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During the 1930s, British and French scientists developed social networks that mixed professional relations with political and ideological affinities, with social leanings and engagement against fascism. The Anglo-French Society of Sciences was established in April 1940, in which James Gerald Crowther played a key role. His conception of the social and international functions of science is displayed in his 'imaginary history' of the Society, written in June 1940.

Introduction

In its standard representation, science is still dominantly seen as politically neutral, and even when included in international relations, science is considered to be spontaneously and truly international. Scientists are naturally predisposed to forget national and cultural boundaries in their activities.[1] When the political commitments of intellectuals are studied, the scientists are often forgotten.

However, throughout the twentieth century, some scientists were politically active in the anti-fascist struggle in the 1930s, in the war efforts against the Nazis, and in the atomic bomb issues. They were also involved in other scientific and political conflicts of the 1950s. Their

[1] Joseph Needham, when arguing in favour of UN scientific laboratories (UNESCO / Nat.Sci./24, 20/02/47): 'When scientists meet, they understand each other instantaneously, whatever part of the world they come from' (p.11).

commitment was not only individual, but also collective. This did not prevent academic institutions from warning against the mixing of science and politics, as for example did A.V. Hill to the Royal Society in the 1930s.[2] The International Council of Scientific Unions (ICSU) limited itself, in the 1950s, to defending scientists only when their scientific freedom was affected, and not for their citizen rights.[3]

When studying international networks, the entangling of science with politics is omnipresent. Of particular interest are the Social Relations of Science (SRS) Movement of the 1930s and 1940s, and its international connections. The part played by Crowther in this movement is well known. He played also a key role in the relations between British and French scientists during these years. He was the main founder of the Anglo-French Society of Sciences in April 1940, which lasted only a few months, but was revived in September 1944. Louis Rapkine, a French biologist, became Crowther's assistant in the Society for Visiting Scientists (SVS) at the end of 1943, and organized what was known as the French Scientific Mission in United Kingdom from September 1944 to October 1945, which placed dozens of French scientists in British laboratories. Finally, Crowther was the first General Secretary of the World Federation of Scientific Workers (WFScW), established in 1946, and a member of its leading quartet with Frederic Joliot, John Bernal, and Pierre Biquard.

The 1920s and 1930s

[2] A.V. Hill quoted by Gary Werskey, The Visible College. A Collective Biography of British Scientists and Socialists of the 1930s (London: 1978; Free Association Books, 1988) 154.

[3] Frank Greenaway, Science International. A History of the International Council of Scientific Unions (Cambridge: Cambridge University Press, 1996).

French and British scientists maintained important academic relations in the 1920s, particularly in biochemistry (including Joseph Needham and Rapkine)[4] and in physics (Paul Langevin, Biquard, Pierre Auger, and the Cavendish Laboratory). The Great Depression provoked a crisis about the responsibility of science; and scientists and laboratories shared economic difficulties and unemployment. The professional relations between became more political in the mid-1930s with the rise of fascism and the threat of war in Europe. In 1933, the Nazis seized power in Germany; many scholars were persecuted, and solidarity movements developed. Scientists began to participate in anti-fascist and anti-war organizations. The political situation made urgent the need for a British-French democratic axis at all levels, including science. Many scientists were also fascinated by what seemed like the privileged status of science in the USSR, which strengthened their social and political leanings. Many scientists travelled to Russia between 1925 and 1935. Crowther organized several such political and professional expeditions, the main one being in 1931.[5]

In this context, the Second International Congress of History of Science (2nd ICHS, London, 1931), in which a Soviet delegation participated, headed by Nicholas Bukharin,[6] was influential among young British scientists, but less so in France. In Great Britain, it gave an impulse to the development of a SRS movement, with the Division for the Social and International Relations of Science (DSIRS) established by the British Association for the Advancement of Science (BAAS), the Association of Scientific Workers (AScW) and the

[4] The marine biology station in Roscoff (Brittany) was the place where Needham and Rapkine first met in the 1920s. There, one could met also in the 1930s J.B.S. Haldane, Marcel Prenant, Boris Ephrussi, René Wurmser, Georges Teisser (who succeeded Joliot as the CNRS Director in 1947), and many others. Many were linked with Communist parties.

[5] J.G. Crowther, Fifty Years with Science (London: Barrie and Jenkins, 1970) 84-85. The 1931 expedition included Bernal, N.W. (Bill) Pirie, Huxley, Haldane, John Cockroft. On the French side, an official 'French scientific decade' was organized in the USSR in 1933-34. Joliot visited the USSR in 1933 and 1936.

[6] Nicholas Bukharin et al., Science at the Crossroads. New edition in 1971 with a foreword by Joseph Needham (London: Frank Cass and Co.,1931).

Cambridge Scientists AntiWar Group (CSAWG).[7] The Academic Assistance Council (later the Society for the Protection of Science and Learning - SPSL), the Society for Intellectual Liberty,[8] the Peace Council were some other scientist commitments in the pre-war context. The BAAS was representative of the scientific community, and its DSIRS played a federative role for the SRS movement, gathering from Marxist to liberal pragmatic scientists.[9] Bernal's influential book, The Social Function of Science (London: Rotledge, 1939) expressed the views shared by a large part of the SRS movement.

