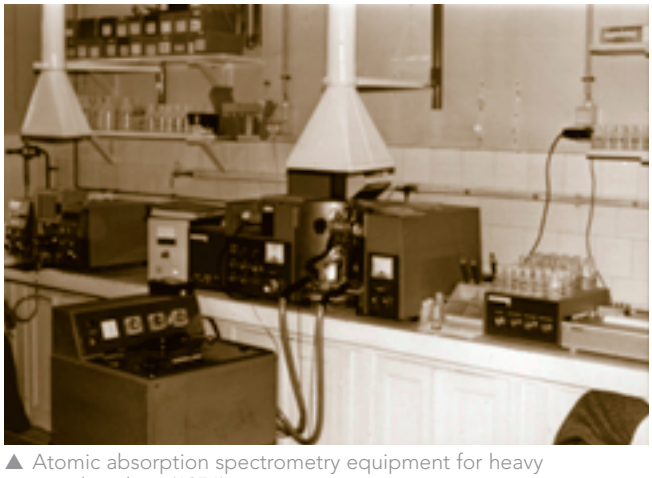
▲ Bacteriological analysis of suspicious packages (2001)

4.4. From developing the products of the earth to consumer protection

If the post-colonial period of the agrochemical departments is properly considered, it is apparent that it was possible to develop the know-how accumulated since the creation of the laboratory of the Ministry of the Colonies usefully after its transfer to the Ministry of Agriculture. In fact, the expertise acquired in chemical and physical-chemical analysis of rocks, soils, tropical wood, foods, plant extracts, etc. quickly turned into practical developments that could be of immediate interest to our country. That is how, from the beginning of the 1960s, the agrochemical departments were able to occupy a position as a pioneer in mineral analyses in the matrices of interest to our agriculture : soils, water and agricultural products. To perform these analyses, leading edge technologies based on X-ray fluorescence, UV emissions and atomic absorption of elements were introduced, and for a long time constituted the laboratory's prime tool because of the numerous applications achieved with this equipment as well as because of the international influence connected with this expertise. At the same time the experience acquired in developing the African biomass (tropical woods) was quickly transformed into know-how in the area of the development of the by-products of agriculture by applying biotechnological procedures. There was also the mastery of chromatography techniques that made it possible to substitute for the analysis of plant poisons present in minute quantities in certain exotic plants, the analysis of various organic components (organic acids, sugars, amino acids, etc.) in agricultural raw materials and products.

From the end of the 1960s, spurred on by Pierre Herman, a new direction began in the mission of the agrochemical departments. At that time none of the centres that were under the control of the Ministry of Agriculture was sufficiently well equipped to deal, with all the expertise and the equipment necessary, with the new problems that had emerged and become major during the last few decades, namely the increasing pollution of our environment, and as a consequence, of our agricultural production. We are in fact in an era marked by serious chemical pollution accidents. As example we can cite the mercury pollution of the Bay of Minamata which affected a great many victims in Japan starting in 1953; dioxin pollution as a result of the use of Agent Orange (defoliant) by the Americans during the Vietnam War; dioxin pollution (once again and still!) following the chemical accident of Seveso in 1976. During these years seasoned analysts like Xavier Monseur played a pioneering role in the development of leading edge methods like gas chromatography coupled with mass spectrometry. This technology was successfully applied for the analysis of aromatic organic components, pollutants present in traces in the air, the water and other matrices. At the same time the expertise concerning heavy metal analyses found applications in the study of commodities that are very sensitive to these pollutants, the products of the seas (fish, mollusks and crustaceans).

As from the second half of the 1970s, another problem was tackled by the agrochemical departments; this time it oncerned studying the extent to which the intensification of agricultural activity itself constituted a source of pollution for the rural environment, and if this was the case, how its impact could be minimised. As a result research was carried out by Raymond De Borger and Marc Decleire to study the influence of intensive use of fertilizers and pesticides on the quality of the soils, the water and the plants.



▲ Atomic absorption spectrometry equipment for heavy metal analysis (1976)

▲ The personnel of the Institute for Chemical Research, at its 50th anniversary in 1978

The years that followed saw this approach strengthened, but gradually the accent was placed on the aspects of prevention of pollution and the establishment of mitigation technologies. This is why after liquid manure, which had already been the subject of studies during the 1970s for its use in biogas, lactoserum was the focus of numerous research efforts during the 1980s. In partnership with industry, the agrochemical departments developed biotechnological procedures that made it possible to make use of this waste product of the dairy industry by producing organic acids from it that can be used in the chemical and food processing industries. Other forms of development of the biomass were studied subsequently, in particular for the production of enzymes (chitinases, for example) and food colourings (by means of cultures of plant cells).

During the 1990s, CODA-CERVA found itself involved in carrying out several European projects, both in the area of the behaviour of pesticides in the soil and the sub-soil and in the study of the influence of atmospheric pollutants such as nitrogen oxides, sulphur, CO_2 and ozone on the yield and the quality of the harvests. For the latter studies CODA-CERVA was equipped, among other things, with a network of open top chambers, a kind of mini-greenhouse that made it possible to expose the cultures to controlled doses of atmospheric pollutants.

▲ Open Top Chamber installations (1990)

The 1990s were also marked by research studies dedicated to the problems of water pollution by pesticides, and more specifically the development of prediction systems allowing the authorities to manage this problem better, as well as continuing surveillance campaigns on the state of contamination of plant productions by heavy metals and fluorides (network of plants that are indicators or accumulators of pollution).

At the present time, all the expertise acquired on the subject of the analysis of chemical contaminants of the mineral and organic types is being used with a view to better surveillance of the food chain. For this purpose CODA-CERVA concentrates, first of all, on studying the contamination of the first links in this chain, i.e. the essential environmental compartments that make up the water, the soils, the plants and the animals (including livestock animals and the fishery products). The orientations currently recommended are moving in the direction of better control of the quality and the safety of products, giving priority to the development of ever more refined methods of analysis (for example, ICP-MS for the analysis of heavy metals), and in accordance with the current requirements concerning quality (necessity of accrediting the analyses). Moreover, major research efforts have also been agreed for the study of the transfer mechanisms of contaminants upstream and downstream in the food chain and to the evaluation of risks to the consumers of contaminated foodstuffs.

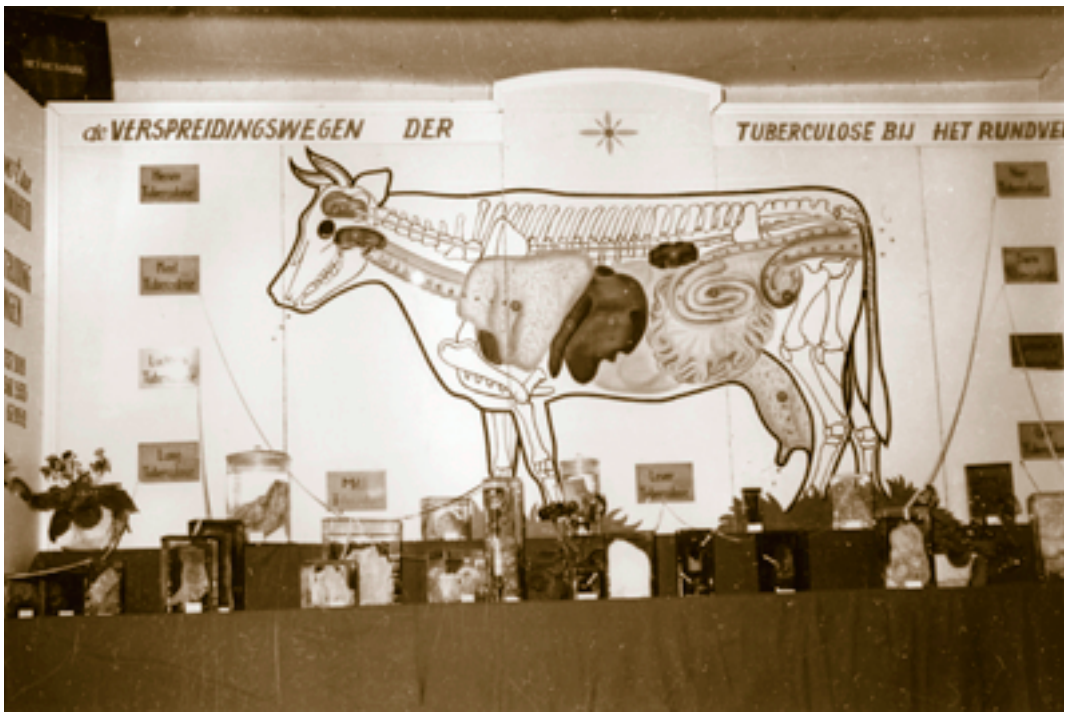
At the present time the researchers of the agrochemical departments are especially focused on contaminations by heavy metals, by mycotoxins (secondary toxic metabolites produced by fungi present in agricultural products and stored foodstuffs) and by persistent organic pollutants (POPs). Therefore CODA-CERVA is contributing to better surveillance of foodstuffs consumed and to increased protection of the consumers.

4.5. The expertise and the disclosure of the results of research

The very nature of CODA-CERVA's mission presupposes the disclosure of the results of research. This was very well understood by the first director, Emile Leynen, who developed this activity to a very significant extent. From the beginning, the results of the research were published. In addition, the results were popularised and thus made available to veterinary practitioners and livestock breeders. CODA-CERVA still owns a large collection of slide plates, of films, of projecting equipment and of teachnig panels that, from 1925 to 1930 served for giving conferences in the veterinary circles and the agricultural companies of the country. Since CODA-CERVA became a scientific establishment of the State, publications have appeared in journals with an international audience and scientific communications are passed on to a great extent at international conferences.

