Switzerland is a truly federal nation. This means that important sectors, such as health care, teaching, and the police, are controlled mainly at the level of the 26 cantons, independently and in their own specific fashions. These divisions make the development of very large centers extremely difficult, whereas they do offer an excellent basic surgical service within small communities. To appreciate this particular setup, one has to realize that Switzerland is characterized by its small size (population of 7 million), hosting 2 main cultural backgrounds, Germanic and Latin, and 4 national languages (German, French, Italian, and Romansch). Switzerland has only 5 faculties of medicine in the Universities of Basel, Bern, Geneva, Lausanne, and Zurich, still a large number for 7 million people. The public health sector (around 50% of the hospital bed capacity of the country) is divided into university, cantonal, and regional hospitals, respectively. In addition to providing basic health care, generally at a remarkably high standard, all physicians participate actively in undergraduate and postgraduate medical training.

HISTORICAL BACKGROUND
On March 8, 1913, 112 surgeons met in Bern under the presidency of Theodor Kocher, MD (the only Swiss surgeon to have been awarded the Nobel Prize for Medicine) (Figure 1), and founded the Swiss Society of Surgery. The agenda for discussion was “acute appendicitis”; agreement was reached on the need for immediate emergency surgery for this condition, a topic that up to that moment had been a matter of dispute. In his inaugural address, Kocher spoke in favor of specialization, both for the well-being of the patient and in the best interest of the ethical standards of the medical profession.

Parallel to the development of the Swiss Society of Surgery, several specialty societies have been created: orthopedics in 1941, urology in 1945, neurosurgery in 1954, plastic, reconstructive and aesthetic surgery in 1965, pediatric surgery in 1969, maxillofacial surgery in 1973, and thoracic and cardiovascular surgery in 1985. In July 1974, the societies existing at that time united to create the Union of Swiss Surgical Societies, later joined also by the Swiss Society of Gynaecology and Obstetrics. This federation plays an important role in representing the common interests of all the surgical disciplines, especially in the field of professional politics, and in that of undergraduate and postgraduate training. The Union also organizes a quadrennial congress in which society members are welcome to participate.

TRAINING: UNDERGRADUATE AND POSTGRADUATE
Medical undergraduate education at each of the 5 universities is based on federal legislation. It lasts 6 years, at the end of which the medical diploma of the Swiss Confederation is conferred. The graduates then undertake specially designed postgraduate training leading to accreditation in their chosen field, in which they are awarded the title of Specialist.

The rules governing postgraduate training are drawn up by the specialty so-
cieties and endorsed by the Swiss Medical Federation (Foederatio Medicorum Helveticorum [FMH]). The latter entrusts the elaboration and application of specific rules to the societies in charge of the various disciplines. The Swiss Society of Surgery is therefore responsible for drafting the regulations governing training in its field. While only a few years ago not a single examination was given during the entire period of surgical education, 2 examinations are now required: a basic examination after 2 years of training and the specialist board examination after 6 years.

Postgraduate training takes a minimum of 6 years. There are 2 distinct parts: basic training (2 years) and specialist training (4 years). Within these 6 years there is a minimum requirement of 4 years in general surgery (including 3 months of anesthesia and/or intensive care). During elective years, a maximum of 2 years in specialized surgical disciplines (maxillofacial, pediatrics, neurosurgery, orthopedics, plastic and reconstructive, urology, cardiovascular, and hand surgery), 1 year of scientific research in a surgically oriented discipline or institute, and 6 months of day surgery and accident and emergency surgery, will be recognized, while further in-depth study prolonging the 6 years is not at all discouraged.

Prior to admission to the second part of training, the candidates are required to submit a doctoral thesis, and of course must have passed the basic examination in surgery. This is a standard examination for all specialties within the Union, which focuses on general surgical knowledge and emergency surgery.

The registered hospitals for postgraduate training (in Switzerland or abroad) are categorized. The minimum required length of residency in each category is also specified.

Trainees must also (1) present a signed catalog of their operative activities (logbook); (2) prove that for each year they have accumulated 40 points of continuous education; (3) take part in 2 annual assemblies of the Swiss Society of Surgery and 4 postgraduate training courses (eg, advanced trauma life support and association osteosynthesis, etc). Finally, they must have attended a basic course in radioprotection and must have published 2 scientific articles as the main author.

Since 1999, it has become mandatory to have passed the specialty board to be accredited as a Specialist in Surgery FMH.