In France, the situation has been different, and it is impossible to speak of a French SRS movement, even if scientists have been increasing present in the public sphere during the 1930s and were involved in political struggles. Neither the Association Française pour l'Avancement des Sciences (French Association for the Advancement of Science, AFAS) nor the scientific trades unions played a major role in the scientific community. The AFAS did not feel concerned by the social function of science. Bernal's book was never translated in the French language.[10] The radicalization of French scientists took other paths, much more split. Significant differences arouse from the reception of the 2nd ICHS in both countries. The French delegation to the ICHS was small: Hélène Metzger, Henri Behr and Pierre Brunet. The presence of a Russian delegation, and their thesis, had very little impact among the French historians of science, and it has not been a political founding event for the International Academy for the History of Science, nor for the Centre International de Synthèse. The

[7] Werskey (1978), op.cit. note 2; William McGucken, Scientists, Society and State: the Social Relations of Science Movement in Great Britain, 1931-1947 (Columbus: Ohio State University Press, 1984).

[8] Established in 1936, by Bernal, Leonard and Virginia Woolf, Blackett, Conrad Waddington and Hyman Levy, among others.

[9] Werskey called it a 'scientists popular front'. Werskey (1978) op.cit. note 2.

[10] Only the introduction of the Social Function of Science was translated, by Langevin himself, and published in Cahiers rationalistes, n°75, 1939, 114-134.

function of science was more discussed on the intellectual level, in the positivist tradition. The Union Rationaliste (Rationalist Union) was founded in 1931 (the year of the 2nd ICHS) to defend science and rationality, with the participation of left-sided scientists. Besides this tradition, the political attraction for the USSR gave rise to the establishment in the 1930s of the Cercle de la Russie Neuve (New Russia Circle), with a scientific commission headed by Paul Langevin[11] to promote Marxism in science and to develop scientific relations with the USSR. A succession of conferences 'A la lumière du marxisme' (to the light of Marxism) were organized from 1933, with the participation of many known scientists. Langevin even established a group to study materialism in his laboratory. A journal, La Pensée, Revue du rationalisme moderne came out in 1939 from this rationalist and Marxist background. The year before, the Modern Quarterly, which showed many similarities and some differences, had started its publication in London.[12]

British and French scientists shared many professional commitments: science popularization through books, radio broadcasts, conferences, universities for workers; lobbying for the funding of scientific research and its organization, for a governmental science policy; participation to societies for scientific exchanges with, and travels to, the USSR. There were also bilateral relations between British and French movements such as the BAAS and the AFAS; the AScW and Jeune Science;[13] and so also, the relief societies for scientist refugees: the SPSL and the Comité d'Accueil et d'Organisation du Travail des Savants Etrangers (the

[11] Henri Wallon et al., A la Lumière du marxisme (Paris: Éditions sociales internationales, 1936). Paul Labérenne, 'le Cercle de la Russie Neuve (1928-1936) et l'Association pour l'étude de la culture soviétique (1936-1939)', in La Pensée, n°205, June 1979, 12-25.

[12] A third review, Science and Society, was published in the USA from 1936. There were many cross-participations between the Reviews.

[13] Jeune Science never went beyond a hundred members. It disappeared during the war, and was replaced by the Association des Travailleurs Scientifiques (ATS) after the Liberation. It never developed as its British partner.

Committee for the Welcome of, and Organization of Work for, Foreign Academics), initiated by Rapkine.

British and French scientists or intellectuals finally co-operated for peace and against fascism and Nazism. In France, after the fascist riots in February 1934, a Comité de Vigilance des Intellectuels Antifascistes (Committee for the Vigilance of Intellectuals against Fascism, CVIA) was soon established.[14] Exchanges were continuous between Langevin and British intellectuals. Because of his action during World War I, Langevin was the example to follow for the CSAWG, which established relations with the CVIA.[15] There was also cross-participation in anti-fascist conferences: for instance, in Oxford, in August 1935,[16] on academic freedom; and in Paris, in September 1936, in support of the Spanish Republic. The Society for Intellectual Liberty kept also in close relation with Langevin's anti-war anti-fascism committee.

Science and politics were inseparable in these commitments. In the scientist minds, the struggle against Nazism was a struggle to defend the integrity of science and democracy. Science was supposed to be value-laden, and then contradictory to Nazism. There was a strong continuity of engagement <u>for</u> science (its organization, its founding, its integration with government policies, its popularization, the recognition of its social function) and <u>in the name of</u> science (social welfare and justice, freedom, democracy).

[14] Langevin, Rivet, and Alain were the co-presidents of the CVIA, which progressively lost its influence after 1936 because of political disagreements between pacifists and anti-fascists. A new <u>Comité mondial de lutte contre la guerre et le fascisme</u> was established and presided by Langevin. Since the riots in 1934, fascism was considered as the prime direct danger by most of the French intellectuals. This antifascist conscience grew slower in United Kingdom, which may explained the initial failure to reproduce something alike the CVIA.

[15] John Bernal, 'Langevin et l'Angleterre', <u>La Pensée</u> n°12, mai-juin 1947, p.18

[16] Organized by the Academic Freedom Committee, with the participation of the CVIA.

The sociability between the British and French owed much to a small number of scientists who were representative of their communities. The British scientists most directly involved were those from the 'visible college' and its environs. The French were linked with the Popular Front and left-wing parties. The leading figures included Bernal, Needham, Julian Huxley, Crowther, Patrick Blackett, and Solly Zuckerman on the British side; and Langevin, Rapkine, Henri Laugier, Joliot, Auger, and Biquard on the French side.

