The 19th century and language

You must collect things for reasons you don’t yet understand.
— Daniel J. Boorstin

A conception can be understood only through its history.
— Auguste Comte

Introduction: History, Typology, Structuralism

Some three-quarters of the way into the 19th century, the French historian Gabriel Monod offered what has become a famous observation about his century. "The history of languages, the history of literatures, the history of institutions, the history of philosophies, the history of religions, all of the studies which take man and the phenomena of the human spirit as their object have taken on a historical character. Our century is the century of history."¹

As the 19th century began, its intellectual concerns were with history and with origins, and over the course of the century, these developed into a passion for typology, measurement, and classification, and then into a more abstract way of generalizing beyond typology. The notion of time was central to almost every question. And gradually, over the course of the century, another order of thought would emerge, one that we find by the end of the century, a concern with abstract structure, which had in its turn emerged from the study of taxonomies.²

Historical time exploded during the 19th century: the world went from being a few thousand years old to being much, much older. In large measure, this change occurred because the easy answers once provided by the Bible were no longer sufficient for everyone. Indeed, the sense that the Bible was not the final answer to many of these questions had begun with the Renaissance; the answers provided in the Bible were no longer consistent with what science was discovering about the physical world. This was a shock to Western sensibilities, though

¹Monod, 1876, p. 27.
²There is a large literature on the history of science in the 19th century, and we have profited from it. See the collection of papers in Cahan, 2003. As Cahan notes, three of the syntheses proposed in the 20th century for the scientific perspectives in the 19th have had considerable impact, though they paint vastly different portraits of the age; these are the works of John Theodore Merz, 1903, of J. D. Bernal, the influential Marxist, and of the historical sociologist Joseph Ben-David.

More generally regarding the 19th century, we have been influenced by our reading of the monumental trinity of the British marxist historian, Eric Hobsbawn. See: Hobsbawm, 1962; Hobsbawm, 1975; Hobsbawm, 1984.
it was not the first of its sort: geographical space had exploded in a similar way during the 16th century. In the century that followed Christopher Columbus, as technology and commerce pushed explorers to map the globe, the world came to grips with the realization that while the Earth was finite, and that it had no edge, because it was a sphere. Indeed, astronomical space had exploded during the 17th century, when we began to get a sense of how large the solar system is, by any terrestrial measure. But it was the 19th century that radically changed our notion of time, very much in line with the changes in our notion of space that had already begun.

There were many questions that interested thinking people: How old is the Earth, and how old the Sun? How did the different peoples come to populate the continents on the Earth? Is the history sketched in the Bible—a brief history of the Earth, a longer history of its people (longer, but still quite incomplete)—is this story right in its broad outlines, or is it so seriously off the mark as to be of no real interest any longer? How did so many different languages come into existence in our world? What was the first language, the language of Eden, and what would be the language of Heaven? Was the first language, the one that Adam and Eve spoke, perfect, and if so (as seemed likely to some), what was a language like that expressed only perfectly clear and unambiguous messages? Why do descendants of the Romans speak languages that are similar, even if they no longer can be said to share a common language? Why are Africans dark-skinned, and northern Europeans fair-skinned? Why do we find some animals virtually everywhere, and some only on one continent? As these examples suggest, the question of the depth of time was deeply entwined with the discovery of the complexity of all of the stuff that there was on the Earth, all the teeming species of both organic and inorganic nature.

Trying to satisfy this grand curiosity demanded a tremendous effort to collect things. If you want to think dismissively, think butterfly collecting—is there anything we care less about today? Today butterfly-collecting seems pointless because there is nothing to it but to pin a specimen in a book and set a label next to it. But we have to remember that two hundred years ago, it was not just butterflies that people were collecting, but species of every imaginable sort, from aardvarks to zebras, and not just mammals, but fossils and flowers, bugs and beetles, even soil and stone. Out of this grew a concern for finding the principles of organization that would account for the massive variety, and the hints of structure and organization that the expert could perceive. If the first four Aristotelian elements (earth, water, air, fire) and the fifth (ether, in the heavens) was no longer an acceptable catalog of the building blocks of the universe, what then would this system be replaced with? How many basic elements were there, in this sense, and why were there that many and no more? Why did different elements interact differently with others, and why did some weigh more? One of the greatest accomplishments of the century was Dmitri Mendeleev’s periodic table of the elements, which imposed a simple ordering and organization on each and every known element, and this master stroke would feed the energies of scientists following on his trail. In Chapter 9, for example, we will see how this model would have an impact on the work of Nikolai Trubetzkoj and Roman Jacobson. More clearly than anyone else at the time—and perhaps since—Mendeleev explained in a totally unexpected way the structure that lay behind a pattern of some 50 disparate objects

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1 Samuel Butler wrote, in 1863, “The world begins to feel very small when one finds one can get half round it in three months.” We all know what Jules Verne was able to do with that idea.
2 We have in mind a remark that Noam Chomsky made in Language and Responsibility, p. 57.
that seemed indivisible. He proposed a principle of organization, the periodic table of the 
elements, that was not an analysis, in the core sense of the word: it did not break down the 
elements, but it showed that they reflected a common structure. This table would become 
the icon of 19th century thinking, and we will return to this later in the chapter.

The understanding of history during the 19th century was part of the larger question of the 
meaning of time. The nature of the past is one that has in some respects, at least, been 
settled today, in the modern West, and science has had the last word. But our political 
spectrum today reflects a difference that divided Europeans at the beginning of the 19th 
century: is the past the legacy of inequality and injustice that needs to be removed in order 
for society to achieve its potential, or is the past the sum total of the cultural achievements 
and the social practices that separate us from our prehistoric ancestors? Revolutionaries 
tend towards the first view, social conservatives toward the second, and the controversy 
continues today. This divide will appear again in our discussion of the Prague phonologists 
in Chapter 9.

Not only was the past and its meaning for us rethought during the 19th century, so was the 
meaning of the future, and even that of the present. Taken together, this uncertainty, born 
of the need to reconsider the character of time, gave rise to a sort of anxiety that we will 
encounter over the course of this book. The central question for us is the sense and nature 
of change, especially at the level of society. Is it sensible to say that mankind is moving in a 
direction, or that it ever has, or that it ever will? The most basic question along these lines 
is that of teleology, a word that comes from the Greek telos, or goal: can human action— 
whether it be at the individual level, or that of a society—be understood in terms of goals? 
Most of us do not doubt that an individual's actions can only be understood in the context 
of the individuals' own intentions, but does it make sense to say that a society changes in 
some fashion in order to better achieve a goal? Does it make sense to say that the natural 
world changes in such a fashion?

Over the course of the 19th century, we find three pairs of oppositional words that were 
central to the way time was understood. The first pair, static and dynamic, was used in 
different ways at different times, sometimes clearly and sometimes obscurely. The second, 
mechanical and teleological, was almost always used in an obscure way, but those uses are no 
less important for all of their obscurity. Only the third, synchronic and diachronic, was used 
in a consistent and clear way: a synchronic analysis of a language looks at the condition of 
the languages at a given moment, while a diachronic account compares two chronologically 
distinct stages of a language, drawing conclusions from the way elements in the different 
stages of the language change in one way or another. These terms were brought to linguists 
attention by Ferdinand de Saussure at the beginning of the 20th century.

When, nearly a hundred years earlier than Saussure, Auguste Comte used the pair of words 
static/dynamic, he had a similar distinction in mind. His static analysis was much like 
Saussure's later synchronic analysis, and his dynamic analysis was like Saussure's diachronic 
analysis. But later on, as we will see, when synchronic analyses came to be the dominant 
sort of analysis, linguists would find some aspects of synchronic accounts that were static

1 See page 109 below.
and others that were dynamic, even though all of them were synchronic. We will have to figure out how this conceptual evolution occurred.

The opposition between mechanical approaches and teleological approaches will play an important role in this book, starting with our discussions of Charles Darwin’s theory of evolution. The two terms were rarely defined clearly, and it will fall to us now to get as clear as we can what the issues were that were joined when there was controversy about mechanical analyses and teleology. Darwin’s theory was viewed by most as a blow for mechanistic views, but that was only part of the story, and when we meet European structuralism, and Trubetzkoy and Jakobson in Chapter 9, we will see them making the case for a teleological view of language change, which they see as being in keeping with the advanced scientific thought of the day, and explicitly rejecting Darwin’s theory as they understood it.

**Nations in Europe**

To understand the development of the mind sciences in the 20th century, we must first understand the broad political outline and the particular developments of the sciences during the 19th century. We will begin with a brief overview of the major political trends, as well as some of the broader themes of the period as well—the focus on time and history, on collecting and typologizing. By the end of Chapter 5, we hope that it will be clear that all of the mind sciences are deeply rooted in discussions and controversies that were central to 19th century thought.

The written form of language has long played an important role in the history of modern European languages and countries. During the Renaissance, fired by the views of the humanists and the Reformation, the modern languages spoken by real people took on a new importance. In northern Italy, Dante, and later Pietro Cardinal Bembo, accorded a new status to the modern forms of language, and they themselves wrote in the dialects of Tuscany and Florence. Erasmus translated the New Testament from the Greek. Protestants felt that it was essential to translate the Latin Bible into the modern vernaculars so that people had direct access to the holy word.

And so, the Bible was translated into the languages of the people. Luther preached and wrote in German, Calvin in French, Tyndale translated the Bible into English, and Nicolas Van Winghe into Dutch.

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1. If Erasmus and Luther eventually opposed each other from a doctrinal point of view, they started off from quite similar positions. In *opera omnia* (1523), Erasmus wrote,

   > why does it seem inappropriate if someone sounds forth the gospel in his native language, the language he understands —the French in French, the English in English, the German n German, the Indian in the language of India? It seems to me more out of place—even ridiculous, rather—that the uneducated and women, like parrots, mumble their psalms and the Lord’s Prayer in Latin, although they do not understand what they themselves are uttering. Erasmus, *Paraphrase on the Gospel of Matthew*, Volume 45.

2. A particularly striking case is the case of Martin Luther and his German translation of the Bible; his usage there established, more than any other text or usage, what would become known as Modern German.
The immediate consequence was that the vernaculars of western Europe took on the status of languages in the full sense of the term. The translation of the Bible established a norm, with consequences for spelling, for the lexicon, and for the syntax of each language.

It was during the 19th century that these linguistic issues had a direct impact on the political map, for the 19th century was the century of nation building, and by its end, the face of Western Europe had become one much closer to what we recognize today. The great British historian Eric Hobsbawm spoke of the long 19th century, starting with an age of revolution, which stretched from the great revolution of 1789 in France to the smaller revolutions across Europe in 1848, to the age of capital and on to the age of empire, which brought us to the brink of global war in 1914. Just listen to a few of the highlights of this part of the century. There was the Louisiana Purchase, by which the infant United States purchased a good running start on a coast-to-coast empire, buying out land—530 million acres—that Napoleon didn't need and didn't want, given his commitments in the Old World. There was Napoleon's march to establish an empire, which for a brief moment succeeded, with the military defeat of Prussia, Poland, Russia; Norway declared itself independent in 1814, but didn't quite make it till 1905. The Holy Roman Empire was dissolved, South America freed itself from Spain and Portugal, Greece became independent of the Ottoman Empire, Belgium became sovereign and independent, as did Colombia, Ecuador, Venezuela, and Panama, as well as Guatemala, El Salvador, Honduras, Nicaragua, and Costa Rica. Texas became independent, too, for a brief while.

It was easy to see the changes taking place on the map, and there was hardly a year when map publishers did not need to put out a new edition to keep up with reality. But there were also underlying themes and forces had a lasting influence, many of which continue to have an influence on the political world. The 19th century saw the emergence of a strong pan-Slavist movement, for example, and it was one would have direct consequences for the development of linguistics. The Czech language, a minority language within the Habsburg empire, was displaced in many respects by German during the early part of the 19th century. This was also a period in which there was considerable migration from the countryside to the city, in part as a response of the abolition of serfdom. But efforts to develop and maintain a standard Czech language throughout this period were successful, and Czech was able to flourish as a language once Czechoslovakia was established as an independent country after World War I. Its first president was Tomaš Masaryk, who, as we will learn, had been a student both of Franz Brentano and of Wilhelm Wundt, had befriended Edmund Husserl before assuming the presidency, and afterward he provided important support for one of the most important centers of work on linguistics, the Prague Linguistic Circle (see Chapter 9). In the figure of Masaryk, we see an incarnation of the close links between nationalist politics, philosophy, and linguistics.

Nationalisms in Europe

The relationship of language and nationhood has never been a simple one, and its importance has attracted the attention of political philosophers, and other thinkers. During the 19th century, several conceptions of what it is that makes a people took shape. These dif-

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1Bras, 2007
ifferent approaches were rooted in disparate moments of Enlightenment thought, as well as French and German romanticism. We will focus on three views: In the first, the political view, the people is equivalent to the Greek *demos*, which is to say, the assembly of citizens, and it is this assembly that provides the legitimacy of political power. This is the conception that lay at the core of the American and the French revolutions, and its sense is found at the beginning of the American Constitution:

**We the People of the United States,** in Order to form a more perfect Union, establish Justice, insure domestic Tranquility, provide for the common defense, promote the general Welfare, and secure the Blessings of Liberty to ourselves and our Posterity, do ordain and establish this Constitution for the United States of America.

The second approach takes the people to be an *ethnos*, a group of individuals united by ties of blood and land, which we may call the *ethnic* view. This conception was dominant in German romanticism, and was celebrated in the doctrine of “Blut und Boden”: literally, blood and soil. (Fichte, 1808) Fichte believed that there was something that Germans and only Germans possessed—a belief rooted in an essentialist and linguistic conception of German identity.

The third vision sees the people as a *plebis*, the gathering of the poor among the lower class. This class-based view dominated the Marxist and socialist conception from the Paris Commune of 1871 until the rise of Leninism. This vision will play at best a marginal role in the questions of language to come.

Throughout the 19th century the confrontation of these three conceptions gave rise to ceaseless changes in people’s understandings of who they were and in the political struggles out of which the modern nations of Europe arose. The conflict between the first two views—the political and the ethnic—was stormy and sometimes violent during the period that we are considering, and the reader who has opened a newspaper recently will be aware that the last bullet has not yet been shot over this issue.

The ethnic view that emerged in German romanticism offered a central role to language, and this conception was dominant in the European context. The popular movements of

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1 German romanticism was a movement that began roughly at the time of the French Revolution, and lasted until the middle of the 19th century. Its effects were most visible in the arts, where it emphasized the importance of feeling over thought, and genius over effort; it had little sympathy for the values of the Enlightenment. Among philosophers, Fichte was a leading voice of romanticism in Germany. Friedrich Schlegel was one of a group of friends, most of them poets, who formulated the central ideas of romanticism; he was also arguably the first serious historical linguist of the 19th century, as we will see shortly.

2 Given the Greek word *demos*, one might be justified in referring to this view as the *democratic* view, but that word is charged with other conceptual freight nowadays.

3 Fichte, 1808.
national identity in the Germanic countries inspired an internal critique of the rationalism of the Enlightenment led by philosophers such as Johann von Herder and Johann Wolfgang von Goethe and by the Sturm und Drang movement, which explored the cultural specificity of the German nation. Herder himself saw language as a human creation and as the repository of the particular culture of each people—as that which made it unique, what he called its Volksgeist.

Herder’s focus on the empirical study of each nationality was also the beginning of serious work on indigenous cultures, and the science that would become the study of folklore, or traditional knowledge. This type of research in cultural ethnology would become especially important in the Germanic tradition, where traditional languages and practices, legends, myths, epics and sagas were gathered and published. This work was carried out by linguists and philologists such as Rasmus Rask and Jakob and Wilhelm Grimm who specialized in Danish, German, and the other Germanic languages. The Brothers Grimm would become known internationally for their traditional tales, of course: we will discuss their linguistic work later in the chapter.

The communities that were formed by language and culture in the 19th century were also the communities that defined the political aspirations that led to the formation of the modern states of Europe. In many cases, the aspiration to the status of a national language entailed devising or recognizing something that was a language—but the status of being a language could not be reduced to being a recognized language of culture or a language with a written tradition. The national language in most cases was popular, not the language learned in school, but rather the everyday language that made people feel as though they had something in common. In a word, an oral language, a spoken language, or even what a linguist, or a sociolinguist, would later call a dialect.