The researchers of CODA-CERVA represent the federal Authority or are present as independent experts in numerous international commissions supported by the European Union, the International Office of Epizootics (OIE), the Food and Agriculture Organization (FAO) and the World Health Organization (WHO).

▼ Didactic poster explaining the dissemination of cattle tuberculosis (1978)



III. The staff of CODA-CERVA

1930

Although CODA-CERVA had occasion to celebrate its first 75 years of existence by looking proudly at the road it has travelled, and by observing with confidence the objectives to be achieved, it is above all thanks to the people who brought it into being, who helped it to grow, to develop, to blossom, to always respond to new challenges. The history of CODA-CERVA corresponds above all to the history of its staff members.

1. The directors of the veterinary departments of CODA-CERVA

Seven people have directed the veterinary departments of CODA-CERVA (or the laboratory that preceded it) from 1930 to 1995 :

Emile LEYNEN from 1930 to 1933,
René WI LLEMS from 1933 to 1961,
André FLORENT from 1961 to 1975,
Joseph LEUNEN from 1975 to 1986,
Jos DE KEYSER from 1986 to 1991,
Robert STROBBE from 1991 to 1994,
Johan PEETERS from 1994 to 1997

a. Emile LEYNEN

Louis-Emile Leynen was born in Hasselt on 14 October 1876 and died in Uccle on 10 June 1951. He directed the laboratory from its origins to 1933. Son of a livestock breeder, with a degree in veterinary medicine from the Veterinary School of Cureghem in 1900, he began his career as a veterinary practitioner in Hasselt. After ten years in practice, he entered the Administration as the Veterinary Inspector of Limburg. During the war from 1914-18, the Belgian Government in exile in Le Havre gave him to the French authorities, who entrusted him with the job of the veterinary department of the Haute-Loire. Returning to the country after the conflict, he exercised the function of veterinary inspector of Brabant before founding the State Veterinary Inspection Laboratory. In parallel, E. Leynen was interested in the livestock farms of the Belgian Congo. From December 1927 to June 1928, he made a study trip to Africa on behalf of the Special Comity of Katanga and in 1929 he became the director of the land service of this company. Not being able to carry out two heavy tasks at the same time, in 1933 he gave up the direction of the laboratory. He ended his career in 1941 while keeping administrative mandates in various colonial companies. E. Leynen was an enterprising and tenacious precursor to whom CODA-CERVA owes its foundation. He was also known as a talented populariser, but unfortunately he left the laboratory at a time when he would still have been able to render great service to it. On the scientific level, he was concerned with many problems, and published around thirty scientific works, basically on anthrax, dourine, avian diseases, foot-and-mouth disease and livestock breeding in Katanga. E. Leynen held numerous honorific and scientific distinctions, and in particular was a permanent member of the Royal Academy of Medicine of Belgium of which he was the first vice-president.

When leaving the laboratory, E. Leynen made a gift of a picture, the work of Géo Bernier, one of our greatest animal artists. This canvas, representing horses that are drinking, ornaments the hall of Building A.

1930

b. René WILLEMS

René-Alexandre-Jean-Hubert-Gérard Willems was born in Leuven on 6 June 1896 and died in Uccle on 19 September 1967. He directed the veterinary departments of CODA-CERVA from 1933 to 1961. He completed his secondary studies on the eve of the World War from 1914-18. A volunteer in the Belgian Army, he spent the war in the Automobile supply column and in the Armoured corps. His conduct in the service of the country brought him a number of military honours, amongst them the War cross with palm. Son of a veterinarian and with a degree in veterinary medicine from the Veterinary School of Cureghem in 1923, he started his career by working for a few months with his father's clientele in Leuven. He entered the Veterinary Inspection in 1924 and immediately worked in the Inspection Laboratory. He spent his whole career there, for six years as inspector, for three years as assistant and for twenty-eight years as director. After going into retirement, he still exercised the function of chairman of the Working Group for the study of the foot-and-mouth disease virus, from 1961 to 1967. René Willems participated in the founding of CODA-CERVA with E. Leynen. Under his direction, major modifications took place. He transferred the laboratory of Cureghem to Uccle where he had numerous buildings built; he also built the slaughter-house and the experimental stables of the Machelen Centre. In addition, he increased the scientific and technical Civil Service staff and he considerably expanded the activities of CODA-CERVA. His great courteousness and his skill at conducting debates made Willems a master appreciated in all assemblies, both national and international. In particular for many years he presided over the Committee on Foot-and-Mouth Disease of the World Organisation for Animal Health (OIE), as well as the Scientific Veterinary Commission of the Commission of the European Communities. His scientific activity is reflected in around fifty publications concerning the study of several contagious diseases and, more specifically, botulism and foot-and-mouth disease. René Willems held numerous honorific and scientific distinctions. In particular he was a permanent member of the Royal Academy of Medicine of Belgium, with an honorary doctorate from the University of Munich and, an exceptional honour, a Member of the Institute of France.

René Willems was a man unanimously respected by the Belgian veterinary profession. When in 1964 the Belgian Veterinary Union celebrated its centenary, it was to René Willems that the mission of welcoming His Majesty the King and of making the official speech was entrusted. When he went into retirement, a collection was organised among the Belgian veterinarians with a view of presenting a gift to him; he asked that the sum gathered be dedicated to the founding of a "Willems Prize" intended periodically to reward a member of the technical staff of CODA-CERVA

André Florent gave homage to his predecessor by having a bust of René Willems made by the sculptor U.D. Auquier on a commemorative bronze plaque that was placed at the entrance of CODA-CERVA and inaugurated on 05-11-1968.

1961

1961

c. André FLORENT

André-Jules-Adolphe Florent was born in Manage on 12 October 1910 and died in Uccle on 7 December 2001. He directed the veterinary departments of CODA-CERVA from 1961 to 1975. Son of a veterinarian, and with a doctorate in veterinary medicine from the Veterinary School of Cureghem in 1933, he practised for a few months before entering the institute. He spent his whole career there, for four years as assistant, for twenty-three years as senior research officer and for fourteen years as director. In the course of this long career of more than forty years, André Florent experienced all the major transformations that marked the history of CODA-CERVA. Under his direction, CODA-CERVA underwent numerous expansions : the construction of the avian pathology and virology laboratories and the acquisition of fields adjoining the property in Uccle. He doubled the scientific staff, particularly thanks to recruitment to the professional Civil Service staff of the Legal Entity. André Florent also expanded the scientific activities, especially through the creation of a laboratory for checking vaccines and serums used in veterinary work. A conscientious researcher with high scientific value, André Florent acquired an international reputation for his work on diseases of the reproductive system and in particular trichomoniasis and vibriosis of Bovidae. He supplied the results of his research in about seventy publications. André Florent held numerous honorary and scientific distinctions; in particular he was a member of the Royal Academy of Medicine of Belgium.

1975

1975

d. Joseph LEUNEN

Joseph-Marie-Emile Leunen was born in Etterbeek on 23 July 1921. He directed the veterinary departments of CODA-CERVA from 1975 to 1986. Awarded the degree of doctor of veterinary medicine by the School of Veterinary Cureghem in 1947, he worked for a few months in a pharmaceutical firm before being recruited as research assistant at the institute. He spent his entire career there, as research assistant from 1948 to 1957, senior research officer from 1957 to 1962, laboratory director from 1962 to 1966, head of the Virology department from 1966 to 1975 and director from 1975 to 1986. From its beginnings he was associated with René Willems' work on foot-and-mouth disease. Together they perfected a procedure for manufacturing an anti-foot-and-mouth disease vaccine of the Waldmann type. This vaccine was prepared with the natural virus produced by intralingual inoculations of healthy Bovidae. The mission of starting the industrial manufacturing of the anti-foot-and-mouth vaccine at CODA-CERVA fell to Joseph Leunen. Leunen turned out to be a first-rate organiser, because before starting up the manufacturing of the vaccine it was necessary to produce the virus in sufficient quantities. This production on live animals imported from Ireland necessitated major infrastructures and the coordination of an extremely diversified workforce. Starting in 1956, Leunen was assisted by Robert Strobbe. The two of them perfected a procedure for the preparation of a virus of the Frenkel type; this was a matter of harvesting lingual epitheliums from slaughtered animals in the slaughterhouses. Put into a culture, at the latest 48 after swabbing, these epitheliums constituted the cellular support necessary for the multiplication of the foot-and-mouth disease virus. The swabbing of healthy epitheliums was originally done in the slaughterhouses of Belgium, and later in the slaughterhouses in Scotland, Yugoslavia and Brittany. The complexity of the organisation of such an undertaking, which had to be done in a minimum amount of time, can be imagined. In 1960, Leunen left the Foot-and-mouth Disease Unit to Robert Strobbe, to develop primary cellular culture techniques starting with foetal organs withdrawn in the slaughterhouses. In parallel, Leunen started to isolate the viruses on bovine material. He handed the Cellular Cultures department over to Marc Mammerickx in 1961, and the Bovine Virology department to Guy Wellemans in 1963. Later, Leunen devoted himself to developing a Porcine Virology service until 1975, the date

at which he left his laboratory work to take over the direction of the veterinary departments. Since 1960 Leunen already had an administrative responsibility because he managed the Legal Entity of the veterinary departments. Joseph Leunen is a member of the Royal Academy of Medicine of Belgium.

