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SWITZERLAND TOWARDS ESA AND ESO: DIVERSITY, PERSEVERANCE, AND DIPLOMACY – AN INTERVIEW WITH MARCEL GOLAY

Abstract. In this interview, Marcel Golay[1] shares his experience in leading Switzerland's membership in astronomy-related international organizations such as ESA and ESO. He also insists on the fact that personal achievements are only possible if backed by team work and institutional support.

Editor (Ed.): Prof. Golay, in a chapter published in OSA Vol. 2, you described the strategies involved under your leadership for bringing Geneva Observatory from 19th- to 21st-century astronomy (Golay 2001). There is another scope of activities that we would be interested to hear of, namely the entry of Switzerland into astronomy-related international organizations such as the European Space Agency (ESA) and the European Southern Observatory (ESO). But perhaps we should start by recalling what was the context of the time or – I know you like chronologies – by reminding us of some important facts progressively leading to the situations we shall discuss subsequently?

Marcel Golay (MG): I do indeed love chronologies and it would be worthwhile to first mention a number of events in my early life in order to "frame" the context in which I was involved subsequently.

Ed.: You were born in 1927, you obtained a degree in engineering in 1946 just after World War II and a PhD in mathematics in 1954, and you were nominated as Professor and Director of Geneva Observatory in 1956 ...

MG: Individual deep interests take shape during youth. At the age of 12,

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I read a French translation of the book by Eddington *Stars and Atoms* (1930) which was centered on the close links between what happens within stars and within atoms. I was also influenced by a book of Lemaître (1946) opening far-reaching perspectives on the relationships within the universe. In that book were also to be found the idea of interactions between the Earth and an evolving universe, as well as the concept of beginning – an important cosmogonical hypothesis at a time when this was not yet established. Radioastronomy was also born in 1953, revealing the spiral structure of the galaxy.

Ed.: There were definitely a number of key steps taking place in those mid-century years.

MG: Just after WWII, L. Spitzer put forward the idea of a telescope in space (Spitzer 1946). UNESCO[2] was created in 1949. The Swiss Research Foundation (FNRS[3]) – a milestone for funding research at the national level – was born in 1952. The same year, CERN[4] was established next door on the French-Swiss border. In 1954 were signed the preliminary agreements for ESO. Switzerland, while kept informed, was not part of these. In 1957, the first spacecraft, *Sputnik I*, was launched by the USSR. This led to the founding of NASA[5] the following year. *Sputnik I* itself was an expected thing, but the striking message was the definite perception that it had now become feasible to experiment from space. In particular, it was then possible, in principle, to put in orbit a space telescope capable of working in the full electromagnetic range.

Ed.: Let's go back a moment to the local and national context, necessary to understand the progress towards membership of Switzerland in ESA and ESO.

MG: One can already find details in my earlier paper (Golay 2001). There were three basic and traditional missions Geneva observatory had to fulfil when I was put in charge of it in the mid-fifties:
– chronometric service: control of watches and chronometers from Swiss and foreign manufacturers; prizes were granted and results were extensively used in advertizing campaigns; this was discontinued only in 1968;
– meteorological service: multiple daily measurements and readings; monthly and yearly statistics, also from several other stations located in

[2]United Nations Educational, Scientific and Cultural Organization.
[3]Fonds National de la Recherche Scientifique.
[4]Centre Européen pour la Recherche Nucléaire.
[5]National Aeronautics and Space Administration (USA).

the countryside and at Grand Saint Bernard Pass; this was stopped when the Observatory moved to its current location at Sauverny in 1966;
– time service, including managing the speaking clock and determining time from meridian observations; this also disappeared in 1968.
These services and the maintenance of material were keeping busy all personnel, including the warden. The Law was making provisions for astronomical instrumentation needed for teaching, but there was no mention of astronomical research.

Ed.: As far as research is concerned and as already mentioned in your OSA 2 chapter, you immediately realized you needed observing facilities out of the city of Geneva.