According to Eric Burhop, the idea of an international organization of scientists arose during these exchanges:

> I recall particularly one such meeting when some British scientists, from Cambridge and London, went urgently to Paris to meet Langevin, Frédéric and Irène Joliot-Curie and other French scientists to discuss these matters. In these discussions, the idea germinated of an international organization of scientists to press for the proper organization of science to constructive ends and against obscurantist and Fascist trends.[17]

Crowther and the French scientists

Crowther's links with French scientists began in 1937, when the Manchester Guardian sent him to Paris to report on the renewal of French science.[18] He had first met Biquard --

[17] E.H.S. Burhop, 'Scientists and Public Affairs', in Maurice Goldsmith and Alan MacKay (eds.), The Science of Science (London: Souvenir Press, 1964), 34.

[18] Crowther (1970), op.cit. note 5, 183-187. Notebooks in Crowther Papers (University of Sussex), box 34 (Paris 1937), file 'Paris 17-21 April 1937'. The Manchester Guardian published interviews with Perrin and Joliot among other reports.

physicist, pupil of Langevin and friend of Joliot -- in Kapitza's club in Cambridge some years earlier.[19] Biquard was his only contact among French scientists. He was then the private secretary of Jean Perrin, member of the French Government in the Under Secretaryship for Scientific Research. He was later to be Crowther's successor as the General Secretary of the WFScW.

During this first trip (17-21 April 1937), Crowther visited Joliot's laboratory. He met Laugier, head of the Service de la Recherche Scientifique (Scientific Research Service), later the Centre National de la Recherche Scientifique (CNRS).[20] Thirty years later, Crowther stated how much he has been struck by the international character of Joliot's laboratory, and by the Joliot's personality: 'I believe that Joliot's views on the internationalism of science contributed at least as much as individual factors to the subsequent formation of the WFScW'.[21] Crowther noticed the 'cultural idealism' of Jean Perrin, which influenced the Government's science policy: 'science provided the only means for the liberation of humanity from the restrictive condition of nature', which was shared by other French scientists. 'The French tradition of intellectual freedom and culture was aggressively alive'.[22]

Crowther also met many other French scientists. He became particularly acquainted with Pierre Auger, the physicist who was to succeed Needham as the Head of Unesco's Science Division in 1948. Over the coming years, when in Paris, Crowther lived in Auger's home. Their friendship ended with the Cold War

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[19] Letter from Crowther to Biquard, 31 March 1937 – Crowther Papers, box 9 'correspondence'. Letter from Biquard to Crowther, 2 April 1937 – Crowther Papers, box 34, op.cit. note 18. Upon the Kapitza's club, see J. W. Boag, P. E. Rubinin and D. Shoenberg (eds.), Kapitza in Cambridge and Moscow (Amsterdam: North Holland Publishing Co., 1990).

[20] In 1939, the Scientific Research Service became the Centre National de la Recherche Scientifique (CNRS), and was headed by Laugier until the war, and by Joliot just after the war. Crowther admired particularly the presence of Nobel laureates (Irène Curie and Jean Perrin) at the head of French science, which, he lamented, was not the case in Great Britain.

[21] Crowther (1970), op.cit. note 5, 186

[22] Crowther (1970), op.cit. note 5, 185

Crowther travelled again to Paris on 14-20 July 1937, for the International Exhibition. He met then Langevin for the first time, and travelled to Marseilles with him, Perrin, Biquard, and Auger, to inaugurate a physics laboratory.[23]

He travelled again to Paris from 30 September to 10 October 1937.[24] This time, he attended the International Scientific Congress, which marked the establishment of the Palais de la Découverte. Many British scientists participated in this congress, including Needham, Cockroft, Pirie, Waddington, Haldane, Blackett, and Bernal. In his report on the Congress for the Manchester Guardian, Crowther highlighted again the part played by young French scientists working with Jean Perrin, in organizing this international congress and the renewal of French science: Auger, Francis Perrin, Joliot, Irène Curie, Teissier, Ephrussi, Wurmser, and Biquard.

After this trip, Crowther exchanged many documents in 1937-38 with Auger and Joliot about the situation of French and British sciences. Auger appeared to be his main scientific relation in Paris before the war.[25]

Rapkine arrived in London during January 1940 with an official French mission to organize the coal supply for French industry and army. He met then Crowther for the first time, and rapidly became one of his French close friend,[26] with Auger, Biquard, Joliot and their wives.

[23] Notebooks in Crowther Papers, box 34 (Paris 1937), file 'Paris 14-20 July 1937'.

[24] Notebooks in Crowther Papers, box 34 (Paris 1937), file 'Congrès du Palais de la Découverte'. Crowther (1970), op.cit. note 5, 187-188

[25] Crowther Papers, box 82 (SVS-1) and box 8 (personal correspondence).

[26] Crowther Papers, box 82 (Society for Visiting Scientists – SVS-1). Letter from Auger to Crowther, s.d., probably February 1940.

The Anglo-French Society of Sciences in 1940

The Tots and Quots, a club of scientists involved in the struggle for the public recognition of science, was created by Solly Zuckerman in 1931. Although it had disappeared by the mid-1930s, the war revived it in November 1939 and Bernal, Crowther, Huxley, Waddington and Blackett became regular participants.[27] The book Science in War, published in London in July 1940 as a Penguin paperback,[28] was the collective work of the Club. The book highlighted how science and scientists are fundamental for the war effort, and was drawing the perspective of what came to be called 'operational research'.

