

Anregungen und Empfehlungen

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Sarton, Science, and the End of History*

Zusammenfassung: Ausgehend von der Frage George Sartons nach der Bedeutung von Auschwitz und Hiroshima für die Geschichte der Wissenschaften soll hier der Versuch unternommen werden, die Geschichte der Naturwissenschaften und der Technik einmal von ihrem möglichen und mit naturwissenschaftlich-technischer Perfektion herbeiführbaren Ende her zu bedenken: dem atomaren, biologischen und chemischen Holocaust, der, in Perversion, dann den vollständigsten Triumph über die Natur bedeutete, den Wissenschaft und Technik erringen könnten. Muß daher die Geschichtsschreibung der Naturwissenschaften, wenn sie glaubwürdig und aufrichtig bleiben will, nicht um historiographische Ansätze und Urteile bemüht sein, die sich, wenn denn das Ende politisch und technisch schon jetzt erreichbar ist, auch angesichts solcher Perspektive verantworten lassen?

Schlüsselwörter: Wissenschaftsgeschichte, George Sarton; XX Jh.

Sometimes, anniversaries seem to have their own rationale. Thus George Sarton's 100th anniversary coincided with the fictitious date of George Orwell's *Nineteen Eighty-Four*, as it was justly remembered by the editorial "Sarton, Science, and History" in the *Isis* Centennial Issue¹. But have we, as historians of science, really accepted the Orwellian challenge for our own discipline? No doubt, in this century science and its applications have revealed their Janus faces. As historians we know both sides, the contributions of science and technology towards the happiness and freedom of mankind – the very basis of Sarton's faith –, and their contributions towards a degradation of man and nature to mere objects and expendable commodities.

This year we are commemorating the end of World War II, just 40 years ago, and the first use of the atomic bomb as the deadliest invention ever made by science. This might be an opportunity to recall another, sometimes forgotten, aspect of George Sarton's work, since he was a scholar who accepted this challenge as a historian of science, and often asked himself and his colleagues: What does the war, what does the murder of millions of Jews, and what does the bomb on Hiroshima mean within the history of science and civilization, and how do these events affect our historical understanding? Sarton's awkward questions are, to some extent, a touchstone of our historical conscience, and in these times they are more urgent than ever. And I should like to take Sarton's argument even a little further, for times have changed considerably since then.

* This note originated in a discussion paper presented at the annual meeting of the *Driburger Kreis* in September 1984. I owe a special debt to the editor of *Berichte zur Wissenschaftsgeschichte* for permission to publish in the language George Sarton would have chosen for such matters; cf. his letter to the editor of the *New York Evening Post* (1919 Feb. 22), reprinted in *Isis* 2 (1914/19), 320–321.

Sarton's answer was part of his biography. In 1914 German troops invaded his native Belgium and forced him to emigrate to England. A few months later he decided that it would be more useful for the cause of peace if he went to the United States which had not yet entered war. In fact, one of his reasons for going to America was the idea "to organize a new pacifist propaganda with new methods" from the other side of the Atlantic². The medium to which he eventually entrusted this message was no less than his journal *Isis*, founded at his home at Wondelgem just two years before. The bitter lesson of World War I, which, for the first time in history, was immediately viewed as being a war of national sciences and technologies, led Sarton to strive for a new humanism, for a "reconciliation of science and art, truth and beauty", in order to build a better and more peaceful world. The core of his message was his belief in the unity of mankind and the unity of knowledge, which was to remain Sarton's creed for the rest of his life. His editorial *War and Civilization*³ in the first post-war issue of *Isis* of September 1919, and his *The Faith of a Humanist*⁴ of December of the same year should be compared with the notorious *Krieg der Geister*⁵ in order to evaluate the *Zeitgeist* which was prevalent at the time of Sarton's confession to pacifism and internationalism.