MG: We had not only to go out of the local pollution and illumination in Geneva, but also out of Switzerland for better weather conditions, down to the Southern hemisphere to be able to observe Southern stars, and out into space to access wavelength ranges beyond the atmospheric windows. We went to the Jungfraujoch peak (1959) in order to get above the most absorbing atmospheric layers. We also reached an agreement with Haute Provence Observatory to install in 1962 a 1m telescope on their site. The bottomline was: to look for the best site, to go into the international context but to remain independent.
The same principles guided us when we installed years later (1975) a telescope on ESO's premises at La Silla in Chile, before Switzerland become a full member of that organization. Another principle was applied to instrumentation: to construct in house what could not be purchased elsewhere and possibly to sell to others what we constructed well. In 1960 we also started launching stratospheric balloons from French, Brazilian and US sites, depending on the experiment flown. But all those ventures, albeit successful, were constrained and limited. It was obvious that we would dramatically benefit from full membership in European organizations such as ESA and ESO.

Ed.: Access to space came first.

MG: It was obvious to me that astronomy in space could only be possible through a large organization similar to CERN. In the second half of 1959, from all sides of Europe, physicists, geophysicists, aeronomists and many others, albeit few astronomers, most of them young scientists, began to raise their voice. They were thinking of an international organization or to set up specific agreements with NASA that had been created in October 1958. In April 1959, the Italian physicist Amaldi, one of the founding