After the basic examination, each of the specialized disciplines of the Union offers specific postgraduate training, leading to the obtainment of an equivalent FMH title.

Additional subspecialty board qualifications are evaluated, acknowledging further in-depth training in general, visceral, thoracic, vascular, and trauma surgery. It may seem paradoxical to have an in-depth qualification in both general or basic general and visceral surgery. In fact, the former corresponds to a long-standing Swiss surgical tradition that still associates nonspecialized visceral surgery with equal activity in traumatology, consisting mainly of uncomplicated fracture surgery. This type of surgical profile is still required mainly in regional hospitals and in some private practices, and is intended primarily to cover the demand for community-based surgical care. The visceral surgeon has in-depth training, mostly in gastrointestinal, endocrine, and breast surgery.

The Swiss Medical Federation has also entrusted the specialist societies with the organization of their own continuing medical education programs, in which all holders of an FMH title must participate. The aims are to maintain medical knowledge and professional competence, to ensure safe and effective introduction of new developments in their field, and to promote responsible attitudes toward the management of health care and professional politics. Continuing medical education for a surgeon must involve a minimum of 80 hours a year of either organized or otherwise acknowledged activities of the Swiss Society of Surgery (congress, lecture courses, etc) and personal study (reading). A credit point system has been established. The Swiss Society of Surgery publishes annually a list of the acknowledged events. All surgeons fill out a form of authentication indicating the events in which they have participated.

**RESEARCH**

Surgery provides an almost unlimited range of topics for research. Switzerland follows the increasing trend of encouraging young surgeons in training to engage in research, if possible in association with basic scientists, to foster a critical attitude toward the appraisal of the results of surgical treatment and to stimulate a continuing interest in combining investigative work with clinical practice.

There have been few exclusively Swiss developments in surgical research. Research has always been dependent on individuals and, as a result, has lacked continuity and has developed differently from one university
to another. Most surgical scientific contributions from Switzerland have been possible thanks to international cooperations or exchanges, but a few may be attributed to Swiss researchers alone. The work of César Roux, MD (Figure 2), in Lausanne and Kocher in Bern in the early days of surgical research must be mentioned. The Study Group for Osteosynthesis has achieved a well-deserved international reputation for its research in bone fracture healing. The Swiss Institute for Applied Cancer Research is conducting several randomized clinical multicentric studies. Major opportunities are also offered for collaboration with the Swiss Institute for Experimental Cancer Research, the 2 federal polytechnic schools in Zürich and Lausanne, the Institute of Immunology in Basel, and several institutes for biomolecular research. There is increasing cooperation between basic scientists and clinicians in the conduct of research related to clinical problems (tandem research projects). With only a few exceptions, such as the Association Osteosynthesis In-cal problems (tandem research projects). With only a few exceptions, such as the Association Osteosynthesis Institute for Tandem Research Projects. There are also several private foundations that support surgical research. These are administered by universities, industries, or private boards. The most important federal body supporting research is the Swiss National Foundation. This institution has a federal government budget and supports research projects according to internationally accepted standards, especially regarding peer review, and promotes specific national research projects for which qualified research groups may apply.

SURGERY IN THE SWISS HEALTH CARE SYSTEM

The function of surgery in Switzerland is closely related to that of public health policy, which endeavors to remain fairly liberal. In principle, therefore, patients are free to choose their physician. Health insurance is compulsory, although the individual is free to choose an additional form of coverage, for example, in a private setting. The structure of the hospital system is divided between various public and private institutions. As in most countries that have a modern medical system, technical improvements are continually advancing, while adequate financial provision is becoming more and more difficult. The prospects for meeting future costs are bleak: despite increases in health insurance premiums, the outgoing expenditure of the insurance companies remains greater than their income. Economic efforts being made in hospitals in an attempt to reduce the financial deficit are only slowly showing benefit. The recent introduction of a federal law concerning health insurance (LAMAL) has defined new working rules for public health and its financing that have not yet produced their expected result. Consequently, insurance companies are having to provide broader basic coverage. Primary care and preventive medicine are 2 examples of areas that are creating considerable increases in costs.

These financing problems are the root cause of the rapidly growing constraints that are being imposed on medical practice in general and on surgery in particular. They are demanding substantial new economic measures, including the development of diagnostic and therapeutic guidelines that can modify treatments, at times without the surgeon's prior knowledge.