Max Weinreich was a famous linguist in the first half of the 20th century, a great specialist in Yiddish, and father of Uriel Weinreich, whom we will meet in volume 2. Weinreich told a story that is still told today, though more often than not without recalling that it came from Max Weinreich. “A teacher at a Bronx high school once appeared among the auditors. He had come to America as a child and the entire time had never heard that Yiddish had a history and could also serve for higher matters.... Once after a lecture he approached me and asked, ‘What is the difference between a dialect and language?’ I thought that the maskilic contempt had affected him, and tried to lead him to the right path, but he interrupted me: ‘I know that, but I will give you a better definition. A language is a dialect with an army and navy.’ From that very time I made sure to remember that I must convey this wonderful formulation of the social plight of Yiddish to a large audience.”

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2The English word folklore was coined during this period (1846) by William Thomas in a conscious calque on the German Volk.
Deep time

For someone who had traveled little and learned less, the Earth in 1800 seemed to be flat, even if this flatness is interrupted here and there by mountains and canyons. Circling the globe on a ship gives us a better sense of just how big the Earth really is, but even that experience will not give us a sense of how far away the Sun is, or the closest stars. As our ability to see and measure both land and sky has advanced, our imaginations have been forced to conceive of the universe we live in as immense, and almost indescribably larger than we had thought it was.  

There were three important sciences that informed the thinking of the 19th century as it recalibrated its sense of time: geology, zoology, and the study of human languages. In this section, we will look at geology and the impact of the Darwinian revolution on zoology, noting briefly the strong degree of interaction between the development of the ideas about the evolution of species and of languages in the middle of the century, and then we will return to linguistics in the next section.  

Geology

The Bible told a story of a great flood, from which only Noah’s Ark saved humanity and the other surviving species on the planet. Could that story be substantiated by looking at the evidence before our eyes? Could the strata observed in rocks be linked to the flood? These questions—as well as increasing industrial interest in ores and mining—led to careful geological surveys.

Later in this chapter, we will encounter Ferdinand de Saussure, an important linguist in this century. One of Saussure’s friends, Aimé Pictet, wrote this in his diary, after hearing Saussure speak excitedly about linguistics and Sanskrit during a visit:

De Saussure begins to explain Sanskrit etymologies to Guillaume and me, how Sanskrit, Greek and Latin are sons of one and the same father, Indo-Germanic, and brothers of almost all the languages of Europe...the most comical thing was that I understood perfectly and that I began to admit, almost, that these philological studies might have a certain utility. In any event that of proving yet again that humanity is much older on this poor earth than it believes. It is curious how all the sciences, linguistics, geology, natural history, all arrive at this same result by a hundred different path. And there is only this poor Genesis of Moses to battle against these conquests of the 19th century.

Although thoughtful people have been interested in the nature of the earth and what it contains, it was not until the end of the 18th century that geology reached a state of development where it was ready to become a science. There were many good and practical
reasons why the study of the earth was important, and of these the most pressing was the need to better understand where valuable resources inside the earth were to be found and to be extracted—everything from gold and silver to coal and granite.

For the geologist, there was one major theme that began in the first half of the 18th century, and developed throughout the 19th century: the discovery and identification of strata, or layers, of rock. The central dogma at this time was that the earth as we see it is covered by layers of distinct classes of materials, each formed on top of the previous one. Thus there was a temporal order to what we see on the earth—the closer to the surface, the more recent. A number of conceptual breakthroughs were necessary for this central dogma to become dominant. Geologists had to discover the mechanisms that were responsible for why the strata that were observed were not always flat: the observed reality was not always as simple as the model predicted, and additional mechanisms needed to be formulated to allow for shifting up and down after the initial layers were created.

The second breakthrough that led to the central dogma of this early 19th century was considerably more breath-taking: it was the notion that the layers that we observe in one spot on the earth could be aligned with the layers observed at other spots, often very distant from the first. The stratigraphy of the earth was not merely local, but global as well. In fact, 19th century geology centered around the development of an account of the structure of the earth based on a single and global sequence, now called the stratigraphical column. The idea is simple and elegant: in many areas, it is easy to see that the ground is formed in layers of varying composition, and the hypothesis lying behind the stratigraphical column is that there is a single set of layers that accounts for the layers of the earth everywhere. The surface of the earth may correspond to different points on that column in different spots on the earth, but there was a single sequence found everywhere. Early in the 19th century, geological formations were relied upon to establish correspondences between spots at different locations on the earth, but by 1835, fossils were being used as well for the same purpose. Long before this time, the notion of dry land being the result of sedimentation in long-gone lakes and oceans was understood, and this led naturally to the idea that the layers identified by the stratigraphical column corresponded to periods of time. But there was, during the 19th century, no way to associate any specific lengths of time. Moments in time could only be described in relative terms: before and after.

William Daniel Conybeare and William Phillips expressed this with great clarity in 1822.\footnote{Conybeare and Phillips, 1822} If geology is the study of the earth’s structure, then the crucial element is to ascertain “the order in which the materials constituting the surface of our planet (for beyond this observation cannot penetrate) are disposed.” This declaration is by no means obvious; it amounts to a decision to treat data arrayed in three dimensions with a one-dimensional model, a decision with momentous consequences for geology. “The superficial and hasty observer might suppose that these materials are scattered irregularly over the surface and thrown confusedly together, but a slight degree of attention will prove that such a conclusion would be entirely erroneous.”\footnote{p.ii.}
They continued with a simple observation: if a traveler sets off from London and walks to an area where coal is to be found and keeps his eyes open, he will note that he passes through the same series of landscape, in the same order: first an area of clay and sand, next an area of chalk, followed by an area rich in calcareous freestone used in architecture. In the coal-rich areas, he will see (if he keeps both his eyes and his mind open) hills rich in the same sort of compact limestone, with grey and dark marble, and mines providing zinc and lead. A bit further on, he will find mountainous areas with slate, surrounding groups of granitic rock. This pattern, they wrote, was no accident:

The intelligent enquirer, when he has once generalised these observations, can scarcely fail to conclude that such coincidences cannot be casual; but that they indicate a regular succession and order in the arrangement of the mineral masses constituting the Earth's surface; and he must at once perceive that, supposing such an order to exist, it must be of the highest importance to oeconomical as well as scientific objects, to trace and ascertain it.

Geology was thus an outstanding exemplar of scientific enterprise during this century. Doing it right demanded enormous amounts of detailed observations, and a passion for seeking principles that brought regularities to light within the data. Geology was in a renaissance mode, as one historian has put it. It has also used large amounts of observations to develop a picture of the past and the principles by which the past gave rise to the present.

This was heady stuff! William Whewell, president of the Geological Society, in England, waxed rapturous in 1839, just thinking about how great geology was:

I confess indeed for my own part, I do not look to see the exertions of the present race of geologists surpassed by any who may succeed them. The great geological theorizers of the past belong to the Fabulous Period of the science; but I consider the eminent men by whom I am surrounded as the Heroic Age of Geology. They have slain its monsters and cleared its wildernesses; and founded here and there a great metropolis, the queen of future empires. They have exerted combinations of talents, which we cannot hope to see often again exhibited; especially when the condition of the science which produced them is changed. I consider that it is now the destiny of Geology to pass from the heroic to the Historical Period. She can no longer look for supernatural successes: but she is entering upon a career, I trust a long and prosperous one, in which she must carry her vigilance into every province of her territory, and extend her dominion over the earth, till it becomes, far more truly than any before, a universal empire.

Alexander von Humboldt was a great German geographer and explorer, and brother to the linguist Wilhelm von Humboldt. Not long after Whewell made his comments, Humboldt

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connected geology and languages in his monumental Kosmos, published between 1845 and 1862.

Languages compared together, and considered as objects of the natural history of the mind, and when separated into families according to the analogies existing in their internal structure, have become a rich source of historical knowledge; and this is probably one of the most brilliant results of modern study in the last sixty or seventy years. From the very fact of their being products of the intellectual force of mankind, they lead us, by means of the elements of their organism, into an obscure distance, unreached by traditionary records. The comparative study of languages shows us that races now separated by vast tracts of land are allied together, and have migrated from one common primitive seat; it indicates the course and direction of all migrations, and, in tracing the leading epochs of development, recognizes, by means of the more or less changed structure of the language, in the permanence of certain forms, or in the more or less advanced destruction of the formative system, which race has retained most nearly the language common to all who had migrated from the general seat of origin.

Von Humboldt’s remarks illustrate well how scientists at the time saw the history, geology, and historical linguistics engaged in a common enterprise at the cutting edge of knowledge.

Collecting and typologizing

During this period, each state, each king, each prince had his collection of plants, minerals, fossils, and animals mounted and stuffed, while passionate biologists, zoologists, geologists and geographers joined the groups of men exploring the world, thanks in part to the developments in the technology of navigation that made such expeditions possible. Some of these voyages have become famous, of course: from those of James Cook and Jean-François de La Pérouse to Darwin’s, and Alexander von Humbolt’s.

One of the principal goals of the expeditions was to enrich these collections, and among the greatest scientists at the beginning of the 19th century were the curators of these great collections, which they discussed, presented, and analyzed in their theoretical writings.

19th century science grew out of these collections, and the commentaries that were written on them. In a very real sense, the collections were the research instruments of science in the 19th century. A collection would lead to a proposal for a system of classification, a taxonomy. And in this context, a science would begin as a systematic classification of what nature provides. Theoretical reflections on the principles that underlay classification led the further development of hierarchical organizations, which led to more abstract structures and systems of relations. These structures and relations would lead eventually to historical reconstructions and to the declaration of missing elements, places where an element should be within the structure even if it had not yet been observed.

1Humboldt, 1858.  
2See Buffon, 1749-1789 Jussieu, 1824 Cuvier, 1817 Saint-Hilaire, 1818.
The first great modern classification of forms of life had been proposed by Carl Linnaeus in the 18th century. His *Systema Naturae*, which went through many editions during his lifetime, marked the beginning of a new scientific conception: that of systematics. The hierarchical taxonomic principles that served to classify the animal and vegetable world began in Linnaeus’ scientific practice, and evolved in effect into a theory—what Bourdieu called an enacted theory—and this systematic thinking would influence the entire 19th century, notably in Lyell’s conception of geology, Darwin’s of life, Mendeleev’s of chemistry, and ultimately Saussure’s reconstruction of the vowels of Indo-European. In a word, the greatest accomplishments of 19th century science.

### Darwin and evolution

Perhaps the single greatest scientific discovery of the 19th century was the theory of evolution through natural selection, proposed and developed by Charles Darwin and by Alfred Russel Wallace. Darwin published *On the Origin of Species* in 1859, and the world has not been the same since. Building on the work of researchers before him, and the observations and lore of stockbreeders, as well as decades of his own observations and meditation, Darwin proposed a new account of why and how the world of living things had arisen. The world of living things had developed and evolved, with one species evolving out of another in a slow process of change effected within a community of all of the members of the species at any given time.

Darwin’s central idea was that biological reproduction always involves variation, differences of sorts between the offspring and its progenitor. (This variation is greater when sexual reproduction is involved, since the offspring is a never-before-seen amalgam of two parents’ contributions.) The variations of the offspring will serve as a new basis from which the next generation is formed: each successive generation’s genetic code (as we now call it) varies slightly from that of the one that preceded it. Nature—everything that surrounds the organism—would challenge every organism in its struggle to survive and prosper, and not just nature. Even the internal efficiency of an organism could contribute to its ability to function well. Those organisms that fared well would survive better, to the point of having better adapted offspring themselves, while those that were less fit than others were likely to fail to survive and reproduce. Thus Darwin proposed a model of evolution fueled by only two natural principles: the random variation generator that introduces variation in the recombination of the DNA with each generation and the natural selection that selects specimens best fitted to their ecological niche. With those two principles he was able to justify and explain a general taxonomy of the living, and able to make predictions in some cases that we would find fossils that represented ancestral forms that had since disappeared.

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1. Linnaeus was also a great traveler, and he scoured Europe in search of specimens. Visitors can still see the botanical garden that he created for his collection at the University of Uppsala.
2. Later in the century, when structuralist methods of analyzing a corpus were getting underway, the work on taxonomies was not far from the thoughts of those putting together the new perspectives. Saussure wrote, in 1872 (when he was 15 years old), that “we have a sort of classification that unites not only species, but types (e.g., taxons). I do not claim that χλάδος for example is the same word as χλαλαμος I say simply that if we allow a primitive form kal, these two words can be derived from it. … We should not say that the dissimilarity between two words joined by a common root leaves the door open to allow just any word in: if the limits of a root are wide, they are also sharply marked.”Saussure. [1978(1874)]. 86
Teleology

There were two ways in which Darwin’s point could be seen in an even larger picture, and they relate to the opposition between mechanistic and teleological views that we discussed earlier. The interpretation that was mechanistic was viewed as a challenge to some conservative social views, while the weakly teleological interpretation view was that Darwin had shown exactly why we can be confident that the world is progressing (not unimportantly, this was the view that gave rise to social Darwinism).

The first interpretation, the mechanistic interpretation, emphasized the random character of the small changes that arise between generations. Some saw this as tantamount to the conclusion that there was no finality to the community of living organisms: there was no master plan of the living world towards which each organism was trying to satisfy. There was no evolution towards something, except in retrospect and in the eye of the beholder. Evolutionary changes took place in direct response to challenges and opportunities in the immediate world in which each organism found itself.

But there was another possible perspective that could be taken of Darwin’s scientific views, even though this was not his own interpretation. His account could be joined with the belief that evolution in the animal world was progressive—species that died out died out for a reason, no? they were losers—and there will always be those who choose modern humans as the pinnacle of life’s evolution. Darwin’s account could be viewed as one that provides an explanation for progress, grounded in an explanation that the less adapted, the less fit, would fail to procreate, and this very failure was the underside of the larger picture of progress which the species as a whole was engaged in. This perspective, with all of its consequent social implications, came to be known as social Darwinism. At its heart lay the view that there is no better way to characterize large-scale change than as a fierce competition, and to succeed in that competition was quite obviously the goal of all living things.

But neither interpretation was of any comfort to people who believed that the world was evolving in a specific direction towards a particular state or in a particular direction, the view that we associate with teleologism. We are going to encounter three different interpretations of teleology, though, and we need to clearly distinguish among them. The first is the simplest: it is the belief that there exists a specification of where the world is heading, and that specification exists outside the universe as we know it—typically in the mind of a God who exists outside of the universe, and who can conceive of a universe that is different from the one in which we live. The traditional term for such a view is transcendent, in the sense that both God and His idea of the universe exist outside of the universe, and we can refer to this as transcendent teleology. The second is an immanent conception of the goal towards which the world is tending: immanent views of God’s existence see Him as being one with the universe, not outside our universe: Spinoza is the ultimate spokesperson defending an immanent view of God. On this view, then, there are goals towards which the universe is heading, but they are of a piece with the universe that exists, just as God is (though there is no need to have an opinion about God in order to be a defender of immanent teleologism). The third interpretation of teleology is political. We will see this side of teleology emerge clearly in Chapter 9, as we explore the meaning of Trubetzkoy’s concept of Eurasianism.
To some, immanent teleologism seems impossible and contradictory, for how can the world be anything more than just what it is? And how can a goal towards which everything is moving not be part of what the universe already is? The immanent view of teleology is the most illusive, but also the most important in our story. It is a view that sets itself up as an alternative to a mechanistic view of the universe, but without casting about to find something exterior to the universe to explain what is going on within it. It is the belief that the 17th and 18th century Newtonian metaphor of the universe—billiard balls and complex systems of gears, as in a clock—are not sufficient to understand the world scientifically.

Two new ways of understanding physical systems that emerged in the 19th century would become extraordinarily important. One is the concept of a force field, such as an electromagnetic force field; the second was the notion of entropy, which was crucial for understanding what heat is, and how engines work: in a word, thermodynamics.

Before Michael Faraday and James Clerk Maxwell formulated the idea of electromagnetism as a force field, it was only natural to think of electrical (and magnetic) attraction and repulsion as forces that somehow related two objects that were at a distance from each another. Faraday rejected this, and proposed in its stead a vision of a field of forces that is present everywhere, and whose strength at any given point is created by charged objects. On this view, objects do not directly affect one another: each object affects the overall force field, which takes on specific values that can be calculated, and then the force field in turn acts on objects. This would be an important metaphor developed by gestalt psychologists, as we will see in Chapter 5.