1986

1986

e. Jos DE KEYSER

Paul Jozef (called Jos) De Keyser was born in Tildonk on 25 May 1927 and died in Rhode-Saint¬Genèse on 19 January 2000. He directed the veterinary departments from 1986 to 1991. Awarded a doctorate in veterinary medicine by the School of Veterinary Medicine of the State University in Ghent in 1951, he had a colonial career from 1952 to 1960. A veterinarian in the service of the State, at first he exercised the function of area veterinarian in Bukavu and in Goma, then he continued his career in Africa as a veterinarian in the veterinary laboratories of Elizabethville in the Belgian Congo and of Astrida in Rwanda-Burundi. Returning to Belgium shortly after the Belgian colonies became independent in 1960, he was recruited as research assistant to CODA-CERVA. He spent the rest of his career there as research assistant from 1960 to 1967, senior research officer from 1967 to 1968, head of section from 1968 to 1972, head of the Nutrition, Immunology and Toxicology department from 1972 to 1981, head of the Pathology of Large Domestic Animals department from 1981 to 1986 and director from 1986 to 1991. From 1960 to 1986, he worked mainly as the manager of the Reproductive System Diseases and Histopathology service; in this service he succeeded André Florent whose research work he continued, especially on bovine genital campylobacteriosis. Above all he became absorbed in the multiple and difficult problems caused by the fight against bovine brucellosis (diagnostics, monitoring/checking antigens and vaccines, all jointly with the Regional animal health centres). With subsidies from the EEC, which later became the European Union, he carried out studies aimed at standardising brucellous antigens and serological reactions at European level. In 1986, he perfected the diagnostic techniques for contagious metritis of mares that had just infected the country. Shortly afterward, he took over the direction of the veterinary departments for a term of five years.

1991

1991

f. Robert STROBBE

Robert-Petrus Strobbe was born in Forest (Brussels) on 2 October 1929. He directed the veterinary departments from 1991 to 1994. Awarded a doctorate in veterinary medicine by the Veterinary school of Cureghem in 1953, he was hired as an inseminator at the new Artificial Insemination Centre founded by Professor Hubert De Vuyst of the Catholic University of Leuven, in Lovenjoel. From 1953 to 1954, he worked as an inseminator in the province of Luxembourg. After having done his military service, he was recruited as research assistant. He spent his whole career there, as research assistant from 1956 to 1961, senior research officer from 1961 to 1962, laboratory director from 1962 to 1967, head of the Anti-Foot-and-Mouth Disease Vaccine section from 1967 to 1976, head of the Virology department from 1976 to 1991 and director from 1991 to 1994. From the time he started the job, he was associated with Joseph Leunen to produce the foot-and-mouth disease vaccine. When in 1960 Joseph Leunen started to develop cellular cultures with a view to making virological examinations, he became the sole manager of the Foot-and-Mouth Disease service. From 1960 to 1991, that is for thirty years, with the cooperation of Jacques Debecq, recruited in 1963, he concerned himself exclusively with foot-and-mouth disease : diagnostics, research, production, monitoring and distribution of the vaccine, stamping-out and disinfection of sources of infection. From 1961, the generalised annual vaccination of Bovidae aged more than six months was made compulsory in Belgium; afterwards CODA-CERVA produced around 2,500,000 trivalent vaccine doses for Bovidae annually. CODA-CERVA could not allow itself to slow down its production because the sale of the anti-foot-and-mouth disease vaccine was the principal source of financing of the Legal Entity, which employed a large staff recruited to make up for the absence of recruiting in the State Civil Service professional staff. This meant enormous responsibility that fell on the shoulders of the men responsible for the Foot-and-Mouth Disease service. In 1991, R. Strobbe took over the direction of the veterinary departments for a term of three years.

1994

1994

g. Johan PEETERS

Johan Emiel Marie Rose Peeters, was born in Mechelen on 3 July 1951. He directed the veterinary departments from 1994 to 1997 and then the whole of CODA-CERVA from the time of its creation. He was awarded a doctorate in veterinary medicine by the veterinary medicine faculty of the State University in Ghent in 1975. With a master in animal production science from the same faculty in 1981, a degree in Medical and veterinary mycology from the Institute of Tropical Medicine of Antwerp in 1979, degrees in Human Resources Management (KULeuven in 1995 and Vlerick Leuven Gent Management school in 1997). Research assistant to the faculty of veterinary medicine of the University of the State in Ghent, Avian Clinic, Bacteriology and Contagious Diseases service from 1975 to 1976. Part-time lecturer in "Diseases of rabbits" at the Faculty of Veterinary Medicine in Ghent from 1986 to 1991 and at the "Prince Léopold" Tropical Institute from 1988 to 1997. Scientist since 1977 at CODA-CERVA in the area of avian and rabbit pathology and then in the area of parasitology. Research assistant in 1977, first assistant in 1981, senior research officer (senior registrar) in 1987, head of the "Parasitology" section from 1990 to 1993; head of the Small Stock Diseases and Parasitology department from 1993 to 1997. Director ad interim (1994-1995) and director (1996-1997) making the veterinary departments function, chairman and managing director of the whole of CODA-CERVA as from 1 January 1998. His scientific activity is reflected in around one hundred scientific publications principally concerning the study of digestive disorders of rabbits (coccidiosis, colibacillosis, enterotoxemia-iota, relationship of the alimentary composition and intestinal infections, etc.), avian coccidiosis, bovine cryptosporidiosis and porcine mycoplasmosis. President-elect of the World Rabbit Science Association (1992-1996). Member of the steering committee of the Federal Public Service Health, Food Chain Safety and Environment.

1997

2. The directors of the agro-chemical departments of CODA-CERVA

The successive directors of the agro-chemical departments of CODA-CERVA (or the former laboratory) were :

Joseph PIERAERTS, from 1928 until 1931,
Léon L'HEUREUX, from 1931 until 1942,
Emile CASTAGNE, from 1946 until 1966,
Edouard ADRIAENS, from 1966 until 1970,
Pierre HERMAN, from 1970 until 1977,
Jean ISTAS, from 1977 until 1989,
Raymond DE BORGER, from 1989 until 1994,
Marc GUNS (acting), from 1994 until 1997.

1928

a. Joseph PIERAERTS

Joseph-Jean-Marie Pieraerts was born on 10 January 1868. He was professor of Chemistry at the Catholic University of Leuven and also head of department at the Museum for Belgian Congo. At the beginning of 1911 he argued with the Minister for the Colonies via his director for the establishment of a scientific laboratory, "not only to carry out analyses but also for the methodological study of the products that the Congolese soil produces with an eye to industrial exploitation". For security reasons the laboratory was physically separated in a separate building on the opposite side of the Leuvensesteenweg in Tervuren. The question of why this department was later completely separated from the Museum within the Ministry for the Colonies remains unanswered. Some people think that it was due to a difference of opinion between him and the director of the Museum. On 1 May 1928 he was appointed Director of the Laboratory for Chemical and Onialogical Research in Tervuren. After a fruitful career as a scientist he died at the age of 63.

1931

1931

b. Léon L'HEUREUX

Léon-Louis-Fernand L'Heureux was born on 11 July 1885 in Lodelinsart. He had finished his studies to become doctor in Chemistry and was initially an attaché and also an accountant of the Chemistry department of the Museum for Belgian Congo. On 1 May 1928, when the director was appointed he was promoted to project manager in the newly founded Laboratory. On the death of Mr Pieraerts, he was appointed director of the Laboratory on 1 July 1931. On 6 August 1938 he moved into the director's house that shortly before had been built next to the laboratory building. In the summer of 1940 he had to flee from the occupying forces, it is claimed he had helped the British Resistance.
He initially returned to Tervuren but was arrested on 12 August 1942 by the German occupying forces in his hiding-place in Landelies. On 3 October 1945 the mayor of Tervuren was informed of the death of Mr L'Heureux in Dachau on 28 January 1945

1942

1946

c. Emile CASTAGNE

Emile-Etienne-Edouard Castagne was born on 11 May 1901 and obtained the diplomas of Master of Chemistry, Master Brewer and Master of Philosophy at the University of Leuven. On 1 July 1928 he joined the Laboratory in Tervuren as a chemist and was promoted to project manager 1 january 1939. His specialities were general chemistry, phytochemistry (i.c. alkaloids and glucosides), botany and microbiology; he amongst other things studied Congolese fungi strains. After the deportation of director L'Heureux he took the function of acting director from 19 August 1942; after the director's death he was appointed director as of 1 July 1946. In that year, a substantial expansion of the framework took effect, the number of researchers with university diplomas tripled to 18 and about the same number of technicians could start work. Director Castagne was thus able to sharply expand the activities as well as the equipment and the infrastructure. When the laboratory was transferred to the Ministry for Agriculture he was furthermore given the task of reorientating the research to the agriculture of the moderate regions. After a career at the Institute spanning 38 years he retired on 1 June 1966.