Cantonal protectionism also leads to a breakup of the available funds and otherwise avoidable duplication of expensive structures and services. Therefore, a very large number of specialized cantonal hospital units exist, generating exorbitant costs for the infrastructure and the multitude of duplicated, fragmented services. The LAMAL excludes the patient from being treated outside his canton unless he has additional private coverage or is suffering from a disease only treatable outside a given canton or in cases of emergency. This results in a deplorable lack of patient mobility and generates serious conflicts between the insurance companies and the cantons about covering costs. The private

Figure 2. César Roux (1857-1934), MD, professor of surgery, University of Lausanne, Lausanne.
sector includes many extremely well-equipped hospitals representing considerable economic competition for the public hospitals.

The absence of any restriction on entry for students to universities remains a reality in Switzerland. This has resulted in the development of an important problem for medicine, the effects of which are particularly felt in surgery. Redundancy is affecting physicians both in training and in established practice. The recent imposition of the new postgraduate training rules and the introduction of obligatory examinations should provide better control of the situation, but the benefits will not be fully realized for several years.

Politically, Switzerland still does not belong to the European Union. This fact makes it difficult for physicians to train or practice in those countries that form it. Several measures are being developed to address this problem. Some in-depth training examinations are available that are similar to the European standards. For others, the candidates must present themselves directly to the European Board, as no such specific body exists in Switzerland.

In Switzerland, surgery is still practiced largely on an inpatient basis, contrary to the widespread American practice of ambulatory day surgery. The latter has increased in the last few years but still remains relatively low compared with other countries (around 20%-25% of total surgical interventions).

PROFESSIONAL POLITICS

The Union of Swiss Surgical Societies, as well as the Swiss Society of Surgery and the various other specialized surgical societies, represent significant political weight. The Swiss Society of Surgery has approximately 1100 members, not all of whom are in active surgical practice, while the Union has a total membership of around 3500. Effective political and professional conduct remains difficult given modern-day challenges, especially the ever-increasing administrative and political interference. Largely owing to media pressure, public debate represents another growing professional challenge to which Swiss surgeons are not yet well accustomed; when they do respond the result is simply more and more pressure.

On a national level, Swiss surgeons have 2 journals for communication. The first one, Swiss Surgery, offers a scientific platform for the various surgical societies of the country. It publishes original work, as well as supplements covering specific topics or the abstracts of the various congresses. For the front page and title, English the fifth Swiss language, is used to make everyone happy! Die Union is an information bulletin devoted to political matters and professional practice issues. This bulletin is distributed to all members of the Union of Swiss Surgical Societies.

CONCLUSIONS

Modern Swiss surgery needs to face several challenges; eg, the maintenance and development of quality practice, the adaptation of the latter in relation to technical developments, the completion and refinement of postgraduate training programs, the advent of examinations and titles compatible with their European Union equivalents, and the control of professional manpower requirements. Its future direction will depend on how these issues are handled and resolved.

The small size of the country and its political and linguistic fragmentation complicate this evolution. Operative surgery practiced in Switzerland is of a high standard, widely recognized for its application of the latest developments, both in human resources and equipment. However, high-tech advances in certain fields are limited owing to the constraints inevitably imposed within a small country. The split of the discipline into specific subspecialities, as it might be conceived in a large country, is in fact not always possible in a country where the total population is less than that of a large capital city. This limited critical mass therefore represents an important element to consider in all Swiss surgical projects, and has far-reaching consequences. A more rigorous control of the rising number of surgeons and hospital establishments is another aspect to consider, and regional groupings and the establishment of specialist networks must also be considered. Before true rationing in access to care is considered, there is room and the need for rationalization within a fragmented federal system! In the field of postgraduate training and diplomas, the Swiss structure needs to be more closely modeled after that of the European Union.

The future of surgery will involve a more self-conscious appraisal of the role of basic science in surgical research than has been called for in the past. At the outset, the young surgeon starting in research should study 1 or 2 years to acquire the vocabulary, skills, and concepts of some area of basic science, molecular biology, immunology, genetics, or bioengineering. This work will often be in collaboration with scientists whose training is denoted by a PhD degree, a degree now fully established in Switzerland. To enable this to happen on an increasing scale, it is essential that such scientists are appointed to and incorporated into surgical departments. This will promote the required strong interdisciplinary collaboration in any research project.

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