Entropy was a very different sort of entity. During the 19th century, scientists studied the ways in which heat was created and how it flowed from one object to another. Heat had characteristics that it shared with other sorts of energy, which led scientists to conclude that in a closed system, energy is neither created nor destroyed, but is rather conserved. And yet in real systems, heat energy only flows from warmer to cooler objects, and never the reverse, an asymmetry in its style of conversion that seemed quite unlike energy in other domains. And entropy, a measurement of the disorder of a system, would always increase.

It followed from this that in at least one rather dismal sense, the universe did have a directionality to its evolution: it was always moving towards a state of greater entropy, and thus greater disorder, a thoroughly uninspiring conclusion. But a more appealing and elegant picture emerged as well: in predicting how an object will move in a force field and how a system of molecules will evolve in a larger thermodynamic system, the right way to understand the system is to conceive of it as a system in which the interaction of a large number of elements and forces seeks an equilibrium, a balancing of all the forces at every single place within the system.

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1 It was over the course of the 18th century that the notion that matter was neither created nor destroyed became clear, a discovery often associated with the French scientist Antoine Lavoisier. The 19th century saw the development of an awareness of the conservation of energy in all its forms, and in light of that observed conservation, it was easy to reach the conclusion that energy had a metaphysical reality no less than matter did. Sarton et al., 1929. It would take the 20th century only a few short years to be confronted with the notion that neither matter nor energy were always conserved, because one could be converted into the other.
Darwin and language

Darwin viewed language as an important factor in the development of the human brain—language did not simply reflect what was going on inside the brain, but was in addition a force for the development of the mind or brain. One of the central challenges of an evolutionary account of the origins of the human race was to come up with an account of how the brain evolved to allow more complex thought, and Darwin sought an account that would involve language. Perhaps language came first, he thought, and the greater cognitive abilities that came with linguistic skills would in turn have an effect on the brain. What led Darwin to this perspective? Robert Richards argues that Darwin was influenced by Wilhelm von Humboldt (1767-1835), whom we will meet below, and by Hegel, both of whom were in turn greatly influenced by Herder. Hegel, of course, was the leading German philosopher in the generation following Immanuel Kant.

Darwin: If we possessed a perfect pedigree of mankind, a genealogical arrangement of the races of man would afford the best classification of the various languages now spoken throughout the world; and if all extinct languages, and all intermediate and slowly changing dialects, had to be included, such an arrangement would, I think, be the only possible one.

By the time of Darwin's major publications, historical linguistics was an established discipline. Linguistics had taken the steps necessary for developing a rational taxonomy of languages whose groupings were historically meaningful, and had made major steps towards establishing the means to postulate a hypothetical series of stages in the history of the modern languages. This success at both a methodological and a conceptual level had enormous influence on Darwin's thinking, to the point where he devoted an entire chapter of his first major book to the parallels between the evolution of species and languages. He proposed sixteen criteria in support of this parallel, noting the importance of the existence of variation and drift in language change as in the biological world. Over a century later, William Labov would take as the theme of his presidential address to the Linguistic Society of America the ways in which controversies in linguistics regarding lexical diffusion and regular sound change could be understood against the backdrop of parallel questions in the early work in biological evolution. More recently, Labov has gone back to the 15 criteria that Darwin proposed, and showed that 14 of them had been verified in the linguistic context work in the 20th century.

The 15th criterion concerns the question of whether adaptive changes are improvements. Linguists today do not characterize linguistic changes as improvements or as deteriorations—and, as we shall see later in this chapter, the first linguistic scholars who felt themselves to be in rupture with their elders were the Neogrammarians, whose rejected their teachers' willingness to characterize changes in languages' style of morphological analysis in a positive or negative sense.

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1See notably Alter, 2005; Richards, 2002.
3Labov 1981.
Darwin was in good company in looking for support of his view of evolution from the new and exciting work accomplished by linguists: in this, he was joined by the geologist Lyell, as well as by the biologists Asa Gray and Thomas Henry Huxley, friends of Darwin’s, and Ernest Haeckel. And linguists made a similar point about the bigger picture that linguistics was opening up, notably Hensleigh Wedgwood (Darwin’s brother-in-law), Frederick William Farrar, and Max Müller and August Schleicher.

The Periodic Table

If exploration and classification were two of the essential passions of the 19th century, the quest for the basic building blocks of the physical universal was a natural task as well. The Aristotelian world, rediscovered by the medieval philosophers, and before them, Arabic philosophers, was built out of the elements of earth, water, air and fire, plus a fifth element, ether, that we could not sample here on Earth. The ancients did know something about the substances which later came to be understood to be “atomic”: copper, silver, gold, iron, mercury, lead, tin, sulphur and carbon, and arsenic, antimony and bismuth were added to the list later. But in the period beginning around 1735, some 40 more basic elements were discovered.

How did these elements differ? How should their properties be quantified? How could they be organized so that they could be conceived of as more than a hodge-podge of unrelated figments of God’s imagination?

The story of how chemistry got it right—how it figured out what an element was, how to distinguish an atom from a molecule, how to understand what it meant for a molecule to have a certain weight, and how to count the relative contributions of different elements to a single molecule—is a great story, and greater still because it was carried out without scientists being absolutely certain that there were such things as atoms. It was not until the early 20th century that the debate was finally settled about atoms, and scientists came to agree that they do indeed exist. But it was during the first three quarters of the 19th century that chemists got clear on the central ideas of elements, compounds, and molecules.

The man who crystalized the notion of the periodic table of elements was Dmitri Mendeleev, who was born in Siberia in 1834 and became one of the most important Russian chemists of his day—and with the development of the periodic table, one of the most influential chemists of the 19th century. The periodic table was not only important for chemistry: its very form became the image of the best work that science could achieve.

Mendeleev published his work on the periodic table in 1869, at the age of 35, and as he noted explicitly, the work was made possible by the important empirical work that had been accomplished over the course of the 1860s. The pattern that he discovered was a brilliant combination of careful study of numbers and observed properties, on the one hand, and the insistence on finding an overall schema that simplified everything, on the other. Look-

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1 Alter, 2003, p.4.
2 Many scientists were convinced of the existence of atoms in the 19th century, but it was not until 1905 and the article that earned Albert Einstein his Nobel prize that the controversy faded away, and the anti-atomists had to admit defeat.
ing back, he wrote about some of the basic principles that he had observed and taken very seriously: “The elements, if arranged according to their atomic weights, exhibit an evident periodicity of properties. . . Elements which are similar as regards their chemical properties have atomic weights which are either of nearly the same value (e.g., platinum, iridium, osmium) or which increase regularly (e.g., potassium, rubidium, caesium).” “They increase regularly”: this phrase hides the immensity of the creative leap required to recognize a pattern that no one had seen before. “We must expect the discovery of many yet unknown elements, for example, elements analogous to aluminium and silicon, whose atomic weight would be between 65 and 75,” and “the atomic weight of an element may sometimes be amended by a knowledge of those of the contiguous elements. Thus, the atomic weight of tellurium must lie between 123 and 126, and cannot be 128.”

Some twenty years later, at the age of 55, Mendeleev gave the Faraday Lecture to the Fellows of the Chemical Society in England, and he looked back then at the results and impact of the approach he had developed. Chemistry, he said, had reached the ideal set by Bacon and Descartes—its results were submitted to the scrutiny of both experiment and reasoning:

> Willingly or not, in science we all must submit not to what seems to us attractive from one point of view or from another, but to what represents an agreement between theory and experiment; in other words, to demonstrated generalisation and to the approved experiment. . . We still may hear the voices of its opponents; they enjoy perfect freedom, but vainly will their voices rise so long as they do not use the language of demonstrated facts.

This was a lovely phrase: *an agreement between theory and experiment*. Together, jointly, they set the standard that scientists and their ideas must respect. Mendeleev explained why he was able to come up with his hypothesis. The first major factor was the development of detailed information about the atomic weights of each of the elements. Part of this development was empirical, in the laboratory sense of the word; some of it was theoretical, in the sense that it was crucial to impose the condition that elements could contribute only in an integral (and not a fractional) way into the composition of molecules. All of this is very delicate, we know today, because the weight of an atom is simply related to the number of protons and neutrons in its nucleus, and since protons and neutrons weigh nearly the same amount, the weight will be nearly an integral multiple of the weight of a proton (or neutron). But the advancement through the periodic table, starting from the beginning, accords with the number of protons, regardless of the number of neutrons, and just why a collection of a certain number of protons wanted (or preferred?) a certain number of neutrons was a question wildly beyond the vision of any scientist in the 19th century. But that is not to criticize the Mendeleev and his colleagues: their advance was tremendous, it was a necessary condition for moving ahead, and it required a great leap of abstraction, both quantitative and qualitative:

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1 Mendeleev, 1889.
The solution of the problem advanced but slowly, because the facts, and not the law, stood foremost in all attempts; and the law could not awaken a general interest so long as elements, having no apparent connection with each other, were included in the same octave. [source:Mendeleev]

One of the most striking aspects of the development of the periodic table was the set of predictions that grew out of it regarding elements that ought to exist, if the periodic table was a chart in which each natural position would be filled by a presence, by an element with its own weight and chemical properties; these predictions were subsequently proven correct.

The periodic table is a magnificent monument to the style of fundamental scientific work that characterized the 19th century. Every student of chemistry studies it today. Despite the fact that it has little to say about deeper scientific questions—why are the electron shells populated as they are? why do heavier elements need more neutrons in their nuclei to be stable?—one could hardly imagine someone arguing that the periodic table was outdated and needed to be replaced. Yes, theory goes much deeper now, but the periodic table of the elements is an extraordinary synthesis of careful, quantitative measurement and a thoughtful classification of chemical behavior. It is difficult to put ourselves in the mindset of the 19th century chemist, whose laboratory work gave him access to atomic weight, which is based on the number of protons and neutrons in the nucleus, but no access to atomic number, which is ultimately the number of protons in each nucleus. Mendeleev and his world had no concept of neutron or proton, or anything beginning to resemble it. So he had to discreetly but adroitly find a way to fit elements with increasing—but irregularly increasing—atomic weight into a simple table, sometimes trusting in the elegance of nature to predict a place for a missing element (like gallium) or even to invert the placement of elements (tellurium and iodine), trusting to the existence of a structural simplicity in nature that would take many decades to affirm.

By its very nature, the periodic table makes an unlimited number of predictions, and we continue to discover (or create) new elements. As of our writing this, mankind has reached element number 115.

We will see that the periodic table provided a standard against which to propose and judge future models. The German psychologist Karl Bühler used the periodic table as a way to illustrate the importance of Trubetzkoy’s ideas of phonology in the 1930s.

Trubetzkoy's simple and lucid systematic idea is of great consequence in the theory of language...Let us again recall Mendeleev's idea by way of comparison. The task there was to arrange the atomic weights of the chemical elements and it turned out that they form a discrete series according to a curious law of numbers. The theoretical reflections in chemistry began here and resulted in the well-known success in the analysis of the make-up of the chemical elements and finally of matter in general. Here we are considering vocalization in the word images of human languages; it turns out that it, too, displays a transparent arrangement if the aspect of diacrisis [phonological contrasts]

The Synoptic Bible

We have already mentioned that the study of the Bible—and, in particular, the story that it told—made it impossible for 18th century scholars to construct models of language change that are believable today. But there is another side to studies of the Bible that may have helped early 19th century students of language. Among students of Christian theology, a controversy raged regarding the relationship of the four books of the Gospel, Matthew, Mark, Luke, and John, because they each told more or less the same story, but not exactly the same story. Students of the Bible asked themselves whether there were earlier versions—which were perhaps no longer known to us—that could have served as sources for the texts that had come down to them in modern times.

This came to be known as the synoptic problem: what was the relationship among the Gospels? Through the late 18th and the 19th century the problem was attacked by scholars of various sorts, especially in Germany. Gotthold Lessing and Johann von Herder, who were public intellectuals of their day (and were, in fact, friends), argued in favor of a reconstructed past of the Gospels in which their earliest form was oral, not written. Lessing was the first to posit (in 1778) an earlier gospel now lost; this hypothetical gospel has long been referred to as “Q” (for German Quelle).

Let us take a brief look at the kind of problem these scholars were concerned with, because in retrospect, it is striking how similar the problems they approached were to those addressed by the scholars of historical and comparative linguistics in the coming years. The books of Matthew and Luke have a number of similarities: in some cases, the words themselves are quite similar. Matthew 6:24 and Luke 16:13, for example, are identical: No man can serve two masters: for either he will hate the one, and love the other; or else he will hold to the one, and despise the other. Ye cannot serve God and mammon. More interesting, perhaps, is the relationship between the Sermon on the Plain that Jesus gives in Luke 6 and the Sermon on the Mount in Matthew and Luke, and in a much shorter form in Mark, where both the content and the grammar could be juxtaposed and differences identified.

The development of synoptic versions of the Bible was a major stimulus to the discussion of how differences among the Gospels could serve as the basis for a historical and causal account—causal in the sense that time came into the picture, and what was earlier was the cause of what came later—of the similarities and differences among the Gospels. The logic of this kind of intellectual puzzle is extraordinarily close to the problem that the historical linguists of the next generation were just about to embark upon. In both cases, the heart of the matter is the observation of parallels, and then undertaking a hypothetical scenario

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1The term synoptic comes from the Greek “seen together,” and refers to the practice of presenting the Gospels juxtaposed, by content, on a single page, so that it is clear what material is presented in more than one Gospel, and how the different presentations are similar or different. This graphical practice would have an important influence on the methods used to compare sister languages descending from a common ancestor.
that will provide a simple explanation for why things that are similar or identical are that way.

From a methodological point of view, and perhaps even an epistemological point of view, this was a remarkable step forward, employing a precise textual critique that looked a range of facts squarely in the face. Sentences in Mark, Luke, and Matthew were lined up one with another; differences were noted, similarities compared and evaluated. Arguments were made as to which came first, or at least which one had gone from an oral to a written tradition first.

Linguistics

“If a monument were to be erected to the admirable work done in the nineteenth century in language research, two words could not be left out of the inscription: comparison and history.

— Karl Bühler
Theory of Language:1

Nineteenth century linguistics engaged with the study of both living and dead languages in two ways: the first tried to uncover the ancestral relations between languages, which would show how one language changed and evolved over time into another, while the second was part of a more general effort to look into the functioning of languages and see how languages differed. This second trend focused on the morphology, or internal word structure, and morphology would continue to be the principal stage upon which these discussions would be played out over the course of the century.

Morphology is the word we use to describe the patterns of word-internal structure in language, but it would not be until half-way through the 19th century that the term would take on such a meaning in linguistics. Until then, linguists spoke generally of “word structure,” and the rise of the term morphology in linguistics was encouraged by linguists (notably August Schleicher) who saw deep connections between biological and linguistic structures of various sorts. The word morphology had been coined at the end of the 19th century by Goethe, the poet and polymath who was deeply interested in the nature of biological species, their modifications, and their relations, and for Goethe morphology was the general study of form, which would include a typology of form, a set of criteria to establish similarity and differences among forms, and the ways in which forms could be composed with each other. This perspective would be applied to various sciences over the course of the 19th century, including chemistry, zoology, music, and linguistics.

Morphological analysis would rapidly become the central type of analysis done by linguists throughout the 19th century, and a number of influential suggestions would be made about what differences in morphology were important, and what were not.
While we are on the subject of the changing use of technical terms, we should mention, too, that the term *inflection* is used differently today by linguists than it was in the early 19th century. The term then referred to internal changes in a root to mark grammatical features—as with *fall/fell* in English. Today, the term *inflectional morphology* has quite a different meaning; it refers to the ways in which the forms of a lexical paradigm differ from one another—all of the tense subject-agreement forms of a verb, for example, and inflectional morphology is distinguished today from derivational morphology, which is responsible for the analysis of the ways in which distinct words are related to one another (for example, a suffix like the English suffix -ize can create a verb from a noun: *winter/winter-ize, scandal/scandal-ize*).

William Jones and the call of the Orient

As we noted just above, the greatest intellectual achievements in linguistics during the nineteenth century involved historical and comparative linguistics, the areas that ask questions about the historical relations among languages alive at a given moment and languages once spoken but now extinct.