1966

1966

d. Edouard ADRIAENS

Edouard Victor Frans Adriaens was born in Hasselt on 26 December 1904. He took his doctoral degree in Chemistry at the Catholic University of Leuven. He joined the Laboratory on 1 january 1929 and worked there during his entire career, first as a chemist, from 1 january 1940 as project manager, from 1 july 1966 as department head and from 7 february 1967 as director. In the colonial period he was above all active in research into vegetable oils and fats. In 1948-49 he went on a mission to the Belgian colony to study the nutrition of the native population. When Mr Castagne retired he was acting director of the Institute and was appointed director at the beginning of 1967. During the last few years before his retirement he was ill for a long time and was replaced as director by Mr G. Waegemans.

1970

1970

e. Pierre HERMAN

Pierre Simon Melchior Herman was born in Antwerp on 23 August 1912. He took his masters degree in Chemistry at the Free University of Brussels and took the doctorate at the University of Leuven in 1948. In 1943 he joined the geological department of the Ministry for the Colonies in Bukavu and amongst other things worked for the 'Société des Mines d'Or de Kilo-Moto', at the laboratory of the geological department of the Colony and at the Centre for Mine Research. On 16 December 1955 he joined the then Laboratory in Tervuren. He specialised in geochemical research into minerals and ores and after the colonial period he above all focussed on research into the mineral composition of soils and plants by means of UV-emission spectrography. He was appointed deputy department head on 1 January 1960 and department head on 1 March 1969 and from 1 July 1970 succeeded Dr Adriaens as director of the Institute. For the next 7 years he was the motor of the reorientation and expansion of the research at the Institute by reacting to the need for research after the pollution of the environment. He retired on 1 September 1977.

1977

1977

f. Jean Romain ISTAS

Jean Romain Victor Istas was born in Overijse on 24 April 1924. In 1946 he was awarded the diploma of Chemical Engineer of Agricultural science at the Catholic University of Leuven. His career at the former laboratory started on 1 May 1947 when he was charged with the study of improving the nutrition of the Congolese population. Soon after that he started a chemical study of Congolese types of wood with an eye to valorisation in the paper industry. On 1 July 1958 he was promoted to deputy department head. After the colonial period he focussed on the study of Belgian types of wood including at the arboretum in Tervuren. When the environmental studies were started at the Institute at the beginning of the nineteen seventies, he devoted himself to studying the impact of air pollution on crops. Following a number of cases of damage, the study focussed on ethylene, fluorides, NH_3, HCl, NO_x SO_2 and O_3. He was appointed department head and when he took over the function of director in 1977 from his predecessor a sound foundation had been laid for topical research that was further elaborated by his staff at international level. As director he further increased the effectiveness of the staff, obtained the status of legal entity for the Institute and had the new building constructed. He retired on 1 May 1989.

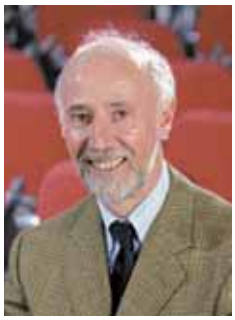
1989

1989

g. Raymond DE BORGER

Raymond Louis Nancy De Borger was born in Willebroek on 19 August 1931. In 1954 he took the diploma of Engineer in Chemistry and Agricultural Industries at the Faculty of Agricultural Sciences in Ghent. In 1956 he started as an IWONL assistant at the Centre for Applied Physical Chemistry and after one year was appointed research assistant at the Laboratory for Chemical Research in Tervuren. In the colonial period he was charged with the study of amino acids in native nutrition. After the transfer to the Ministry for Agriculture he focussed on studying the organic matter in soil, more in particular in the humus components; with the research results he obtained his doctorate in Agricultural Sciences in June 1971 and was then promoted to project manager. From 1973 his work focussed more on environmental studies amongst other things on groundwater pollution within the framework of the National R&D programme 'Groundwater pollution by hydrocarbons' and the issue of semi-liquid manure within the EEC programme 'Animal wastes'. He did a lot of work in the study into overfertilization and the consequences of contamination of the surface waters with nitrates; within this framework he took the initiative to build a lysimeter. After that he coordinated studies into acidification of the soil, cadmium pollution and the issue of pesticides. On 1 May 1989 he succeeded Mr Istas as director. In the next five years the Institute was able to maintain its research activities at international level by participating in several European research programmes amongst other things with regard to the issue of pesticides and the impact of air pollution on agricultural crops. He retired on 1 September 1994.

1994



1994

h. Marc GUNS

Marc Jan Frans Guns was born in Deinze on 22 May 1950. He took the diploma of Master of Chemistry in 1971 at the University of Ghent. After six years of registrarship at the Laboratory for General and Inorganic Chemistry he took his doctoral degree in Sciences. Immediately afterwards he was recruited as a research assistant at the Institute for Chemical Research. He was charged with the mineral analysis of soils and plants with the aid of UV-emission spectrography and X-ray fluorescence; his research was related to the pollution of sea organisms by heavy metals, bromide residues in the soil and groundwater, soil acidification and the phosphate load of agricultural land. In addition he was active in implementing computer applications in research amongst other things for automatic data acquisition and processing. He was appointed project manager in 1983 and department head in 1989. After the retirement of Mr De Borger in 1994 he was appointed acting director.

1997

1928 - 1997















3. The director of CODA-CERVA

Since its creation in 1995, CODA-CERVA has been directed by Johan Peeters.

4. The staff of CODA-CERVA

When we take a look at CODA-CERVA's past history, we note that time and again the different directors of CODA-CERVA have requested our Authorities for staff for CODA-CERVA and principally that the size of the scientific staff in the laboratory be proportional to the tasks that they entrust to them.

4.1 The staff of the veterinary departments

The Civil Service for the professional staff has changed in the course of time but the professional staff has only been filled out in a sporadic way. Overall, the scientific staff recruited for the State Civil Service grew in a regular way during the first few years, then stabilised in the 1970s and remained the same afterwards over the course of time (figure AA). Presented in this form, one could believe that the Civil Service scientific staff grew gradually and harmoniously from the origins to the present. In fact, there were quite a few difficulties in the recruitment of scientific staff. All the directors made tenacious efforts to increase the professional staff and to fill it as quickly as possible when posts became free.

As from 1961, the creation of the legal entity (RP-PJ) has enabled the recruitment of additional units in order to make up for the narrowness of the professional staff of the State and in order to respond to the needs for staff necessary for the production of vaccine but also for all the services and expertise that we provide. At this time, in fact, the category of technical personnel of the State Civil Service was no longer filled and more and more staff members were recruited to arrive at a maximum of 82 people in 1973. The stopping of anti-foot-and-mouth disease vaccination in Belgium in 1992 forced the legal entity (RP-PJ) to reduce its staff; the scientific and technical members under contract with the legal entity (RP-PJ) were not replaced when they left. The creation of the Health Fund and of health teams at CODA-CERVA then of the Coordination Centre for Veterinary Diagnostics made it possible for the legal entity

(RP-PJ) to offer different posts for academics and analysts involved in missions for the surveillance of livestock; this had a beneficial effect on the evolution of the technical and administrative staff, but was without positive direct impact on the evolution of the scientific staff, because the academics recruited under this specific contract did not have any scientific career. Certain surveillance missions however were taken up by this new staff, thus allowing a part of the personnel of the State Civil Service to be relieved of this work while still participating in it, thanks to close cooperation.

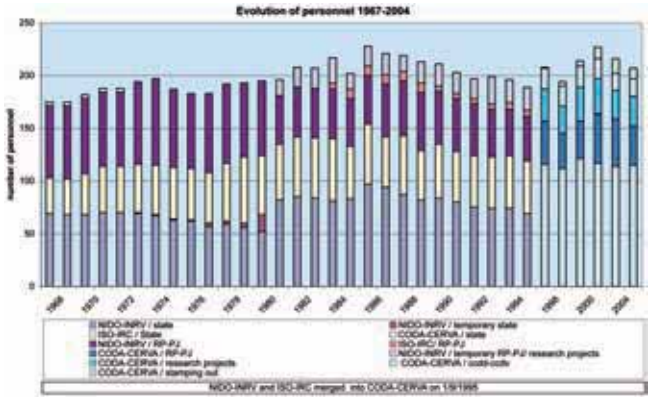
4.2 The personnel of the agro-chemical departments

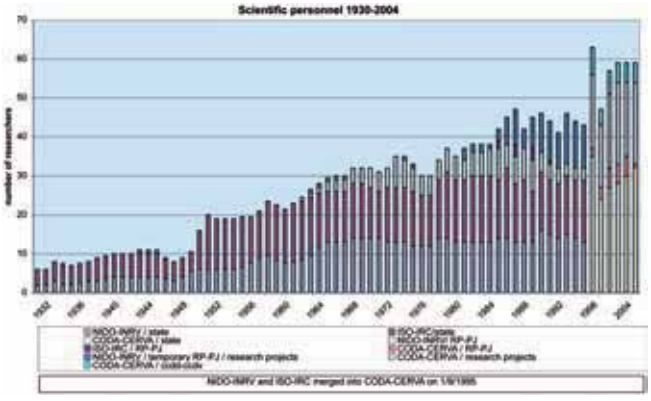
When the Laboratory was founded under the Ministry for the Colonies in 1928, the personnel of the former 'chemistry and onialogy' department of the Museum for the Belgian Congo were transferred to the autonomous laboratory, in total only 5 people of which 2 scientists. From 1929 the newly compiled personnel framework was gradually filled : 5 scientists and half a dozen staff; this stayed almost constant until just before the Second World War. The number of personnel could be found in the annuals of the Ministry for the Colonies; often the staff was expanded with temporary workers, a few of which were natives from the colony. In 1946 the framework of personnel was greatly expanded to 18 researchers, 17 technicians and 4 staff, however this was never fully filled. In 1965, when the statute of scientific institutes and its personnel was published; it had 18 researchers, 10 industrial engineers, 16 technicians, 6 administrative employees and 6 labourers. This framework was never fully occupied either but was supplemented with personnel from workgroups within the Ministry for Agriculture and employed unemployed persons. In 1984 the institute acquired the legal personality so that personnel could be recruited to carry out contracted research for the regions and the European Union; before that this recruitment occurred via the RP-PJ of other scientific institutions of the Ministry for Agriculture. The effective number of personnel is shown in the accompanying table and graphe.