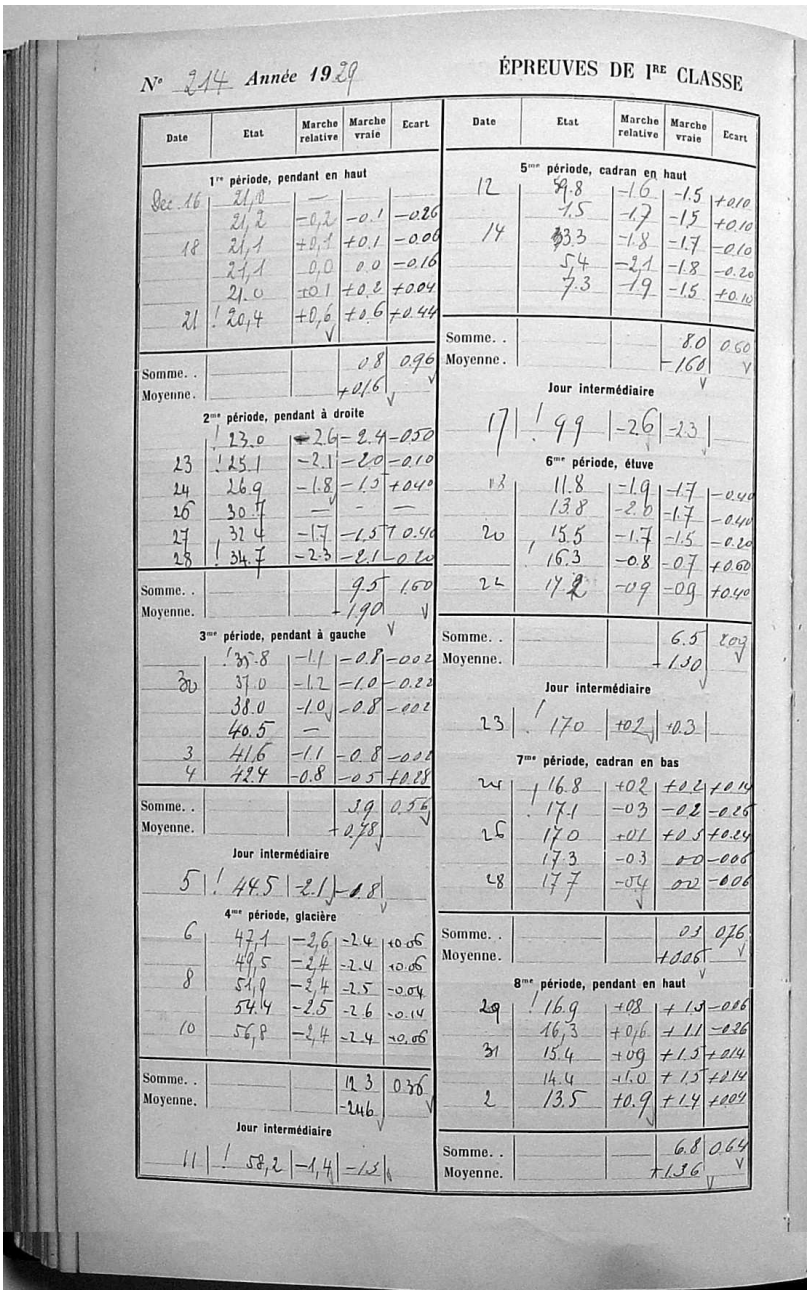

Figure 1. A page from the register of chronometric tests, one of the activities of Geneva Observatory until the late 1960s. (Courtesy Geneva Obs.)

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OBSERVATIONS MÉTÉOROLOGIQUES

FAITES A

L'OBSERVATOIRE DE GENÈVE

PENDANT LE MOIS DE **MARS 1943**

Extremums de pression: 742mm,7 le 1 et 720mm,9 les 24 et 25.
Ecart de la température moyenne du mois avec la moyenne normale: + 2°,60.

Jour du mois	Pression Moyenne 3 obs.	Vent Dominant	Vent V. moy. km/h.	Température Moyenne 4 obs.	Température Minim.	Température Maxim.	Fraction saturant. Moy. 3 obs.	Nébulosité Moy. 3 obs.	Durée d'insolation	Pluie Hauteur 24 h.	Pluie Nombre d'heures	Observations
	mm			°	°	°			h.	mm		
1	**41.13**	calme	1.5	4.10	− 2.0	11.6	79	0	8.6	....	....	gelée blanche
2	36.43	calme	2.7	6.90	0.0	14.2	72	3	8.5	....	....	.....
3	31.40	NE 1	3.7	7.40	0.0	14.6	73	0	9.7	....	....	.....
4	32.00	NNE 1	6.5	6.30	4.9	8.8	77	5	3.0	....	....	.....
5	35.70	NE 1	2.3	6.57	0.7	11.5	81	3	7.8	....	....	brumeux matin
6	30.27	NNE 2	11.5	5.65	2.8	12.3	78	5	3.0	....	....	.....
7	28.13	NNE 3	**30.2**	3.65	1.9	6.0	68	0	10.2	....	....	.....
8	28.53	NNE 1	2.3	**3.00**	**− 2.3**	9.2	72	0	9.8	....	....	gelée blanche
9	25.40	NNE 1	4.4	5.93	− 1.8	12.8	70	2	9.9	....	....	gelée blanche
10	23.87	var.	6.0	6.70	3.3	12.5	68	0	10.0	....	....	.....
11	24.33	NNE 1	2.9	6.15	0.0	13.3	78	0	9.9	....	....	.....
12	24.50	NE 1	3.2	7.02	0.8	13.2	74	5	4.2	....	....	gelée blanche
13	24.27	NNE 1	3.9	6.35	0.8	11.1	73	4	9.3	4.2	8	brumeux matin
14	24.60	NE 1	4.1	4.90	3.7	7.8	92	10	0.4	4.2	7	.....
15	25.27	NE 1	3.7	6.25	4.0	9.7	87	7	5.5	0.2	2	.....
16	25.97	calme	2.5	6.78	0.6	12.8	83	1	10.3	....	....	brumeux matin
17	26.20	calme	2.5	6.87	1.5	13.1	73	1	10.1	....	....	.....
18	24.60	E 1	3.4	8.40	1.3	15.8	68	8	4.2	0.1	2	tonnerres à 16 h. 20
19	27.37	var.	4.6	9.43	7.2	14.3	70	6	5.1	1.1	3	.....
20	27.43	var.	2.7	7.50	1.1	13.8	77	4	9.6	....	....	.....
21	27.17	S 1	3.2	8.45	4.3	13.2	76	10	0.0	1.4	3	.....
22	27.07	calme	1.8	7.40	5.0	10.6	85	8	4.5	....	....	.....
23	25.40	SW 1	2.0	8.80	2.0	16.8	70	1	**10.7**	....	....	.....
24	**21.73**	calme	0.0	9.80	2.6	14.8	**65**	8	4.0	0.4	2	.....
25	22.17	calme	0.4	9.25	7.2	11.1	88	10	0.0	1.9	10	.....
26	24.97	calme	0.4	9.15	7.1	11.7	**95**	10	0.0	**14.1**	**16**	.....
27	25.83	calme	1.3	**11.47**	8.6	**17.4**	86	5	6.4	1.8	3	.....
28	25.60	calme	1.5	8.70	5.3	14.6	85	9	0.8	4.7	6	.....
29	28.83	NNE 3	19.0	6.63	5.5	9.1	74	6	1.9	....	....	.....
30	30.70	NNE 1	2.9	7.45	0.0	11.7	72	0	8.6	....	....	.....
31	32.43	var.	5.1	10.30	4.2	14.8	70	10	4.2	3.2	8	.....
Mois	27.72		4.59	7.20	2.59	12.40	77	4.6	190.2	37.3	70	