In later years the story would often be told, and then retold, of how comparative linguistics as we know it began at the end of the 18th century with Sir William Jones, who put forward the view that a common language must have existed that gave rise historically to Greek, Latin, and Sanskrit, and likely to the Germanic and Celtic languages. He wrote, in 1788, a passage that has been cited in virtually every history of the development of modern linguistics:

> The Sanscrit language, whatever be its antiquity, is of a wonderful structure; more perfect than the Greek, more copious than the Latin, and more exquisitely refined than either, yet bearing to both of them a stronger affinity, both in the roots of verbs and the forms of grammar, than could possibly have been produced by accident; so strong indeed, that no philologer could examine them all three, without believing them to have sprung from some common source, which, perhaps, no longer exists.


Most of the distinguished books in the standard linguistic canon point directly to Jones as the originator of notion that the Indo-European languages formed a family. Certainly it is true that in 1788, Jones was an Orientalist of considerable talent and renown, and he had already published a monumental grammar of Persian. He was a judge and a royal administrator, and interested in the principles of traditional Hindu law.

And yet considerable work on the relationships among the languages of Europe had started in the early years of the Renaissance. Current scholarship has shed considerable light

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1. Jones’s creation of modern comparative linguistics is recounted, for example, in Bloomfield, 1932: 12; Saussure, 1995 [1916]: 2; Pedersen, 1931: 18.
2. For a new view on this development, see Campbell and Poser, 2008.
3. See Burridge, 2013 for a recent overview, and also Koerner, 1975.
on the richness and the complexity of the development in Europe of our understanding of the historical relationship of the European languages, and a number of scholars have argued that Jones’ contribution has been considerably exaggerated and the historical reality oversimplified. The current discussion seems to be structured in large measure to address the credit problem (how much intellectual credit should Jones receive?), a difficult question that we recused ourselves from in Chapter One—and yet it is a question that many find hard to simply let go of.

Renaissance scholars well before Jones had already established an understanding of the evolution of Latin into the Romance languages, and in the 16th century, Joseph Justus Scaliger had suggested groups corresponding to Germanic, Greek, Latin and Slavic. 1 17th century scholars such as Andreas Jäger and George Stiernhielm began to propose hypotheses linking the languages known to Western scholars, and a good deal of energy went into trying to determine which, if any, of these known languages was the first and original language. In the background of this discussion was the story of mankind as presented in the Judeo-Christian Bible, to be sure. The great philosopher Gottfried Leibniz spent an enormous amount of effort comparing the languages not just of Europe, but of Asia and Africa as well, and proposed quite respectable hypotheses about the development of these languages. He put Arabic and Hebrew and other Semitic languages in a category he called Aramaic, and the European languages (other than Basque) into the Japhetic branch. As far as we can tell, his thinking was guided and constrained by his understanding of the history of mankind offered by the Christian Bible. It is striking, in retrospect, that the single most important intellectual shift that was necessary to arrive at the modern view was dropping what had seemed like an essential constraint on possible theories, the Bible’s rough account of the beginning of human history.

There was indeed an understanding common to a number of these works that there had once existed a “no longer spoken parent language which in turn produced the major linguistic groups of Asia and Europe.” 2 A hundred years before Jones—in 1686—Andreas Jäger had written words not so very dissimilar. 3

An ancient language, once spoken in the distant past in the area of the Caucasus mountains and spreading by waves of migration throughout Europe and Asia, had itself ceased to be spoken and had left no linguistic monuments behind, but had as a “mother” generated a host of “daughter languages,” many of which in turn had become “mothers” to further “daughters.” (For a language tends to develop dialects, and these dialects in the course of time become independent, mutually unintelligible languages.) Descendants of the ancestral languages include Persian, Greek, Italic (whence Latin and in time the modern Romance tongues), the Slavonic languages, Celtic, and finally Gothic and the other Germanic tongues.

And the Jesuit Gaston-Laurent Coeurdoux was also responsible for an analysis prior to Jones which postulated a family of languages which we would today call Indo-European. 4

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2 Metcalf, 1974, p. 251.
3 Quoted in Metcalf, 1974: 233; and see Campbell and Poser 2008.
4 See Godfrey, 1967, pp. 57-59, and especially Trautmann, 2008, 18ff, which presents an important case for viewing the question of language origins against the background of the understanding of the genetic relations
Even if the existence of a family of Indo-European languages and the postulation of an ancestral language that is no longer spoken was not a totally new idea, Jones’s formulation had considerable impact, in no small part due to Jones’s scholarly reputation—and, perhaps, the fact that the time was ripe for it. Jespersen gives Jones credit for stimulating interest in Sanskrit, but noted that Jones “did nothing to carry out in detail the comparison thus inaugurated, and it was reserved for younger men to follow up on the clue he had given.”

The cultural importance of Indo-European

Let us return now to the early 19th century. The dawning realization that there was an Indo-European family, with a considerable depth in time and cultural richness, served to provide a new answer to European issues of identity which became acute as a new set of nations emerged over the course of the century. The Western tradition had long been ambivalent about the uncomfortable fact that it was the Semitic sphere, not the European, where a tradition of language, literature, and religion reaching back at least two thousand years could be found. But with the emergence of the Indo-European family, a new family, the Aryan family, was now ready to appear with a rich and coherent tradition, not to mention a powerful set of myths. The word Aryan was coined by Schlegel in 1819 on the basis of the Sanskrit root ary-, “noble.” In francophone and anglophone countries, one spoke of “Indo-European,” while in Germany one spoke of “Indo-Germanic,” a term created by Franz Bopp.

Jean-Paul Demoule put himself in the position of a 19th century European of this time:

Had not the Europeans till then been endebted to the Jews, the image par excellence of the Other, in their accounts of their own origin?—surely this was scandalous. And so the European intellectual groped for the stuff from which a myth could be put together, a myth that would give Europeans indigenous roots; this quest was all the more intense in Germany, a country without a state, or a territory, or even a single language.

Ernest Renan was a well-known writer in France in the mid 19th century, an expert on the Middle East and especially Christianity—Renan’s renown was based more than anything on his efforts to show that Jesus had somehow risen above his Semitic background to become Aryan. Unappealing as that hypothesis might appear today, it shows how work that began as strictly comparative linguistics opened the door for those, like Renan, who simply needed another account of who he and his countrymen were: they were rooted in a deep historical among peoples, and the difficulty with which European thought extricated itself from the background myths of Eden, Moses, and the Tower of Babel.

1Jespersen, 1922, pp. 33-34. See Metcalf, 1974 for extended discussion, and Godfrey, 1967. Jespersen’s comment in this paragraph reads a bit like an unprovoked criticism; it only makes sense if there lies behind it some expectation of work that should be done by anyone noted by history books. There will always be questions left for younger people to follow up on. That is the nature of knowledge, which begets both ignorance and questions. If Jones left work for those following him to accomplish, so did Jespersen; of whom can that not be said?

The right answer to the credit problem takes on a special importance from the point of view of the linguists we have cited, because the discovery of Indo-European has an essential role to play in the account linguists give themselves as to their origin.

2See Norman, 1929 and more generally, Benes, 2004.

3Demoule, 2004 and see Demoule 2014 for important developments of this point.
tradition that was, most importantly, not Semitic. It was Indo-European, Indo-Aryan—a fine alternative to the Semitic family, if one did not want to be culturally indebted to Jews and Arabs.

Renan was able then to divide his understanding of the Western world into two parts: “The most important conclusion that the historical and philological sciences have arrived at in the last fifty years has been to show in the general development of mankind two elements which (though they may have varied in their relative strengths over time) have served as the frame upon which the fabric of history has been woven.” These two parts were the Semitic and the Indo-European.

As far back as the 17th century and indeed almost as far back as the Middle Ages, it was recognized that the Hebrews, the Phoenecians, the Carthaginians, the Syrians, Babylonia (at least after a certain point in its history), the Arabs, the Abyssinians had all spoken languages that were of the same family. Eichhorn, in the last century, proposed the name “Semitic” for these languages, and inexact though it may be, may well continue to be used.

But there was a whole new way to understand European history now, he wrote:

In the first years of our present century an important discovery, both delicate and important, was made. Thanks to a knowledge of Sanskrit, due to the English scientists of Calcutta, the German philologists, notably Mr. Bopp, established solid principles with which one could establish that the ancient languages of Brahman India, the different dialects of Persian, Armenian, several dialects of the Caucasus, Latin and Greek and the languages derived from them, the Slavic, Germanic, and Celtic languages all form a vast system, profoundly different from the Semitic group, which was been termed Indo-Germanic or Indo-European.

In short, the discovery of the relatedness of Sanskrit and the vast majority of the languages of Europe was a matter of importance, value, and meaning, to thoughtful people—and in many cases, anxious people—everywhere in Europe. That work had an impact on the way in which Europe saw itself, and how it understood its history and its prehistory. This return to India passion inspired an Aryanism that was at first scientific but that evolved into a political and racial trend. The term race began as a descriptive term with no racist connotation, in our sense today, and we see that in the universalist humanism of Renan, for example; but it slowly took on the sense that we know today, which began with Arthur Gobineau, and Georges Vacher de Lapouge, and was developed by Houston Stewart Chamberlain in the larger context of a social Darwinism which was, in turn, borrowed from Herbert Spencer and Ernst Haeckel.

Aryanism and Indo-Germanism became the basis of a national movement, the Volksisch movement that arose at the end of the 19th century, incorporating racist elements in a
quest to determine the identity of the German people. The movement was based on the
anti-Semitic writings of Paul de Lagarde, who began his own career as a Semitic philolo-
gist, and who shifted his interest to Indo-Germanic and Sanskrit, influenced by Max Müller,
a linguist we will meet shortly, and Herbert Spencer, the influential thinker who coined
the phrase “survival of the fittest.”[1] This nationalist movement was strongest in Germany,
where the “return to India” movement brought cultural, ethnic, and mythological answers
to the questions being posed by philosophers about their origin as a people.[2]

Within German romanticism, Aryanism was tightly linked to organicism, the view of lan-
guage as a living organism; it was Schleicher[3] who most clearly expressed this very German
position: “Languages,” wrote Schleicher, “are natural organisms which, beyond human will
and in accord with definite laws, are born, grow, develop, age, and die; languages thus
manifest that series of phenomena which we normally view as aspects of life. Glottics, or
the science of language, is hence a natural science.”[4] This would become a hotly contested
position later in the century, when linguistics moved further and further away from the
biological metaphor. But linguists still refer to the smallest core of a word as its root.

Generations in linguistics

In the previous chapter, we discussed the important role that generations play in the de-
velopment of the mind sciences, and nowhere is this clearer than in the development of
linguistics in the 19th century. We are going to look now at the first three generations of lin-
guists, illustrated on the next page. The first generation was composed of the scholars who
began the serious comparative study of the European languages after William Jones, bring-
ing Sanskrit into that larger picture; the principal members of this group were Friedrich von
Schlegel, Franz Bopp, Jacob Grimm, Wilhelm von Humboldt, and Rasmus Rask. It was only
at the end of this generation that universities began to be a home for researchers: Bopp,
as we will see, obtained a chair with the support of the influential Wilhelm von Humboldt.
The first generation learned their linguistics by studying language directly.

The second generation included Georg Curtius, August Schleicher, William Dwight Whitney,
and Max Müller, who deepened and broadened their teachers’ work.[5]

The third generation brought the first instance of social rupture in linguistics, pitting the
Neogrammarians in Leipzig against the image they had of their teachers. The Neogrammar-
arians were the first generation of German linguists that was able to overcome the Romantic
ideas of language decay, and develop a modern account of sound change. These included
such linguists as August Leskien, Berthold Delbrück, Hermann Ostoff, Karl Brugmann, and
Hermann Paul. Heavily influenced by the Neogrammarians were two students who es-

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[1] Regarding aryism as an ideological response to semiticism, see Olender, 1992 and Demoule, 2014. See
[2] For a study of the influences of Indo-Europeanism on the European (and especially the German) intellectuals,
see Cowan, 2010. (The chapters of the book examine the intellectual struggles of such luminaries as Johann Got-
tfried Herder, Friedrich von Hardenberg (Novalis), Friedrich Schlegel, Friedrich Schelling, Schopenhauer, Hegel,
and Nietzsche with the “mythical image of India” (p. 5).) See also Marchand, 2009.
[5] It is not at all insignificant that they all began as Semiticists, before turning to Sanskrit.
tablished schools outside of Germany: Ferdinand de Saussure, a Swiss francophone who
studied briefly in Leipzig, and Jan Baudouin de Courtenay, a Pole who developed one of the
first schools of phonology in Russia, after receiving his doctorate in Leipzig. Both Saussure
and Baudouin viewed themselves as autodidacts, as scholars who had arrived at their in-
sights without the help of the teachers who had lectured to them, as if they were unwilling
or unable to digest anything worth keeping in their heads from the things that they heard
in lectures.

Proto-Indo-European
We must briefly introduce some notions that will play an important role in the discussion
of the first several generations of linguists in the 19th century, all of whom worked on the
reconstruction of the early Indo-European language, or some closely related issues. Once it
was generally accepted that Jones’s basic idea was correct, and that Sanskrit, Latin, Greek,
and most of the other European languages descended historically from a single language of
which no direct evidence exists today, it became perfectly clear that there was a great chal-
lenge to face: would it be possible to reconstruct the earlier language, to somehow spell out
the words, and the roots, stems, and suffixes of this hitherto unknown language? To be sure,
scholars had long been aware of the fact of language evolution: knowledge of Latin had not
disappeared from Western Europe, and the common inheritance of the modern dialects
of French, Italian, Spanish, and the other “Romance languages” was widely appreciated.
But while there were a good number of evident commonalities among the Indo-European
languages, the differences were far more numerous, and the challenge of explaining those
differences was considerable. Ultimately the task for the linguist was to develop a set of hy-
potheses regarding what the word structure, and sentence structure, was in the most recent
common ancestor of the Indo-European family, presented along with a set of hypotheses for
how the twelve or so branches of Indo-European had changed as they went their individ-
ual ways—and this was precisely a matter of determining the morphology of the language
in Goethe’s sense. Behind this work was the belief that the reconstructed Indo-European
language (or Proto-Indo-European) would have been spoken by a single group of people, in
some particular geographical area whose location remained to be determined. That group
of people, perhaps living somewhere in Central Asia, gradually migrated in various direc-
tions, beginning before any written or unwritten records that remain today and continuing,
let us not forget, right up to the present.

An example or two might be helpful here. We know that the Greek word for “horse” was hip-
poi; we have embedded that word in hippopotamus (from horse of the river; hippo+ potamos),
and we know that the Latin word for “horse” was equ¯i. Sanskrit had aśv¯a, and those are
just three of the older forms that we know. From these and the general patterns we have
uncovered, we can reconstruct the Indo-European word for horse as *ekwo, where we put
the asterisk to indicate that this is our hypothesis of the form of the word at an earlier time.
This example is a bit opaque; other examples of related words in the various Indo-European
languages are more transparent.

1 Included reconstructed forms.
Friedrich von Schlegel

Friedrich von Schlegel (1772-1829) holds an important place in the history of German culture: he was a major figure in the rise of the Romantic movement, which emphasized emotion over intellect, and beauty over rationality. In his late 20s, after studying ancient Greek, he moved to Paris, where he was able to study both Persian and Sanskrit, because of a rather unusual situation. A British citizen named Alexander Hamilton, born in India, had been a member of William Jones's Asiatic Society. After Jones's death, Hamilton moved to England from India, and he was working with Sanskrit archives in Paris when war broke out between France and England in 1803. Though technically an alien citizen of an enemy power, he was permitted to teach Sanskrit in the French capital, and he counted Friedrich Schlegel among his students, and Franz Bopp, as well as a Frenchman named Antoine-Léonard de Chézy, who would later obtain the chair of Sanskrit in the Collège de France; we will meet Franz Bopp just below, who studied Sanskrit in Paris with both Hamilton and Chézy.

Schlegel's deepest interests lay in art and poetry, and by today's standards, he was much too quick, and too comfortable, in making decisions about what kind of word structure is degenerate, a style of expressing his ideas that a good many linguists continued to indulge in for another fifty years, until the time of the Neogrammarians. He was particularly unimpressed by languages in which it was easy to segment an inflected word into stem and affix, and he viewed this analytic simplicity as entirely artless.