4.3 The staff of CODA-CERVA

The obtaining of a growing number of research projects with external financing, national or international, allowed and still allows CODA-CERVA to increase its critical mass to the level necessary for the pursuit of high-quality research. In 1973, the first scientist was recruited under a temporary contract for a research project. In 2004, 20 scientists and 12 analysts were working under the status of scientist or of technical assistant in a research project.

This proportion of people under contract in comparison with statutory employees indicates the appropriateness of CODA-CERVA in its research environment. It also indicates the dynamism of the statutory staff in the ever more difficult obtaining of research projects from international bodies.





IV. The property and buildings of CODA-CERVA

CODA-CERVA has exercised and exercises its activities on six sites in Brussels or on the periphery of the city. We will consider each of these six sites in turn.

1. Parc du cinquantenaire in Brussels

Emile Leynen, the first director, and René Willems, his assistant, were initiated in bacteriological techniques in the Central Laboratory for the Administration of Hygiene. This laboratory was under the control of the Ministry of the Interior and was located at 2, Parc du Cinquantenaire in Brussels. These premises still exist in the enormous warehouse that is seen to the right of the archways of the Cinquantenaire when one arrives from the avenue de Tervuren. As from 1924, the Veterinary Inspection Laboratory was established in Cureghem, but Emile Leynen and René Wililems kept the contract with the Central Laboratory for the Administration of Hygiene where, moreover, they still received mail and samples in 1925 and 1926.

2. Anderlecht-Cureghem

The laboratory started to operate in 1924 in the former isolation ward of the Veterinary School of Cureghem (Anderlecht). This building had been temporarily given to the Ministry of Agriculture by Gustave Gratia, at the time the director of the Veterinary School. The building in a U shape, which still exists moreover and which served as the autopsy hall of the Faculty of Veterinary Medicine, consists of a large square room 10 metres on a side, flanked by two annex wings containing stables. The Veterinary Inspection Laboratory occupied the large room and they used the stables to accommodate the laboratory animals (chickens, rabbits, guinea pigs). These premises accommodated the laboratory from 1924 to 1937, it goes without saying that they were cramped. As from 1929 Emile Leynen was already writing to the minister to tell him how inadequate the premises were !

▲ The building of the Veterinary Inspection Laboratory in Anderlecht-Cureghem

3. Uccle

This site corresponds to the headquarters of the administrative services of CODA-CERVA and it also accommodates the veterinary departments. Its chronological evolution is related below in three phases, the setting up of the veterinary departments, the extension of the property to respond to the growing needs for premises and equipment, and finally the specialisation in biosafety necessary for a laboratory at the level of CODA-CERVA in order to guarantee the safety of its entourage and of its staff.

▲ The façade of the principal building (building A) in 1938

▲ The back and the annex of the principal building (building A) in 1938

3.1. Setting up

In 1936, the Ministry of Public Works bought a property in Uccle consisting of a long plot of land, more than thirty meters wide, that fronted on the avenue called "Groeselenberg", and was extended by an enormous plot, more or less rectangular, enclosed in a block of residences and right up against the Royal Athenaeum of Uccle (a secondary school). The area of this property was around one hectare. In 1937, the Ministry of Public Works built and fitted out five buildings there :

1. A principal building in front (building A) with the façade as it still exists currently, but without a second storey in back; the last annexe of this building stopped at the height of the autopsy hall (building B) and was extended by a manure pit.
2. A stable building for Bovidae and horses.
3. A caretaker's flat, continued by the pens for pigs.
4. A building with garages and workshops, a part of which originally existed on the property and which was simply fitted out; it was only in 1973 that this last building received its cladding of yellow bricks to harmonise better with the whole.
5. A hen house backing onto the wall of the royal athenaeum; this building later served for accommodating guinea pigs and calves, and was finally demolished to allow the construction of the current Building E.

The property was surrounded by a wall that ran to the left in a straight line up to the plot of the royal athenaeum, the wall of the athenaeum at the far end, the wall of the property of the Deux-Alice to the right, and a simple fence between the caretaker's residence and the entrance.
It was in the course of 1938 that the veterinary departments of CODA-CERVA moved into the Uccle site.

▲ The stable building for Bovidae and horses (1938)

3.2. Expansion

Over the years, the veterinary departments of CODA-CERVA carried out transformations, built new buildings and acquired plots; the most important modifications were, in order :

1. In 1946, acquisition of a rectangular plot of around thirty ares adjoining the property on the left, and to which there was access through a passage starting from avenue Houzeau; this property was made up of the Casteel, De Wil and Vermeulen parcels. This extension was to be completed 26 years later by the acquisition of a plot corresponding to the remainder of the De Wil property and of an area of around 24 ares. This property included, among other things, two residence homes that were fitted out in 1977 and 1978 to establish accommodations for the caretaker, the library and a laboratory.
2. In 1948, construction of a refrigeration chamber to store the anti-foot-and-mouth disease vaccine, to the location of the manure pit which extended the principal building to the front (location of the current Building B).
3. From 1950 to 1953, construction of the stables (Building F) intended for monitoring the anti-foot-and-mouth disease vaccines on Bovidae.
4. From 1950 to 1953, construction of Building D "foot-and-mouth disease" containing the factory for manufacturing the vaccine.
5. In 1953, construction of an upper storey on the back part of the principal building in front (Building A). During the transformation works, all the laboratories were temporarily set up in the cellars of the "foot-and-mouth disease" building.
6. In 1963, construction of the ground floor of Building C "avian pathology", which would receive an upper storey eleven years later, of the large refrigerator and the refectory.
7. From 1972 to 1977, construction entirely from own funds of Building E "virology" backing against the wall of the royal athenaeum. This building of +/- 2700 m^2 consists of one level of animal houses and three levels of laboratories.
8. In 1979, beginning of the construction of Building G which would remain incomplete for many years. Between 2000 and 2003 converted into a high biosafety building (risk class 3) (see below).
9. In 1984 and 1985, construction of the new building (H) of the administration in place of the caretaker's building and the pig pens.

▲ The library in 1979

▲ Construction of building D "Foot-and-mouth disease" in 1951

▲ Construction of building E "Virology" in 1975

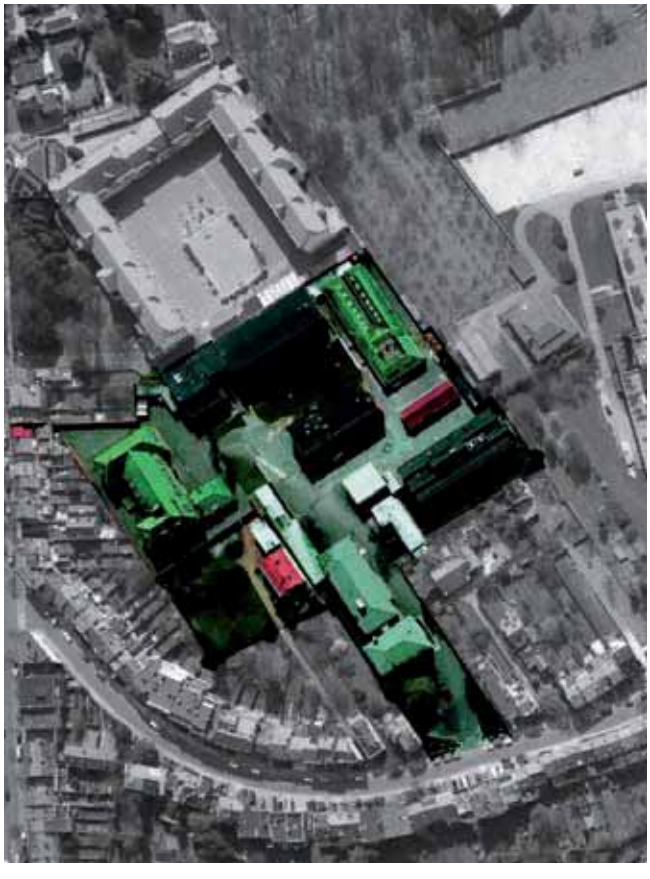
▲ Building E in 1980

3.3. Specialisation

Working with highly contagious agents constitutes in and of itself a threat for the environment, animal health and the public health. An infrastructure with a high degree of biosafety is therefore a basic condition. From this point of view as well CODA-CERVA is a precursor; to be able to continue to work as the reference laboratory for foot-and-mouth disease for the FAO after the stopping of compulsory vaccination in Europe, in 1992 CODA-CERVA was the first in Belgium to launch a confinement laboratory at the level of risk class 3.

When in 1994 the Brussels Region applied the European directives concerning biosafety, CODA-CERVA was well prepared to deploy new initiatives ensuring the biosafety of the other activities at risk, such as swine fever, avian influenza, brucellosis, anthrax and tuberculosis. In this frame-work, two buildings entered into consideration : on the one hand the former hall for the production of the anti-foot-and-mouth disease vaccine in Building D, and on the other hand Building G, which since 1979 had not been completed because of the bankruptcy of the principal contractor.