His monumental *Introduction to the History of Science*⁶, the first volume of which appeared in 1927, is the academic fruit of his humanistic credo. "The history of science", it reads in the preface, "is the history of mankind's unity, of its sublime purpose, of its gradual redemption"⁷. In the same year in a letter he wrote: "I am anxious to prove inductively the unity of knowledge and the unity of mankind"⁸. Accordingly, for Sarton, the history of science should play a very decisive role in the creation of a new and better world. In a collection of essays entitled *The History of Science and the New Humanism*⁹, which appeared ten years later, he again expressed his conviction that the light of beauty, truth and justice would in the end prevail undiminished in the history of humanity over all the temporary defeats inflicted by the darkness in the world. A lecture entitled *The History of Science and the Problems of Today*, which he held in the Carnegie Institution of Washington in 1935, begins with a parable¹⁰:

[...] consider with me two men who are fighting one another. They are of equal strength and courage but the one is fair and gentle, while the other is rough, cruel and unfair. Thus the strength of the first is jeopardized by the many limitations exacted by his own conscience, while for the other there are no limitations whatsoever – anything goes. Who has the best chance of victory? The second of course. *Yet if you take mankind as a whole, it is the first who has won.*

Thus the second war Sarton was destined to experience affected him deeply as a historian of science. "The day of Munich was the nadir of my life", he is reported to have said again and again¹¹. At the end of the war, with forty million dead and six million Jews murdered, humanity had won nothing, absolutely nothing. Sarton's editorials in the war issues of *Isis* reflect his increasing perplexity. In June 1939 under the heading *Quousque tandem?* he asked about the relation between ethics and technological advance¹². In August 1940 he appealed to the republic of letters to protect the ideals of humanity against the darkness of the present¹³:

In the shadow of so many crimes and sufferings can there be a greater consolation than to study and explain more clearly the best and highest deeds of the people of every nation and thus to vindicate the goodness of man?

Sarton's editorials then became more and more distinct. Soon he even referred to the murderers by name. At the end of 1942 he wrote¹⁴:

It is truly impossible for decent man to encompass with their minds crimes of such enormity and

multitude. However, you must try to imagine it, dear Reader, and to remember it. Forgive me for having raked up that filth, but I had to. You know that it is not my habit to do so and that I prefer to remain silent, but there are times when a man must speak out or his heart would burst.

For Sarton the historian bears responsibility for the past and for the future¹⁵:

In the year 2043, our descendants will celebrate the fifth centenary of Copernicus and Vesalius, the fourth centenary of Torricelli, the third centenary of d'Alembert, the second centenary of Joseph Plateau and Stuart Mill, and the first centenary of what?

In April 1944, when the end of the war was already in sight and Sarton quite justly feared that its horrors could be all too soon forgotten or thoughtlessly suppressed, he reminded his colleagues under the heading *Scripta Manent!* that the historian cannot forget nor be allowed to forget as long as the sources exist. Because even if the war guilt were to be disputed and the murder of Czechs, Poles and Jews denied, the fact that Hitler's *Mein Kampf* was published and had a circulation in the thousands, could not be disputed¹⁶:

Mein Kampf is an indestructible monument, which it will be impossible in later times to deny or to ignore. It will remain forever an intrinsic part of German culture, which historians of literature or science will have to interpret in one way or another; they will not be able, if they be honest, to be silent about it or to explain it away. This justifies my editorial. One might say that it is irrelevant in a journal devoted to the history of science; it is, on the contrary, highly relevant, and the more we are interested in German science (meaning, science in Germany) the more relevant it becomes. [...] Of course, new scientists will appear in Germany when the storm is over, but there will remain a solution of continuity which the historians of science of the next century will have to account for. Therefore, they will have to speak of Hitler and his henchmen, even as historians of science in the fourteenth century must speak of Tamburlaine¹⁷. We are simply anticipating them.