In February 1940, Langevin, Laugier and Auger were sent to London by the French Government to establish scientific war co-operation. They met many of the Club members. The monthly Tots and Quots' dinner, held on 23 February, was dedicated to Anglo-French co-operation, and was attended by Captain Jacques Métadier, the French naval attaché. The discussion went on during the March dinner, when Zuckerman proposed the establishment of an 'Anglo-French Society of Sciences'.[29]

Crowther and Métadier were sent to Paris to set up the Society. Their visit (8 -13 April 1940) was organized by Auger.[30] Crowther, Joliot and Auger conflicted with Metadier, who was

[27] Solly Zuckerman, From Apes to Warlords. An Autobiography, 1904-1946 (London: Collins, 1988), 108-118 and 393-402. The Zuckerman Papers (Norwich University) contain the records of this Club. See also Crowther (1970), op.cit. note 4, 210-222; Brenda Swann and Francis Aprahamian, J.D. Bernal: A Life in Science and Politics (New York: Verso, 1999); Mary-Jo Nye, Blackett: Physics, War and Politics in the Twentieth Century (Cambridge MA: Harvard University Press, 2004).

[28] The book was decided upon during the June dinner, and written in 11 days. Rapkine, Huxley, Bernal Zuckerman, Waddington and Crowther, among others, contributed to the book, which was published without its authors' names. See Zuckerman op.cit. note 27, 398-401; Nye, op.cit. note 27; and Swann, op.cit. note 27.

[29] Sources for the Society are found in the Crowther Papers, the Zuckerman Papers, and the Rapkine Papers (Institut Pasteur, Paris).

[30] Crowther papers, box 39 (France 1945), notebook 'Paris 8-13 April 1940'.

right-sided and, at first, refused Joliot to preside the Society. The project met with broad acceptance by French scientists. Crowther, Joliot and Auger wrote the paper presenting its aims. The French branch was officially established on 25 April, with the participation of Joliot, Auger, F. Perrin, Wurmser, and Ephrussi among others. Its aims were the exchange of scientific information and publications and the coordination of research, with emphasis on the war efforts. Joliot was elected President, and Auger Secretary. Rapkine, who was already in London, was chosen as the 'Secretary in England' of the French branch. Back in London, Crowther immediately met Bernal and Zuckerman to check their agreement with the Paris decisions, and met Paul Dirac who agreed to chair the English branch of the Society on 17 April.

A second visit was organized (21 April – 4 May) for Bernal and Zuckerman, to establish co-operation in military research. Contacts were made with Laugier and Henri Longchambon at the CNRS, the Army Health Service, and a ballistics laboratory where Bernal and Zuckerman attended experiments with explosives. Back in his London laboratory, Zuckerman went on experimenting with the effects of explosives on birds and rabbits.

Reports of both visits to Paris, and of the French constitutive meeting, were made to the 1 May dinner of the Tots and Quots. The English branch of the Society was officially established two days later. Zuckerman became Deputy Chairman and Crowther, General Secretary, in addition to Dirac.[31]

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[31] Bernal, Blackett, Cockcroft, Waddington, and C.D. Darlington were among the members of the Executive Committee.

When the French army was defeated in June 1940, some French scientists came straight to London. Immediately after the German-French armistice (22 June), the English branch met on 23 June to discuss the situation.[32] Rapkine and Laugier wished to concentrate in United Kingdom all French scientists who already exiled, or were about to leave France. When at the Tots and Quots' dinner of 10 July, which was attended by Rapkine and Longchambon, Bernal and Laugier introduced a discussion on the difficulty faced by the scientists which were leaving France. But it was already too late. On July 3rd, the British Navy attacked the French Fleet in Mers-el-Kebir to prevent the Nazis to take it over. 1300 French soldiers were killed, and Petain's Government broke off the diplomatic relations with the United Kingdom on July 8th. This stopped also the scientific co-operation between both countries. Rapkine and Laugier left London and went to the USA to go on rescuing French scientists with the help of the Rockefeller Foundation.[33] This brought the first phase of the Society to an end. Rapkine was nominated as the head of the Free France scientific bureau in New York in December 1941.

The Imaginary History of an Anglo-French Society of Sciences

On 12 June 1940, Crowther presented to the Tots and Quots an 'Imaginary History of the Anglo-French Society of Sciences',[34] picturing the Society as it might have been. The text was intended to gain support for the Society among British scientists. Although a fiction, this

[32] Crowther, Bernal, Zuckerman, Waddington, Laugier, Longchambon, Rapkine, and Hans von Halban were present.

[33] For the rescue of French scientists, see Diane Dosso, Louis Rapkine (1904-1948) et la mobilisation scientifique de la France libre, unpublished Ph. D. (Université Paris VII-Denis Diderot, décembre 1998, p.675).

[34] Crowther Papers, box 82 (SVS-1). All quotations are from this document (9 pages), dated June 6, and annotated by Crowther.

history reveals Crowther's ideas about the political function of international scientific co-operation.

