

Historical Background for Galois – from Enc. Brit. 11th ed.

It begins with the fall of the last Bourbon, Charles the tenth.

“The united opposition of monarchist Liberals and imperialist republicans responded by legal resistance, then by a popular *coup d'état*, to the ordinances of July 1830, which dissolved the intractable Chamber, eliminated licensed dealers from the electoral list, and muzzled the press. After fighting for three days against the troops feebly led by the Marmont of 1814, the workmen, driven to the barricades by the deliberate closing of Liberal workshops, gained the victory, and sent the white flag of the Bourbons on the road to exile.

The rapid success of the ‘Three Glorious Days’ (‘les Trois Glorieuses’, as the July Days were called), put the leaders of the parliamentary opposition into an embarrassing position. While they had contented themselves with words, the small Republican-Imperialist party, aided by the almost entire absence of the army and police, and by the convenience which the narrow, winding, paved streets of those times offered for fighting, had determined upon the revolution and brought it to pass. But the Republican party, which desired to re-establish the Republic of 1793, recruited chiefly from among the students and workmen, and led by Godefroy Cavaignac, the son of a Conventionalist, and by the chemist Raspail, had no hold on the departments nor on the dominating opinion in Paris. Consequently this premature attempt was promptly seized upon by the Liberal *bourgeoisie* and turned to the advantage of the Orleanist party, which had been secretly organized since 1829 under the leadership of Thiers, with the *national* as its organ. Before the struggle was yet over, Benjamin Constant, Casimir Périer, Lafitte, and Odilon Barrot had gone to fetch the duke of orleans from Neuilly, and on receiving his promise to defend the Charter and the tricolor flag, installed him at the Palais bourbon as lieutenant-general of the realm, while La Fayette and the Republicans established themselves at the Hôtel de Ville. An armed conflict between the two governments was imminent, when la Fafayette (*there are two spellings of the name in the original*), by giving his support to Louis Philippe, decided matters in his favour.’

With this decision of Lafayette, the hopes of the republican students, among them Galois, were disappointed. The text continues at some length, but I content myself with some brief citations, just to capture the flavour of the subsequent two years.

“The liberal ideas of of the son of Philippe Égalité, the part he had played at Valmy and Jemappes, his gracious manner and his domestic virtues, all united in winning Louis Philippe the good opinion of the public”

“But the tradition of France was both twofold and contradictory, *i.e.* the Catholic-legitimist and the revolutionary. Louis-Philippe had them both against him.”

“Now Louis-Philippe, beneath the genial exterior of a bourgeois and peace-loving king, was entirely bent upon recovering his authority which was menaced from the very first on the one hand by the anger of the royalists at their failures, and on the other hand by the impatience of the republicans to follow up their victory.”

Galois was one of the impatient republicans.

“The struggle against the republicans was still longer, for having lost all their chance of attaining power by means of the Chamber, they proceeded to reorganize themselves into armed secret societies.”

To what extent the reorganization had begun by the time of Galois’s death on May 31, 1832, I do not know.

Some dates in the life of Galois

October 18, 1811. Born at Bourg-la-Reine, now in the suburbs of Paris

1815. His father elected mayor of Bourg-la-Reine.

1818-1823. Learns latin from his mother.

1823. Enters the royal college of Louis-le Grand. Remains until 1829. Studies Latin, Greek, French, a brilliant student.

1827. Introduced to mathematics through a text of Legendre, begins to study Lagrange.

1827-1828. Fails to be accepted at the École Polytechnique

1829. First publication in April. Submits first memoirs to the Académie des Sciences in May and June. Father commits suicide in July. Enters the École Préparatoire, the name of the École Normale during the Restoration, in October.

1830: Submits a second memoir – on conditions for the solvability of equations by radicals, to the Académie française in February. Learns in June of its loss. In December publishes a letter attacking the Director of the École Normale (which must have regained its old name after July) for his behavior during the Revolution. He is excluded from the school and the affair reaches the press.

1831. In January publishes a letter *Lettre sur l’enseignement* on pedagogy, signed with initials, he is also formally expelled from the École. Submits once again, on the invitation of Poisson, a second memoir on the solution of equations by radicals to the Académie. On the recommendation of Poisson it will be declined on July 4. It will appear much later, long after his death.

May 9, 1831. Revolutionary toast to Louis-Philippe – interpreted as a threat.

May 10, 1831. Arrested.

June 15, 1831. Acquitted.

July 14, 1831. Arrested again during a republican demonstration on the Pont Neuf

October 23, 1831. Sentenced to six months imprisonment in Saint-Pélagie for possession of a weapon and for wearing the uniform of the forbidden Republican Artillery Guard. He will write a preface to his memoir there in December.

April 1832. Released from prison. Appears to fall in love with the daughter of his landlord. So far as I know, his passion was not reciprocated, and her character appears to me to be somewhat doubtful.

May 29, 1832. Challenged to a duel under obscure circumstances.

May 30, 1832. The “duel” takes place. Galois has no second and is mortally wounded.

May 31, 1832. Dies.

Two books

There are many. A recent one, with many references is by a mathematician Laura Toti Rigatelli, *Matematica sulle barricate*. It is available in English. There is of course also a great deal of information in Galois’s *Œcrits et Mémoires mathématiques*. A novel with the title *The French mathematician* is advertised in recent issues of the NY Review of Books. The blurb runs,

“This remarkable novel resurrects a young overemotional, impetuous, and headstrong genius whose personal failures read like a Hugo novel but whose voice resonates more clearly now with the passage of time.”

It is clearly about Galois.

Extracts from Galois’s writings

Two memoirs on pure analysis

Preface

First of all the second page of this work is not encumbered by the names, given names, qualities, dignities and praises of any avaricious prince whose purse was opened by the smell of incense and threatened to close when the censer was empty. Nor does one see in characters three times as large as those of the text any respectful homage to some elevated dignitary of science, to a scholar-patron, something, however, indispensable (I was about to say inevitable) for someone at the age of twenty who wants to write. I say to no-one that I owe to his counsel or his encouragement everything of value in my work. I do not say it, because it would be to lie. If I have anything to say to the great men of the world or to the great men of science (and the way things are now the distinction

is imperceptible) I swear that it would not be to give thanks. To some I owe the late appearance of two memoirs, to others having to write everything in prison, a stay that one is wrong to think an occasion for reflection, and where I was often astonished at my carefree manner of shutting the mouths of my carping critics, and I am sufficiently convinced of the baseness of my critics that I think I can use the word carping without any fears for my modesty. It's not my purpose to explain how and why I was detained in prison, but I have to say how often manuscripts lose themselves among the papers of Messieurs the members of the Insitut, although I have difficulty in conceiving such a casualness on the part of men who have the death of Abel on their conscience. Since I don't want to compare myself to this illustrious geometer, it's enough to say that my memoir on the theory of equations was submitted, in essence, to the Academy of Science in February, 1830, that extracts of it had been sent in 1829, that no report resulted, and that it has been impossible to recover the manuscripts. There are very strange stories of this sort, but it would be graceless to recount them, because I have met no accident of this sort, except for the loss of my manuscripts. Happy traveler, my sullen mug has saved me from the jaws of the wolves. I have already said more than enough to make the reader understand that no matter how well-intentioned I may have been, it would have been absolutely impossible for me to grace or disgrace, as one likes, my work with a dedication.

Secondly, the two memoirs are short and not at all proportional to the titles; moreover they contain at least as much French as algebra, to such a point that, when the manuscripts were brought to him, the printer thought in good faith that it was an introduction. In this regard I am completely inexcusable; it would have been so easy to repeat the rudiments of the whole theory, on the pretext of having to present it in the form necessary for the comprehension of the work, or even better to present a whole branch of science larded with two or three new theorems but without indicating which were new. It would have been so easy to substitute all the letters of the alphabet in an each equation, numbering them by order in order to recognize what combination of letters each of the subsequent equations referred to; which would have multiplied indefinitely the number of equations, especially if one recalls that after the Latin alphabet, there is the Greek, and this exhausted there are Gothic letters, that nothing prevents the use of Syrian characters, and if necessary even Chinese characters. It would have been so easy to transform each phrase ten times, taking care to precede each transformation with the solemn word of theorem, are even better to arrive with the help of OUR ANALYSIS at results known since the time of the good Euclid, or finally to ensure that each proposition was preceded and following by a procession of particular examples. In spite of all these means, I was not able to use a single one.