Let us assume that this terrible judgement is correct and that this will be "forever an intrinsic part of German culture", no different than Gauss, Goethe and Beethoven. If, however, this is the case and the attempt to separate the one from the other is neither historical nor honest, then Auschwitz and Hiroshima are also intrinsic parts of our technological and scientific culture, and not just slips that can be ignored.

In March 1948 George Sarton held a lecture at University College London. Its subject, *Science and Tradition*, represented a renewed attempt to show the significance of the history of science for the scientific-technological culture of the future. Sarton had not ceased to see in his discipline the necessary correction for the suffering of his time, a means of discerning, through which the humanization of science, and the better society he dreamed of, could be attained¹⁸:

The question remains and we ask it with more anxiety than ever. "How could such a complete perversion of humanity happen in one of the most enlightened countries in the most enlightened age?" I have thought long and often on that question and my answer is [...] that the German scientists and engineers were partly the victims of their "technical" infatuation. They were "technocrats" with a vengeance, and one can see how some of Mr. Hitler's problems may have excited their technical minds. Absolutely new problems, such as this one "What is the simplest and cheapest way of destroying human beings, not individually, nor by the thousands, but by the millions?" The problem included enough difficulties, with no precedents for guidance, to challenge the ingenuity of the most resourceful technicians. [...] German technicians solved that problem and gave the means of destroying ruthlessly and unobtrusively millions of innocent people. Their technical concentration and the benumbedness and insensibility which proceeded from it were carried to such a point that their minds were closed to humanity and their hearts dulled to mercy.

In the printed versions of his lecture Sarton at this point added a comment¹⁹:

The reader might stop me here and say "What about the atomic bomb?" The atomic bomb is an instrument of warfare, the latest and deadliest weapon invented by men. In a sense war is criminal; it is the greatest moral bankruptcy, yet when we are involved in it, there are no alternatives but to beat the adversary

or be beaten. There is an immense difference between killing men in warfare and murdering them as a civilian policy. The Nazi slaughterhouses were not instruments of war, but instruments of civilian destruction. The fact remains that we have many “technocrats” in our midst, an increasing number of technocratic brutes, without sensibility and without imagination, who do not hesitate to make drastic decisions on the grounds of technical efficiency alone without any regard for the feelings of the individuals involved.

The discussion about the responsibility of the scientist for the results of his work, continued Sarton in his lecture of 1948²⁰, had reached a dramatic climax recently apropos of the atomic bomb; if the latter were used for the destruction of mankind should we condemn or exonerate the physicists and chemists who brought it into being?

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The situation has changed completely in the last forty years. Ethics is no longer the first concern, but instead existence itself. The bombs dropped on Hiroshima and Nagasaki, and the crematoriums at Auschwitz were test tube experiments compared with what scientists and technicians have devised and constructed in the meantime. The atomic bomb has long ceased to be an instrument of warfare. It has become an instrument of civilian destruction in Sarton’s sense. At a time when the complete destruction of mankind has become a political calculation and where maybe half of all the scientists and technicians worldwide are preparing or already practising the military annihilation of life, Sarton’s question: “What about the atomic bomb?”, is again crucial for our discipline. For if it is the case that Hitler is just as much a part of German culture as Gauss, Goethe and Beethoven, and that Auschwitz and Hiroshima cannot be separated from the technological-scientific civilization of the twentieth century, then the feasible destruction of mankind by nuclear weapons would not be a slip in the history of science, but instead its carefully devised – but final result.

As historians we are accustomed to analysing developments after they have taken place. Examination of the results makes the causes apparent and thus the spectrum of the possible is narrowed down to the succession of the factual. Would it not be advisable, therefore, to take Sarton’s “if the atomic bomb were used for the destruction of mankind . . .” seriously and to attempt to evaluate the history of science anew from this point? Not as the history of increasing clarity and increasing possibilities. Let us take its possible end as the point to begin with, the irrevocable end of the history of mankind in its atomic, biological and chemical annihilation, which would then also be the end of the history of science – devised, calculated, tested and prepared by mathematicians, physicists, chemists, biologists and technicians in the most exacting of detail with all their professional ability. *Diabolus ex machina*. The unshakeable belief in the future of mankind that George Sarton maintained through two wars would be meaningless in the moment when mankind no longer existed.