According to Crowther's conjectural history, in 1936 a Left-wing government won the polls in the UK, as in France. British foreign policy became based on a world alliance of democratic countries, and legislation was introduced for the control of the country's resources and labour. The new policy extended the realm of social progress and 'released a fresh enthusiasm for co-operation in science':

> The scientists of England and France took the initiative of fostering this cooperation. Groups of some thirty were formed in both countries, under the presidency of Joliot and Dirac. Each group organized a bureau to centralize the interchange of information, arrange the exchange of research workers, organize French and British meetings, and combine Franco-British meetings. (…)
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> The presence of an able group of French physicists contributed much towards the elimination of provincialism at Cambridge, while French scientists at Oxford, owing to their admirable culture, were able to secure for the first time in that University proper respect for science. (…) Similar transformations occurred in France. The French Government was willing to provide sums of money to Englishmen to spend on experiments which it denied to its own citizens. Having acquired the habit of expenditure, it founded many new laboratories for research in technical sciences.

The imaginary history goes on with the formation of Anglo-French specialized groups in various disciplines: they published memoranda on the research trends, which influenced the

Government and even the Rockefeller Foundation. A hospitality fund was created for the visiting scientists. The Bureaux received financial support for their activities. The Society contributed a great deal towards the transformation of the governmental attitude towards scientists and science. Through a Ministry of Information, created in 1937, the Society inspired a powerful new interest in science among the general population. Even The Times began to publish a daily article on science.

The Society's most profound influence was to be seen in atomic physics:

> Through the Society, the dash of the French and the technical thoroughness of the English atomic physicists were combined, and the lead in this field was secured by them. They invented a compact form of particle accelerator, which superseded the big and expensive machines developed by the Americans. The mastery of research in atomic physics provided new industrial processes and military weapons which assured the security of the two countries.

Other advances are described by Crowther in physics and biology. The Society has expanded to Canada and the USA, and then became 'a world association of scientists, which promoted science among all peoples, and urged the best possible use of science for the benefit of the whole population of the earth'.

To this sentence at the end of the imaginary history, Crowther added an appendix, saying that part of these prospects could still be achieved, in spite of the 'gravest military reverses', with the establishment of branches in North America to help the survival of the creative part of English and French science.

Although presented as 'imaginary', this history is based upon realistic and informed considerations about the situation of scientific research in France and Great-Britain. The 'imaginary' laid only in the political situation. The comparison Crowther had made in 1937-1938 between the French and the British scientific systems was entirely in this history. Crowther's conceptions showed how small were the differences, when the war was beginning, with the traditional representations of science. The scientific mobilization for the anti-Nazi war shaped the conceptions of the scientific left as well as those of the conservative scientists, and determined their participation to the war efforts. Science was unanimously considered as value-laden, and as the most important source of social welfare. To promote science, and to improve the public attitude towards science, were the main issues for the social responsibility of scientists, and the priority for left-sided scientists also.

1944-45: The Revival of the Society and the French Scientific Mission

The premises for the renewal of the French British scientific co-operation existed once the Society for Visiting Scientists (SVS) was established in March 1943. Crowther invited Rapkine to represent France in the SVS.[35] He was nominated assistant to Crowther in December 1943. Only from January 1944, when the SVS moved to its own office, more and more foreign scientists would benefit of the reception by the SVS.

Rapkine's project was again to gather exiled French scientists in London. As soon as October 1943, the project had a formal agreement from the Provisional French Government, but Rapkine was unable to travel from New York to London during the preparation of D Day. He complained directly to the General de Gaulle about the delay: some exiled French scientists

[35] Letter from Crowther to Rapkine, 12 July 1943. CNRS Papers, versement 1980-0284, article 59, file SVS (CAC - Centre des Archives Contemporaines, Fontainebleau)

have already resigned, and were waiting to travel; the Foreign Office was supporting the Mission; the travel restrictions would be lifted if the scientists were invited as scientific counsellors of the French Army.[36]

Finally, Rapkine arrived to London only in the end of August 1944. A few weeks later, the French Scientific Mission was constituted. Joliot himself, who stayed in Paris during the war, travelled from Paris to London in the first days of September 1944, just after the Liberation of Paris.

Scientists in exile in North and South America, and, above all, scientists isolated in France by the German occupation, gathered in London to become familiar with new scientific knowledge and methods. It was the main piece for the reconstruction of science in France after the war. Nearly one hundred French scientists stayed for varying periods in British laboratories, until October 1945, and published hundreds of reports on the state of science.[37] At the same time, operational research was developed in France by Rapkine, Auger, and other scientists from this Mission.

The French Scientific Mission, in London, hosted the reconstitution of the Society. The Joint Executive Committees met on 16 and 23 September, with Bernal, Blackett, Crowther, Zuckerman, Auger, F. Perrin, and Rapkine. The immediate aims included scientific rehabilitation, periodical reviews of the progress of science, joint conferences, and the study of lessons to be drawn from reconstruction problems. During these months, a major role was played by the SVS, which offices hosted the headquarters of the Mission and the Society. Crowther and Rapkine were omnipresent.

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[36] Letter from Rapkine to the French Provisional Government, 6 July 1944. CNRS Papers, op.cit. note 35, article 58.

[37] Rapport sur l'activité de la mission scientifique française en Grande-Bretagne (fin août 1944 – fin décembre 1945) (Rapkine Papers, Institut Pasteur). CNRS Papers, op.cit. note 35, article 58. Most French scientists involved in the Anglo-French networks participated in the Mission.

The first joint conference, on Solid State physics, took place on 20 January 1945, and was attended by around fifty British and French scientists.