Thirdly, the first memoir was not chaste of the master's eye; an extract sent in 1831 to the Academy of Sciences was submitted for examination to M., Poisson, who admitted in one of its sessions to not having understood it at all. In my eyes, fascinated as I am by an author's vanity, this proves simply that M. Poisson was either not willing or not able to understand, but in the public's eyes will mean that my book was worth nothing.

Everything suggests to me therefore that in the learned world, the work that I am submitting to the public will be received with a compassionate grin, that the most indulgent will tax me with clumsiness, and that for some time I shall be compared to Wronski and to

those indefatigable men who discover every year a new solution to the problem of squaring the circle. I shall above all have to bear the guffaws of the examiners of candidates at the École Polytechnique (*who had failed him!*) (who, in passing, to my astonishment do not occupy each and every one a chair of the academy of science because they certainly do not belong to posterity) and who, tending to monopolize the publication of books on mathematics, will not discover without being offended that a young man, twice rejected by them has the pretension to write, not didactic texts, but theoretical texts.

I have said all this in order to prove that I am wittingly exposing myself to the ridicule of fools.

If I publish in spite of everything, with little chance of being understood, the fruits of all my late nights, it is in order to fix a date for my researches, it is in order that the friends I have made in the world know, before I am locked up, that I'm very much alive, it's perhaps also in the hope that this research could fall into the hands of people who will not be prevented from reading it by a stupid arrogance and could direct them into the new path that must, according to me, pursue analysis into its highest branches. It's necessary to be clearly aware that I am speaking here of pure analysis; my assertions if transferred to the most direct applications of mathematics would become paradoxical.

Long algebraic calculations were at first of little need to the progress of mathematics, very simple theorems gained little from being translated into the language of analysis. It's only since Euler that this briefer language has become indispensable to the new extension that this great mathematician has given to the science. After Euler, calculations have become more and more necessary, but more and more difficult to the extent that they were applied to more advanced topics of science. Since the beginning of this century, the algorithm had attained such a degree of complication that with it no progress was possible without the elegance that modern mathematicians were able to impose on their research, by means of which the mind was able to grasp promptly at one swoop a large number of operations.

It is clear that the elegance much praised, and with good reason, has this as its sole aim.

By the well-confirmed fact that the efforts of the most advanced mathematicians aim at this elegance, one can conclude with certitude that it becomes more and more necessary to embrace several operations at once, because the mind no longer has the time to attend to all details.

Now I believe that the simplifications produced by the elegance of the calculations (intellectual simplifications of course; there are no material simplifications) have their limits; I believe that the moment will arrive where the algebraic transformations foreseen by the speculations of the analysts will find neither time nor place to occur; to such a point that it will be necessary to be content with having foreseen them. I don't want to say that there is nothing more for analysis without this help, but I believe that without one day everything will be exhausted.

To take a bold leap at these calculations; to group them according to their difficulties and not according to their forms; that is, according to my view, the mission of future mathematicians; that is the path I have taken in this work.

It is necessary not to confuse the opinion expressed here with the affectation of certain

persons to evade in appearance every sort of calculation, by translating by long sentences that which can be expressed very simply by algebra, thereby adding to the length of the operations the length of a language not made to express them. Those persons are a hundred years behind the times.

Here there is nothing of the sort; here the analysis is analyzed; here the most advanced calculations carried out until present are considered as particular cases, that it was necessary, even indispensable to handle, but that it would be baneful not to abandon for research on a broader scale. The time to execute the calculations foreseen by this higher analysis and classified according to their difficulty but not according to their form will arrive when a particular question requires it.

The general thesis that I am proposing will not be understood without reading this work, which is an application of it, attentively: not that the theoretical point of view preceded the application; but I asked, my book finished, what made it appear so strange to most readers, and looking inside myself, I thought I observed just such a tendency of my spirit to avoid calculations in the subjects treated and, what is more, I recognized an insurmountable difficulty that would be met by anyone wishing to carry them out generally with the matter treated.

It should be foreseen that, when treating such new domains, when risking oneself in such new paths, I have met difficulties that I could not overcome. Thus in these two memoirs and in particular in the second, which is more recent, the phrase “I do not know” appears frequently. The class of reader that I mentioned at the beginning will certainly find this an occasion for laughter. It’s unfortunately that they will not suspect that the book the most valuable and the most learned is the one in which the author says everything that he does not know, that they do not suspect that an author never does more damage to his readers than when he hides a difficulty. When the reign of competitiveness, thus of vanity, in the sciences ends, when one cooperates for studying, rather than sending sealed packets to academies, one will be eager to publish the simplest observation, provided they are new, and one will add “I don’t know the rest”.

From Sainte-Pélagie, X, 1831

Preliminary discourse

The following memoir was sent about seven months ago to the academy of sciences in Paris, and misplaced by the commissioners who were to examine it. The work has therefore acquired no prestige that would encourage reading it; and this is not the only reason that has kept the author from publishing it. If he finally decided to do so, it is for fear that more adept mathematicians, taking over the same field, may cause him to lose entirely the fruits of a long labor.

The aim that has been proposed is to characterize equations that can be solved by radicals. We can affirm that no domain more obscure and isolated from the rest exists in pure analysis. The novelty of the material has required the usage of new terminology and of new characteristics. We have no doubt that this inconvenience will rebuff from the beginning the reader who can scarcely pardon the use of a new language even to authors

for whom he has every respect. But finally, we have had no choice but to conform to the demands of the subject, whose importance merits a certain attention.

Given an equation algebraic with arbitrary coefficients, numeric or literal, determine whether the roots can be expressed by radicals, is the question to which we offer a complete solution.

If now, you give me an equation that you have in any way you like and if you want to know whether it is or not solvable by radicals, I have nothing to do but to indicate to you the way to reply to the question, but without obliging either myself or anyone else to do so. In a word, the calculations are impracticable.

Accordingly, it appears that there are no fruits to harvest from the solution that we propose.

Indeed it would be so if the question presented itself ordinarily from this point of view. But most times, in applications of Algebraic Analysis, one is led to equations whose properties one knows in advance: properties by means of which it will always be easy to reply to the question by the rules we propose. There exists in effect for these kinds of questions a certain order of metaphysical consideration that float over all the calculations and often render them unnecessary. I cite for example the equations that give the division of elliptic curves and that the celebrated Abel solved. It is certainly not because of their numerical form that this mathematician succeeded. What makes the theory beautiful and at the same time difficult is that unceasingly one indicates the progress of the calculations and foresees their result without ever being able to effect them. I cite as well the modular equations,

Observe that the discourse ends with a comma!

Historical background for Kummer from German History 1770-1866 by J. J. Sheehan

It can begin with the Revolution of 1848, which in France led to the fall of Louis-Philippe and a brief victory for the republicans. I quote some passages from Sheehan's book.

"..., on 22 February, the streets of paris were filled with anti-government demonstrators; the next day they built barricades and fought with royal troops; on the day after that King Louis Philippe fled."

The revolution spread.

"Beginning in the south-west at the end of February, a wave of unrest spread through the German states until it reached the Russian frontier. In hundreds of cities, towns, and villages, people demanded political reform, social justice, and relief from misery and servitude... With the possible exception of the months immediately after the First World War, there is no other period in German history so full of spontaneous social action and dramatic political possibilities."

March 13. Metternich, the Austrian chancellor, resigns after protests, demonstrations

and violence in Vienna.

“Metternich wrote a brief letter relinquishing all his posts; twenty-four hours later, in disguise and with money borrowed from the Rothschilds, he left the city to begin a long and circuitous passage to England, where he joined other casualties of the revolution such as Louis Philippe, Guizot, Prince William of Prussia, and Lola Montez.”

In Austria,

“Moderate opinion was delighted by the emperor’s proclamation of 15 March which abolished censorship,..., and promised to convene a constitutional assembly ... But in order to enjoy these newly won achievements, it would be necessary to have peace and domestic tranquillity. The violence, which the moderates had used for their own end on 13 March, had to stop. Count Hoyos, the new commander of the Civil Guard, called upon responsible people to join his fight against ‘the wild, criminal impulses of the proletariat’”.

So we see a conflict between liberal and proletarian elements that will be reflected in Kummer’s letter to Kronecker. In Prussia, whose king Friedrich Wilhelm the fourth was later, to be declared mentally incompetent, so that his responsibilities were assumed by his brother as regent, and especially in Berlin, the same forces were at work.