Such a thought-experiment could appear to be questionable from a methodological point of view, because a method of recording history that attempts to pass judgement from a point beyond history cannot really be called historical, no matter whether it results from a Christian or Marxist observance. But still there is a difference. For the point at which history ends, because humanity is no more, this point is now in the range of the technically feasible and historically possible, since we have made this goal attainable through the customary perfection of our science and technology.

To prevent any misunderstanding: we do not want to be prophets of doom. The ability of the historian to predict the future is just as limited as that of any other

contemporary. The historian is even less suited to be the apologist of the factual and mere chronicler of events. That things are the way they are does not mean that they are supposed to be that way or that they had to happen. Historians of science especially appear to forget this now and again, perhaps because they have become too accustomed to the idea that nature herself necessarily dictates the way in which we deal with her. However, it is especially the historian of science who, more than any other, is aware of the productive tension between the conceivable, the possible and the necessary, out of which everything new in the history of mankind with world and nature has emerged.

What do we as historians of science gain when we, at least for a moment, try to look at science from the perspective of the end of the history of science, when we admit that this in fact would be the last and complete triumph that our science and technology could achieve over nature, and when we at the same time admit that this end already is significantly a part of the history of science, because the rockets are aimed, their trajectories are calculated, and the consequences have been planned. What do we gain then?

First of all the ability to distinguish. To distinguish between the historically necessary, the historically possible and that which perhaps would also still have been possible in the history of the perception of nature and our dealings with her – and all this in order to ask ourselves why this or that path was taken, and why others which also would have been possible had not been chosen.

To distinguish between gain and loss, because we have perceived that gain also means loss and that there were victims in the process of the intellectual and material acquisition of nature. Did not the advanced cultures of Central America fall victim to the conquest of the New World? In the seventeenth century, did not womankind have to pay the price for the male mechanical philosophy? And did not Frederick the Great, in that little-known argument with d'Alembert, try in vain to save poetry from the clutches of the mathematicians²¹?

When we have learnt to think from the point of the end of the sciences we gain another advantage: an invariable point of reference on the other side of all ideological or philosophical points of view through which we can escape the poverty of historicism and relativism. We would then be able, in fact even summoned, to think about which traditions in the history of the sciences lead to the destruction of the world and which lead to a more human future. We will then have to ask ourselves whether our historical judgement is still valid in view of the possible end, and whether that which we called a gain really was a gain, that which we called progress really was progress and that which we called an achievement really was an achievement.

We will have to ask ourselves whether we, as historians of science, have fulfilled our responsibilities. Has not our discipline often enough contributed to the veiling of differences, to the legitimizing of demands of power and to the silencing of the victims? At the same time we, the ones who know the sources, are also the last who could hear the voice of the suffering. Would it not be our duty to make people look at the world's need of healing from the perspective of the victims?

Finally we will have to ask ourselves how we can fulfill our responsibility for the future, and this so that there will be a future. Our possibilities as historians are limited, but concrete: we can show and name, which means that we call murder murder, and injustice injustice. Due to the fact that we have followed the dialogue between mankind and nature through history, we can show perspectives and offer orientation aids like Sarton did with his New Humanism, even if our conclusions might be different. In this

way we can provide partial steps of cognition and ensure that our discipline becomes an area of critical reflexion within the training of scientists and technicians.

