

## Chapter 23. *Récoltes et Semailles*

Grothendieck began writing *Récoltes et Semailles* in June 1983, and continued working on it for about three years. Originally he had planned a much shorter “testimony” (*témoignage* is a key word that he uses to describe the work), and more than once he thought he had reached the conclusion. While writing it, however, he learned of a whole series of publications by former colleagues and students, of which he had had no inkling during his many years of voluntary isolation. The discussion of these publications led to new topics and points of view, and altogether to a considerable broadening and reorganization of the text, to which he added more and more sections.

*Récoltes et Semailles* holds a position of particular importance, because it is the only one of Grothendieck's “philosophical meditations” which he actually had reproduced and mailed out to about two hundred of his friends, acquaintances and colleagues. It is thus the only meditation which has acquired a certain - although restricted - circulation, prominence and recognition, and even a somewhat ambivalent fame.

It is not the author's intention to examine the content of *Récoltes et Semailles* in detail. The text is available to anyone who really wants to read it, and a publication in book form is apparently in the offing. This chapter will primarily describe the genesis of the text, and deal with the question of what Grothendieck wanted to achieve in writing it. His own opinion was that *Récoltes et Semailles* was a far more important legacy to the world than all of his mathematical works together<sup>1</sup>. We recommend the article *Découvrir et Transmettre* by A. Herremann for an analysis of the text<sup>2</sup>.

To gain an overview of the entire text, we will begin with the table of contents, giving the dates of the writing of the different sections wherever possible. From these dates alone, it becomes apparent that the writing of *Récoltes et Semailles* was a complex process, during which there were frequent additions and even new beginnings.

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<sup>1</sup> See Roy Lisker: Visiting Alexander Grothendieck, [www.Fermentmagazine.org](http://www.Fermentmagazine.org)

<sup>2</sup> Alain Herremann: *Découvrir et transmettre. La dimension collective des Mathématiques dans Récoltes et Semailles d'Alexander Grothendieck*, preprint of the IHES, available on the internet, for example on the website Grothendieck Circle.

## Table of Contents of *Récoltes et Semailles*<sup>3</sup>

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*Les Portes sur l'Univers (Appendice à La Clef du Yin et du Yang).* [pages PU1 - PU127], 17 March - 11 April 1986

Besides the four parts available to us, it appears that a fifth and even a sixth part were planned, although the author does not know if these were ever actually written. As one can see from this overview, the text including parts I, II, III and IV was written first, with the later addition of several hundred pages of introduction and commentary (whether or not this was a good idea will not be discussed here). On completing the first part, *Fatuité et Renouveau*, Grothendieck believed that he had finished the work. On March 21, 1984, he wrote a letter to his German friends:

I was namely extremely busy writing an “introduction” for a mathematical page-turner, which I have been writing for over a year - the whole time I kept thinking that I would finish in the next few days, in the end it's over 150 pages, a sort of meditative review of my past life as a mathematician. It will now become (with one or two additions) the introductory volume for a planned series of mathematical phantasmagorias with the title “*Récoltes et Semailles*” [...] I am having it typed and reproduced at the university in order to send it to friends and students.

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<sup>3</sup> In English Grothendieck translates the title as “Reaping and Sowing”, and in German “Ernten und Saaten” or also “Ernten und Säen.”

In many places in the text, Grothendieck explains his reasons for writing the meditation, and his intentions regarding it. On page P 7/8 he writes:

Above all, *Récoltes et Semailles* is a **reflection** on myself and my life. It is thus also a **testimony**, and that in two different ways. It is a testimony of my **past**, which is the main focus of the reflection. But at the same time it is a testimony of the most immediate **present** - of the very moment that I write and in which the pages of *Récoltes et Semailles* are born hour after hour, nights and days. These pages are the faithful witnesses to a long meditation on my life, as it really happened (and is still happening at this very moment...).

These pages do not have any literary pretensions. They constitute a **document** about myself.

As has already been said, the actual writing took almost three years. Grothendieck, as usual, typed the text onto poor quality paper with his old typewriter, frequently taking the paper out and reinserting it in order to use up every last corner of the page. He sent this first manuscript to B.L., the secretary of the mathematical institute of Montpellier, who conscientiously and meticulously prepared the final draft. Grothendieck was very pleased with her work. When she had finished a section she would send back the original typescript and her final draft, and Grothendieck proof-read it and made small improvements if necessary. B.L. was thus the first person to read the complete work, and her assessment is presumably not much different from the generally held opinion that one half is a “settling of accounts” [*règlement de comptes*], the other half “madness” [*délire*].