A joint meeting of the French and British Executive Committees of the Society met on 21 January to decide on further conferences: one on cosmic ray physics in Bristol, proposed by physicist Nevill Mott, and various meetings on biology, proposed by Joseph Needham.[38] On 22 January, Joliot, Auger, J.P. Mathieu (ATS), Rapkine, Bernal, Blackett, Crowther, Darlington, Waddington, Pirie, Haldane and others attended the Tots and Quots' diner. The next day, Joliot delivered a speech upon 'the British French scientific co-operation' during a meeting of the French British Parliamentary Committee.[39]

However, the Society was already facing many difficulties. In January 1945, the British Council and the Royal Society denied any official funding for the Society, arguing that such money was reserved to the ICSU and other official institutions chosen by the Government. The Society was only a private initiative of scientists, even if they were famous.[40] More generally, relations between the British Council, Crowther, and the SVS became tense.[41]

The Bristol conference was organized by Bristol University alone on 25-26 September 1945. A meeting of the Society (the last one?) was organized on the occasion. Back from Bristol,

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[38] Crowther Papers, box 39 (France 1945), file 'London 19-23 January 1945'. Needham happened to be in London in January 1945, on leave from China for a few weeks. He was in the SVS building, and joined the Committees for tea time. See also: Minutes of the joint meeting, Sunday 21st January, CNRS Papers, op.cit., note 35, article 60. During this meeting, the Society changed its name from 'Anglo-French' to 'Franco-British' to satisfy their Scottish colleagues.

[39] Crowther Papers, box 39 (France 1945), file 'London 19-23 January 1945'.

[40] Crowther Papers, box 82 (SVS-1). Letters from Crowther to the BC on 7 November 1944 and to Dale (Royal Society) on 25 January 1945. Letter from Dale on 29 January 1945.

[41] Crowther Papers, box 85 (British Council – BC-1) and box 87 (BC-3). Crowther was Secretary of theBC's Science Committee. Crowther has been long in conflict with the Royal Society (Henry Dale and A.V. Hill) from the choice to send Needham in China in 1942, to which Dale was opposed. The SVS is also seen by the Royal Society as too autonomous, and reflecting too much Crowther's political leanings. Crowther was forced to resign from the Science Committee on February 1946. It might be attributed to the first consequences of the beginning Cold War. Co-operation began to be difficult between liberal pragmatic and socialist scientists, between the BAAS and the AScW for instance. See also: Werskey (1978), op.cit. note 2.

Joliot, Bernal, and Blackett held a conference in London for the SVS on the social consequences of the atomic bomb.

When the French Scientific Mission came to an end, so did the Society.[42] As a follow-up to the Society, Rapkine organized British scientific conferences in Paris, under the aegis of the CNRS, the Palais de la Découverte and the British Council. Dirac delivered the first conference on 6 December 1945. Crowther delivered the next one, 13 December, on 'The Social Relations of Science'. It was his first trip to Paris since the war, and renewed his friendly meetings with the Rapkine's, the Joliot's, the Auger's and the Biquard's. From this stay, he kept in close contact with Dennis Riley, the new scientific delegate of the British Council in Paris.[43]

The tightness of the co-operation between British and French scientists during the war, and in its immediate aftermath, led Joliot to speak of a unique 'French and British Science'.[44]

1946: UNESCO and the WFScW

During the war, the social relations of science movement remained active in London, holding various conferences[45] on 'Science and World Order' (1941), on 'The Planning of Science in

[42] Many reasons seemed to have pushed the Mission to an and: the end of the 'reconstruction phase', with the establishment of classical forms of co-operation; the economical difficulties; the strong suspicions against the French scientists, so many of them being left-sided and even in the French Communist Party. A scientific bureau was established within the French Embassy in December 1945 to maintain a co-operation, and the CNRS nominated a scientific attaché in London (its first attaché in a foreign country) a little later. See a 'secret note' about the difficulties with the Foreign Office, from the French Embassy in London, CNRS Papers, op.cit. note 35, article 59, file 'Ambassade'.

[43] Crowther Papers, box 39 (France 1945), file 'Paris 11-17 December 1945'. The text of Crowther's conference is also in this box.

[44] Frédéric Joliot-Curie 'La science franco-britannique et la guerre', Dialogue, Revue mensuelle franco-britannique, n°1, Juillet 1946, 29-34

War and Peace' (1943), and on 'Science for Peace' (1945).[46] These conferences opened the way for the World Federation of Scientific Workers (WFScW).

In July 1943, Crowther became also secretary of the Science Commission of the Conference of Allied Ministries of Education,[47] which prepared proposals for an international post-war educational and cultural system. In the commission, Crowther acted as Needham's spokesman, and argued for the inclusion of science in the future agency. Crowther was also responsible for Needham's presence in China on behalf of the British Council from 1942 to 1946. He circulated to British scientists the various manifestos written by Needham when in China, in which he had developed his own views on international scientific co-operation.[48] Playing this role of go-between, Crowther was tightly associated with the birth of UNESCO.

UNESCO was decided by the Allied London Conference (November 1945) and progressively took shape in 1946. Its First General Conference happened in Paris, November 1946.

The WFScW also came into being the same year. Its way was prepared by the AScW, with a conference 'Science and the Welfare of Mankind', held in London, February 1946. More than six hundred scientists attended this conference, among whom were Julian Huxley (already provisional Head of Unesco), Blackett, and J. P. Mathieu for the French Association des Travailleurs Scientifiques (Association of Scientific Workers, ATS). Joliot was not present, but a speech by him on the atomic bomb was read out.