To be sure, there is no simple solution, no exclusive recipe as to how the history of science ought to be written. It would be intellectually and morally wrong to limit our discipline to any single approach or method. After all, historians don't hold the key to the world's salvation. But if we as historians of science want to remain credible, then we have to strive for a historical judgement that we can justify even in view of Auschwitz and Hiroshima, and even in view of the destruction of our environment and the danger of nuclear annihilation, and this independently of whatever subject or whatever period we are working in individually. Here it is not so much the question of an ethical responsibility of the scientist and the consequences of his actions and discoveries that are important, but rather the question of a fundamental new determination of the relationship between man, nature and culture²². Theodor Adorno was wrong when he said that no more poems could be written after Auschwitz. The history of science also has not come to its end, but instead has been given a new and unpostponable task from the possible end of history. However, we are just beginning.

- 1 Arnold Thackray: Sarton, Science, and History. *Isis* 75 (1984), 7–9.
- 2 Hosam Elkhadem: George Sarton's Correspondence: Sarton and Irénée van der Ghinst. *Isis* 75 (1984), 33–38, on p. 37 (Sarton to van der Ghinst, 1915 Mar. 13).
- 3 George Sarton: War and Civilization. *Isis* 2 (1914/19), 315–321 (Brussels, 1919 Sept.).
- 4 George Sarton: The Faith of a Humanist. *Isis* 3 (1920/21), 3–6 (Brussels, 1919 Dec.).
- 5 Cf. *Der Krieg der Geister. Eine Auslese deutscher und ausländischer Stimmen zum Weltkriege 1914*. Collected and edited by Hermann Kellermann. Stuttgart 1915. The battle was opened by the *Aufruf an die Kulturwelt* (1914 Oct. 4), signed by 93 eminent German professors such as Nernst, Röntgen, and Planck.
- 6 George Sarton: Introduction to the History of Science. (Carnegie Institution of Washington, Publication 376) Vol. I–III, Baltimore 1927–1948.
- 7 G. Sarton (cf. note 6), Vol. I, p. 32.
- 8 Arnold Thackray/Robert K. Merton: George Sarton. In: Dictionary of Scientific Biography. Vol. XII, New York 1975, pp. 107–114, on p. 109.
- 9 George Sarton: The History of Science and the New Humanism. Cambridge, Mass. 1937.
- 10 G. Sarton (cf. note 9), p. 165 (Sarton's italics).
- 11 A. Thackray/R. K. Merton (cf. note 8), p. 112.
- 12 George Sarton: Quousque tandem? *Isis* 31 (1939), 6–7 (Cambridge, Mass., 1939 June 13).
- 13 George Sarton: To the Republic of Letters. *Isis* 33 (1941/42), 1–3 (Rockport, Mass., 1940 Aug. 31), on p. 3.
- 14 George Sarton: The Years "Forty-Three". *Isis* 34 (1942/43), 193–195 (Cambridge, Mass., 1942 Nov. 12), on p. 194.
- 15 G. Sarton (cf. note 14), p. 195.
- 16 George Sarton: Scripta manent. *Isis* 35 (1944), 201–205 (Cambridge, Mass., 1944 Apr. 23), on p. 204.
- 17 The Asian conqueror Tīmūr Lang (1336–1405), through Christopher Marlowe's tragedy better known as "Tamburlaine the Great". Sarton (cf. note 6, Vol. III/2, pp. 1467–1474) devoted an entire chapter of his Introduction to this great destroyer, which was published in 1948 and is interlarded with hints to Stalin and Hitler.
- 18 George Sarton (a): Science and Tradition. In: George Sarton: Horus. A Guide to the History of Science. New York 1952, pp. 3–16, on p. 9. An almost identical French version was presented at the Institut d'Histoire des Sciences in Paris (1948 May 21) and published as: (b) Science et tradition. *Archives Internationales d'Histoire des Sciences* 2 (1948/49), 10–31 (Lugano, 1948 June).
- 19 G. Sarton (cf. note 18/a), p. 9; the French version has „Que pensez-vous de la bombe atomique? de la guerre biologique?“ (cf. note 18/b, p. 20).
- 20 G. Sarton (cf. note 18/a), p. 10, (note 18/b), p. 20.