Schlegel proposed a first classification of ways in which words could be formed—of morphology, as we say today. When one looks at sets of grammatically related words (which might be as simple as drink and drank, or jump and jumped), we see that modifications may either be inside the root (as in drank)—and Schlegel called such modifications “flexional”—or formed by addition of material (such as -ed)—we call these additions “affixes”. Ten years later, Schlegel's brother, August Wilhelm Schlegel, proposed a third category, that of

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2The classic discussion of morphological systems in contemporary linguistics remains that of Greenberg, 1963. It would take us far afield to enter into a discussion of Schlegel's deep concerns about the depth of the decline of modern European culture; see Gérard, 1963 for a detailed discussion of Schlegel, Bopp, von Humboldt, and other linguists of their generation, and the concerns about the decadence of society in the West. We have left out of our story so far any mention of Friedrich's brother August, who was as famous among German romanticists as our Friedrich was, and who will appear briefly below.

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<table>
<thead>
<tr>
<th>Language</th>
<th>father</th>
<th>mother</th>
<th>brother</th>
<th>one</th>
<th>two</th>
<th>three</th>
<th>nine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sanskrit</td>
<td>pítár</td>
<td>mātár-</td>
<td>bhrātār-</td>
<td>ēka-</td>
<td>d(u)vá</td>
<td>trāya-</td>
<td>návā-</td>
</tr>
<tr>
<td>Latin</td>
<td>pater</td>
<td>mater</td>
<td>frater</td>
<td>u:nus</td>
<td>duo</td>
<td>trēs</td>
<td>novem</td>
</tr>
<tr>
<td>Greek</td>
<td>patē:r</td>
<td>mātēr (Dor.)</td>
<td>phrāte:pector</td>
<td>oinē: ‘ace’</td>
<td>dúo</td>
<td>treis</td>
<td>ennē(w)a</td>
</tr>
<tr>
<td>Old Irish</td>
<td>athir</td>
<td>māthir</td>
<td>brāthir</td>
<td>o:en</td>
<td>da:u, da:</td>
<td>trī</td>
<td>nōin-</td>
</tr>
<tr>
<td>Gothic</td>
<td>faōar</td>
<td>māthir</td>
<td>brōpar</td>
<td>āins</td>
<td>ūni</td>
<td>priya</td>
<td>niun</td>
</tr>
<tr>
<td>Old Icelandic</td>
<td>hayr</td>
<td>māyir</td>
<td>elbayr</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Armenian</td>
<td>hayr</td>
<td>māyir</td>
<td>elbayr</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Tocharian A</td>
<td>pācar</td>
<td>mācar</td>
<td>pracar</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Old Church Slavonic</td>
<td>mati</td>
<td>bratrū</td>
<td>dūva</td>
<td>trije</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Fig. 2.1: Generations
languages that have neither flexional nor affixal morphology, which is possible if words remained isolated units, not forming paradigms or other sorts of sets of closely related words; today we call these “isolating” languages, and Chinese illustrates this kind of language.

Schlegel saw something “organic”—which was, in his view, a very good thing—in a language with a flexional system, that is, one that makes internal changes to the root of a word (these changes can be to an internal vowel, or to a consonant). “In the Indian and Greek languages each root is actually that which bears signification, and thus seems like a living and productive germ, every modification of circumstance and degree being produced by internal changes.” Now, reconstructed Proto-Indo-European contained many complex changes in the root that were occasioned by grammatical features, and this fact has been of great help in determining the relationship of the descendant languages. These complex changes were “woven into a fine artistic tissue,” Schlegel wrote, and that has made reconstruction possible. When languages express their morphological features with distinct morphemes, each added almost one after another, it seems, there is no “bond of union,” and their “roots present us with no living productive germ, but seem like an agglomeration of atoms, easily dispersed and scattered by every casual breath.”

Schlegel was partial to the term organic, which he opposed to the word mechanical, to describe certain aspects of language, and famously wrote:

1 Schlegel, 1849, p. 449.
2 cited in Koerner in original. Translation appears to be Lehmann’s, on his website. Friedrich Schlegel 1808:28 Über die Sprache und Weisheit der Indier. Note the use of mechanical here, in light of our on-going discussion of the word teleology.
This debate has by no means been settled today; there are still competing historical scenarios placing various prehistoric bands of Indo-European ancestors on various sides of the Black Sea, and while advances in DNA tracing and in archeology have clarified the situation, fundamental controversy about the historical character of the spread of the Indo-European languages remains alive today.

First generation

Franz Bopp 1791-1867

Jacob Grimm 1785-1863

Friedrich von Schlegel 1772-1829

Rasmus Rask 1787-1832

Wilhelm von Humboldt 1767-1835

Johann Wolfgang von Goethe 1749-1832

Johann Gottfried Herder 1744-1803

Immanuel Kant 1724-1804

Franz Bopp

Franz Bopp was the youngest member of this first generation of linguists, and also the first linguist to obtain a professorial position to do modern linguistics—in his case, developing Indo-European linguistics. As a student, he had been inspired by Schlegel's book to focus on Oriental studies, and he studied Sanskrit with Schlegel's tutor Chézy in Paris. He also interacted with Alexander Hamilton, as well as Wilhelm von Humboldt, who was a diplomat at the time in the Prussian embassy located in Paris. He was the first major linguist to develop an explicit account of the evolution of much of the morphological structure of Latin, Greek, Persian and Sanskrit—inspired by the work of Schlegel in particular on Sanskrit, though Bopp was able to provide a clearer picture of the changes involved. One of his best-known discoveries illustrates well what 19th century comparative linguists were looking for: not the evolution of words, but methods to use knots of complexity in separate languages in order to understand the historical relationship between the languages. Bopp did just this, showing that the Celtic languages (such as Welsh, Irish, and Breton) were part of the Indo-European family. It was well known at the time that in certain grammatical constructions, the initial consonant of a word could undergo systematic changes that were occasioned by the preceding word. In Irish, we see *a cara* “her friend,” but *a chara* “his friend” (where the *ch* is a velar fricative), and *a gcara* “their friend,” (where *gc* represents the familiar sound /g/). The changes in the second word are determined by the word that precedes,

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1Benes, 2004
2See Demoule 2014 for a discussion of these scenarios.
and many other words of Irish show one of these three kinds of effects (called mutations). Bopp discovered that the kind of effect a word has can be determined by looking at the corresponding form in Sanskrit! Irish a “her” corresponds to Sanskrit asyās, Irish a “his” corresponds to Sanskrit asya “his”, and Irish a “their” corresponds to Sanskrit ējām “their.” Irish words that correspond to vowel-final words in Sanskrit act like Irish “her”, and those that end in a nasal consonant act like Irish “their”. What an astonishing discovery! Let us not lose sight of the fact that part of the beauty of this discovery derives from the fact that Bopp followed Schlegel’s belief that studying the comparative linguistics of the grammatical system was more important than comparing the form of lexical roots and items.

<table>
<thead>
<tr>
<th>Sanskrit</th>
<th>Celtic</th>
</tr>
</thead>
<tbody>
<tr>
<td>asyās</td>
<td>her</td>
</tr>
<tr>
<td>asya</td>
<td>his</td>
</tr>
<tr>
<td>ējām</td>
<td>their</td>
</tr>
<tr>
<td></td>
<td>a cara</td>
</tr>
<tr>
<td></td>
<td>a chara</td>
</tr>
<tr>
<td></td>
<td>a gcara</td>
</tr>
</tbody>
</table>

Bopp’s work shifted the underlying assumptions about how European languages related to all of the rest of the world’s languages. By identifying more rigorously what constituted the Indo-European languages, it became even clearer how different the non-Indo-European languages were from the Indo-European. As we noted at the beginning of this chapter, this was the moment when the globe was becoming much older in people’s minds, and the community of mankind was being rethought. Bopp’s book on comparative grammar was published over a period of twenty years and had an enormous influence on the discipline; it was in its third edition at the time of his death.

Bopp saw morphology rather differently than Schlegel did, and their disagreement (which grew over time) reflects a difference of views that we still see today, in some respects. Schlegel believed strongly that the governing principle of morphology in Sanskrit was what he would call “inner change” in the roots, which would soon be called Umlaut and Ablaut, and which today might be analyzed as the effect of a rule on the phonological substance of a root. For Schlegel, any change that is not the addition of a prefix or a suffix (as these internal changes are not) is organic; the addition of an affix would be, in his view, mechanical. Most linguists today are in agreement that such a difference might well be analyzed in different theoretical ways, even if they would not agree that a language chooses just one sort of strategy or the other (many languages employ both). Few, if any, would defend the notion that one sort of language is better, or more organic, or glorious, than the other. Bopp, on the other hand, was strongly inclined to divide words into morphemes, pieces that he could associate with grammatical function, in a fashion that some, but only some, linguists share today. More than 100 years later, Charles Hockett would dub Bopp’s theoretical preference as an item and arrangement model. Thus Bopp’s conception of a perfect language shifted from that of Schlegel: for Bopp, perfection lay in the natural correspondence between the pieces of a word and the functions expressed by the word as a whole.

Bopp’s work reads today like modern linguistics in certain ways. He notes, for example, the potential mood in Sanskrit is realized with a i between the root and the suffix marking

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1Example from Pedersen, 1931, pp. 57-8.
2Verburg, 1949
3This is a particularly striking aspect of Distributed Morphology.
the subject; the \( \tilde{i} \) becomes \( y \) before a vowel \( ady\tilde{a}t, \ ad\tilde{a}t \) (the root is \( ad \) “eat”), and merges with a preceding \( a \) to become \( e \), as in \( bhav\tilde{e}t \) “he/she/it would be” instead of an expected (but incorrect) \( bhava\tilde{a}t \). Bopp notes the parallel situation in the Greek optative, where the \( i \) is “inserted just in the same way as \( \tilde{i} \) is in Sanskrit, between the root and the personal termination.” And the same is found in Gothic, relating \( Soky\tilde{a}m \) “we seek” and \( sokya\tilde{a}m \) “we may seek.” Or a few pages later, comparing a 1st person singular suffix which is \( m \) in Sanskrit to a suffix which is \( n \) in Greek, he notes that the \( \mu \) is changed to \( \nu \) “conformably to the prevailing principle of the language, which does not permit the use of a final \( \mu \)”:

Bopp's analysis leaned heavily towards an abstract morphological analysis, in the sense that the internal pieces of the word—its analysis into morphemes—would each be assigned a grammatical function in the sentence in which it is found. He viewed the central relation in morphology to be binary, of which one item is basic, the other accessory (a “transparent agglutinative structure”, as Verburg calls it): today we might say lexical and grammatical. His structural intuition is shared by many linguists today. By no means did his view in this regard convince his colleagues.

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Bopp's introduction to his most famous work (Bopp, 1885) contained a passage that expressed well Bopp's perception that he was doing something new by studying languages “for their own sake”:

As in this work the languages it embraces are treated for their own sakes, i. e. as objects and not means of knowledge, and as I aim rather at giving a physiology of them than an introduction to their practical use, it has been in my power to omit many particulars which contribute nothing to the character of the whole; and I have gained thereby more space for the discussion of matters more important, and more intimately incorporated with the vital spirit of the languaore.

This phrase would be echoed decades later in Ferdinand de Saussure's work.

Verburg argued that Bopp's analysis was essentially synchronic in outlook: “Bopp compares forms of language which he takes to be static...the diachronic process with its transitions do not interest him as such. Especially the typically Romantic ethos with regard to history is wholly absent in him.” (453) “Everywhere Bopp doggedly insists on the reduction to affixing, e.g. infixing, on the elementary addition of formerly independent linguistic elements (except for reduplication), in which the primitive element, the root, bears the [fundamental concept] and the affixed (or infixed) elements bear the [relational concept].”

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1 Bopp, 1885.
2 There is an enormous literature on the rise of 19th century historical linguistics, of excellent quality, written by scholars who often feel that they disagree deeply with all the others. Pedersen, 1931 is an excellent read; Koerner’s more recently and scholarly “European Structuralism: Early beginnings” Koerner, 1975 is also useful in this context (even though it places its focus elsewhere, as the title indicates).
From Humboldt’s point of view, Bopp’s work, and more generally historical and comparative grammar, was strategically important for the construction of a German identity, and he was able to easily persuade the Kaiser to create an academic chair for Bopp in Berlin.

**Wilhelm von Humboldt**

Wilhelm von Humboldt’s placement in the first generation of linguists seems odd if one simply looks at the year in which he was born: he was in fact twenty years older than Rask and Bopp, but his own career as a linguist did not begin in earnest until he retired from a career as a Prussian civil servant and diplomat in 1820, at the age of 53. Not that he did not work on language and languages while he was a diplomat: he certainly did. When he was Prussian ambassador to England, he took private lessons on Sanskrit from Bopp, who was doing research in England at the time. And von Humboldt did much the same when he was in Paris.

Von Humboldt articulated a view according to which the ability of humans to learn languages, with all their richness and depth, was surely based on a deep-seated human capacity. “Language could not have been discovered,” he wrote, “if its prototype, its *Typus*, had not already been present in the human mind.” What a human ear hears is not a stimulus, like one that an animal might respond to; it is a “an articulated sound designating an idea.” And he believed that language could not have been slowly developed by humans: “its discovery could only happen all at once. The human being is only a human being because of language: in order to discover language he must already be a human being.” Of course, languages are learned, but that learning is possible because inherent in humans is a functioning that allows them to be creatures who speak. He saw that in babies: “Anyone who observes infants carefully will agree that their way of imitating the sounds of those who are around them is less a matter of learning than of guessing and creating.”

Von Humboldt developed the morphological typology that the Schlegels had begun, proposing that many North American languages should be classified as *incorporating*, allowing for the occurrence of more than one stem in a word—indeed, it remains widely used today. If we look at what von Humboldt wrote with our present-day eyes, we can interpret his discussion charitably, and we can see that he was sensitive to at least three important characteristics of some, but not all, morphological systems. Some languages present internal changes to stems for grammatical reasons—*internal* in a left-to-right sense, just as we see in English in the changes that relate the three words *sing, sang, sung*. Languages that express grammatical information in this way were called *inflecting* during this period, as we have noted. The principal alternative to this kind of morphology was the affixal morphology, whereby a word was composed of a stem, with one or more affixes (i.e., prefixes or suffixes). There was a tremendous suspicion and bias in the minds of linguists such as von Humboldt against affixation and in favor of inflection, and the reasons that von Humboldt gave in support of his view, from today’s perspective, seem amateurish at best. Still the
considerable influence of his point of view on Darwin was significant, and allowed Darwin to talk about the parallels between species and languages.

There were two more distinctions brought out: in some languages, there were changes in the sounds that appeared at the end of a stem or the beginning of a suffix, typically changes that made the union of the stem plus the suffix seem better glued together—for example, a stem-final vowel might be elided before a suffix beginning with a vowel (as we do in English, when we combine *buddha* and *-ism* to form *Buddhism*). And finally, there were languages in which each affix could be associated with a single grammatical category, and those in which that was not the case. Indo-European languages typically fell into the second category, in that verbal suffixes more often than not indicate both person and number, and nominal (and adjectival) suffixes often mark some combination of number, case, and gender.

During the 19th century the notion of progress was visible everywhere, a fact that made it difficult to think about morphology and change without bringing the notions of progress, and later fitness, into the picture. Germany was home to a great deal of the early research on Indo-European, and the influence of Romanticism on it is indelible in the work of Bopp, Schlegel, and other early linguists, such as Jacob Grimm. From Romanticism came the image that language is organic (we will explore this later), and that the course of an organism over time is not merely change, but a movement along a dimension that can be labeled as positive development and perfection at one end and decay and degeneration at the other.[1]

Organicism took on another form in the context of the comparative analysis of morphological systems that von Humboldt undertook. Von Humboldt made an Aristotelian distinction between language as *ergon*—something produced or made—and *energeia*, which is an activity or a virtual dynamic, something more likely to be conceived of as a vital power, hence an organism. It was notably the distinction between the three types of morphology developed by Schlegel and von Humboldt that was conducive to a typological classification of languages, and an account by which each typological class could be graded along a cline of adaptive evolution. Inflectional languages were the most evolved, while isolating languages were the least, with agglutinative languages falling in between.[2]

**The new university system**
The rapid development of a new system of German universities that was focused on research over the 19th century played a key role in the developments of all of the disciplines that

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1Amsterdamska, 1987, p. 37.
2Page 85 Humboldt introduced a fourth category, polysynthetic languages, as well; see Humboldt, 1836.
Before the remarkable revolution in the German university system at the beginning of the 19th century, universities had come out of the Middle Ages as an embattled institution with a history of close connection to the Church. One reformist model for education that was discussed in the 18th century was the complete replacement of universities by state-funded and -directed professional schools, with scientific research academies operating in a different social sphere. Major parts of this proposal were adopted in France in 1793, as the 24 universities in France were abolished wholesale, at a time when universities across Europe were struggling with unsustainably low enrollments. In France, a highly centralized system of higher education was established, which was maintained essentially through the 19th century and which served to educate those entering the state civil service, while in Germany a radically new system was established that would eventually take root throughout the world, one in which the research function of the professoriate was at the heart of the university’s raison d’être, and the life of the people at the university included active seminars and dissertations with novel ideas. The central belief was that the highest order of education would create people who could themselves be intellectually creative, and the best way to accomplish this was to organically link the teaching and the research functions of the university faculty.