Because of the complexity of the works, it was first of all the production unit for the anti-foot-and-mouth disease vaccine that was transformed to accommodate the Modelling of Epizootic Diseases section. This laboratory was put into service in October 2001. The works on Building G were undertaken in 2000 for the laboratories of the Small stock diseases (influenza, avian pseudo-pest) and Bacterial Diseases (brucellosis, tuberculosis, anthrax, tularemia, plague, etc.) sections. The inauguration of this building by Mr Jef Tavernier, Minister of Consumer Protection, Public Health and the Environment took place on 30 January 2003.



▲ Electromicroscopy : Jan Mast (2004)

To crown the control of the microbiological threat to public health and to animal health with success, the setting up of an orientation laboratory was necessary. This laboratory forms the intermediate link between investigators in the field, relayed by the second-line laboratories and the highly specialised reference laboratories. It must stand surety for raising awareness of the second-line laboratories for the recognition and the rapid transfer of suspect agents. In addition it must have rapid orientation tests available. This will make it possible to confirm a first assumption of an emerging or rare infectious disease and then to entrust the suspect agents to national or foreign reference laboratories for definitive confirmation and characterisation.

Cooperation between human and veterinary microbiologies is essential in this framework, given that a good number of contagious diseases known in human beings are of animal origin. Besides that, it is a prototype for the cooperation that the (ISSP) Scientific Institute of Public Health and CODA-CERVA are deploying within SPF Public Health.
Since June 2004, this orientation laboratory has been lodged in Building B of CODA-CERVA. It has 90 m^2 of space for preparation, 130 m^2 of laboratories of confinement level 3 and 30 m^2 of animal houses of confinement level 3 for small animals and of laboratory for experimental infections with unknown agents. The inauguration of this building by Mr Rudy Demotte, Minister of Public Health, took place on 2 June 2004.

CODA-CERVA currently has at its disposal in Uccle two high biosafety complexes provided with a usable area of 1,800 m^2 in laboratories, of an animal house of confinement level 3 and with 10 isolators for the study of highly contagious agents and of exotic viral and bacterial diseases. The current area of laboratories of the standard level of confinement, that is 1 and 2, exceeds 5,000 m^2, while that of small laboratory animals exceeds 1,400 m^2. The area of administrative rooms and meeting rooms adds up to 1,300m^2.

▲ Building B in 2004 : Orientation laboratory and anatomopathological unit

▲ General virology laboratory : A. Delangre (2002)

4. Machelen

In 1951, the Minister of Public Works acquired a plot in the industrial zone of Machelen with a view to constructing a Centre for the Production of the Foot-and-Mouth Disease Virus there. By the Royal Decree of 24-07-52, the Ministry of Agriculture received the authorisation to establish this centre. The construction works were started immediately and after one year, the major work having been completed, they hoped to occupy the premises in 1955. However, it was necessary to wait until 1961 for all the machinery and equipment work to be completed. At that time, the buildings in Machelen were solemnly inaugurated by Mr Charles Héger, Minister of Agriculture.

CODA-CERVA property in Machelen is made up of a long plot of around two hectares opening onto Kerklaan, in 1830 Machelen. A principal building with a built surface on the ground of 3,250 m^2 is found there. This building with three levels includes : four stables for large animals (two stables with 50 places and two stables with 25 places), an industrial slaughterhouse, enormous refrigerated passages, a factory for the destruction of carcasses, outbuildings for machinery, lodging for the staff, plumbing installations for the staff and workshops. The stables and the industrial slaughterhouse are located on the first floor of the principal building; vehicles and the animals have access to it using two inclines that flank the building on either side.

▲ The principal building with the office part followed by four stable wings (1962)

▲ One stable of 50 places (1962)

▲ The slaughterhouse (1962)

Since 1953, there has been a plan for the construction in Machelen of experimental stables to accommodate 200 Bovidae; a part of this plan has been implemented, and Building I contains 24 separate stalls for the accommodation of Bovidae or swine.

Originally the Experimental Centre of Machelen had been planned for the production of natural foot-and-mouth disease virus on Bovidae. This procedure was never applied in Machelen because it was given up in Belgium and the Experimental Centre of Machelen was converted as from 1962 :

- to the destruction of animals infected with legally designated contagious diseases,
- to the checking of anti-foot-and-mouth disease vaccines;
- to experimental work on large animals.

The current mission of this centre is the accommodation of experiments on large animals and the observation of animals in the field affected by specific pathologies that could be contagious.

Major works are under way so that these buildings, whose basic design remains perfectly valid, entirely meet current standards concerning biosafety and protection of the environment.

▲ The official inauguration of the buildings by the Minister of Agriculture, M. Chalres Héger in 1961

▲ Technical infrastructure : autoclave and steam production unit (1962)

5. Tervuren

▲ Shell of the chemical laboratory, Molenstraat Tervuren (1911)

▲ Finish of the new building after the first World War (1918)

5.1. The buildings on Molenstraat (later Museumlaan) in Tervuren

The former laboratory and later the agro-chemical departments of CODA-CERVA have successively moved into two buildings.

Following a decision to set up a chemistry laboratory in the Museum for the Belgian Congo, rooms in the museum building had to be renovated. In a document dated 27 June 1912, architect Tielemans declared that he advised against setting up an 'unhealthy and dangerous laboratory' in the existing buildings due to the impact on the plants, the park and the ponds in the vicinity and danger to the exhibition rooms. The architect proposes to construct a new building that would only cost 2/3 of the installation in the existing museum buildings; the building should be placed in the vicinity of Brussels and not in Tervuren since there was no other drainage than to the ponds.

Originally the Minister for the Colonies resisted the construction of a new building as the problem of water pollution could be solved cheaply with the construction of a water purification installation (estimate of the costs : BEF 2 000 = +/- €50). At the end of 1912 the first plans for a new building for the Chemistry and Onialogy of the Museum for the Belgian Congo were finally signed. On 31 October 1913 the shell of the building, located at Molenstraat 1 in Tervuren, was ready. In the same year the company Robert Drosten – forerunner of the company Van der Heyden located on Rue du Marais in Brussels – submitted an offer for equipping the laboratories with work tables, fume cupboards and furniture for the price of BEF 62 429 = +/- €1560), but the finishing had to wait due to the First World War.

After 1918 the building was finished and the department of the Museum was able to move in before it was founded as an independent laboratory under the Ministry for the Colonies. The building consisted of a basement storey that was half under the ground, a ground floor and one upper floor. Originally, only the upper ground floor was planned as a laboratory. In the basement, mills and other heavy equipment were placed and there were places for storing samples and collections, glass and flammable products, in addition to a lab in which dangerous products were used and also a washing-up and heating area and part of the caretaker's rooms . On the ground floor, in addition to an office for the department head and one for the staff there were laboratories equipped for titration, electrolysis, incineration, mechanical tests and also a weighing room and a dark room.

In 1935 a villa was built on the same terrain that was furnished as the director's house; Léon Heureux was the first director to live in it. Shortly after the Second world War a caretaker's house was built next to the main building, but in 1951 it was taken over by the department studying Congolese wood, as their laboratory had burned down.

As the number of personnel and activities increased, the more the top floor was completely taken up by laboratories; to this end the small round windows of the storage areas were converted into fully-fledged windows. Shortly after the retirement of Mr Castagne, the director's house was converted into an administrative building, in which the director's offices and his administration were housed.
A few years later, in 1971, a pre-fab building was constructed in which the library was housed, leaving the main building free for offices for the researchers. In the mean time the search had started for another, larger building to house the agro-chemical departments; some people explored the Brussels environment for this to guarantee the bilingual nature of the Institute. A plan was also drawn up to provide for the extension of one of the buildings on a parcel next to the site being used but in view of the residential nature of the district this plan had no chance of success.

5.2. The building at Leuvensesteenweg 17 in Tervuren

At the end of the nineteen seventies, the idea was concretised to finish the concrete shell, the so-called 'CAPA' building, for the agro-chemical departments of CODA-CERVA. This shell had been built on the opposite side of the Leuvensesteenweg in 1957 as one of the four buildings that were planned as an extension of the Royal Museum for Central Africa [the new name for the Museum of Belgian Congo]. In this shell prefabricated rooms had been constructed in 1958 to accommodate the Congolese who populated the stand of the Belgian Congo at the world exhibition in Brussels; that is why it was called the CAPA : Centre d'acceuil du personnel d'Afrique. After the independence of Congo in 1960 the plans for this extension were shelved and the shell remained unmanaged for almost twenty years.

Originally, the entire building was to be used by the agro-chemical departments but the Museum claimed its building. A Belgian compromise was arrived at and in view of the height of about 7 metres between the concrete levels, intermediate storeys were placed so that both the users could have the same amount of space. It took no less than 12 years to finish the building, during this period the construction stopped for several years due to a lack of funds.

In January 1992 the agro-chemical departments were able to move to the new laboratories that had been equipped with the latest technologies. There were centralised installations for compressed air, vacuum, de-ionised water and some gases. What is more : an auditorium for 200 people and spacious meeting rooms had also been built, a facility that the Institute had never had at its disposal until then.