When the whole work was completed and copies had been made, B.L. received a mailing list from Grothendieck, in which he detailed which people should receive which sections. Near the end of her work for Grothendieck, B.L. obtained her first computer and wrote a few specimen pages with it. She found the computer text to be much nicer and also much clearer, but the spacing between lines could not be altered for footnotes. Grothendieck would not agree to this, and their relationship ended in a dispute.

What is *Récoltes et Semailles* about? In truth, the author feels that the task of responding to this question is overwhelming, and the following attempt at an answer is fairly general and conventional. The text is an analysis of Grothendieck's past as a mathematician and as a member of the mathematical community. Broad stretches of the text really do possess the character of a “settling of accounts”. Grothendieck critically examines his own past life as a mathematician, above all in regard to the activities of his colleagues and students. He further describes his own intellectual development, albeit somewhat erratically, and comments on many aspects of his mathematical work in detail; he analyses his relationships with colleagues and students, and he meditates on his life. In its form and content, *Récoltes et Semailles* is a highly unusual and personal review of mathematics covering the years from 1950 until around 1975.

As already mentioned several times, Grothendieck initially planned to write only a short account. During the writing of *Récoltes et Semailles* however, he became aware

of some work of his former students that was closely related to his own. This led to a reaction which, witnessed from the outside, can only properly be described as cataclysmic. In several hundred pages of recriminations against his former students, colleagues and co-workers, Grothendieck accuses them of having plagiarized, distorted and misused his ideas, and of contributing to his “burial” (*enterrement* is another key word throughout the text). He speaks of a barbarization of mores, the downfall of all morals, and the rise of disrespect. On top of this he firmly believed that also his (indirect) student and friend Zoghman Mebkhout had been systematically cheated out of his mathematical work in a downright conspiratorial manner, which he deals with in great detail and with many repetitions.

There can be no doubt that these portions of the text have a somewhat paranoid character. In a letter to Teissier dated January 15, 1986, Grothendieck goes so far as to say that the *mystification-escroquerie* [scam] to which he had been subjected had never been surpassed in the history of mathematics. Things which one might consider relatively inconsequential are commented on without any reasonable restraint, for example the behavior of the German publishing house Springer-Verlag. It is hardly surprising that the text contains contradictions. Grothendieck reproaches his students on the one hand with having made use of his work without developing it further, and on the other hand, inasmuch as they did develop it further, he accuses them of plagiarism, theft and distortion of his ideas.

There is no question about the fact that central ideas contained in the incriminated works stem from Grothendieck. His input, however, is credited in the usual manner, and within the “community” there was never the slightest doubt about the significance of his input and ideas. It can be noted that it was unfortunate to cause him to appear as a co-author of new SGA volumes without consulting him in any way. All in all, however, Grothendieck's reaction was excessive. As already said, the real tragedy lies in the fact that this was the last text through which the mathematical public heard from him. In this way, *Récoltes et Semailles* contributed to the final and definitive break between Grothendieck and the community of mathematicians.

Jean-Pierre Serre and Pierre Deligne were the two mathematicians with whom Grothendieck had the closest relationship, and it is with regard to them that one can perhaps see most clearly how deep and final this break really was. At the end of the seventies, Grothendieck was still in contact with Deligne, who kept him informed about important mathematical events. In spite of this, Grothendieck directed his indignation particularly against Deligne, who thus became one of the main protagonists of *Récoltes et Semailles*. Long sections of *Récoltes et Semailles* deal with this conflict. Grothendieck's arguments are not necessarily convincing to an outsider, and there is something disconcerting in this exaggerated criticism, although Grothendieck does generally refer to him as “my friend Pierre” (*mon ami Pierre*).

After Grothendieck had the text mailed out, he received a whole series of letters, in spite of which he repeatedly complained that he had received almost no feedback. One of the first reactions was a letter by Serre dated July 23, 1985. It was the first

contact between the two after a long hiatus, as the relationship with Serre had been effectively cut off since the “Great Turning Point” in 1970. Serre expressed himself clearly and objectively in his letter, and he commented on Grothendieck's accusations against Deligne:

As I already told you on the telephone, it saddens me that you are bitter about Deligne; he is one of the most honest mathematicians that I know - and is one of the closest to you. I will not try to change your mind about this (or about anything else): I know just how firm and rigid your convictions are. That is without doubt what I find the most painful in your text. That, and the general tone of accusation, whether it be against yourself or your students.