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[45] Some were organized by the DSIRS-BAAS, some by the AScW alone, when the BAAS began to keep its distances from the Left.

[46] On these conferences, including the last one in 1946: see the BAAS archives (Bodleian Library, Oxford), AScW and WFScW archives (Warwick University).

[47] The Science Committee was established on 27 July 1943. Initially, the main aim was the scientific reconstruction after the war, but it also cared of the educational international organization to establish. Crowther Papers, box 86 (BC-2). See also the minutes of this committee in CAME archives (Unesco, Paris).

[48] Needham Papers (Cambridge Library), files D2 to D24 (memoranda). Crowther papers, box 88 (Unesco, Preparatory Commission), file 'commission I'.

Crowther travelled again to France in May 1946. He visited new laboratories. Crowther echoed from the first time some critics made by Joliot against Needham (supposed to have been too much friendly with the Kuomintang – but Crowther defended Needham) and against Auger, whom the French Government chose for the French national commission for UNESCO, instead of him.[49] In August 1946, Crowther had holidays with the Joliot's, the Langevin's, and other scientists in L'Arcouest (Brittany), a small village where friends of the Curie's and the Perrin's gathered for summer since the beginning of the 20th Century. He visited the marine biology station in Roscoff, and stayed one more week in Paris with the Auger's in September. To be invited to L'Arcouest is the good measure of Crowther's integration into Joliot's inner circle.[50]

Following the success of 'Science and the Welfare of Mankind' conference, the WFScW was founded in London, July 1946.[51] More than a dozen associations participated to this conference, some of them as observers. Needham represented UNESCO; Jan Burgers the ICSU. The Federation of American Scientists (FAS) was among the observers, although it never joined the WFScW.

In its Constitution, the WFScW defined itself as a 'science and society' movement, rather than as a trade union. Its first aim was 'to work for the fullest utilization of science in promoting peace and the welfare of mankind, and especially to ensure that science is applied to solve the urgent problems of the time'. 'To improve the professional, social, and economic status of scientific workers' appears only in seventh place, just before the last: 'to encourage

[49] Crowther Papers, box 39 (France 1945), file 'notebook, Paris 15-25 May 1946'.

[50] Crowther Papers, box 47 (Mexico 1946-47), file 'notebook August-September 1946'.

[51] WFScW Archives, FMTS (Fédération Mondiale des Travailleurs Scientifiques – WFScW) Archives (fonds Jaeglé, Archives départementales de Seine Saint-Denis, Bobigny), and Joliot Papers (Institut Curie, Paris).

the scientific workers to take an active part in the public affairs'. Joliot was elected President, Bernal, Vice-President; and Crowther, General Secretary. Biquard replaced Crowther in 1955. The WFScW is undoubtedly the main follow-up of the Anglo-French interaction of the 1930s. The British ASCw and the French ATS were the pillars of the WFScW until 1952, when the USSR rejoined them. For the first General Assembly (Prague, 1948), nearly 80 per cent of the members were from both the UK and France.

Although Needham and Joliot thought, in the beginning, that the two organizations could be complementary, the WFScW was never in the position to build strong links with UNESCO. The US State Department was hostile to the WFScW, and vetoed an agreement similar to the one linking the ICSU and UNESCO.[52]

Crowther travelled to Paris in March 1947 to negotiate an agreement with UNESCO, and to organize the WFScW. A lunch took place between Crowther, Joliot, Biquard and the UNESCO Secretariat, including Huxley and the Americans, who thought the ICSU could well fulfil the aims of the WFScW, which, then, had no utility.[53] In April 1950, the UNESCO Executive Committee changed the rules for the relations with the NGOs, and that was the end of the possibility of a favourable agreement for the WFScW. Finally, a limited agreement was established with UNESCO in July 1947, which enabled the WFScW to participate in some Unesco activities, although with no financial support.

This did not prevent Crowther to use UNESCO facilities, thanks to Needham. He benefited an official 'expert mission', from 11 November to 20 April 1948 to prepare the UNESCO

[52] The main supporter of the WFScW inside UNESCO seemed to have been the Chinese scientist Yeh Chupei. He proposed Crowther to be engaged by UNESCO to be Needham's Deputy, but Huxley refused, arguing he was not a scientist: letter from Yeh Chupei to Crowther, 30 December 1946, Crowther Archives, box 112 (WFScW-1), file 'personal 1950'. Yeh Chupai also criticized Needham not to have proposed an agreement with the WFScW simultaneously with the ICSU agreement: letter from Yeh Chupai to Crowther, 22 April 1947, Crowther Archives, box 112 (WFScW-1), file 'personal 1950'.