In 1997 unused laboratories were occupied by the State Analytical Laboratory] of the Directorate-General Raw Materials of the Ministry for Small Enterprises and Agriculture, that had to leave its unsafe labs in Antwerp. After the foundation of the Federal Agency for the Safety of the Food Chain (FAVV-AFSCA) and the regionalisation of the Ministry for Agriculture, the infrastructure is shared by a laboratory of the FAVV-AFSCA and CODA-CERVA, that still manages the building.

▲ Main building of the Institute for Chemical Research (1978)

▲ The library building of the ICR (1972)

▲ The actual CODA-CERVA building (1992)

IV. The backbone of CODA-CERVA : scientific

Our mission may be summarised as follows : "Scientific research at the service of safe food production and animal health". Our current research activities can be categorised under six themes correlated with these two major issues.

research

Theme 1 : Enzootic Diseases

In the context of the control of enzootic diseases, CODA-CERVA is called upon for its expertise and its role as the federal reference laboratory. Economic imperatives drive the control and eradication of these diseases in our livestock, but the prevention of these diseases can also be important for public health due to the anti-microbial agents used for the fight against these infections.

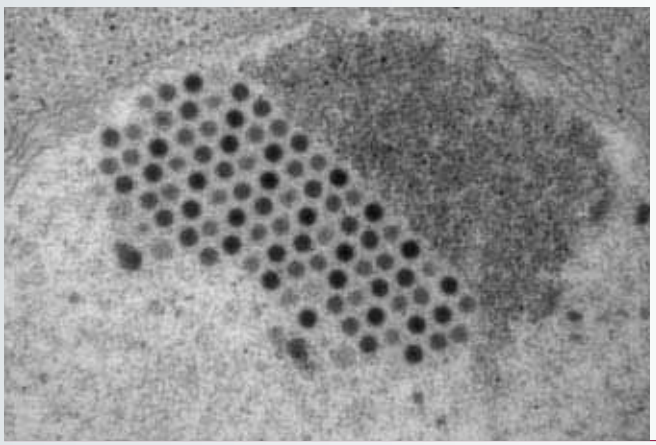
Research in this area is focused on the identification of the causative agents, the study of the pathogenesis and of the possibilities for control and eradication. CODA-CERVA is mainly active in the following three fields :

- Improvement of the diagnosis of enzootic diseases
- Study of their epidemiology
- Development of new prophylactic strategies

These three activities are intimately linked and influence each other. Attention must be focused on the reliability of the diagnosis and its continued adjustment as a function of the development of the epidemiological situation. Adjustment of the diagnostics is also studied in relation to compliance with the requirements of the Federal Agency for the Safety of the Food Chain. The development of diagnostic techniques using monoclonal antibodies, cellular immunity and different methods of molecular biology is ongoing.

In order to develop an effective control and eradication programme for an enzootic disease, the epidemiological parameters of the infection in our livestock must be identified first. This study implies the development of methods for molecular typing of the relevant agents, while also investigating any possible change in their pathogenic capacity.

Depending on the relevant epidemiological situation, prophylaxis will be based either on medical or on hygienic measures. The role of CODA-CERVA as reference laboratory consists in providing its expertise concerning the choice of the prophylactic means to be deployed. This expertise is based not only on field tests to validate already-developed protocols, but also on the development of new vaccination methods conforming to the current epidemiological requirements and employing modern molecular biological techniques.



▲ Transmission electronic micrograph of intranuclear adenovirus virions arranged in a paracrystalline array.

Theme 2 : Epizootic Diseases

As the Belgian and Luxembourg reference laboratory for the European Union, CODA-CERVA plays an important role in the control of epizootic diseases.

Since 2002, the spread of some epizootic diseases, for instance avian influenza (AI) and blue tongue (BT), has been increasing dramatically within the European Union. In addition, possible transmission routes of the AI virus to humans are causing great concern. Other epizootic diseases, such as foot-and-mouth disease (FMD) (serotypes O, A and Asia) and small ruminants plague ("peste des petits ruminants"), are lurking on the borders of the EU (e.g. the Greek-Turkish border), while swine vesicular disease (SVD) appeared, apparently out of nowhere, in Portugal in 2004.

The opposition of the public and of farmers to the mass slaughter of animals has forced the European Commission to change its disease control policy. Vaccination has been reintroduced as an important control tool, as was seen in Italy and Spain, where the Commission allowed the local authorities to use vaccination in controlling the AI and BT outbreaks, respectively. Applying such a policy makes ifferentiating infected from vaccinated animals essential. CODA-CERVA plays an important role in the control of these vaccines and in the development, validation and implementation of differential diagnostic assays.

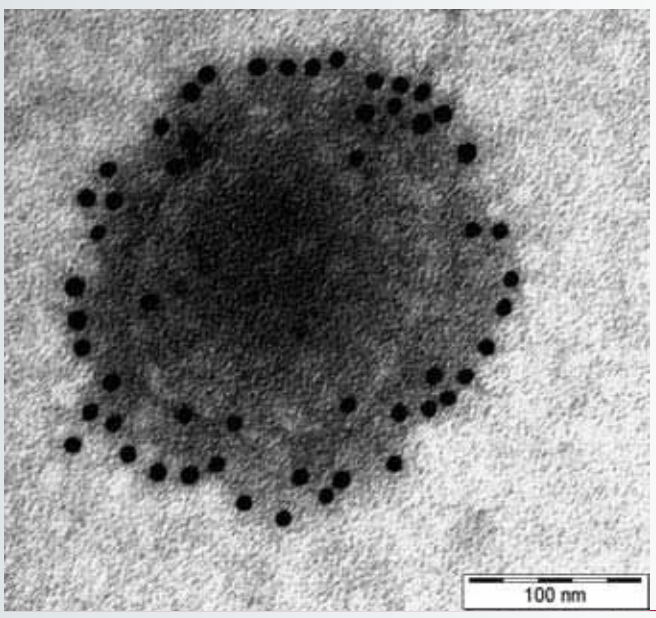
However, apart from vaccination, early laboratory diagnosis of epizootic diseases remains of the outmost importance. This is not only emphasised by the increased international movement in animals, animal products and people, but also by the possible deliberate introduction of pathogens (bio- and agro-terrorism).

Therefore, CODA-CERVA has given priority to the development of multiplex differential diagnostics and to viruses that also spread in humans, e.g. pox viruses. Our experience in rapid diagnostics gained in the field of epizootic diseases could be of great help in rapidly controlling human epidemics.

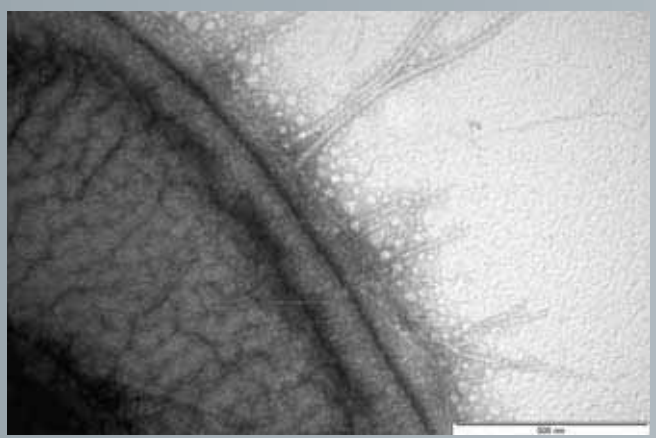
▲ Molecular Diagnosis of avian influenza : Marc Boschmans (2004)

To continue to fulfil its role of reference laboratory for epizootic diseases, CODA-CERVA focuses its research on five well-defined areas :

- Increasing the sensitivity and specificity of methods used for the mass diagnosis of epizootic diseases, by using molecular biological techniques (real time RT-PCR, RCA, micro-arrays, biosensors, sequencing, molecular epidemiology)
- Development and validation of tests capable of differentiating infected from vaccinated animals of reference sera and antigens in collaboration with the EU, the FAO, and the OIE
- Development of reference sera and antigens in collaboration with the EU, the FAO, and the OIE
- Evaluation of marker vaccines and new vaccination methods
- Modelling of viral diseases and their economic impact.



▲ Electron micrograph of a virion of the La Sota strain of Newcastle disease virus.



▲ Micrograph of a negatively stained E. coli expressing flagellae and type I fimbriae at its cell surface.

▲ Preparation of a sequence reaction using a Beckman CEQ8000 Genetic Analysis System : T. Stakenborg and A. Pil (2004)

Theme 3 : Microbiological Safety

Farmed animals including horses can carry microorganisms that can be transmitted to humans through the consumption of contaminated animal products or through contact with infected animals. Contaminated animals often exhibit no symptoms whatsoever (e.g., *Escherichia coli* O157 in cattle, *Salmonella*) or cause lesions that go unnoticed until the animals reach the slaughterhouse (*Mycobacterium bovis*). Other agents are enzootically present and may cause e.g. abortion (*Brucella*) or nervous disorders (BSE). All these agents can be transmitted to human beings, where they are responsible for severe pathologies. Most of these pathogenic agents not only survive particularly well in the environment (fodder, dust, stables, pastures, surface water, and ground-water) but may also infect rodents, flies, animals living in the wild and so on, and are therefore extremely difficult to eradicate.