“Finally, on the evening of 17 March, Frederick William approved plans that met some of the moderates’ most important demands ... On the morning of the 18th, however, the king appointed General von Prittwitz, a hard-liner, as military commander of Berlin. Prittwitz’s troops, apparently frightened by the presence of a large and peaceful gathering in front of the royal palace, fired into the rowd, killing several civilians. People reacted furiously... We do not know the social position of those who fought against the king’s soldiers, but we do know the identities of many who died in the fighting. Most of them were males ... between the ages of twenty and thirty-five; they included a few members of the *Bürgertum* ... and some manual workers, but the overwhelming majority consisted of craftsmen,”

“The bloody events of 18 March made a shambles out of Frederick William’s attempt to channel the opposition into a moderate course. That evening he faced in stark and unyielding terms what he had been trying to avoid for a fortnight – the choice between determined resistance or unambiguous surrender to popular demands... Early in the morning of 19 March, he wrote his famous proclamation ‘An meine lieben Berliner!’ which accepted the insurgents’ key demand ... Theodor Fontane, who had spent the evening crouched on a barricade in Alexanderplatz (*he was an apprentice in a pharmacy a few hundred yards away*) recalled the feelings of joy and exaltation with which he and his comrades learned of the king’s decision. Victory was theirs – but ... the revolution’s triumph had been given them as a gift and could just as easily be taken back.”

Fontane describes his experiences on March 18 in his Autobiography, from which I shall take his description of the elections.

Somewhat earlier, the diet in Frankfurt, the seat of the Confederation of German states had begun to respond to events.

“Finally, on March 10, a majority of the diet’s membership – some acting without instruction from their governments – called upon the various German states to send ‘men trusted by the public’ to Frankfurt in order to draft a new federal constitution.”

“ the so-called *Vorparlament*, (*basically a self-selected group*)... met in Frankfurt on 31 March...(it) voted in favour of elections for a constituent assembly and established a committee of fifty to help administer them.”

Preparations for the elections begin.

“With few exceptions ... the states established a two-step ballot”

“while the *Vorparlament* specifically outlawed limiting the franchise on religious or financial grounds, it did say that only ‘mature, independent’ citizens (and this meant *male* citizens) could vote or be elected to office... In some states, however, the authorities used this term to exclude the lower orders.”

The newly elected parliament first met on May 18. The events described by Fontane in his Autobiography and by Kummer in his letter to Kronecker took place in the intervening weeks.

From Fontane’s Autobiography

In the Wool Staple – First and Last Appearance as a Politician

“I no longer know how many weeks later the elections to a ‘constituting assembly’ began. A representation of the people was to called up and the Constitution was to be confirmed by it. As is well known things turned out a lot differently, and the final result after refusal to grant taxes and dissolution of the assembly was a ‘conceded constitution’ and not one dictated by the will of the people.

Anyhow elections to the constituting assembly. The method of election corresponded to the three-class system that had exercised its blessing up the that time and what it came to was not direct elections but indirect, in other words that an intermediary pushed himself in. This intermediary was the ‘Wahlmann’ (*elector*). He was generated by the Urwähler (*primary elector*) and then, in his turn, generated the deputy proper.

All the details of the procedure have of course long vanished from my memory, and I still know only that I myself was old enough to make an appearance as Urwähler. I acquired therefore, I suppose, the necessary document and, equipped with it, betook myself to the premises, in which the primary electors of the Neue Königstraße and vicinity were to come to a conclusion about their Wahlmann and to grant him their political procuration. Although I say premises, this is not quite correct. According to Berlin notions premises

are spots where there are many waiters lounging about who occasionally bring you a pint, even before it has been ordered. Our election premises were by no means of this sort. It was rather a large, long shed on both of whose sides enormous sacks of wool were piled high, while two of these sacks were shoved at right-angles to each other and formed a compartment, a kind of business room. In front of them a small table had been placed at which an electoral official, or someone of the sort, sat, a dignified elderly gentleman, apparently also the most intelligent, who was to take charge of events. The number of those present was not large, at most some thirty, and as nobody quite knew what was to be done, we all stood around in groups and waited for someone, who had at least some notion of how to proceed, took matters in hand. Naive folk always have great need for direction. The electoral official finally asked if one of those who had shown up wouldn't like to suggest a possible Wahlmann. Everyone expressed agreement, but otherwise remained silent, and eyes were all turned to a lanky middle-aged gentleman, who in that excitement that is the certain sign of someone with a great urge to speak and an accompanying inability to do so paced back and forth in front of the two woolsacks. Es was as much an image of misery as of comedy, accented by his dress. Whereas the rest of us, mostly small artisans, small shopkeepers or waiters, had turned up in our everyday clothes, the excited fellow wore a black frock coat and a white candidates' band. He constantly took off his glasses and put them on again and was annoyed when the stems were snagged in his wiry blonde hair.

'Who is the gentleman', I asked my neighbor.

'That's the principal of the school just across the way.'

'What's his name then?'

'Schaefer I think; but it could also be Scheffer. I'll just ask Roesike ... Hey there, Roesike.'

And it was apparent that for my sake he was about to cry out to his friend the baker Roesike about 'Schaefer or Scheffer'. He didn't get to it, as in just that moment the principal placed himself beside the table of the elderly gentleman who was directing the proceedings and said – a couple of key words remain in my mind – more or less the following 'Ja, meine Herren, what has brought us together – we are gathered together here in this wide space, and each of us is certainly imbued by it. And everyone is doubtless grateful to God that we have a race of princes like ours. There is no land with such a race and we stand with it in love and loyalty ... but, my dear gentlemen, neither horse nor rider ... you know, that in this place too, there have been heroic struggles, the blood of citizens has been spilt, and victory has been on our side. We have now to chain this victory to our flag. For that we need the right men, who are aware at all times that the German spirit is incapable of baseness. And betrayal of our holiest possessions is baseness. I know that there is no-one under us. But not everyone thinks and feels this way. There are still many who desire life before freedom. They tear at it with the beaks of vultures. Therefore I'm for annexation to France and I see a danger for Prussia from that man who put Poland in a coffin and who is opposed to our young freedom. Thus, meine Herren, men of proven loyalty to the king, of proven loyalty to the people: Jahn, Arndt, Boyen, Grolmann, perhaps also Pfuel. They will hold our flag high. I vote for Humboldt.

The speech was met with applause and only the chairman smiled. But he did not feel the need to refute it, and so it fell to my wretched self, to catch the reins of the principal

as he raced off in a wild chase of the most elevated goals. Much against my inclinations. I was righteously indignant over these desolate, pompous gimcrack notions, and observed accordingly that it was not given to us, here below, to concern ourselves directly with the Hohenzollerns or with freedom, but that we had no more to do here on God's earth than, in our capacity as *Urwähler*, to elect a modest *Wahlmann*. Everything else came later, then would come the time to steer Prussia to the left or to the right. I had therefore to decline on this occasion to give Alexander von Humboldt my vote, and was rather in favor of my neighbor, the baker Roesike, of whom I knew that he was a generally respected man and had the best rolls in the whole neighborhood.

Since as it happened, there was no other baker present, my proposal was generally approved, but Roesike himself, free of all ambition, wanted to hear nothing about being elected, proposed rather, in considerate revenge, my name, and as, ten minutes later, we left the electoral premises, I was indeed *Wahlmann*.

This was my debut in the wool staple, and at the same time my first and last appearance as a politician."

A few lines further on, he continues,

"On the evening of the same day I went out to Bethanien in order to visit Pastor Schultz ... from a few words that had just been uttered as I entered I made out with no difficulty that they were speaking of the elections and making fun of them. Schultz, otherwise a very serious man – too serious – was the heartiest of all and as he saw me making my bows from the door to the gentlemen present he called to me in a high spirits, 'What brings you here, now that you've become an elector?'

I nodded.

'Of course, you look exactly like one.'

Everybody laughed and I thought it wisest to join in, even though my insides boiling, I was saying vainly to myself, 'Dear Schultz, I'll get even with you.'

Fontane's mocking tone can be compared with the still amused but less distant tone of Kummer in a letter to Kronecker. At that time, Breslau had been for about one hundred years a part of Prussia, so that we can assume the electoral regulations were the same. On the other hand, Kummer's response was immediate, not written 4 and 1/2 decades after the event.