This process began in 1810 with the establishment of the Königliche Friedrich-Wilhelms-Universität—today, Humboldt University in Berlin—by Wilhelm von Humboldt, whose work after his retirement in 1820 we have just looked at. In 1810, von Humboldt headed the section responsible for education within the ministry of the interior, and he was able to develop in practice many of the radical ideas proposed by the philosophers Johann Gottlieb Fichte and Friedrich Schleiermacher in their discussions of the goals of education. The university at Halle, the country's premier university, had been closed by Napoleon in 1806 (the reader will recall Napoleon's march across much of Western Europe), and the king of Prussia wanted to establish a new university. Von Humboldt proposed that henceforth, teaching would be valued and viewed as an integral part of doing research. Creating knowledge would be a central mission of professors, a radically novel idea. Von Humboldt himself noted that henceforth, science would be viewed as “a problem that has not yet been completely solved and thus remains always in a state of research... The relationship between teacher and student is therefore utterly different from what it was in the past.” In the past, the teacher was there for the sake of the student, but in the new system, “both are there for the sake of Wissenschaft,” that is, for the sake of science. This was the model that would come to the United States later in the century: first to Johns Hopkins, then to Clark University and the University of Chicago. This conception of the university shared an important feature of its medieval predecessor, which was its autonomy with respect to civil authority.

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2In Napoleonic France, the imperial university was essentially an institution for the awarding of degrees. Teaching was very much a secondary function, and taking a degree did not require taking any courses, while research was essentially nonexistent. The peripheral institutions (the Ecole Normale Superieure, the Ecole Pratique des Hautes Etudes, the College de France) took on the pedagogical and research functions that were in effect abandoned by the university system during the 19th century.


4These American universities, the first to adopt the values and goals of the German universities, did not have an easy time in recruiting outstanding European scholars. It is notable that Johns Hopkins recruited the noted British mathematician James Joseph Sylvester in 1876, after a long career in England in which he was the target of anti-semitism. The role of the American university system in assisting Jewish professors in the 1930s will be discussed below.
Structurally, the German system was conducive to competition among universities, in part because Germany was not united politically.

As universities were founded, linguistics was viewed by many as a field that was young and up-and-coming, and also one that should be supported by professorships at such places as Berlin, Bonn, Leipzig, Munich, and Breslau (the reader who thinks that linguistics departments are new inventions should think again). Schlegel was named professor of Sanskrit in Bonn in 1818, and Bopp in Berlin in the same year; in both cases, von Humboldt played a significant role in the appointment process.

It is important to recognize the impact on the development of the sciences by the change in the very conception of what universities are for, and how they were to be organized. Scientific research, both theoretical and applied, became an important driving force behind economic development and social progress. Rivalries among the major states of Europe—England, France, Prussia, Austro-Hungary, Russia—for political and economic superiority included competition for the best scientific laboratories as well, and universities played a significant role in this area. Germany’s victory over France in the Franco-Prussian war of 1870 was viewed by the French intelligentsia not so much as a defeat of France but as a “victory of German science.” For many intellectuals, linguistics and especially historical and comparative grammar was a German science—an opinion that would play a role in some of the polemics that would ensue in the years to come.

Rasmus Rask

Rasmus Kristian Rask (1787-1832) was a Danish linguist who was particularly interested in classification and the typological relatedness of languages based on their morphology. He saw in his own work a descent from Linnaeus's systematic classification. From the beginning of the century he worked on Old Norse, and he compared the morphology of contemporary Danish with that of its ancestor in the etymological grammar he wrote, in Danish, in 1810. This was the first work to explicitly compare two distinct states of a language, and proposes a systematic analysis. What has come to be known as Grimm’s Law, describing the major features of the changes of consonants in the Germanic branch of Indo-European, was first discovered by Rask; we will return to this shortly.

Jacob Grimm

Much of the world remembers the Brothers Grimm for their fairy tales; Jacob Grimm, the older brother, was a professor of Germanic linguistics at Göttingen and Berlin. His careful and precise analyses have left their mark on the names given to many classic phenomena, such as strong and weak verbs, Umlaut, and Ablaut. As we have noted, the Germanists’ world was focused on the oral language and on the diversity that lies in the range of dialects found in real life, and Grimm’s *Deutsche Grammatik*, published in 1819, was an important moment in the comparativist movement. The second edition, which came out in 1822,
included a systematization of Rask’s work, and introduced his Lautverschiebung, known to posterity as Grimm’s Law (a name later coined by Max Müller). Grimm devoted nearly 600 pages to the study of phonetic changes and the laws that organized them, thereby changing the very face of linguistics: his work for the first time justified using the term law in the same sentence as language. No longer were linguists studying words; they were rather studying sounds (still often called letters, it is true). Linguists were studying the system of sounds in a language: that was an enormous step forward.

Grimm embraced the judgmentalism of the first two generations of linguists, as a sentence like this illustrates well:

Since the High German of the 13th century shows nobler, purer forms than the language of the present day, and those of the 8th and 9th centuries are purer still than those of the 13th, and finally since the Gothic of the 4th and 5th centuries shows even more complex forms, so it follows that the language spoken by the German people in the first century will have surpassed even Gothic.

Second generation

August Schleicher

August Schleicher (1821-1868) was a major figure in the mid-century study of Proto-Indo-European, in the generation following Bopp and Schlegel, the second generation of modern linguists. His vision of language was deeply influenced both by Hegel and by biological thought and metaphor, and he emphasized the way in which the reconstruction of Indo-European was the reconstruction of a linguistic genealogy: he wrote of the family tree of languages—his term, Stammbaum theory, “family-tree theory”, is still widely used today, and he used the same graphical notation for languages that people used for family genealogies. He was also the first to attempt to reconstruct the phonological form of a hypothetical proto-word.

Schleicher shared with his times the need to view change as either development or decay, but his was the last generation in which this kind of value-laden judgment would be viewed as natural for the linguist. For someone who studies linguistics today, the very idea of using linguistics to decide which languages are better and which are worse in some absolute sense is very odd.

1 Jacob Grimm wrote, in 1846, in “What is a nation (Volk)?”: “a nation is the embodiment of people who speak the same language. That is for us Germans the most innocent but also the proudest definition because it … turns our gaze to … near future when all barriers fall and the natural law will be acknowledged that neither rivers nor mountains divide nations but that language alone can set boundaries around a people that has pushed past mountains and streams.” Cited in Benes, 2008, p. 147.

2 Koerner, 1975, p. 759: “If there was a major ‘breakthrough’ in 19th-century linguistics, it is with the work of Schleicher in the 1850s and 1860s and not with the Neogrammarians from 1876 onwards, as has generally been asserted in the histories of linguistics available to the present.”

3 Recall Labov's discussion above of the 15 Darwinian criteria.
Schleicher also retained the Humboldtian distinction that we discussed above regarding the types of morphology found in languages: isolating, agglutinating, inflectional. In keeping with his concern with the concept of development, he saw not just a difference among these types, but a direction of positive change (away from isolating, and towards inflectional, systems). The question of teleology arises here, which is to say, the notion that change is always towards a goal that is defined, somehow or other, before the change in question takes place.

But the evidence does not point to such a directionality towards inflectional languages among the known languages, even if Schleicher perceived that the inflectional system constituted the highest level of development. How can this apparent contradiction be maintained? Here the influence of Hegel was crucial. Hegel distinguished development before history and during history. Schleicher believed that the development of language was prehistoric, in Hegel's sense, and once the Hegelian spirit entered history, language was no longer on its developmental track: it had actually entered into the period of decay.

Schleicher read Darwin's *Origin of Species* a few years after it came out, and he immediately saw the closeness of the fit between his thought and Darwin's; we noted earlier that Darwin himself drew a parallel between languages and species and was deeply influenced by historical linguistics. Schleicher published a book in 1863 exploring the relationship between work in historical linguistics and Darwinian explanation, and he had no difficulty in accepting the notion that languages were “organisms of nature.” Schleicher went so far as to write that languages “have never been directed by the will of man; they rose, and developed themselves according to definite laws; they grew old, and died out.” For other linguists, as we shall see, this was going too far.

**Max Müller**

There were two other important linguists of the second generation: Max Müller, a German linguist who spent his career in England, and William Dwight Whitney, the first great American linguist, who would have an impact on linguists to come, notably Saussure and Bloomfield. Müller and Whitney became embroiled in the first major linguistic controversy, or, perhaps we should say, created the first great controversy.

Max Müller was a German-born linguist who spent fifty years in England, where he was widely recognized as a great scholar of Sanskrit, and a popularizer of the new science of linguistics, and today he is recognized as one of the most important contributors to the founding of the study of religions. Müllers proposed the term *Turanian* to refer to what he viewed as a large family of languages spoken on the land mass to the east of Europe, and spreading over much of Asia. He also spoke and wrote elegantly about what linguistics had accomplished, and what it had yet to do. Let us take a brief look at one lecture, much of which is modern and insightful and at the same time is thoroughly grounded in a mind-set of development and decay, making some of it hard to take seriously today.

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1 Schleicher, 1863, p. 20.
2 Alter, 2005, p. 129.
3 The following discusses his “On the Stratification of Language,” a lecture in 1868 delivered at Cambridge University, and published by Longmans in 1868.
“What has the Science of Language, as yet, really accomplished? It has achieved much, considering that real work only began about fifty years ago; it has achieved little, if we look at what still remains to be done,” he wrote. “The first discovery was that languages admit of classification,” he continued, and certainly that was an important step forward; he had in mind, first of all, the genetic classifications that linguists had been exploring since the end of the 18th century, and also the classifications regarding morphology and word order that we discussed briefly above. Of the linguistic families, there were two that had been studied in detail, the Aryan—that is, the Indo-European—and the Semitic. Others have been studied to some degree, including the Ural-Altaic, the Indo-Chinese, and the Dravidian, but Müller argued this was really not enough, because

...considered by themselves, and placed in their proper place in the vast realm of human speech, they describe but a very small segment of the entire circle... nearly all the discoveries that have been made as to the laws of language, the process of composition, derivation, and inflection, have been gained by Aryan and Semitic scholars.

There are so many more languages to be studied:

we must not shut our eyes to the fact that our field of observation has been thus far extremely limited, and that we should act in defiance of the simplest rules of sound induction, were we to generalize on such scanty evidence. (p. 8-9).

Now his discussion became, all of a sudden, something that seems like it came from a mindset we no longer share. Müller wrote that since we know the Indo-European and Semitic families of languages better, let us see what they can show us—a not unreasonable suggestion:

All we know of them is their period of decay, not their period of growth, their descending, not their ascending career, their Being, as we say in German, not their Becoming.

It is taken for granted, and without argument, that languages first went through a period of growth and development whose details are hidden from us in the mists of time, and that period was followed by a period of decay (the only period that you and we have ever known). This was how the world was seen and how it was felt.

Even in the earliest literary documents both the Aryan and-Semitic speech appear before us as fixed and petrified. They had left for ever that stage during which language grows and expands until it is arrested in its exuberant fertility by means of religious or political concentration, by means of oral tradition, or finally by means of a written literature.

In Müller's view, languages grew and developed for a period, an exuberant period, and then that development was cut short. It was cut short by becoming a written language, even though “writing, or what in early times takes the place of writing, oral tradition, is
something merely accidental.” That is to say, do not suppose or speculate that something significant has happened to a language when its speakers begin to write it down, or develop an oral tradition. “It represents a foreign influence which, in natural history, can only be compared to the influence exercised by domestication on plants and animals.” Language would be more truly language—those are his words—if there were neither oral nor written literature. And so if we take our study of the ancient written languages of the Semitic family or the Aryan family as our guides, they will never be anything but monstra, “unnatural, exceptional formations which can never disclose to us the real character of language left to itself to follow out its own laws without let or hindrance.” (10)

Müller then sketched the Humboldtian view, which he thoroughly endorsed, that languages may begin in a period of word isolation, in which sentences are strings of indivisible words, after which some of the words may lose semantic robustness and become regular affixes on a neighboring word, which is then a stem. After that, the stem-affix unity may become more organically composed, and we then have an inflecting language, like the languages of Indo-European and Semitic. So far, this is still widely agreed to today. But Müller went on to say that many of the languages of the world were “arrested in their growth during their earlier stages, and had remained on the surface [note the geological metaphor] in this primitive state, exposed only to the decomposing influence of atmospheric action [and again].” Chinese is a language that was arrested in its development very early on, Müller continued, which makes it both instructive and fascinating. Chinese is like someone “groping his way, and so delighted with his first successful grasps that he repeats them again and again. It is child's play, if you like, but it displays, like all child's play, that wisdom and strength which is perfect in the mouth of babes and sucklings.” (13) Müller then went on to describe very plausibly how languages could evolve from Humboldt's isolating type to his agglutinative type, and then on to an inflectional system—again, plausible by today’s understanding, but cast within a worldview in which this morphological and syntactic change is part and parcel of a picture of decay, not just of language but decay in the modes of thinking that are due to that linguistic decay.

Müller emphasized in the strongest possible terms that languages could and did evolve through these three stages, and he could not understand why so many of his colleagues in the discipline seemed to think that “by some inexplicable grammatical instinct, or by some kind of inherent necessity, languages were from the beginning created as isolating, or agglutinative, or inflectional, and must remain so to the end.” (17-18) “But when we analyse each language more carefully we find there is none exclusively isolating, or exclusively agglutinative, or exclusively inflectional”: each language can retain parts of the its older inheritance, which serve like fossils to show how the language used to be. But again the metaphor of decay is never far away: “Unless Sanskrit and Hebrew had passed through the agglutinative stratum, nay unless, at some time or other, they had been no better than Chinese,”—imagine that!—their present state would be inexplicable.

William Dwight Whitney

The first great American linguist was William Dwight Whitney (1827-1894). He was born in Northampton, Massachusetts, and early on studied ornithology and botany; as a young man, he worked with his brother Josiah on a geological survey of Lake Superior. But in the end it was Sanskrit that captivated Whitney’s imagination, and he went to Yale to pursue this
interest. Alas, Yale was not the place to study Sanskrit—Germany was—and so he set off for Berlin. His first Sanskrit teacher was Franz Bopp. "I don't find lectures at the University of Berlin so great shakes as I had supposed," Whitney wrote to his brother. Whitney was appalled at how much he was being charged. "I have had the last experience with the old gentleman, and never really want to see his face again... Bopp's lecture this afternoon, stupid enough as usual." He stopped attending Bopp's lectures, and went on to study with two other scholars, both of them former students of Bopp: Rudolph von Roth, and Albrecht Weber. Then he returned to Yale in 1854, where he taught Sanskrit—and French and German too, since demand for Sanskrit was limited.

Whitney published two books on general linguistics, the first in 1867, and the second in 1875. The latter, entitled Life and Growth of Language, was a much greater success, and French and German translation appeared almost immediately.

In 1875, he was back to Leipzig, where he began his Sanskrit grammar. The next year, a young Swiss linguist by the name of Ferdinand de Saussure arrived in Leipzig to continue his studies of Sanskrit, which culminated with his thesis on "The Primitive System of Vowels in the Indo-European Languages."

In 1879, Whitney went to Berlin to meet Heinrich Zimmer, who was translating his grammar into German, so that the German and the English could be published in the same year.