Serre then goes on to speak of other things, i.e. the publication of SGA 4 1/2 and 5, which seem *very useful* to him, and he then writes about the possible continuation of Grothendieck's program.

The non-continuation of your work by your former students: you are right, they have not carried on with it. But that is hardly surprising: you were the one who possessed a vision of the whole program, not them (with the exception of Deligne, of course). They preferred to do other things. I can't understand why you reproach them with that.

As for Deligne, he moved little by little towards questions that go beyond the framework of algebraic geometry: modular forms, representations, the Langlands program. And he applied his deep understanding of algebraic geometry (including “motives”) for various questions - for example the construction with Lusztig of many (not all) representations of groups  $G(\mathbb{F}_q)$  for  $G$  reductive. Why shouldn't he have used the yoga of “motives”? You introduced it, the whole world knows that, and the whole world is right to use it, on condition of carefully distinguishing between that which is conjectured (and which until proven might turn out to be false) and that which can be proved. I find very beautiful, for example, what Deligne does in LN 900 (the text which you reject in dismay), to get around the Hodge cycle problem, and he gets very useful results (for instance on  $\ell$ -adic representations). I know very well that the idea of “getting around a difficulty” is foreign to you - and this is probably the thing which shocks you the most about Deligne's work (another example: in his proof of the Weil conjecture he “gets around” the standard conjectures - which shocks you, but delights me.)

In the following months Grothendieck and Serre exchanged a few more letters. As already mentioned in Chapter 1, Serre addressed the main issue on February 8, 1986. Let us quote the passage in the original French:

*Une chose me frappe, dans les textes que j'ai pu voir: tu t'étonnes et tu t'indignes de ce que tes anciens élèves n'aient pas continué l'œuvre que tu avais entreprise et menée en grande partie à bien. Mais tu ne te poses pas la question la plus évidente, celle à laquelle tout lecteur s'attend à ce que tu répondes: pourquoi, toi, tu as abandonné l'œuvre en question?<sup>4</sup>*

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<sup>4</sup> One thing which strikes me in the texts which I have been able to see: you are surprised and indignant that your former students did not carry on the work which you had undertaken and for the most part completed. But you never ask the most obvious question, the one which every reader expects you to ask: why did you yourself abandon the work in question?

After a few letters, both parties realized that there was nothing else to say, and the contact between Grothendieck and his “elder brother” (*aîné*) broke off definitively.

While Grothendieck was working on *Récoltes et Semailles*, Deligne decided to leave the *IHES* and France. Before his departure for the Institute for Advanced Study in Princeton, he visited his former teacher one last time in Les Aumettes, on October 20-22. The nature of the conflict between the two mathematicians did not change due to this visit. It was a parting forever. Deligne has told the author that there was no further contact between them, and subsequently he never referred to the accusations in *Récoltes et Semailles*.

Having now described the content of *Récoltes et Semailles*, let us make some remarks about the style and the manner of presentation. There are very different opinions on this subject, ranging from massive criticism to unconditional admiration (which to the author sometimes seems like gushing). Some basic information on this subject can be found at the end of Chapter 18.

In a letter dated October 14, 1985, René Thom writes: “I know you as a great mathematician, but now I discover that you - at least in French - are indisputably [*indiscutablement*] an author.” In a letter dated December 23, 1986, with the heading “*Critiques sur la forme et le style de ton texte*”, Pierre Samuel does not mince his words:

It is really very long, 1252 pages, you are incorrigible! [...] You could certainly say everything in 200 to 300 pages. For instance: after a few weeks in which I had no time to read even one line, I threw myself into the fourth part, and I had the feeling that I had already read all this before.<sup>5</sup>

The way of writing, section by section, day after day, without first making a detailed plan, necessarily leads to superfluous repetitions, to corrections and countless cross-references. All of this lengthens the text and makes it painfully laborious, even for a reader such as myself, who is familiar with the terminology of the mathematical milieu and is not completely lost when reading the words “Weil conjecture” or “étale cohomology”. There is no doubt that the style conveys a sense of your personal psychology and of how you came to your convictions. But if it causes the reader to throw the book away, of what use is that to you? If its subject is of such great importance, then a book is written in order to be read, it is not written to just be there<sup>6</sup>.