Kummer to Kronecker – Breslau, May 5, 1848

"Can you imagine, that in the last eight days I've twice tried my hand at speech-making. First of all before a meeting of our electoral district, where I spoke about the qualities of a good elector, and was very well received, and was unanimously elected chairman of the next meeting. During the first meeting I had reconnoitred the terrain and discovered that the democratic club prevailed through the presence of insignificant individuals, who were trying to push themselves forward as electors. In order to succeed, they flattered the workers, threw suspicion on civil servants, and availed themselves of all the

usual tricks. I decided thereupon to eliminate, in my own person, at least one of these fellows and delivered a second speech directed principally at the workers. Although I applied means exactly opposite to those of the democrats, namely to point out to the workers exactly what they had achieved since the 18th March, and to imbue them with confidence in the present regime, I succeeded completely. The democrats held indeed another meeting on Sunday, where they attempted to eliminate me, but that didn't work, as you saw from the list of electors. Besides me, of course, apart from two local citizens, only members of the democratic club were elected for Frankfurt and Berlin; in fact, the democrats here won solidly. I myself am not prejudiced against the democrats. Provided that their views about the solid establishment of a thoroughly free constitutional monarchy are sincerely meant, and they don't take to the field against royalty, or attempt secretly to undermine it, I'm basically fonder of the democrats than of the philistine citizens, who hardly participate any longer in the elections for Frankfurt, because they have little if any interest in them. The demands that I place on a deputy to Berlin are 1) true love of the fatherland, 2) insight and understanding, 3) strength of character. I place no special demands, because after all we have to take the candidates that are left after the narrower and narrowest choices. We'll be lucky if we, in the end, can choose from two good candidates the best. It's certainly possible that in the end we'll have to choose the lesser of two evils. For a deputy to Frankfurt the demands would be the same, but the love of the fatherland would have its roots more in a single Germany than in Prussia, and the insight extend more to the general. – I am very proud of my title of elector, as you can see from the circumstance that in Fürstenstein, where we were on Wednesday, I registered myself as E. Kummer, *Wahlmann*, my wife as *Wahlweib*, my cousin as *Urwähler* and Louise Cauer as *Wahlverwandtschaft*.

We have already met several *Urwähler*. I recall that *Wahlverwandtschaft* means *elective affinity*, so this is an allusion either to Goethe or to a now outmoded chemical doctrine. (rpl)

I am really pleased with my success, in particular because my sincere patriotism allowed me to overcome my timidity and to stand up and speak before such a mixed assembly. As soon as I have done my duty as a citizen, namely immediately after the elections for the Frankfurt assembly, I shall return with all my forces to my mathematical work, as I'll have for the moment nothing more political to do. If you visit me next week, as I am hoping, then I'll recount more about the local elections and give you the draft of my first speech. The second was almost spontaneous, and only vaguely planned. All the best ... and the best of greetings from all my family."

In order to see what Kummer met when he as *Wahlmann* elected the deputy, I continue with Fontane's account.

Sequel – Berlin in May and June, 1948

"I have spoken earlier of my status as elector and the oratorical achievements in the

wool staple in the Neue Königstraße leading to it as my ‘first and last appearance as politician’. I should add that this ‘first and last appearance as politician’ had as one of its components a sequel. The sequel was the assembly of Wahlmänner for the purpose of the election of a deputy. I was elected in wool staple in the Neue Königstraße, I was to elect, or at least to take part in the deliberations, in the concert hall of the Royal Theatre. That I did, and I count the hours in which the deliberations took place among my happiest. Everything was full of life and interest, even though in respect of genuine politics every modern politician would turn his face in disgust. Things were said precisely of the best men that had almost no relation to the subject to be treated there; but so bizarre, often even bordering on the comic, these shots in the treetops appeared, there was still something in the expectorations of these dilettantes. The old General Reyher – Chief of the General Staff and the predecessor of Moltke, who often spoke gratefully of him as his teacher – spoke once, and briefly offered a confession of faith, perfectly useless in connection with the matters that we were there to settle. It made, nevertheless, a great impression on me to hear a distinguished old general confess freely to his faith in his king and in the army, for one heard then very little of such things. And then, on the same day I believe, the old *Jakob Grimm* stepped up to the podium, the wonderful head – fixing itself in the memory like the head of Mommsen, in a halo of long snow-white hair, and spoke something completely general about Germany, that in any proper political gathering would have brought shouts of ‘to the point’ down on his head. This shout was, however, not heard because everyone was moved by the sight and felt, that no matter how far away all of that might lie, it was to be followed, willy-nilly.

Those were two splendid figures that remained in my memory forever, while the others were by and large chatterboxes and nullities, a few even confidence men.”

Kummer would have enjoyed such a gathering! In general, Kummer, in contrast to Galois, seems to have been neither rebellious nor dissatisfied. He took life and the world about him as it came with considerable good humor. He was a one-year volunteer in the Prussia army as a young man, enjoyed a hunting party, and was fairly gregarious. He also seems and that is unusual for a mathematician of his calibre to be a competent and respected administrator. He became rector at Breslau on October 15, 1848. The university at Breslau (the present Wrocław) was presumably not very large, and his responsibilities not overwhelming, but in the aftermath of the March revolution he undoubtedly had to steer an uneasy course between the students and the Prussian university administration. The speech he gave on assuming the office of rector is extant. It is a lecture on academic freedom and the purpose of the university. It is long and I do not cite it at length. Besides to understand it, would require more understanding of the details of the university reforms than I possess. I am not certain what Kummer is defending as academic freedom. It would not be uninteresting to examine the full speech with more care. I content myself with quoting two passages.

One from the beginning

“On the assumption of the rectorate of the university, now in a time in which our entire fatherland has made progress that is of the highest significance in its historic development

and that has set in great motion all members and institutions of the state, and therefore our university as well, I am seized by a certain uneasiness, for I do not know how far I shall succeed in fulfilling the high duties that this office imposes on me. The academic year, that now lies ahead of us, will acquire no doubt, just as the year now ending, more than usual significance through the numerous improvements and new arrangements that it will call into being, which satisfy the needs of the present and the generally awakened freer spirit. The more important and the more pregnant with consequences this progress is, the heavier is the responsibility that I assume as Rector, but the greater is the urge in me to devote myself with the entire force of my being to the care of the prosperity and well-being of the University. Indeed in the firm hope, that the newly awakened political life in our Fatherland, even with all the contending contradictions with which it is imbued, will further the well-being of our institution, my unease vanishes, and I am delighted that it is now granted to me to participate fervently in this progress.

The German universities, as the highest institutions of learning of our fatherland, as the hearths of the spirit of our nation, have from the beginning not only incorporated this spirit but also developed and propagated it through teaching and writing. They have thereby not alone moved ahead with the times, but in so far as the true progress of the spirit has been nursed at their bosom, they have even outpaced the times. To mention only one thing, one of the grandest blossoms of the present, the idea of German unity has been for more than thirty years cultivated almost solely by the universities, at a time, when it went almost unnoticed by the people and when the governments attempted to suppress and extirpate it with various measures and punishments.”

One from the middle

“I want therefore to limit myself here to mentioning one of the significant rights that were won for the entire German nation through the overthrow of the old administrative system, the right of association, which is of great importance for the universities too, specifically for the forms of academic freedom in the life of students. There is no doubt, that this right is also available to the students, and that the expected new academic laws in no way restrict it, but that rather only certain forms are to be respected by the student associations, if they are going to be recognized as such by the university authorities.”

Further Dates

1864-1866: Forcible consolidation of Prussia’s position at the expense of Austria.

1870-1871: Franco-Prussian war, creation of the German empire.

As secretary of the Royal Prussian Academy of Science, Kummer was called upon to give speeches on various occasions, anniversaries of Friedrich the second and of Leibniz, or anniversaries of the reigning king Wilhelm the first. Sometimes he takes the occasion to comment on mathematical developments, such as the importance of the contributions of Jacobi and Dirichlet in the development of a real school in Berlin or to relate somewhat

anodine histories of the development of mathematical ideas. He has a taste for history and was, for better or worse, carried away to some extent by the increasingly chauvinistic and militaristic temper of the times. There is a good deal to be learned from the response of a sympathetic figure, like Kummer, to historic changes that most of us find, in retrospect, distressing. The 1877 speech on the occasion of the birthday of Wilhelm the first, who was born in 1797, died in 1888, and who became King of Prussia in 1861 and the German emperor in 1871, is an account of Wilhelm's military career, which began at the age of nine, and is informed by the then prevailing enthusiasm for the military. Kummer, like Dirichlet, supplemented his income with a position at the Military Academy, so that he would have had occasion to inform himself of military matters. The speech appears, although I have not yet read it in full, to make for good and instructive reading. I have as yet only glanced at the others.

I

DEUX MÉMOIRES D'ANALYSE PURE PAR [E. GALOIS]

PRÉFACE

Ceci est un livre de bonne foy.