Figure 2. Meteorological report: also a traditional activity of Geneva Observatory until the late 1960s. (Courtesy Geneva Obs.)

fathers of CERN, had sent a letter entitled *Space Research in Europe* to various European prominent scientists and decision takers.

Ed: Was he the only one behind such a move?

MG: Amaldi had had stimulating discussions with Pierre Auger in Paris (allegedly in the Luxembourg Gardens). Auger was known for his investigations of cosmic rays before the second World War. He was also Director of UNESCO's Department of Sciences and had been actively participating to the creation of CERN. The discovery of the Van Allen radiation belts was also convincing them that space research should not "remain a monopoly of the United States and Soviet Union" to use their own terms.

Ed.: Were these just theoretical wishes?

MG: No, Amaldi had a specific project in mind, a satellite called Euromoon to be constructed jointly by several European countries through a CERN-like organization. During the first General Assembly of COSPAR[6] in Nice (1960), Auger organized two information meetings on the matter. The first one was for countries which had already a committee for space research (most of them were set up in 1959). The second meeting was also open to countries without an *ad hoc* committee, such as Germany and Switzerland. Fritz Houtermans, Professor of Physics at the University of Berne, and myself were attending that second meeting.

Ed.: And this was the beginning?

MG: Auger had recommended that all interested countries set up a space research committee. Houtermans and myself then decided to talk to all potentially concerned people and to our authorities. Back to Geneva, I reported to Councillor Alfred Borel who suggested, at a meeting of the Foreign Affairs Commission of the National Council[7] to create an organization similar to CERN. That proposal was well received by Max Petitpierre, then Head of the Federal Department of Foreign Affairs. Quite possibly other people too influenced him. Then events took momentum.

A copy of Amaldi's report published in December 1959 recommending that European governments jointly set up a "purely scientific" organization for space research on the model of CERN was forwarded to Prof. de Muralt,

[6]Committee on Space Research founded by the International Council of Scientific Unions (ICSU) as part of the International Geophysical Year (1957-1958).

[7]Swiss Parliament.

Figure 3. M. Golay with Paul Chaudet (1904-1977), President of the Swiss Confederation at a NASA exhibition organized in 1962. (Courtesy M. Golay)

FNRS President who called a meeting[8] on 7 April 1960. It appeared that it was up to the Swiss Society for Natural Sciences (SHSN[9]), chaired by Prof. Töndury, to decide upon the Swiss adhesion to COSPAR and to set up a national committee for space science. We also agreed to recommend that the federal authorities organise an intergovernmental conference on space research.

Ed.: And it took place indeed.

MG: But there were still quite a few steps before reaching that stage. In the afternoon on April 7, I met with Max Petitpierre and received from him a formidable lesson of political strategy at the national and international levels. Then I also met Jakob Burckhardt, Head of the Division for International Organisations and his collaborator Samuel Campiche. On June 13, the SHSN Commission on Space Research met in Berne. I happened to chair it, with Houtermans as Vice Chairman and Bonanomi as Secretary.