- 21 See Frederick the Great: *Réflexions sur les réflexions des géomètres sur la poésie* [1762]. In: *Oeuvres philosophiques de Frédéric II. (Oeuvres de Frédéric le Grand, Tome IX) Tome II*, Berlin 1848, pp. 59–74. This was a refutation of d'Alembert's *Réflexions sur la poésie* read at the Académie Française in 1760.
- 22 For two recent contributions towards such new approaches see, among others, Fritz Krafft: *Wissenschaft und Weltbild (II). Von der Einheit der Welt zur Vielfalt der Welten und des Menschen Stellung in ihnen*. In: Norbert A. Luyten (Ed.): *Naturwissenschaft und Theologie. (Schriften der Katholischen Akademie in Bayern, Vol. 100) Düsseldorf 1981*, pp. 79–117, and Klaus Michael Meyer-Abich: *Wege zum Frieden mit der Natur*. München/Wien 1984.

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Dokumentation und Information

Robert-Remak-Fonds bei der Gesellschaft für Wissenschaftsgeschichte

Im Mai 1985 ist bei der Gesellschaft für Wissenschaftsgeschichte ein mit 50 000 DM ausgestatteter Robert-Remak-Fonds eingerichtet worden. Die Gelder sollen nach dem Willen der Stifter für die Würdigung von Leben und Werk Robert Remaks und die Bearbeitung seines wissenschaftlichen Nachlasses Verwendung finden.

Der Berliner Mediziner Robert Remak (1815–1865) gehörte zu den bedeutenden Forschern und Ärzten, die die Berliner Schule nach 1850 geprägt haben. Als Schüler von Johannes Müller und Johann Lukas Schönlein entwickelte er schon in den 40er Jahren Vorstellungen über die Bedeutung der Zelle im Krankheitsgeschehen, die Rudolf Virchow wenige Jahre später mit dem Entwurf der Zellulärpathologie zur Weltgeltung bringen sollte. Bahnbrechend wurden Remaks Arbeiten auf dem Gebiet der Galvanotherapie, in denen er seine neurophysiologischen Erkenntnisse mit klinischen Zwecken verband. Doch im Gegensatz zu anderen Kollegen der Berliner Universität blieb Remak die äußere Anerkennung weitgehend versagt. Einer der Gründe hierzu lag in der Haltung der preußischen Universitäten gegenüber Gelehrten jüdischen Glaubens. Remak wurde 1848 der erste jüdische Pri-

vatozent Preußens, 1859 erreichte er die Ernennung zum Außerordentlichen Professor.

Nachkommen Robert Remaks, die in der Nazizeit nach England ausgewanderten, nahmen seinen wissenschaftlichen Nachlaß zusammen mit anderen Familiendokumenten mit in die Emigration. Vor einigen Jahren beschlossen die noch lebenden Urenkel Remaks, diesen Nachlaß als ein Stück deutsch-jüdischer Wissenschaftsgeschichte nach Deutschland zurückzubringen. Sie verkauften die Manuskripte Remaks zusammen mit zahlreichen wertvollen Briefen berühmter Zeitgenossen (darunter fünfzig Briefe seines Förderers Alexander von Humboldt) an die Staatsbibliothek in Berlin und setzten den Erlös für eine wissenschaftliche Bearbeitung aus. Die Gesellschaft für Wissenschaftsgeschichte wurde damit beauftragt, die ausgesetzte Summe zu verwalten und für ihre Verwendung im Sinne der Stifter zu sorgen. Das Geld soll in erster Linie für die Unterstützung von Veröffentlichungen (so vor allem für Druckkostenzuschüsse, eventuell auch Reisemittel oder Materialkosten) bereitgestellt werden. Nach der zwischen der Gesellschaft und den Stiftern getroffenen Vereinbarung, die recht-