MONTAGNE.

72 a Premièrement, le second feuillet de cet ouvrage n'est pas encombré par les noms, prénoms, qualités, dignités et éloges de quelque prince avare dont la bourse se serait ouverte à la fumée de l'encens avec menace de se refermer quand l'encensoir serait vide. * On n'y voit pas non plus, « en caractères trois fois gros comme le texte », un hommage respectueux à * quelque haute position dans les sciences, à un savant protecteur, chose pourtant indispensable (j'allais dire inévitable) * pour quiconque « à vingt ans * veut écrire ». Je ne dis à personne que je doive à ses conseils ou à ses encouragements tout ce qu'il y a de bon dans mon ouvrage. Je ne le dis pas : car ce serait mentir. Si j'avais à adresser quelque chose aux grands du monde ou aux grands de la science (et au temps qui court la distinction est imperceptible entre ces deux classes de personnes), je jure que ce ne seraient point des remerciements. * Je dois aux uns de faire paraître si tard le premier des deux mémoires, aux autres d'avoir écrit le tout en prison, séjour que l'on a tort de considérer comme un lieu de recueillement, et où je me suis souvent trouvé stupéfait de mon insouciance à fermer la bouche à mes stupides Zoïles : * et je crois pouvoir me servir de ce mot de Zoïle en toute sûreté pour ma modestie, tant * mes adversaires sont bas dans mon

esprit. * Il n'est pas de mon sujet *de dire* comment et pourquoi l'on me retient en prison ** : mais je dois dire comment les manuscrits s'égarent le plus souvent dans les cartons de MM. les membres de l'Institut * quoiqu'en vérité je ne conçoive pas une pareille insouciance de la part des hommes qui ont sur la conscience la mort d'Abel. « A moi qui ne veux pas me comparer à cet illustre géomètre », il suffira de dire que mon mémoire sur la théorie des équations a été déposé « en substance » à l'académie des sciences au mois de février 1830, que des extraits en avaient été envoyés en 1829, qu'aucun rapport ne s'en est suivi et qu'il m'a été impossible de revoir les manuscrits. Il y a dans ce genre des anecdotes fort curieuses * : mais j'aurais mauvaise grâce à les * raconter, parce qu'aucun accident « semblable », sauf la perte de mes manuscrits, ne m'est arrivé. Heureux voyageur, ma mauvaise mine m'a sauvé de la gueule des loups. J'en « ai » déjà trop dit pour faire comprendre au lecteur pourquoi, * quelle que fût d'ailleurs ma bonne volonté, il m'eût été absolument impossible de * parer ou de déparer, comme on voudra mon œuvre d'une dédicace.

72 b En second lieu, les deux mémoires sont courts et nullement proportionnés aux titres *; et puis il y a au moins autant de français que d'algèbre à tel point que l'imprimeur, quand on lui a porté les manuscrits, a cru de bonne foi que c'était * une introduction. En ce point je suis « complètement » inexcusable; il eût été si facile de reprendre dans ses éléments toute une théorie, sous le prétexte de la présenter sous une forme nécessaire à l'intelligence de l'ouvrage, ou bien mieux sans plus de façon * d'entrelarder une branche de science de deux ou trois théorèmes nouveaux, sans désigner lesquels ! * Il eût été si facile encore de substituer successivement toutes les lettres de l'alphabet dans chaque équation, en « les » numérotant par ordre * pour pouvoir reconnaître * à quelle combinaison de lettres appartiennent les équations subséquentes; ce qui eût multiplié indéfiniment le nombre des * équations, si l'on réfléchit qu'après l'alphabet latin, il y a encore l'alphabet grec, que, celui-ci é *puisé*, il reste les caractères allemands, que rien n'empêche de se servir des lettres syriaques, et au besoin des lettres chinoises ! Il eût été si facile de transformer dix fois chaque phrase, en ayant soin de faire précéder chaque transformation du mot solennel théorème; ou bien encore d'arriver par

NOTRE ANALYSE à des résultats connus depuis le bon Euclide; ou enfin de * faire précéder et suivre chaque proposition d'un cortège redoutable d'exemples particuliers ! Et de tant de moyens je n'ai pas su choisir un seul !

En troisième lieu, le premier mémoire n'est pas * vierge de l'œil du maître; un extrait envoyé en 1831 «à l'académie des sciences», * a été soumis à l'inspection de M. Poisson, qui est venu dire «en séance» ne point l'avoir compris. Ce qui, * à mes yeux fascinés par l'amour-propre d'auteur, prouve simplement que M. Poisson n'a pas voulu ou n'a pas pu comprendre, mais prouvera certainement aux yeux du public que mon * livre ne signifie rien.

[Tout concourt donc à me faire penser que dans le monde savant, * l'ouvrage que je soumetts au public sera reçu avec le sourire de la compassion; «que * les plus indulgents me taxeront de maladresse»; et que pendant quelque temps je serai comparé à Wronski ou à ces hommes * infatigables qui trouvent tous les ans une solution nouvelle de la quadrature du cercle. J'aurai surtout à supporter le rire * fou de MM. les examinateurs des 73 a candidats à l'École Polytechnique, (que je m'étonne «en passant» de ne pas voir occuper «chacun» un fauteuil à l'académie des sciences, car leur place n'est certainement pas dans la postérité) * «et qui ayant tendance à monopoliser l'impression des livres de mathématiques n'apprendront pas sans en être formalisés» qu'un jeune homme deux fois mis au rebut par eux a aussi la prétention * d'écrire, non des livres didactiques «il est vrai», mais des livres de doctrine. *

* Tout ce qui précède, je l'ai dit pour prouver que c'est sciemment que je m'expose à la risée des sots.]

Si avec aussi peu de chances d'être compris, je publie, malgré tout, le fruit de mes veilles, c'est * afin de prendre date pour mes recherches, c'est afin que les amis que j'ai formés dans le monde avant qu'on m'enterrât sous les verrous, sachent que je suis bien en vie, ** c'est peut-être «aussi» dans l'espérance que ces recherches * pourront tomber entre les mains de personnes à qui une morgue «stupide» * n'en interdira pas la lecture, * et les diriger dans la nouvelle voie que doit, selon moi, suivre l'analyse dans ses branches les plus hautes. Il faut bien savoir que je ne parle ici que d'analyse pure; mes assertions transportées aux applications les plus directes des mathématiques deviendraient paradoxales.

Les «longs» calculs algébriques ont d'abord été * peu nécessaires au progrès des Mathématiques, les théorèmes fort simples gagnaient à peine à être traduits dans la langue de l'analyse. Ce n'est «guère» que depuis Euler que * cette langue plus brève est devenue indispensable à la nouvelle extension * que ce grand géomètre a donnée à la science. * Depuis Euler les calculs sont devenus «de plus en plus nécessaires, mais» de plus en plus * difficiles «à mesure qu'ils s'appliquaient à des objets de science plus avancés». Dès le commencement de ce siècle, l'algorithme avait atteint un degré de complication tel que tout progrès était devenu impossible par ce moyen, sans l'élégance que les * géomètres modernes ont su imprimer à leurs recherches, et * au moyen de laquelle l'esprit saisit promptement et d'un seul coup un grand nombre d'opérations.

Il est évident que l'élégance si vantée et à si juste titre, n'a pas d'autre but.

Du fait bien constaté que les efforts des géomètres les plus avancés ont pour objet l'élégance, * on peut donc * conclure avec certitude qu'il devient de plus en plus nécessaire d'embrasser plusieurs opérations à la fois, parce que l'esprit n'a plus le temps de s'arrêter aux détails.

Or je crois que les simplifications produites par l'élégance des calculs, (simplifications intellectuelles, s'entend; de matérielles il n'y en a pas) ont leurs limites; je crois que le moment * arrivera **73 b** où les transformations algébriques prévues par les spéculations des analystes ne trouveront plus ni le temps ni la place de se produire; à tel point qu'il faudra se contenter de les avoir prévues. * Je ne veux pas dire qu'il n'y a plus rien de nouveau pour l'analyse sans ce secours : mais je crois qu'un jour sans cela tout serait épuisé.

* Sauter à pieds joints sur ces calculs; * grouper les opérations, les * classer suivant leurs difficultés et non suivant leurs formes; telle est, suivant moi, la mission des géomètres futurs; telle est la voie où je suis entré dans cet ouvrage.