[8]Attendance was Ackeret, Bonanomi, Clusius, Gerber, Hummler and Golay.
[9]Today the Swiss Academy for Natural Sciences.

Houtermans and myself were designated to attend a meeting organized by Auger in Paris on 23-24 June 1960 to set up the "Groupe Européen d'Étude sur la Recherche Spatiale (GEERS)". That group was itself in charge of preparing all scientific, technical and administrative documents necessary for creating an intergovernmental body on space research. The Swiss delegates (Houtermans, Campiche, myself) had the power, thanks to Councilor Borel, to offer housing for offices in Geneva. But Auger, by then Executive Secretary of the commission, established the provisional offices in Paris with the support of the French government.

Ed.: There must have been differing approaches to be tuned together at that very beginning.

MG: There were indeed some ambiguous positions. For instance, the British were seeing, through such a European cooperation, a way to convert their intercontinental missile *Blue Streak* into a civilian launcher. The French did not favor this as they had their own programs for launchers, both civilian and military ones, through ONERA[10]. As far as we were concerned, we could accept to be part of an organization of space research only if it was totally disconnected from military projects. The Swiss authorities were indeed fearing such an organization could endanger our neutrality regarding the Eastern and Western blocks.

From the start, the administrative representatives of the big countries involved in GEERS aimed only at shifting onto this international organization the most expensive part of their national programs, either ongoing or planned. A similar attitude was also coming from some industrial sectors, hoping to get expensive technological research funded through international contracts. Scientists from all the fields concerned were also seeing new ways to develop their projects, out of the traditional funding channels. CERN had already demonstrated in 1959, through successful experiments on the most powerful accelerator of the time, the vital importance of cooperation to achieve projects beyond national resources.

Ed.: Then came certainly the battle for hosting the new organization and/or its laboratories/centers?

MG: This was a fierce struggle that started early. Considering that the new organization could benefit from the CERN experience and proximity, I thought that at least some of the future laboratories could be advantageously located in the area too. Land was found between Nyon and Crassier

[10]Office National d'Etudes et de Recherches Aérospatiales (France).

Figure 4. G. Goy (left) and M. Golay next to the Geneva dome on the grounds of Haute Provence Observatory. Picture taken shortly after completion of the dome in 1962. (Courtesy M. Golay)

on the Canton of Vaud and I could already make, in Fall of that very year, proposals for welcoming in Switzerland one or several centers. We systematically failed, the representatives of other countries considering that we were already benefiting from the presence of CERN. Additionally, I believe the CERN Directorate was also afraid that a new organization in the same area would divert skilled personnel they would happily employ themselves.

Ed.: But was there a total similarity between CERN and that new organization?

MG: The negociations for what would be called later on the "Meyrin Agreement" exposed a fundamental difference between the rationale behind CERN and the motivations for a space organization. Physicists had joined forces through CERN to build one single big machine – and they would subsequently struggle for its exploitation, which would lead to very high level colloquia and contribute to the reputation of CERN. Such a unity behind a single machine did not exist among space scientists as many different disciplines could make use of specific spacecraft. Even among as-

tronomers, there was competition between general astronomy, cosmic-ray investigations, planetary studies, solar physics, and so on.

Auger himself, influenced by his achievements with CERN, argued in favor of a big project equivalent to a big machine, which could only have been a *Large Astronomical Satellite (LAS)*. This sounded too complex and feasible only at a scale of several years. Meanwhile it was necessary to create an environment, to build up experience and to do whatever could be done by using the available French and British rockets for exploring the upper atmosphere while putting together small satellites to be sent by NASA, in the framework of agreements yet to be negotiated. These were the kind of problems we had to discuss at the first conference of the "Commission Préparatoire Européenne de Recherche Spatiale (COPERS)".

Ed.: That conference then took place near Geneva.