A good deal of Whitney's work is remarkably contemporary in tone. And his work in general linguistics (which is to say, that which is apart from his technical work on Sanskrit) emphasized a distinctively American practical sense, a realization that while language is everywhere—in his words—the product of the conscious action of human beings, it is not what "men have voluntarily or intentionally placed there." In fact, when we read Whitney's observations on language and its scientific study, it sounds very familiar. His 1867 book, Language and the Study of Language: 12 lectures on the principles of linguistic science, in some respects seems more up-to-date than books written in the 1920s or 1930s.

\[\text{Each separate item in the production or modification of language is a satisfaction of the need of the moment; it is prompted by the exigencies of the particular case; it is brought forth for the practical end of convenient communication, and with no ulterior air or object whatsoever; it is accepted by the community only because it supplies a perceived want, and answers an acknowledged purpose in the uses of social intercourse... A language is, in very truth, a grand system, of a highly complicated and symmetrical structure; it is fitly comparable with an organized body; but this is not because any human has planned such a structure and skillfully worked it out. Each single part is conscious and intentional; the whole is instinctive and natural.}\]

\[^1\text{Alter, 2003, p. 21.}\]
\[^2\text{Koerner, [1988][1980].}\]
\[^3\text{1889; see its preface p. v. Remove? This was also the year when the psychologist Wilhelm Wundt moved to Leipzig, to begin teaching psychology there, and we will return to this shortly.}\]
\[^4\text{Whitney, 1867a, pp. 22-23.}\]
Fig. 2.2: William Dwight Whitney
Whitney drew heavily upon analogies (though these always remained analogies, whose purpose was for clarification and for instruction) with two of the most important scientific movements of his day: Darwinian evolution and geology.

There is a yet closer parallelism between the life of language and that of the animal kingdom in general. The speech of each person is, as it were, an individual of a species, with its general inherited conformity to the specific type, but also with its individual peculiarities, its tendency to variation and the formation of a new species. The dialects, languages, groups, families, stocks, set up by the linguistic student, correspond with the varieties, species, general, and so on, of the zoologist. And the questions which the students of nature are so excitedly discussing at the present day—the nature of specific distinctions, the derivations of species by individual variation and natural selection, the unity of origin of animal life—all are closely akin with those which the linguistic student has constant occasion to treat. We need not here dwell further upon the comparison: it is so naturally suggested, and so fruitful of interesting and instructive analogies, that it has been repeatedly drawn out and employed, by students both of nature and of language.

One of Whitney's concerns was with the autonomy of linguistics as a discipline and as a profession. He pointed out:

Physical science on the one side, and psychology on the other, are striving to take possession of linguistic science, which in truth belongs to neither.

As we will see below, Edward Sapir would say precisely the same thing in the late 1920s. Whitney certainly had no confidence that an intellectual alliance with psychology was in the interest of linguists. He recognized first that psychology as a discipline was making advances:

For... besides the “recognition of the creative power of man,” we have in this century the advantage of a rational psychology, which strives to discover a mechanism in the movements of consciousness, laws in mental life, and so on; since all the creations of man will be found not less subject to the dominion of rational laws than are the productions of nature.

That sounds very modern: psychology has the right to expect to find laws just like the natural sciences do. Whitney went on to say, then, that understanding the mind better will doubtless help us to understand language better. This is followed then by a big but:

Now we also, on our part, expect decided advantage to the study of language, as of every other human production, from an improved comprehension of the operations of the human mind, as of all the other determining conditions of a difficult problem. But whether the advance of psychology is or is not to bring about a revolution in the science

1Whitney 1867: 19-20.
2Whitney, 1875, p. xxii.
of language, is a question depending on the manner and degree in which language is a "mental production" (geistiges Erzeugnis).

Ah! Is a linguistic production just a psychological act? No, says Whitney; it would be a serious error to think so:

It is very possible here to fall into the serious error of looking upon words and phrases as an immediate emanation of the mind, and so of settling the laws of mental action, and out of them evolving the events of language-history. The soul of man and its power and operation are, after all, the mystery of mysteries to us; the phenomena of language are one of its external manifestations, and comparatively a simple matter; the light which these shall cast upon the soul must probably be greater than that which they shall receive from our comprehension of the soul.

We would not put it this way today, but it is not hard to see what he is getting at. Trying to explain language through psychology amounts to explaining something we understand somewhat by something we understand much less well.

If the linguistic student, in his devotion to psychology, shall invert this relation, he is very likely to add one more to the already numerous instances in which metaphysics has shown its inaptitude for dealing with facts of observation and induction. Only the result can decide, and that we will proceed to test.

We can agree with Whitney or not, but his point is clear enough: to look for an explanation of linguistic generalizations in psychology assumes that the principles of psychology are better understood than those of linguistics, and he was clearly dubious about any assumption of that sort.

Whether, in the first place, men be willing to allow to the study the name of a science or not, is a matter of the smallest moment. It has its own character, its own sphere, its own importance of bearing on other departments of knowledge. If there are those whose definition of a science excludes it, let it be so; the point is one on which no student of language need insist.

What he does need to insist upon is that the character of his department of study be not misrepresented, in order to arrogate to it a kind and degree of consequence to which it is not entitled—by declaring it, for example, a physical or natural science, in these days when the physical sciences are filling men's minds with wonder at their achievements, and almost presuming to claim the title of science as belonging to themselves alone. [He argues that linguistics is a “historical or moral science”]... Not one item of any existing tongue is ever uttered except by the will of the utterer; not one is produced.

\[1\text{Whitney, 1872, 142f.}\]
Let's take a look at how Whitney introduced the idea of a set of sounds in a language. He called it our “spoken alphabet,” and wrote that it was “an orderly system of sounds,” with its “lines and degrees of relationship that bind its members together, and help to determine their transitions.” He introduced the various parts of the articulatory apparatus—the lungs, the larynx, the pharynx, the parts of the mouth. In short, voice was “the audible result of a column of air emitted by the lungs, impressed with sonancy and variety of pitch by the larynx, and individualized by the mouth-organs.”

He then presented the sounds of the language as forming a continuum, from the widest open /a/ to the most closed stop. If the friction of the breath “as driven out through the aperture, forms the conspicuous element,” then it is called a fricative consonant. The main plan of the inventory of sounds is thus along one axis stretching from most open to most closed. “But there are other lines of relationship in it.” [61] The most important involves a position in the mouth—which today we generally call a point of articulation, but which Whitney called a position, or a position of mute-closure. There were three important positions: “one in the front, made by lip against lip, the labial closure, giving p; one in the back of the mouth, made against the soft palate by the rear upper surface of the tongue, the palatal (or guttural) closure, giving k; and one intermediate between the other two, made by the point or front of the tongue against the roof of the mouth near the front teeth, the lingual (or dental) closure, giving t.” [61-2]. He put this together graphically in a simple chart:

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1 Whitney, 1875.
2 op cit, pages 59, 60.
All of this sounds quite modern and up to date, but there is more, and we wish to emphasize this fact because what he wrote next is often taken to be an insight that was not made explicit until the work of the Prague Circle in the 1930s. “Along with \( k,t,p \), in the first place, go their nearest kindred, \( g,d,b \),” Whitney wrote, and he referred to \( g \) as the sonant, or vocal, “counterpart” of \( k \), and so on. The two sound-counterparts are identical except that the “sonant utterance begins in \([pa]\) just when the contact is broken, and in \([ba]\) just before.” The two sounds share something in common, and they are distinguished from each other by the difference in the temporal alignment of the laryngeal voicing with respect to the oral release.

“But there is a third product of the same three positions of mute-closure,” he continued: there are also the nasals, each of which shares the position with a pair of stops. And then he discussed the other sounds of English and some familiar European languages.

“The scheme thus drawn up and described may be taken as a general model, on the plan of which the spoken alphabet of any language may best be arranged in order to the determination of its internal relations and to its comparison with other alphabets.”[67]
He emphasized the continuity that exists between the consonant and the vowel system, even if “their distinction is of the highest importance in phonetics,” because they are “only poles, as it were, in one continuous unitary series, and with a doubtful or neutral territory between them: they are simply the opener and closer sounds of the alphabetic system.”

Whitney drew careful analogies between the work that he and his colleagues were doing in linguistics with the work that other scientists were doing, particularly in geology, the queen of the physical sciences at the time, a status that Whitney took advantage of:

Once more, a noteworthy and often-remarked similarity exists between the facts and methods of geology and those of linguistic study. The science of language is, as it were, the geology of the modern period, the Age of Man, having for its task to construct the history of development of the earth and its inhabitants from the time when the proper geological record remains silent; when man, no longer a mere animal, begins by the aid of language to bear witness respecting his own progress and that of the world about him. The remains of ancient speech are like strata deposited in bygone ages, telling of the forms of life then existing, and of the circumstances which determined or affected them; while words are as rolled pebbles, relics of yet more ancient formations, or as fossils, whose grade indicates the progress of organic life, and whose resemblances and relations show the correspondence or sequence of the different strata; while, everywhere, extensive denudation has marred the completeness of the record, and rendered impossible a detailed exhibition of the whole course of development.

But one of the deepest questions regarding language, like every aspect of human culture, is how it can be analyzed both as the intentional result of many individual acts, and also as a system shared by a community that each individual confronts when he or she learns it, with blessed little power to make changes with it. Whitney wrote

While...we are...forced to the acknowledgment that everything in human speech is a product of the conscious action of human beings, we should be leaving out of sight a matter of essential consequence in linguistic investigation if we failed to notice that what the linguistic student seeks in language is not what men have voluntarily or intentionally placed there. As we have already seen, each separate item in the production or modification of language is a satisfaction of the need of the moment; it is prompted by the exigencies of the particular case; it is brought forth for the practical end of convenient communication, and with no ulterior aim or object whatsoever; it is accepted by the community only because it supplies a perceived want, and answers an acknowledged purpose in the uses of social intercourse. The language-makers are quite heedless of its position and value as part of a system, or as a record with historical content, nor do they analyze and set before their consciousness the mental tendencies which it gratifies. A language is, in very truth, a grand system, of a highly complicated and symmetrical structure; it is fitly comparable with an organized body; but this is

1 [68]. The status of a phonetic alphabet was a subject of considerable moment in the IPA, the International Phonetic Association, as we will see shortly.
not because any human mind has planned such a structure and skillfully worked it out. Each single part is conscious and intentional; the whole is instinctive and natural. The unity and symmetry of the system is the unconscious product of the efforts of the human mind, grappling with the facts of the world without and the world within itself, and recording each separate result in speech. Herein is a real language fundamentally different from the elaborate and philosophical structures with which ingenious men have sometimes thought to replace them. These are indeed artful devices, in which the character and bearing of each part is painfully weighed and determined in advance: compared with them, language is a real growth; and human thought will as readily exchange its natural covering for one of them as the growing crustacean will give up its shell for a casing of silver, wrought by the most skilful hands. Their symmetry is that of a mathematical figure, carefully laid out, and drawn to rule and line; in language, the human mind, tethered by its limited capacities in the midst of creation, reaches out as far as it can in every direction and makes its mark, and is surprised at the end to find the result a circle.

Whitney concluded that language is, in a word, an institution, a social institution. His views would leave a strong impression on all of the linguists who followed him, and on none of them more than Ferdinand de Saussure.

Third generation: Neogrammarians

Among the members of the generation of German students of linguistics in the 1870s—this is our third academic generation of German linguists—there were many who felt that they were part of a revolutionary vanguard that eventually came to be known as the Junggrammatiker, a name that carries an ironic, even self-deprecatory overtone that the translation Neogrammarian, unfortunately, does not. But as Neogrammarians they are known in the anglophone and francophone world, and this is how we shall refer to them. In discerning their origin, we can point both to developments in the understanding of linguistic evolution, and to issues of authority within the German profession of linguistics. In the 1860s and 1870s, there were exciting discoveries—notably those of Hermann Grassmann and Karl Verner—that made sense of a large number of apparent counter-examples to the sound correspondences that had been discovered in the preceding 50 years, most especially in connection with Grimm’s Law regarding the evolution of consonants. Grassmann’s discovery made sense out of the distribution of voiced aspirates in Greek and Sanskrit, and Verner’s made sense out of exceptions to Grimm’s principles in the German languages, on the basis of the placement of stress. The Neogrammarians were confident that these breakthroughs were not isolated but rather showed the value of continued search for deeper explanations, and the importance of not letting counter-examples be dismissed lightly. This confidence played an important role in the creation of the Neogrammarians as a self-defined group.

This growing confidence led them to the conclusion that linguists were discovering generalizations that deserved to be called laws. This is not to say that such a term had not been

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1This event is central to the analysis offered in Amsterdamska, 1987, which heavily informs our account here. See also Kemmer, 2013, whose perspective is similar in some respects to the one developed here; and Davies, 2006 and Blust, 1996.
used by earlier workers; Bopp wrote of “phonetic laws” and “sound laws” in the 1820s, and for Schleicher, Lautgesetz was an important concept as well.

Just as important, the young linguists rejected the deeply held ideas about the development and the decay of languages. The young linguists chose what was known as uniformitarianism, first identified in the study of geology: the notion that the most general laws of change have been fixed over time. Languages in general are not getting better or getting worse; they are just changing. They are evolving.

In 1868, Karl Brugmann and Hermann Osthoff published a statement that is a perfect example of an account of group-identity, the kind of text which we discussed in the previous chapter: a description of who they were, this new group of linguists studying the reconstruction of Proto Indo-European. The manifesto began by explaining that something new happened with the publication of Wilhelm Scherer’s new book on the history of German (Scherer was at that point a German philologist, whose career would turn in the following years more towards literature). Now a new method arose, and with it a group of people had arisen consciously aligned with this new method. Here is how they put it: “Since the appearance of Scherer’s book . . . and principally through the impulses that went out from this book, the physiognomy of comparative linguistics has changed considerably. A method of research has been instituted since then and is winning more and more supporters; it differs in essential respects from the method by which comparative linguistics proceeded in the first half-century of its existence.”

1 The term was due to Whewell, whom we have already met; he is someone who should be read and cited today. "Review of Lyell’s Principles of Geology," p. 126 Uniformitarianism stands in opposition to catastrophism, the view that the important changes in our past have been due to sudden causes from outside the system, such as the arrival of a huge meteor falling from the heavens.

2 Osthoff and Brugmann, 1874.

3 Osthoff and Brugmann, 1874.
In this manifesto, we find a constant mixture of statements of fact and statements that emphasize (or exaggerate) differences of position that relate to being in a group and being outside of a group. Here is an example: the authors pointed out that human speech has a mental and a physical side to it. Articulatory phonetics has focused on the physical side of speech. “This science is several decades old, and the older linguistics, since about the 1850s, has also profited by its results; for this we must give it great credit.” In that sentence alone, there are two striking expressions that emphasize the authors' distancing: one is the phrase “the older linguistics,” and the other is the simple matter of giving someone credit, which is something you normally do to someone else, not to yourself. But they went on to say that there were many aspects of common sound changes for which an articulatory account is not at all sufficient. “The first outlines of this science were drawn by Steinthal in the essay ‘Assimilation und Attraction, psychologisch beleuchtet,’ which up to now has received little notice from linguistic science and articulatory phonetics.” This remark, too, is an example of a flourish, a trope common to manifestos: they identify an important piece of work that has come out but received (they believe, at least) far less attention than it has deserved.

The manifesto continued:

The older comparative linguistics, while it readily accepted and utilized the teachings of articulatory phonetics, hardly concerned itself at all with the psychological aspect of the speech process, and as a consequence it fell into numerous errors. Only in very recent times is one becoming more aware of that neglect. Fortunately the movement starting with Scherer’s efforts, the “neo-grammarians” movement, has already done away with some of the fundamental errors which dominated the entire older linguistics.

We will see in the next section that empirical psychology—what was then called the “new psychology”—was just coming into its own in the 1860s in Germany. That this should have an effect on how young linguists were thinking about their field is hardly surprising: indeed, it is gratifying, and speaks to the influence across disciplinary boundaries that rarely fails to appear eventually. But Brugmann and Osthoff did not describe this as an opportunity for their field to move forward so much as an opportunity to identify errors that the preceding generation had fallen into. This metaphor, by which errors are like ditches, and one falls into them by not paying attention where one’s feet are, is quite the opposite of the perspective advanced as fallibilism, which recognizes that everything we believe now will at some point be found to be replaceable by a view that is more accurate. Strictly taken, fallibilism, our philosophy of scientific modesty, is comfortable with the view that an “entire older linguistics” could be beset by “fundamental errors,” as the Neogrammarians wrote about their teachers, but it is certainly salutary to bear in mind that the earlier generation had rid the world of another and different set of fundamental errors, just as the next generation of linguists coming up at the end of the 19th century will do as well.