Il ne faut pas confondre l'opinion que j'émets ici, avec l'affectation que certaines personnes ont d'éviter «en apparence» toute espèce de calcul, «en» traduisant par des phrases fort longues ce qui s'exprime très brièvement par l'algèbre, et ajoutant ainsi à la longueur * des opérations, les longueurs d'un langage qui

n'est pas fait pour * les exprimer. Ces personnes-là sont en arrière de cent ans.

Ici rien de semblable; ici on fait l'analyse de l'analyse : ici les calculs * les plus élevés ** exécutés jusqu'à présent sont considérés comme des cas particuliers, qu'il a été utile, indispensable de traiter, mais qu'il serait funeste de ne pas abandonner pour des * recherches plus larges. Il sera * temps d'effectuer des calculs prévus par cette haute analyse et classés suivant leurs difficultés, mais non spécifiés dans leur forme, quand * la spécialité d'une question les réclamera.

La thèse « générale » que j'avance ne pourra être bien comprise que * quand on lira attentivement mon ouvrage qui en est une application : non que * ce point de vue théorique ait précédé l'application; mais je me suis demandé, mon livre terminé, ce qui le rendrait si étrange à la plupart des lecteurs, et * rentrant en moi-même, j'ai cru observer cette tendance de mon esprit à éviter * les calculs « dans les sujets que je traitais », et qui plus est, « j'ai reconnu » une difficulté insurmontable à qui voudrait les effectuer « généralement » dans les matières que j'ai traitées.

* On doit prévoir que, traitant des sujets aussi nouveaux, hasardé dans une voie aussi insolite, bien souvent des difficultés se sont présentées que je n'ai pu vaincre. Aussi dans ces deux mémoires et surtout dans le second qui est plus récent, trouvera-t-on souvent la formule « je ne sais pas ». La classe des lecteurs dont j'ai parlé au commencement ne manquera pas d'y trouver à rire. C'est que malheureusement on ne se doute pas que le livre le plus précieux du plus savant serait celui où il * dirait tout ce qu'il ne sait pas, « c'est qu'on ne se doute pas » qu'un auteur ne *sait* jamais tant à ses lecteurs que quand il dissimule une difficulté. Quand « la concurrence c'est-à-dire » l'égoïsme ne régnera plus dans les sciences, quand on s'associera pour étudier, * au lieu d'envoyer aux académies des paquets cachetés, on s'empressera de publier ses moindres observations pour peu qu'elles soient nouvelles, et on ajoutera : « je ne sais pas le reste ».

De St^e Pélagie N^o 1831,

EVARISTE GALOIS.

I

DISCOURS PRÉLIMINAIRE

59 a Le mémoire qui suit a été * adressé il y a * environ sept mois à l'académie des sciences de Paris, et égaré par les commissaires qui devaient l'examiner. Cet ouvrage * n'a donc, pour se faire lire, acquis aucune autorité :, et cette raison n'était pas la dernière qui retenait l'auteur dans sa publication. S'il s'y décide, c'est par crainte que des géomètres plus habiles, en s'emparant du même * champ, ne lui fassent perdre [entiè-
rement] les fruits d'un long travail.

* Le but que l'on s'est proposé est de déterminer des caractères pour la résolubilité des équations par radicaux. * Nous pouvons affirmer qu'il n'existe pas dans l'Analyse pure de matière plus obscure et peut-être plus isolée * de tout le reste. La nouveauté * de cette matière a exigé l'emploi de nouvelles dénominations, de nouveaux caractères. Nous ne doutons pas que cet inconvénient ne rebute dès les premiers pas le lecteur qui pardonne à peine aux auteurs [mêmes] qui ont tout son crédit, de lui parler un nouveau langage. Mais enfin, force nous a été de nous conformer à la nécessité du sujet, * dont l'importance mérite sans doute quelque attention.

* Étant donnée une équation algébrique à coefficients quelconques, numériques ou littéraux, * reconnaître si les racines
59 b ne peuvent s'exprimer * en radicaux, telle est la question dont nous offrons une solution complète.

Si maintenant vous * me donnez une équation que vous aurez choisie à votre gré, [et que vous désiriez connaître si elle est ou non résoluble par radicaux], je n'aurai rien à y faire que de vous indiquer le moyen * de répondre à votre question, sans vouloir charger ni moi ni personne de le faire. En un mot les calculs sont impraticables.

* Il paraîtrait d'après cela qu'il n'y a aucun fruit à tirer de la solution que nous proposons *.

« En effet » il en serait ainsi si la question se présentait ordinairement sous ce point de vue. Mais, la plupart du temps, dans les applications de l'Analyse Algébrique, on est conduit à des équations dont on connaît d'avance toutes les propriétés : propriétés au moyen desquelles il sera toujours aisé de répondre à la question * par les règles que nous exposerons. Il existe en effet pour ces sortes de questions un certain ordre de * considérations Métaphysiques qui planent sur tous les calculs, et qui souvent les rendent inutiles. Je citerai par exemple les équations qui donnent la division des fonctions Elliptiques, et que le célèbre Abel a résolues *. Ce n'est certainement pas d'après leur forme numérique que ce géomètre y est parvenu. * Tout ce qui fait la beauté et à la fois * la difficulté de cette théorie, c'est qu'on a « sans » cesse à indiquer la marche * de l'analyse et à en prévoir les résultats sans jamais pouvoir les effectuer. Je citerai encore les équations modulaires, *

*Auf dem Wollboden — Erstes und letztes Auftreten
als Politiker*

Ich weiß nicht mehr, um wieviel Wochen später die Wahlen zu einer Art »Konstituante« begannen. Eine Volksvertretung sollte berufen und durch diese dann die »Verfassung« festgestellt werden. Bekanntlich kam es aber erheblich anders, und das Endresultat, nach Steuerverweigerung und Auflösung der Versammlung, war *nicht* eine vom Volkswillen diktierte, sondern eine »oktroyierte Verfassung«. Es ist immer mißlich, wenn die Freiheitsdinge mit etwas Oktroyiertem anfangen.

Also Wahlen zur Konstituante! Der dabei stattfindende Wahlmodus entsprach dem bis diesen Augenblick noch seine sogenannten Segnungen ausübenden Dreiklassensystem und lief darauf hinaus, daß nicht direkt, sondern indirekt gewählt wurde, mit anderen Worten, daß sich eine Zwischenperson einschob. Diese Zwischenperson war der »Wahlmann«. Er ging aus der Hand des Urwählers hervor, um dann aus seiner – des Wahlmanns – Hand wiederum den eigentlichen Volksvertreter hervorgehen zu lassen.

Alle Detailbestimmungen sind meinem Gedächtnisse natürlich längst entfallen, und ich weiß nur noch, daß ich persönlich alt genug war, um als »Urwähler« auftreten zu können. Ich erhielt also mutmaßlich den entsprechenden Zettel und begab mich, mit diesem ausgerüstet, in ein Lokal, in welchem sich die Urwähler der Neuen Königstraße samt Umgegend über ihren »Wahlmann« schlüssig machen und diesen ihren politischen Vertrauensmann proklamieren sollten. Wenn ich eben sagte: »in ein Lokal«, so ist dies nicht ganz richtig. Ein »Lokal« ist nach Berliner Vorstellung eine Örtlichkeit, drin viele Kellner umherstehen und einem unter Umständen ein Seidel bringen, noch ehe man es bestellt hat. Ein solches »Lokal« war nun aber unser *Wahllokal* keineswegs; es war vielmehr ein großer, langer Boden, an dessen Seiten mächtige Wollsäcke hochaufgetürmt lagen, während zwei dieser Säcke sich im rechten Winkel quer vor-

schoben und einen Abteil, eine Art Geschäftsraum herstellten. In Front davon war ein Tischchen aufgestellt, an dem ein Wahlkommissar oder etwas dem Ähnliches saß, ein würdiger alter Herr, auch ganz augenscheinlich der klügste, der den Gang der Ereignisse zu leiten hatte. Die Zahl derer, die sich eingefunden, war nicht groß, höchstens einige dreißig, und weil wohl niemand recht wußte, was zu tun sei, stand man in Gruppen umher und wartete, daß irgendwer, der wenigstens einen Schimmer habe, die Sache in die Hand nehmen würde. Naive Menschen sind immer sehr führungsbedürftig. Endlich fragte der Wahlbeamte, ob nicht einer der Erschienenen Vorschläge hinsichtlich eines aufzustellenden Wahlmannes machen wolle. Man drückte Zustimmung aus, blieb aber schweigsam und sah nur immer zu einem langen Herrn von mittleren Jahren hinüber, der in jener Erregung, die das sichere Kennzeichen eines starken Redelust mit Redeunvermögen vereinigenden Menschen ist, in Front der beiden Wollsäcke auf und ab schritt. Er war ebenso sehr ein Bild des Jammers wie der Komik, wozu seine Kleidung redlich beisteuerte. Während wir andern alle, meist kleine Handwerker, Budiker und Kellerleute, in unsrem Alltagsrock erschienen waren, trug der aufgeregte Mann einen schwarzen Frack und eine weiße Kandidatenbinde. Die Brille nahm er beständig ab und setzte sie wieder auf und war ärgerlich, wenn sich die beiden Häkchen in seinem angekräuelten blonden Haar verfitzten.