MG: Answering the invitation issued by Max Petitpierre, Head of the Swiss diplomacy, the interested European countries attended, at the end of 1960, an intergovernmental conference at CERN itself. It successfully ended with the celebrated Meyrin Agreement (1st December 1960) and the creation of COPERS replacing GEERS. At the first COPERS meeting in Paris (13-14 March 1961), a scientific and technical working group was commissioned to report on programs that could be carried out immediately and others that would need longer terms. The resulting report, the *Blue Book* dated December 1961, has been the reference text leading on 14 June 1962 to the founding of the *European Space Research Organization (ESRO)*, the forerunner of the current ESA. All this was approved by the Swiss Federal Chambers on 16 April 1963 following the recommendation of the Federal Council (Council of Ministers) dated 7 September 1962.

Ed.: How was all this welcomed outside the small group of visionaries?

MG: Some associations of industrial companies were created, but they were waiting to see what would happen in the foreign industries. The largest companies were strangely passive: they thought their notoriety would automatically bring them big contracts. Some of them were to experience bitter disappointments. Indifference was also the lot of most university groups. I gave lectures in all universities and tried to convince geologists, geodesists, geophysicists, solid-state physicists, electronic engineers, and so on, virtually without any result. All were saying they were engaged in well-funded promising investigations.

Ed.: But was it different in the rest of Europe?

MG: Most of the laboratories in European universities had defined their orientations before 1957. Those choices had been influenced by pre-WWII "big bosses" who were continuing – with resources acquired with difficulty – programs interrupted by the war. Young scientists, educated after 1945 (and most of them having worked in American laboratories), were often seeing in space projects an opportunity to escape the traditional research orientations. For some university people, the Swiss research would be loosing its own character by being associated to big international experiments. They were considering this had already been the case with CERN.

Ed.: The politicians were on your side?

MG: They were people open to space projects in all political parties, but more reserved voices were heard from time to time. For many, space research, at the European level, was something essentially for the two big countries only, *i.e.* France and the United Kingdom. For Federal Councilor Friedrich Traugott Wahlen, who succeeded Petitpierre as Head of the Foreign Affairs Department, it was even a matter of conscience. He openly asked me one day: "What is more important: to fight misery in the world or to explore space?" I tried to explain that space research would very likely enable the development of tools leading to a better knowledge of our planet and of its atmosphere, and hence to a better evaluation and a sounder exploitation of its resources. I don't think he was fully convinced, but he ultimately accepted to ratify the agreements.

Ed.: It took definitely more time for adhering to ESO.

MG: It should perhaps be pointed out how the membership to an international organization is actually approached in our country. The federal authorities decide upon this after reviewing a few issues of potential concern to the industry, the polytechnic (federal) schools, the universities, the army, the cantons, the political parties, the society at large, etc., as well as the echo such a move could get from the press. In the specific case of science, a decisive rôle was given to a new body, the Swiss Council for Science created in 1965. Its mission was to set up policies for developing science and technology in our country and to advise the Federal Council accordingly. That Swiss Council for Science blocked *de facto* for quite a few years the adhesion of our county to ESO.

Ed.: There was no way to appeal its decisions?

MG: It is important to say a few words about the way such a council works. Such bodies exist probably in many countries with a similar politico-industrial representation. They act as safeguards for high-level political decisions. However, by their very composition, it is unlikely most of their members understand the cultural and even industrial relevance of a rising science as it was the case for astronomy in the early 1960s through the opening of space, the development of computing and the fast evolution of detectors. At that time, there were only about a dozen scientists in the country who could be considered as professional astronomers. Therefore, in the view of the Council, such a group did not deserve any peculiar interest as far as the development of Swiss economy and culture were concerned. Moreover, most of the Council members considered that anything related to astronomy was settled by the mere existence of a Federal Observatory in the country.

Ed.: That observatory had of course its own specific field of activities.