Samuel then quotes numerous examples and concludes with the words “*Voilà*, I have now responded with great frankness to your request for comments on your text. My opinion is quite simple: I would like it to be printed and published, but it cannot be published as it is.”

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<sup>5</sup> The reader can easily check this. If one creates a pdf file and searches for a given word, such as a name, in many instances one finds sections of text that are repeated word for word, not just once, but three or four times.

<sup>6</sup> Samuel uses wordplay: *un livre est fait pour être lu, il n'est pas fait pour être là*.

In letters to his German friends E. and G., Grothendieck frequently spoke about *Récoltes et Semailles*. A letter dated October 16, 1985 contains a personal and very vivid description of what he wanted to express with this text. If one compares his own viewpoint with that of the above-mentioned analysis by Herreman, there is little agreement, which merely confirms that *Récoltes et Semailles* is a multi-faceted work which is almost impossible to interpret.

I would like to have a beautiful frontispiece for *Récoltes et Semailles* ("*Ernten und Säen*") and I thought that perhaps it might tempt you to either draw or paint something meaningful. Here are a few thoughts in case you get "hooked" on the idea.

More compelling and powerful than the actual reaping is the exuberant growth, ripe for the harvest. It is not so much an orderly field (with perhaps cereals or an orchard) as a vigorous proliferation, a tangle of the desired and planned-for (such as slender seed heads) and of the unwanted-troublesome (such as thistles and many other sprouting "weeds"). Whether he wishes it or no, the reaper grasps both the wild and the domesticated, the cursed and the desired, the thorny and the healing - and unintentionally his varied harvest is also a diverse and unpredictable sowing - in all directions the riches waft and fall from his arm - the sailing pollen of thistles or dandelions, perhaps a few confused beetles (who are no longer feeling very safe on the newly cut stalks and stems and let themselves tumble down, or fly off through the cloud of pollen in a whirr of wings...). and here and there a few plump kernels slip out of ripe, waving heads of grain...

A few lines later, he adds a bit more to this picture:

A possible deepening or development would be, maybe, to portray the ground which will receive the seed as partly rocky, and partly open ground (perhaps in furrows). The impression which emerges from *Récoltes et Semailles* is that sooner or later every seed sprouts and bears fruit (albeit neither the devil nor God knows *which* fruit [...])

The history of the editing of *Récoltes et Semailles* is confusing and far from settled. At first Grothendieck doubtless thought about publishing it in book form. This can be deduced from the correspondence with E. I. quoted above. With a view to publishing an English or German version, he contacted several publishers over the course of time. All in all, he did not pursue the issue of publication very forcefully, and it became clear to him that interest was not as great as he had initially thought. On April 23, 1987, he wrote (in English) to Ronnie Brown:

Tomorrow I'm making a 24-hour travel to Paris and back, to meet a friend I know for nearly 40 years and didn't meet in the last 15 years. By that occasion, I'll bring, in the long last, the final typescript of ReS [*Récoltes et Semailles*] to the publisher. So maybe it'll come out some time this year. (For a while I hadn't been too sure whether I was going to publish it or not, and finally decided I would...)

The friend mentioned here is Paulo Ribenboim, who informed the author that nothing came of the visit to the publisher at *Editions Kimé*. (Shortly thereafter Grothendieck apparently contacted the publishing house *Odile Jacob* about the same matter.) The short trip to which he refers is, moreover, the last trip that Grothendieck ever made, with the exception of a single surprise visit to Hamburg in 2006.

It is not quite correct to say that *Récoltes et Semailles* was never published. Remarkably, with Grothendieck's consent, a Japanese translation was published. This was prepared by Yuichi Tsuji (1938-2002); three volumes were published by the publishing house *Gendai-Sugaku-sha* (Modern Mathematics Co.), in 1989, 1990 and 1993. A fourth volume was translated but not published. Tsuji was an acquaintance of Grothendieck from the *Survivre* period; he had already translated a few articles by Grothendieck at the time. Jun-Ichi Yamashita was responsible for contacting the publishing house. Shortly before his death Tsuji had begun translating *La Clef des Songes*, but he did not get very far into the text.

Grothendieck dedicated *L'Enterrement* [The Burial], the fourth section of *Récoltes et Semailles*, to Zoghman Mebkhout, to whom he refers countless times throughout the text as his friend. Let us add a few remarks about this mathematician and his relationship to Grothendieck.