»Wer ist der Herr?« fragte ich einen neben mir Stehenden.

»Das ist der Herr Schulvorsteher von hier drüben.«

»Wie heißt er denn?«

»Ich glaube Schaefer; er kann aber auch Scheffer heißen. Ich werde mal Roesike fragen . . . Sage mal, Roesike . . .«

Und es war ersichtlich, daß er, mir zuliebe, seinen Freund, den Bäcker Roesike, wegen »Schaefer oder Scheffer« interpellieren wollte. Kam aber nicht dazu. Denn in ebendiesem Augenblicke hatte sich der Schulvorsteher neben dem Tisch des den Wahlakt leitenden alten Herrn aufgestellt und sagte – ein paar Schlagwörter sind mir im Gedächtnis geblieben – ungefähr das Folgende:

»Ja, meine Herren, was uns hergeführt hat . . . wir sind hier in diesem weiten Raum versammelt, und es ist wohl jeder von uns davon durchdrungen. Und jeder dankt auch wohl Gott, daß wir ein Fürstengeschlecht haben wie das unsrige. Kein Land, das ein solches Geschlecht hat, und wir stehen zu ihm in Liebe und in Treue . . . Aber, meine Herren, nicht Roß, nicht Reisige . . . Sie wissen, auch an dieser Stelle ist heldenmütig gekämpft worden, Bürgerblut ist geflossen, und der Sieg ist auf unserer Seite geblieben. Es handelt sich darum, diesen Sieg an unsre Fahne zu ketten. Und dazu bedürfen wir der richtigen Männer, die sich jeden Augenblick bewußt sind, daß das deutsche Gemüt einer Niedrigkeit nicht fähig ist. Und Verrat an unsren heiligsten Gütern ist Niedrigkeit. Unter uns, das weiß ich, ist niemand. Aber nicht alle denken und fühlen so, da sind ihrer noch viele, die der Freiheit nach dem Leben trachten. Mit Geierschnäbeln hacken sie danach. Ich bin deshalb für Anschluß an Frankreich und sehe Gefahr für Preußen in jenem Mann, der Polen eingesargt hat und unsre junge Freiheit nicht will. Also, meine Herren, Männer von verbürgter Königs-, aber zugleich auch von verbürgter Volkstreue: Jahn, Arndt, Boyen, Grolmann, vielleicht auch Pfuel. Die werden unsre Fahne hochhalten. Ich wähle Humboldt.«

Die Rede wurde mit Beifallsgemurmel aufgenommen, und nur der Vorsitzende lächelte. Zu Widerlegungen sah er sich aber nicht gemüßigt, und so fiel mir Ärmsten denn die Aufgabe zu, dem einem allerhöchsten Ziele wild nachjagenden Schulvorsteher in die Zügel zu fallen. Sehr gegen meine Neigung. Ich war über dies öde, wichtigtuerische Papelwerk aufrichtig indigniert und bemerkte dementsprechend mit einer gewissen übermütigen Emphase, daß uns hier nicht zu bestimmt sei, für die Hohenzollern oder für die Freiheit direkte Sorge zu tragen, sondern daß wir hier in der Gotteswelt weiter nichts zu tun hätten, als in unsrer Eigenschaft als bescheidene Urwähler einen bescheidenen Wahlmann zu wählen. All das andre käme nachher erst; da sei dann der Augenblick da, Preußen nach rechts oder nach links zu leiten. Hoffentlich nach links. Ich mußte deshalb auch darauf verzichten, Alexander von Humboldt an dieser Stelle meine

DER ACHTZEHNTE MÄRZ

Stimme zu geben, und wäre vielmehr für meinen Nachbar Bäcker Roesike, von dem ich wüßte, daß er ein allgemein geachteter Mann sei und in der ganzen Gegend die besten Semmeln hätte.

Da zufällig kein anderer Bäcker zugegen war, so war man mit meinem Vorschlag allgemein einverstanden; aber Roesike selbst, allem Ehrgeiz fremd, wollte von seiner Wahl nichts wissen, schlug vielmehr in verbindlicher Revanche *mich* vor, und als wir zehn Minuten später das Wahllokal verließen, war ich in der Tat *Wahlmann*.

Dies war mein Debüt auf dem Wollboden, zugleich erstes und letztes Auftreten als Politiker.

Am Abend ebendieses Tages ging ich nach Bethanien hinaus, um dort dem Pastor Schultz, mit dem ich, trotz weitestgehender politischer und kirchlicher Gegensätze, befreundet war, einen Besuch zu machen. Als ich draußen ankam, sah ich an den im Vorflur an verschiedenen Riegeln und Haken hängenden Hüten und Sommerüberziehern, daß drinnen im Schultzchen Wohnzimmer Besuch sein müsse. Das war mir nicht angenehm. Aber was half es, und so trat ich denn ein. Um einen großen, runden Tisch herum saßen sechs oder sieben Herren, lauter Pommersche von Adel, unter ihnen ein Senfft-Pilsach, ein Kleist, ein Dewitz. Aus ein paar Worten, die gerade fielen, als ich eintrat, konnte ich unschwer heraushören, daß man über die Wahlen sprach und sich darüber mokierte. Schultz, sonst ein sehr ernster Mann – zu ernst –, war der ausgelassenste von allen, und als er mich von der Tür her meine Verbeugung gegen die Herren machen sah, rief er mir übermütig zu: »Was führt dich her! Du bist am Ende Wahlmann geworden.«

Ich nickte.

»Natürlich. So siehst du auch gerade aus.«

Alles lachte, und ich hielt es für das klügste, mit einzustimmen, trotzdem ich, ein bißchen ingrimmig in meiner Seele, das eitle Gefühl hatte: »Lieber Schultz, mit *dir* nehm ich es auch noch auf.«

x ist in Beziehung auf die Coefficienten von $f(\alpha)^h$ vom zweiten Grade. Auch läßt sich x durch die Coefficienten von $\psi_1(\alpha)$ $\psi_2(\alpha)$ etc. wo $\psi_r(\alpha) = \frac{(\alpha, x)(\alpha^r, x)}{(\alpha^{r+1}, x)}$ ausdrücken und zwar als lineäre Function derselben. Ich ziehe aber den Ausdruck durch die Coefficienten von $f(\alpha)^h$ vor.

Da ich nun diesen nicht unwichtigen Punkt erobert und der Herrschaft der Wissenschaft unterthänig gemacht habe, so können Sie sich denken, daß ich jetzt versuche von hier aus weiter gegen meinen Hauptfeind, das simple Reciprocitätsgesetz, zu operiren. Es fehlt mir auch nicht an Muth dazu, da ich durch die bisherigen Erfolge kühner gemacht worden bin, und da ich mir bewußt bin bis jetzt noch täglich an der gründlicheren Kenntnis meines Gegenstandes zu gewinnen.

... Leben Sie wohl, empfehlen Sie mich Ihrer Fräulein Braut und den Ihrigen allen und kommen Sie ja recht bald zu Ihrem Freunde

E. KUMMER.

Breslau d. 5. Maj 1848.