MG: Of course. It had been successfully active in the study of the Sun for more than a century. Its Director was Max Waldmeier, a reputed scientist, but with essentially personal and Zurich-centered views of astronomy in Switzerland. He was openly against joining ESO and his arguments were adopted by the Swiss Council for Science from the first meetings. They were reinforced by Burckhardt's scepticism. Burckhardt, already antagonistic at the time of joining ESRO, was very influential and, with others, he insisted on the need for Switzerland to concentrate on a few fields of research with potential economic return for the country such as nuclear energy. My proposal [to join ESO] was also an opportunity for the Council of Science to show they had the courage to say "no" to a minority of scientists. Burckhardt's stand was seconded by others such as Urs Hochstrasser who was at the time President of the Federal Commission for Atomic Energy.

Ed.: This sounds logical ...

Perhaps, but his opposition to a Swiss membership in ESO continued even after he became Director of the Federal Office for Education and Science. In that new position, among his many important responsibilities, was the task to define a long-term policy for the development of science and technology in the country. People had then to wait until this was achieved before taking any decision that would engage Switzerland in the long term. If such an attitude had been enforced five years earlier, it would have made Switzerland's adhesion to ESRO nearly impossible. This was the beginning of a long frustrating period where I repeatedly attempted to convince all

scientific commissions – and extract declarations from their members in that sense – that ESRO (later ESA) and ESO were complementary organizations for astronomers, and that the country could fully benefit from the membership in the former only by joining also the latter.

Ed.: And the Swiss National Foundation?

MG: At that time, the National Foundation was essentially dominated by physicists. They considered that astronomers – and especially that young chap from Geneva – already received considerable resources allowing them to develop the Jungfraujoch station; that they intended to install another one on the Gornergrat; that they got something on the Haute Provence Observatory premises; that they succeeded by getting the country to join ESRO. That had to be enough. All these actions were coming from Geneva and from the same person. That gentleman had also twisted their arm by purchasing a computer one month after they had taken a fundamental decision following which the Foundation would not finance the purchase of computers, leaving this to the Cantons, resisting also some pressure to have a national (federal) computing center in the same way this had been done in Germany with their computing center in Darmstadt.

Ed.: But you got them to finance your computer!

MG: They were left with no other choice. They had financed the photometers used at the Jungfraujoch, Gornergrat and Haute Provence stations. Not buying the computer proposed, an IBM 1620, to quickly reduce the observational data would have made unavoidable the appointment of people to do the same work. Their salaries would, after only three years, have exceeded the computer's cost. Additionally IBM, who wanted to penetrate the market, was offering a 50% discount in exchange for a few hours per week in order to demonstrate the machine to other laboratories.

Ed.: Back to ESO, the federal administration was fully against joining?

MG: As mentioned earlier, Burckhardt was not in favor of space. I recall one freezing night at the end of January 1961 when Campiche – who was in favor – and I spent hours arguing with Burckhardt while walking around the Cathedral in Strasbourg to keep us warm. Later on, he consistently opposed the idea to adhere to ESO. Out of family links – they were involved with heavy industries – he was convinced that Switzerland had its only scientific future in atomic investigations, such as those undertaken through CERN. Using some industrial contacts, I was able to make him

change his mind about space, but this did not work for ESO. As to the people from the Department of Finances, they would not move as long as a budgetary line was not created.

Ed.: But there was also a foreign expert?

MG: He was not quite foreign actually, since he was an expatriated Swiss: Fritz Zwicky. Zwicky had in mind to come back to Switzerland with hopefully a position as a strategical expert by the Federal Council. Out of caution, I had talked to him beforehand, but he could not see the country adhering to an international project led by Jan Oort whom he did not appreciate at all (his own words were much less courteous). As a compensation, he offered me to develop a 2m telescope around Perth, West Australia, and to find the necessary 10 Million Dollars. You can imagine how such a position made the Federal Council and the Swiss Council for Science happy of their own decisions ...

Ed.: You never got that telescope and, of course, you could not accept the position of the national bodies.

MG: The only way left was the political one. But I had a hard time gaining a few politicians to the cause. I had to go and shake hands during the parliamentary sessions. Letters with different arguments were sent to all parties. During the preceding weeks, I always managed to get articles in the newspapers read by the politicians – at that time *Le Journal de Genève* and *Die Neue Zürcher Zeitung* – and to be interviewed on the radio and television. At the beginning and at the end of the sessions, it was important to be on air in the news bulletins at 22:00 or 23:00 because this was when the politicians where driving from home or back home, listening then to the radio.