Mebkhout originally came from Algeria, and arrived in Paris at a historic moment, namely in May 1968. He studied mathematics there, earning his “*maîtrise*” in 1970. In 1973 he got a job at the University of Orléans, but remained rather isolated there. In October 1975 he turned to J. L. Verdier with, as he says himself, a rather naive question about the dualizing sheaf in topology. A short time later Verdier gave him his recently published paper “*Classe d'homologie d'un cycle*”. This was a decisive moment in Mebkhout's mathematical development, because through this he learned about Grothendieck's methods in SGA 5, which he was then able to use in complex analysis.

Mebkhout subsequently worked for the most part independently on his doctoral thesis. In February 1979 he obtained his Ph.D; formally Verdier was his advisor. He then decided to visit Grothendieck, who had had such a big influence on his mathematical work, and in July 1979 he traveled to Villecun. Grothendieck had just left town, however, so the visitor only met with Johanna Grothendieck, and gave her a copy of his dissertation. Two months later he received a first letter from Grothendieck, dated September 4, 1979:

Dear Mebkhout Zoghman,

I deeply regret that, having just left on a trip, I couldn't receive you in Villecun, so that you came all the way “for nothing”. In any case, if you came to discuss mathematics, you would have risked being just as disappointed, as my interest in mathematics is becoming increasingly intermittent and peripheral. This said, the very substantial table of contents and the very renowned jury, which attests to the seriousness of your work, leaves no doubt that we would have been able to embark on a mathematical discussion. It is true that there is no lack of more important subjects of discussion - on current issues (such as the situation of foreigners) or issues relevant to every epoch[...]

I hope that during my absence my daughter Johanna received you better than I would have done.

I thank you for your courtesy and wish you much success in your work, your profession - and in your life!

Cordially,

Alexandre Grothendieck

After receiving this letter, Mebkhout decided to visit Grothendieck in Montpellier, which he did on February 7, 1980. They only spent half a day together, and Mebkhout's strongest impression was that Grothendieck was very happy and enjoyed life. He refused to speak about mathematics, but apart from that he was very communicative, and they discussed many things. In particular he spoke about the correspondence of his parents, from which it emerged that the relationship between his parents had been very violent, something which made a profound impression on Grothendieck and which he was trying to understand. He also spoke about his girlfriends and sexual relationships, how these had been complicated and had only now become serene [*sereines*]. Mebkhout told the author about this visit in the following words:

I think in this period he was just trying to make it easy for himself and for the people around him. For example he told me that he taught games (jeux) to the first year students. It is, he said, much better than mathematics.

As already mentioned in Chapter 15, Mebkhout applied for a position at the CNRS three times, finally obtaining one in October 1982, which allowed him to continue pursuing mathematics.

The next contact with Grothendieck took place three years later, when on April 13, 1983, Grothendieck wrote Mebkhout a long letter suggesting that he work on a “geometric topology of forms” which should not be based on the usual group theoretical topology. (As previously stated, Grothendieck wrote the preliminary version of a manuscript on these ideas three years later.) Mebkhout reacted positively, and visited Grothendieck for four or five days in May 1983. They spent their time in long mathematical discussions lasting up to ten hours a day.

At the beginning of 1984, Mebkhout received the first part of *Récoltes et Semailles*, along with a query as to whether his name could be mentioned in the text. This resulted in a lengthy correspondence; during the writing of *Récoltes et Semailles* they also frequently telephoned for hours and Mebkhout gave Grothendieck much information. In a letter dated April 21, 1984 Grothendieck writes for the first time about a “scam” with regard to his work [*escroquerie à l'égard de mon oeuvre*]. Mebkhout noticed that he was suffering from great inner tension. Many mutual visits took place: Mebkhout, together with his wife and daughter, visited Grothendieck in Mormoiron, and Grothendieck came to Paris for a week in May 1985 and stayed with his friend. During this visit Grothendieck told Mebkhout's wife that every night he spoke with the devil.

After *Récoltes et Semailles* was finished, their relationship slackened somewhat, and on the telephone Grothendieck gave the impression of being absent-minded. In 1988 Mebkhout organized the publication of Grothendieck's letter in which he refused the Crafoord Prize (see Chapter 28). A last telephone conversation took place on January 17, 1991, two hours before the first Gulf War broke out. Grothendieck was enraged at both the politicians and the military.