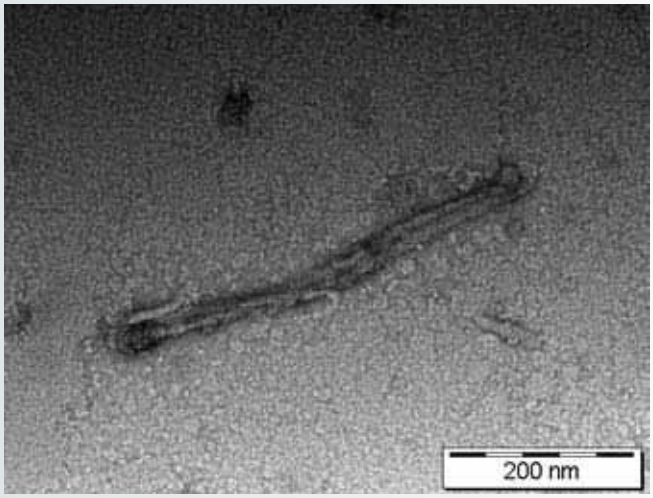
One of CODA-CERVA's main research topics is the study of zoonoses. CODA-CERVA is the national reference laboratory for BSE/TSE and for TSE resistance genotyping in sheep, *Mycobacterium bovis*, *Brucella*, *Salmonella*, and entero-haemorrhagic *E. coli*. As the federal zoonosis centre, a major task is to centralise data with respect to zoonoses. As a precautionary measure, CODA-CERVA is already capable of diagnosing one zoonotic agent that is emerging, although not yet detected in Belgium, i.e. West Nile Virus, which infects birds, mosquitoes, horses and some other mammalians, causing neuroinvasive disease in humans. As a reference laboratory, CODA-CERVA is responsible for providing assistance to the veterinary laboratories and the competent authority (the Federal Agency for the Safety of the Food Chain) with e.g. the confirmation of positive test results, the typing of isolates, the production of reference sera for use in serological tests and the quality control of diagnostic techniques. Scientific research supports the activities of the reference laboratory, and consequently aims to improve diagnostic accuracy, to identify carriers, to support eradication campaigns of the Federal Public Service Health, Food chain and Environment, and to safeguard the export of Belgian agricultural products.

Accurate characterisation of zoonotic agents via, amongst other things, molecular biological methods makes it possible to determine the extent to which agriculture is the source of zoonoses and food-borne infections and the extent to which these findings can be traced back to outbreaks in human beings. Molecular techniques can also be applied to investigate the epidemiological spread of these organisms within and between farms, and to demonstrate whether animals living in the wild are a potential source of infection. This in turn provides the basis for the eradication strategy of European and Belgian veterinary services and is to be considered as policy preparation work. Accurate characterisation may also contribute to the development of vaccines.

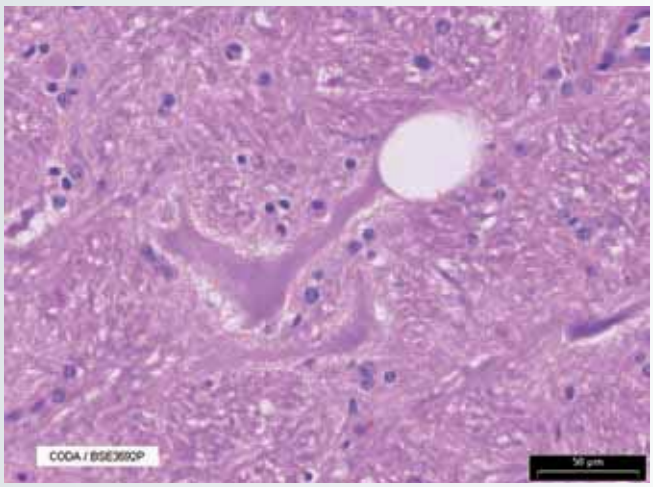
Certain bacteria of animal origin, either pathogenic or not, may also contribute to the transmission of antibiotic resistance to pathogenic bacteria in humans. This issue is causing growing concern among consumers and physicians. For a better understanding of this mechanism, our researchers are trying to submit such bacteria to quality control, to map out the spread of antibiotic resistance, to investigate the transmission and to establish the possible link with the customary methods of treatment.

The various research projects within this theme are grouped into three programmes :

- Transmissible Spongiform Encephalopathies (TSE)
- Setting up of a European network for surveillance and control of TSE in small ruminants
- Genotyping of sheep for TSE susceptibility
- TSE testing in wild ruminants
- Zoonoses
- Mycobacterium
- *Brucella*
- *Salmonella*
- Enterohaemorrhagic *E. coli*
- Antibiotic resistance
- Antibiotic resistance in *Salmonella* and pathogenic *Escherichia coli*
- Standardisation of antibiotics resistance tests and harmonisation of the results
- Standardisation and evaluation of an antibiotics resistance surveillance programme.



▲ Micrograph of a negatively stained scrapie-associated fibril (SAF) characteristic for transmissible spongiform encephalopathy (TSE).



▲ Histopathological image of the brainstem of a positive BSE case (Haematoxylin eosin) : note a typical vacuole in the cytoplasm in the dendrite of a neuronal cell

▲ Diary cow with Bovine Spongiform Encephalopathy (BSE) : note the typical posture of body, head and ears

▲ Sample preparation (clean-up) for the analysis of PCBs : Hugo Franken (2004).

▲ Sample preparation (derivatization) for the analysis of T2/HT2 toxins (2004).

Theme 4 : Chemical Safety

The research on the chemical safety of agricultural products is essentially focussed on the analysis of inorganic and organic contaminants that may be present in trace concentrations in agricultural products. In some cases, the presence of these undesirable substances is directly related to the agricultural production process : residues of plant protection products, mycotoxins in cereals and animal products, etc. In other cases, the agricultural products themselves are adversely affected by industrial and environmental contamination (heavy metals, PCBs, dioxins, etc.). A third possible source of contamination of the food chain is illegal use and accidents such as, in 1999, the dioxin and PCB incidents in Belgium and, in 2002, the case of nitrofen in organic and regular foodstuffs in Germany.

The research conducted at CODA-CERVA encompasses the following topics :

- Development of sensitive and reliable analytical methods for the main contaminants, even for substances that are present in very low concentrations and/or in complex matrices (heavy metals, mycotoxins)
- Studies related to the issues of chemical contamination : investigation of possible sources and factors responsible for some contaminations of the local environment and of the food chain (PCBs, heavy metals)
- Surveys on the presence of relevant contaminants in organic and regular production methods as well as in home-grown vegetables
- Risk assessment studies dealing with the issue of consumers' exposure to some toxic compounds (cadmium, lead, mycotoxins, pesticides).
- Studies oriented to emerging risks : what will be the relevant contaminants in the future? What are the risks linked to mixtures of contaminants? Do we need to pay more attention to some less known mycotoxins ? What are the risks linked to the presence of other toxins such as plant toxicants?

Theme 5 : Interaction environment – food chain

The quality of food and feed depends in many cases on environmental factors. The food chain that starts with the agricultural production process and ends up on the consumer's dinner plate is subject to many influences by the environment. Many problems related to the quality of foodstuffs can be traced to known or unprecedented situations of contamination of the several compartments of the production environment, i.e. soil, water and atmosphere.

A good knowledge and understanding of the status of contamination and the possible transfer to the food chain is essential for the surveillance of foodstuffs of vegetable and animal origin and their derived products, and for the establishment of their quality standards.

The various research projects within this theme are grouped into six programmes :

- Impact of air pollution on agricultural crops
- Tracing and detection of GMOs, of microorganisms and biomarkers for the contamination of foodstuffs
- Research on biopesticides
- Emission of fertilizers and phytopharmaceuticals into the water compartments (modelling and measures of prevention)
- Methodological development for the determination of traces of pesticides in several matrices
- Biodegradation of pesticides and prevention of pollutions.

▲ Climatic chambers for ozone exposure of test plants : Annick Evrard (left) and Karine Vandermeiren (right) (2004).

Theme 6 : Epidemiology

Veterinary epidemiological studies are based on observational information obtained from large samples of a study population. Therefore, they can provide reliable information to support decisions on the prevention and control of animal diseases. As a federal scientific institute, CODA-CERVA has a key position in assisting the authorities in regard to animal disease control and prevention through epidemiological research. In this respect, CODA-CERVA focuses its epidemiological research on monitoring and surveillance systems, diagnostic test evaluation studies and risk assessment.

Monitoring and surveillance systems used in animal disease control programmes must provide sufficient confidence as to the absence or presence of the diseases they focus on. Epidemiologists at CODA-CERVA formulate science-based advice to animal health authorities on the protocols of new or existing disease control programmes. This advice is based on up-to-date epidemiological and statistical methods. Moreover, results from monitoring and surveillance programmes are analysed to identify new characteristics of animal diseases.

Diagnostic test results are a significant component of the information used to make decisions in veterinary medicine. The development of new technologies will make diagnostic testing even more critical in the future. Both animal health authorities and diagnostic test producers are looking for appropriate methods for the validation of diagnostic tests. The diagnostic quality of a test is expressed in terms of diagnostic sensitivity and specificity, which have been estimated historically by comparing the test to a "gold standard" test. Nowadays, the existence of the gold standard test is more and more questioned and methods have been developed for the evaluation of diagnostic tests in the absence of a gold standard. As a federal reference laboratory, CODA-CERVA plays an important role in the quality assurance of animal disease diagnostics, and our epidemiologists are developing new methods to improve this quality assurance.

Risk assessment is a useful tool for animal health authorities to manage risks when making decisions. By incorporating risk assessment into their research, the epidemiologists at CODA-CERVA aim to provide risk management options and to develop new methods to make these options more reliable.

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