[53] Notebook on Crowther's visit, Crowther Archives, box 112 (WFScW-1), file 'personal 1950'.

participation to the UN Scientific Conference on the Conservation and Utilization of Resources (UNSCCUR), to be organized by the UN Social and Economic Council (ECOSOC) in 1949. Crowther was supposed to travel to Mexico, for the 2nd UNESCO General Conference (November 1947), then to the USA, and to produce a report and participate to some workshops. What he did.[54] But he also dedicated most of his time to the WFScW, in Mexico as in New York. In Mexico, he met left-sided scientists, delivered a conference on 'Science and Society in the USSR', and negotiated the relations between the WFScW and the World Federation of Trade Unions with its delegate. In New York, one of his unofficial mission was to negotiate an agreement between the WFScW and ECOSOC. Laugier was the Deputy General Secretary for the UN, and in charge of ECOSOC, which facilitated the negotiation with Crowther. But the exit was as bad as for UNESCO. Crowther met the Federation of American Scientists, and the leaders of the American AScW. Crowther was much deceived by the situation of left-sided American scientists, split in many small groups, each one fighting against the other ones. According to him, the American AScW seemed to be only concerned by the bacteriological weapons.

The WFScW was invited to participated to the UNESCO panels in Paris and New York on the social aspects of science (September 1947). It received a subvention to organize the Rutherford Memorial (Paris, 7-8 November 1947). Needham was invited as the WFScW delegate to the 3rd General Conference in Beirut, with his travel paid by Auger for UNESCO. Crowther's participation to the Langevin and Perrin Memorial (Paris, 14-21 November 1948) was also supported by UNESCO.

[54] His contract and final report are in Crowther Papers, box 89 (UNESCO-1), file 'Paris, April 1948'. His notebook for his stays in Mexico, New York and Washington is in box 48 (Mexico Paris 1947)

Finally, Crowther was closely associated to the creation of the Lilley-Rosenfeld commission on the 'History of Social Relations of Science'[55] within the newly founded International Union of History of Science (IUHS).

The agreement between UNESCO and the WFScW did not last very long. During the 1st General Assembly of the WFScW (Prague, October 1948), some participants showed their deception against UNESCO, too much influenced by the USA, and with a tendency to concurrence the WFScW. For instance, UNESCO was criticized for its interest in the social aspects of science.[56] Soon before, the ICSU Council had refused a joint journal of its Commission on the Social Relations of Science (CSRS, Burgers' commission) with the IUHS commission, the WFScW and UNESCO on the social relations of science.

Though Auger was a former Crowther's friend[57] and now head of the Science Division, UNESCO, had to yield to American pressure and apply the French governmental directives: the Cold War was on, and the agreement was suppressed in 1950.

Conclusion

[55] Needham tried to develop History of Science through UNESCO. He engaged Armando Cortesao, an historian of science to establish the International Union for History of Science, besides the former International Academy. Crowther introduced Léon Rosenfeld, (theoretical physicist, historian of science, Marxist) to Cortesao. Lilley, Rosenfeld chaired the commission 'History of the Social Relations of Science', established in December 1946 with the IUHS. Both were formally confirmed during the 4th ICHS (Lausanne, September 1947). Samuel Lilley, another Marxist friend of Needham and Crowther was chosen as the Secretary of this commission. For the relations of Crowther with this commission, see: Crowther Papers, box 90 (UNESCO-2), file 'Commission on the Social Relations of Science'.

[56] According to Biquard, Joliot was already 'afraid of UNESCO dealing too much with the social relations of science'. Lettre from Biquard to Crowther, 22 August 1948, Crowther Papers, box 192 (report on UNSCCUR). See also Wooster's report after the Prague Assembly, 12 October 1948, Crowther Papers, box 112 (WFScW-1).

[57] Auger was in 1947 a member of the Executive Committee of UNESCO, and the main supporter of an enlarged agreement with the WFScW.

From the mid-1930s to the late 1940s, a small but distinguished group of British and French scientists became deeply and constantly involved in refounding international scientific relations. Some were liberals and democrats, other were socialists and Marxists. A reason why they were called a ‘scientists' popular front’. The network was rooted in professional co-operation, mainly in biochemistry and physics, but gained collective visibility during the anti-fascist struggle; it was dispersed in the 1950s by the Cold War.

The mixing of professional, institutional, political, and ideological relations never stopped during its existence. Various models and ideas circulated through these networks, dealing with science policy, political and social commitments, the social responsibility of scientists (including the popularization of science and the involvement in public affairs). These scientists were deeply persuaded of the social and international functions of science, and put their convictions into practice. During the war and after, they came to hold important political positions. After Hiroshima, the international co-operation became a fundamental issue for them. The international function of science took a new meaning, and a scientific internationalism had to be built on new grounds. Their ideas strongly influenced international scientific relations in many places: UNESCO Science Department, the IUHS and the Rosenfeld-Lilley commission, the CSRS-ICSU, and the WFScW.

Crowther played no direct part in scientific research. Nevertheless, he played a key part in linking the scientists on both sides of the Channel; in using his institutional positions to help publicizing a new kind of scientific internationalism; in promoting some of his political friends in key positions. But this did not prevent the isolation of the WFScW from UNESCO and from the majority of the scientists. When the Russian Government decided to control more strongly the WFScW and to subordinate it to the Soviet diplomacy, Crowther was

considered as the scapegoat of the failure of the WFScW, and pushed off the Secretariat in 1954.

A more interesting contribution was the way Crowther observed, compared, and circulated the transformations of science and scientific systems from the 1930s to the 1950s.[58] His deep involvement in the French and British scientific networks has been operative for that. He publicized the ideas of his network through the Manchester Guardian. His contradiction was to share much of the idealist conception of science as a value-laden (including internationalism) of Perrin and other French scientists, and also much of Bernal's social function of science.

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[58] See for instance his survey: J. G. Crowther, Science in Liberated Europe (London: The Pilot Press, 1949).