Ed.: This was time again for intensive presence in the media and for lobbying.

MG: An extensive lobbying was indeed necessary. I had for instance to get my way into the Swiss Council for Science (through people from industry and politics) and to the Department of Foreign Affairs (through the Belgian and French Ambassadors). I was hammering the argument that we could only fully exploit space projects if we were also in ESO, and not remaining stuck halfway; that we needed a consistent policy otherwise the universities and the citizens would realize that the Confederation's money was badly spent. And so on ...

Figure 5. U. Steinlin, M. Golay and F. Zwicky (left to right) at the IAU General Assembly in Brighton (1970). (Courtesy M. Golay)

Ed.: And ultimately it worked!

MG: Things moved step by step, after I pestered the life of many people. I was planning an action per week. Thanks to [Adriaan] Blaauw, [André] Lallemand and [Charles] Fehrenbach, I got the authorization to put a Geneva Observatory station (financed by the Swiss National Foundation) on ESO's ground at La Silla. Then we obtained an "observer" status at ESO Councils, followed by the involvement of representatives from the Department of Foreign Affairs and of the Interior to build up a real delegation. And these people found there a real motivation to give themselves some importance by working for the project. Switzerland became finally an ESO member in 1982, twenty years after the ESO convention had been ratified by the original members.

Ed.: There are probably more miserable aspects in the whole story.

MG: Definitely, but it is preferable to remain silent about them as they

are not really constructive. It is probably part of every endeavor to meet resistance, lack of sympathy, when simply not pure unjustified antagonism against which it is very frustrating to fight. Even the Swiss participation to the European professional journal *Astronomy & Astrophysics* in 1968 has been a matter for bitter disputes and opposition coming essentially from scientists outside the discipline.

Ed.: As shown in an interview you gave some time ago (Plans Fixes 1999), the abilities of a researcher and teacher had to be supplemented, in your own position, not only by the skills of an expert administrator, but also by the shrewd talent of a diplomat as masterfully demonstrated by the above.

MG: It is important to stress that the achievements just outlined here have involved many more people than the few main actors mentioned. It is also the result of daily actions and steps – lobbying as this is called today – necessary for the ideas to make their way and without which decision makers and takers could not be convinced. People have generally little idea of the time to be spent in trains and planes. Additionally a permanent presence in the media is compulsory.

Ed.: You offered already a glimpse on all this in your OSA 2 chapter. The OSA volumes published also contributions by a member and a past member of your institution: Claude Nicollier (2002) shared his experience as an astronaut servicing the Hubble Space Telescope and Noël Cramer (2001) described his activity as Editor of the multilingual astronomy magazine Orion. *He has another contribution in this volume (Cramer 2004) on the precursory artwork of Ludek Pesek. If we add the development of the seven-color photometry*[11]*, the discovery of the first exoplanet*[12]*, very successful advanced stellar models*[13] *and the scientific management of data from the Integral spacecraft*[14] *– just to mention a few highlights, this gives an idea of the pretty large spectrum of activities and fields that can be covered by a dynamic institution.*

MG: Beyond this, it should be emphasized that personal achievements are possible only because of the existence of an institutional structure, itself resting on team work built on individual results and earlier achievements by others. The context of research is complex and this is sometimes forgot-

[11]See *e.g.* Golay (1980).
[12]See *e.g.* Mayor & Queloz (1995).
[13]See *e.g.* Schaller *et al.* (1992), a paper that reached the highest citation rank for the whole field of physics in 1994.
[14]See *e.g.* Courvoisier *et al.* (2003).

Figure 6. M. Golay with Astronaut Cl. Nicollier (left) after the latter's participation to STS-103, the third Servicing Mission of the Hubble Space Telescope (see Nicollier 2002). (Courtesy M. Golay)

ten by young scientists. A step forward in research is generally the catalysis of an instant and the progress of science nowadays can only be collective and resulting from the convergence of many factors.

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