... Können Sie sich wohl vorstellen, daß ich seit acht Tagen mich zweimal als Volksredner versucht habe? Bei einer Versammlung unseres Wahlbezirks trat ich zuerst auf, und sprach über die Eigenschaften eines guten Wahlmannes, welches sehr großen Anklang fand. Ich wurde darauf einstimmig zum Vorsitzenden für die nächste Versammlung gewählt. Auch hatte ich bei dieser ersten Versammlung mein Terrain recognoscirt und gefunden, daß der demokratische Klubb ganz dominierte und zwar nur durch unbedeutende Personen, welche sich zu Wahlmännern aufwerfen wollten. Diese schmeichelten den Arbeitern um zu reüssiren, verdächtigten die Beamten und gebrauchten alle die gewöhnlichen Kunstgriffe. Ich faßte darum den Entschluß wenigstens einen dieser Leute durch meine Person zu verdrängen und hielt in der zweiten Versammlung eine zweite Rede vorzüglich an die Arbeiter gerichtet. Obgleich ich nun gerade die entgegengesetzten Mittel anwendete, als jene Demokraten, nämlich den Arbeitern zu zeigen, was sie seit dem 18. März wirklich erreicht hätten, und ihnen Vertrauen zu der gegenwärtigen Regierung einzuflößen, so reüssirte ich doch vollständig. Die Demokraten hielten zwar noch eine Versammlung am Sonntage, wo sie mich zu verdrängen suchten, es gelang ihnen aber nicht, wie Sie aus der Liste der Wahlmänner ersehen haben. Neben mir sind außer zwei hiesigen Bürgern allerdings nur Mitglieder

des demokratischen Klubbs für Berlin und Frankfurt gewählt worden; überhaupt haben die Demokraten hier durchgängig gesiegt. Ich selbst bin auch gar nicht gegen die Demokraten überhaupt eingenommen, wenn sie es nur gegenwärtig mit der Befestigung einer durchaus freisinnigen constitutionellen Monarchie redlich meinen, und nicht gegen das Königthum zu Felde ziehen, auch nicht streben es heimlich zu untergraben, so sind mir die Demokraten im Grunde lieber als die philisterhaften Bürger, welche an den Wahlen für Frankfurt fast gar nicht mehr Theil nahmen, weil sie für diese wenig oder gar kein Interesse hatten. Die Anforderungen, die ich an einen Deputirten nach Berlin stelle sind 1. wahre Vaterlandsliebe, 2. Einsicht und Verstand, 3. Charakterfestigkeit. Speciellere Anforderungen stelle ich nicht, weil wir die Candidaten nehmen müssen wie sie eben zuletzt bei den engeren und engsten Wahlen übrig bleiben. Wohl uns, wenn wir zuletzt aus zwei guten den besten wählen können, es kann aber auch kommen, daß wir zuletzt aus zwei Uebeln noch das geringere zu wählen haben. Für einen Deputirten nach Frankfurt würden die Anforderungen dieselben sein, nur daß seine Vaterlandsliebe mehr in dem einigen Deutschland als in Preußen ihre Hauptwurzel haben müsse, und daß auch seine Einsicht sich mehr auf das allgemeinere erstrecken möchte. — Ich bin auf meine Würde als Wahlmann sehr stolz wie Sie daraus ersehen können, daß ich mich in Fürstenstein, wo wir am Mittwoch waren, als E. KUMMER, Wahlmann eingeschrieben habe, meine Frau als Wahlweib, den Vetter als Urwähler und LOUISE CAUER als Wahlverwandschaft. Ich freue mich aber wirklich, daß es mir gelungen ist, besonders darum weil mich nur wahrer Patriotismus dazu vermocht hat meine Schüchternheit zu überwinden, und als Redner vor einer solchen gemischten Versammlung aufzutreten. Sobald ich meinen Pflichten als Bürger werde genügt haben, nämlich unmittelbar nach den Wahlen für die Frankfurter Versammlung, werde ich sogleich wieder meine mathematischen Arbeiten mit voller Kraft vornehmen, denn dann habe ich für Politik für den Augenblick nichts weiter zu thun. Wenn Sie mich in nächster Woche besuchen, worauf ich mich sehr freue so erzähle ich Ihnen das nähere über die hiesigen Wahlen und will Ihnen auch das Concept meiner ersten Rede mittheilen, die zweite war fast ganz frei gesprochen, und nur im allgemeinen prämeditirt. Leben Sie wohl, . . . und empfangen Sie . . . die herzlichsten Grüße der meinigen

Ihr Sie herzlich liebender Freund

E. KUMMER.

6*

Nachspiel — Berlin im Mai und Juni 48

Ich habe, voraufgehend, von meiner Wahlmannschaft und einer gleichzeitigen oratorischen Leistung auf dem in der Neuen Königstraße gelegenen Wollboden als von meinem »ersten und letzten Auftreten als Politiker« gesprochen. Es war das auch im wesentlichen richtig. Ich habe jedoch hinzuzufügen, daß diesem »ersten und letzten Auftreten« noch ein mit zur Sache gehöriges *Nachspiel* folgte. Dies Nachspiel waren die Wahlmännerversammlungen behufs Wahl eines Abgeordneten. Auf dem Wollboden in der Neuen Königstraße war ich gewählt *worden*, im Konzertsale des Königlichen Schauspielhauses, wo die Wahlmännerversammlungen stattfanden, *hatte* ich zu wählen oder mich wenigstens an den Beratungen zu beteiligen. Das tat ich denn auch, und ich zähle die Stunden, in denen die Beratungen stattfanden, zu meinen allerglücklichsten. Es war alles voll Leben und Interesse, wenn auch, aufs eigentlich Politische hin angesehen, jeder moderne Parlamentarier sich schauernd davon abwenden würde. Gerade von den besten Männern wurden Dinge gesprochen, die kaum in irgendwelcher Beziehung zu dem dort zu Verhandelnden standen; aber so sonderbar und oft das Komische streifend diese spontan abgegebenen und sehr »in die Fichten« gehenden Schüsse wirkten, so war doch in diesen dilettantischen Expektorationen immer »was drin«. So sprach einmal der alte General *Reyher* – Chef des Großen Generalstabes und Vorgänger Moltkes, welcher letztere sich später oft dankbar zu diesem seinem Lehrer bekannt hat – und legte ganz kurz ein politisches, mit Rücksicht auf die Dinge, zu deren Erledigung wir versammelt waren, völlig zweckloses Glaubensbekenntnis ab. Es machte aber doch einen großen Eindruck auf mich, einen alten, würdigen General sich freimütig zu seinem König und zur Armee bekennen zu hören. Denn von derlei Dingen hörte man damals wenig. Und dann, ich glaube, es war an demselben Tage, schritt der alte *Jakob Grimm* auf das Podium zu, der wundervolle Charakterkopf – ähnlich wie der Kopf

DER ACHTZEHNTE MÄRZ

Mommsens sich dem Gedächtnis einprägend –, von langem, schneeweißem Haar umleuchtet, und sprach irgend etwas von Deutschland, etwas ganz Allgemeines, das ihm in jeder richtigen politischen Versammlung den Ruf: »Zur Sache« eingetragen haben würde. Dieser Ruf unterblieb aber, denn jeder war betroffen und gerührt von dem Anblick und fühlte, wie weitab das alles auch liegen mochte, daß man ihm folgen müsse, wollend oder nicht.

Das waren so zwei glänzende, mir durch alle Zeit hin in Erinnerung gebliebene Gestalten, während die meisten freilich nur Schwätzer und Nullen waren, ein paar auch sogar Hochstapler. Ich kenne noch ganz gut ihre Namen, aber ich werde mich hüten, sie hier zu nennen.

Wie lange diese Sitzungen dauerten, weiß ich nicht mehr; ich weiß nur, daß alles, was ich erlebte, mich tagtäglich beglückte: der schöne Saal, das herrliche Wetter – wie's ein Hohenzollernwetter gibt, so gibt es auch ein Revolutionswetter –, der Verkehr, das Geplauder. Eine Befangenheit, zu der ich sonst wohl neige, kam nicht auf, weil niemand da war – selbst die besten mit eingerechnet, denen dann eben wieder das Politische fehlte –, der mir hätte imponieren können. Von meiner Unausreichendheit, meinem Nichtwissen tief durchdrungen, sah ich doch deutlich, daß, kaum zu glauben, das Nichtwissen der andern womöglich noch größer war als das meinige. So war ich bescheiden und unbescheiden zugleich.

Eines Tages, als ich aus einer dieser immer den halben Tag wegnehmenden Sitzungen nach meiner Neuen Königstraße zurückkehrte, fand ich daselbst ein Billett vor, dessen Aufschrift ich rasch entnahm, daß es von meinem Freunde, dem schon im vorigen Kapitel genannten Pastor Schultze in Bethanien, herrühren müsse. So war es denn auch. Er fragte ganz kurz bei mir an, ob ich vielleicht bereit sei, die pharmazeutisch-wissenschaftliche Ausbildung zweier bethanischer Schwestern zu übernehmen, da man gewillt sei, den bethanischen Apothekendienst in die Hände von Diakonissinnen zu legen. Im Falle dieser sein Antrag mir passe, wäre es erwünscht, wenn ich baldmöglichst in die betreffende Stellung einträte. Das war eine ungeheure Freude. Auskömm-