That this, however, was not the right way to arrive at correct guiding principles for the investigation of form change and form innovation in our Indo-European languages is so very obvious that one must be surprised at how many have not yet become clear.
about it. Is not, after all, the authenticity, the scientific probability, of the original Indo-European forms, which are of course all purely hypothetical creations, totally dependent on whether they agree in general with the proper conception of the development of linguistic forms and on whether they are constructed according to correct methodological principles? Thus the investigators went around in the most obvious circles, and even today many still do so, without knowing it or wanting to admit it.

This passage illustrates another characteristic of manifestos: they not only make assertions and argue for them, they provide some instruction on how to respond to hearing differences of opinion on matters of concern: in this case, one might be “surprised” to note how many of the preceding generation have not come to agree with them—yet.

Some linguists, particularly a few most directly concerned passed over the question and, abruptly rejecting it, remained satisfied with the old way. No wonder. When serious attempts at upset are directed against a procedure that one is used to and with which one feels comfortable, one is always more readily stimulated to ward off the disturbance than to undertake a thorough revision and possible alteration of the accustomed procedure. But with others, especially younger scholars, the seed scattered by Scherer fell on fruitful ground.

The Neogrammarians declared that their positive focus was on two principles that were central to language change: first, laws of sound change applied without exception, and second, analogy played a central role in the evolution of paradigms. Exceptionless sound change was based on shifting pronunciations in the direction of greater articulatory ease, while the effects of analogy would increase the simplicity of the correlation between form and meaning. But much more important was the view that language change was not a process of decay, and that a language at every moment is the product of the creative, psychological forces of the individuals who learn it.

Paul Kiparsky has suggested that the new shift in perspective in the 1860s and 1870s was that a new perspective came into the picture of what constituted an explanation. No longer was data from a later stage of a language useful only for reconstructing an earlier stage; now the discipline could demand an explanation of the later forms on the basis of the earlier forms. There were no mechanical procedures, so to speak, which would allow data from a later stage to automatically reconstruct the earlier forms—that would remain the challenge for the creative linguist.

But if those reconstructed forms were accurate, then it should be possible to provide a small set of relatively simple rules of sound change that really would explain the later stage of the language, given the earlier stage.

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1ibid.
2Kiparsky, 1974.
3We have already alluded to Labov’s modern interpretation of this material: Labov, 1981; Labov, 1994.
4Brugman 1897[1894]:80-81; this is Brugmann’s contribution to the The Whitney Memorial Meeting: A Report of that Session of the First American...[https://en.wikisource.org/wiki/The_Whitney_Memorial_Meeting]
Soon after the appearance of Whitney’s major work [1875] a movement began in Germany among the Indo-Europeanists which rejected a number of widely used methodological errors, which developed out of errors that Whitney had uncovered. And if suggestions about this movement support came from elsewhere, it is those from Whitney that were perhaps the most important and enduring.

There was intense reaction to some of the Junggrammatikers’ perspectives by other linguists, none sharper than those of Hugo Schuchardt (1885), notably in a long paper on sound laws entitled “On Sounds Laws: Against the Neogrammarians. He wrote, "“The positing of the neogrammarian principle does not mean for me a revolution in the history of linguistics with which the science began to progress with greater rapidity and assurance.”

Georg Curtius, too, was puzzled by the Neogrammarians’ fervor. “For sixty years,” he wrote, “Indo-Germanic linguistics has been developing smoothly and without significant inner contradictions,” and now this? Whence came this “need for a thorough divergence from views previously held in many areas”? Curtius’s own work emphasized his indebtedness to Wilhelm von Humboldt, Max Müller, and William Dwight Whitney. Hermann Collitz was a little bit younger than the Neogrammarians—he was five years younger than Sievers, six years younger than Delbrück—and he was approached by Sievers to see whether he would join forces with them. The necrology of Collitz noted that Collitz “considered many of the attacks against the elders as totally unjustified” and refused to join them. He later came to the US, and he was the first president of the Linguistic Society of America.

In response to Curtius, the Neogrammarian Hermann Paul wrote a review of Schuchardt’s book. He starts by quoting from Schuchardt, who had written, “The only position of the so-called Neogrammarian school that they can claim as their exclusive property is the exceptionless application of sound change.” Paul was not happy with this. “Against his claim with which the writer begins I must lodge a decisive protest. First of all, what gives him the right to speak of a Neogrammarian ’school?”’ This is a striking question: what, indeed? Who has the authority to determine whether certain authors form a bloc, a school—and what difference does it make, anyway? The answer to Paul’s question was the fact that Osthoff and Brugmann published their manifesto. It was an act, a declaration which was a major step towards the formation of the Neogrammarians as a self-conscious group.

Paul referred to a recent review by Osthoff and Brugmann written by Bezzenberger.

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side which he would not have made if he had read my own words with an unbiased attention and not been blinded from the outset.

He continued:

The truth is that over the last decade various ideas that had been seen obscurely have become clearer and their larger role better understood. But that does not mean there is a sense of solidarity to the point of mutual responsibility. There is, then, no school of Neogrammarians—though there is a Neogrammarian “direction.”

Olga Amsterdamska (Amsterdamska, 1987) has argued that the fervor and self-conscious rise of the Neogrammarians can only be understood in historical and sociological terms, and we find her case compelling. The Neogrammarian movement arose at a time when the German university system was growing rapidly, not least in linguistics, philology, and psychology. The numbers of university faculty in this area as well as the number of regularly published journals was rising at a breathtaking speed.

The heart of the Neogrammarian movement lay in Leipzig. Brugmann spent most of his career there, first as an assistant at the Russian Institute in the mid-1870s, and then as a lecturer at the University of Leipzig, eventually taking the chair of Sanskrit and comparative linguistics when Georg Curtius retired. Other Neogrammarians were students at Leipzig during the 1870s, such as Wilhelm Braune, Adolf Noreen, Hermann Osthoff, Ferdinand de Saussure and Maurice Bloomfield; August Leskien was a professor there after 1870. We will return to Leipzig during this period again: it was the spot where the New Psychology of Wilhelm Wundt would develop, when Wundt arrived there in 1875.

The Neogrammarians have left a legacy for modern linguistics, one that puts a high priority on careful historical derivations of observed forms and that refuses cultural evaluations of a language, or a family of languages, or its speakers.

Jan Baudouin de Courtenay, Ferdinand de Saussure, and Maurice Bloomfield

From a cultural point of view, the Neogrammarians were insiders: they were Germans, defending a new German linguistics, largely against an older German generation. There were, however, three other linguists of an age not too different from that of the Neogrammarians, but who came from a different cultural background, three linguists whose professional trajectories were quite different from those of the Neogrammarians. The first was Jan Baudouin de Courtenay, a Polish linguist (born at a time when Poland was under the sway of the Russian empire), the second was the Swiss linguist, Ferdinand de Saussure, and the third was Maurice Bloomfield, an American who had studied with Whitney and who came to Leipzig to study the latest linguistics (he had been born in Austria, so the German language was not an issue). They all spent time studying with German linguists during the 1870s. But Baudouin and Saussure never felt like participants in a great scientific venture with the more senior scholars they met in Germany, and both left Germany feeling that they
were autodidacts, they were the proper students of no one, and they had to fight to have their views taken seriously.

Baudouin, Saussure, and Maurice Bloomfield illustrate three distinct strategies that an outsider can take in the face of a dominant and external imperium. Baudouin, from Poland, was a Slavist, and he spent most of his professional life in Russia; his was a career that represents the Russian strategy of radical autonomy.

Maurice Bloomfield illustrates the policy taken up more generally by American science in the 19th century: it undertook a tacit licensing agreement with Germany, and brought to the New World a simulacrum of German universities and German sciences. It hired scientists trained in Germany, and the network of those scientists increasingly covered the field of American academia. This strategy was abandoned by the 1930s, as the United States began its climb to leadership of the international academic community, a position that would become clear in the postwar world.

But France’s strategy towards its traditional enemy was different. France suffered a stinging defeat at Prussian hands in 1870, and its response was to strengthen its traditional forces. German scientists had once, not that long ago, been educated in France: it was time again to form a professoriate that could compete with the German model. For linguistics, that meant developing a French school, and as we will see, that was precisely what Saussure was engaged in during the second period of his career, the French period.

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1 Mugdan, [1984].
Let us look first at Baudouin de Courtenay and Saussure, and then return to Maurice Bloomfield.

Saussure was twelve years younger than Baudouin, but we know that each influenced the other; the book that Saussure published when he was 21 years old deeply marked Baudouin’s understanding of the sound systems early on, and Baudouin’s writings were cited with approval by Saussure in his lectures: he referred (1908) to Baudouin, and to Baudouin’s brilliant student Micolj Kruszewski, as “closer than anyone to a theoretical view of language.”

When we turn to Baudouin and to Saussure, we encounter for the first time the explicit notion of the **phoneme**, one of the most important contributions of linguistics to modern thought, and a notion that we will see develop over the course of this book. Like any important concept, its precise definition changes over time, and it is often used in different ways by different linguists. But the core meaning is straightforward enough: the sounds of an utterance, in a spoken language, can be represented as a sequence of symbols, regardless of whether the language has a traditional writing system (as English does) or not. As we learn more about carefully observing sounds, and with the aid of modern technology, we may find that the number of different symbols we employ to produce a very fine-grained description of the utterance will grow. Phonemic analysis is a way of thinking about the system of symbols used to represent utterances that does not allow the set of symbols to grow unmanageably: phonemic analysis allows for the introduction of a symbol (to represent a consonant or a vowel, typically) only if that symbol is necessary in order to represent a meaningful difference in the language. In short, a phoneme is a member of the inventory of sounds used by a language to mark differences between words. There will be much more to say about the phoneme as we proceed.

**Jan Baudouin de Courtenay**

Jan Baudouin de Courtenay was born in Poland, in 1845, in an old aristocratic family of French origin, one that could trace its origins to the times of the Crusades. He always considered himself Polish, though he lived and worked in many Central European countries over the course of his career. He studied linguistics in the late 1860s with Schleicher, Leskien, Brugmann, and Delbrück in Leipzig, and, in Russia, with Ismail Sreznevskij, but like so many scholars we have met and will meet, he considered himself self-taught, an academic orphan who was the student of no one. His first major academic position was in Kazan’, where he taught from 1875 to 1883, and it was there that he mentored Mikołai Kruszewski, who in turn would leave a heavy mark on Baudouin’s thought. It was during this period of his life that he created what has come to be known as the Kazan’ school. Later on, he established one of the two important schools of Russian linguistics in the early 20th century, the St. Petersburg school, in the years nearer to the end of his life (1900-1918).

Baudouin may have felt that his work was produced off the beaten path, and it may have taken a while for the linguistic world to recognize the validity of his work, but his effort to develop a theory of phonology and morphophonology produced important results which we view as the first theory of phonology. For linguistic scholars, his most accessible work was a 130-page monograph entitled *Versuch einer Theorie phonetischer Alternationen. Ein Kapitel aus der Psychophonetic* published in 1895. Some of the terms that are essential to the theory
of phonology are due to Baudouin and his school: these include morpheme, alternation, and distinctive feature. (The linguist Meillet found “morpheme” to be “un joli mot,” and so the term made its way into his translation of Brugmann; the rest is diffusion, and history.) It is by no means easy to separate the contributions of Baudouin and Kruszewski; below we will speak of the views of the Kazan’ school and of Baudouin, but Kruszewski was deeply involved in the initial development of these views.

Eight years after Kruszewski’s death at the age of 35, Baudouin discussed how he viewed his student’s contribution to the new ideas in linguistics that he was exploring himself. The remarks were not generous. Perhaps that is made up for by Baudouin’s acknowledgement of his student’s contributions; perhaps not. Baudouin noted that “Kruszewski developed the ‘theory’ of alternations more ‘philosophically,’ more comprehensively, and more precisely than I myself have done.” And yet, “it cannot be denied, however, that Kruszewski merely gave another, finer form to what he had learned from someone else”—and that someone else was, of course, Baudouin. And Kruszewski “left many things unnoticed”; imagine that! And when Baudouin brought up one of Kruszewski’s “most original ideas,” he added that this idea was “nothing new for me personally, since I had been developing it for several years in my lectures.” When we look at Saussure’s experiences in Leipzig shortly, we will see the inverted case, the view of a student who goes to a great deal of trouble to document his personal development of an idea despite his teachers’ parallel efforts.

The word phoneme had just been created, but because of its central role in the development of phonological theory, the precise definition and usage assigned to it has shifted and fluctuated over time, never so much as in its early years. Baudouin captured the concept in these words: “Phoneme (from Greek φωνη, φωνηµα ‘voice’) is a linguistic term: a psychically active, phonetic unit. In the context of speech or hearing, the term “sound” is sufficient, indicating the simplest phonatory unit (that is, unit of pronunciation) which creates a single acoustico-phonetic impression. But if we look at things from the level of a real language, a level which perdures only at a psychological level, only as in a world of representations, the notion of sound is no longer sufficient and we need another term which would be a psychological equivalent to “sound.” This term is phoneme.” Elsewhere Baudouin cited the influence on his thinking of the young Ferdinand de Saussure, and he provided a definition elsewhere: a “unitary concept belonging to the sphere of phonetics which exists in the mind thanks to a psychological fusion of the impressions resulting from the pronunciation of one and the same sound: it is the psychological equivalent of a speech sound.”

Baudouin expressed the feeling that he shared with so many others in this book, the sense that he was likely to be forgotten:

My attempt at presenting a theory of alternations will perhaps receive no recognition. It cannot, however, be denied that the concept of “alternation” and “alternants” is relevant to an enormous mass of linguistic facts, for there is probably no sound in any language which is completely isolated and does not alternate with another sound, just as there is no word to which the study of phonetic alternations cannot be applied.

Jan Baudouin de Courtenay: Attempt...

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1 For a recent discussion, see Radwanska-Williams, 1994.
2 Courtenay, [1972][1894].
More than any linguistic school before or since, the phonological analyses of the Kazan’

school focused on *pairs* of words that were similar but not identical and on words that were

related to each other *etymologically*, that is, in the history of the language. The focus on

pairs, or more generally, sets of words, that are related in the *history* of a language is, for the

most part, a way of talking about words that are related either by *inflectional* morphology

(which is to say, the various members of a paradigm) or *derivational* morphology (related nouns and verbs, for example). In English, this would *not* include the set of words *trip, train, travel*, even though they contain a common initial sequence *tr* and a shared meaning, nor would it include the pair *male, female*, since their etymologies are unrelated to each other (they come from French *mâle, femelle*, and *mâle* has nothing to do with *femelle*). But there are many families of words that are related in this way. For example, *f* and *v* are paired with each other in word pairs such as *life/lives, wife/wives, leaf/leaves*, and a long *i* and a short *i* are related to each other in *divine/divinity, dine/dinner, line/linear*, and *ride/ridden*. Baudouin used the word *alternation*: in English, *f* and *v* alternate in *life/lives*, and so on.

Here is the central point: Baudouin proposed an important link between etymologies, di-

achronic evolutions, and synchronous phonological processes. As we watch the evolution

type about phonology from Baudouin down to our time, the varying ways in which

these links were understood lie at the heart of the discussion. It is at the center of Leonard

Bloomfield’s “Menominee morphophonemics,”⁴ which we will discuss in chapter 6, and

Morris Halle’s “Phonology in generative grammar.”² It represents a central part of the ef-

fort of linguists to come to grips with the question of diachrony, the evolution of the system, is embedded within synchrony, the system as viewed at a moment in time. Baudouin was quite explicit on the importance of distinguishing what he called *static* and *dynamic* aspects of language—what today we call *synchronic* and *diachronic* aspects.

An essential part of the Kazan’ school’s contribution was the recognition that in languages, alternations need to be divided into two sorts. One sort, which Baudouin called *anthropophonic* (today known as phonological), has to do with the sound context in which the sounds in question appear; the other sort, which he called *psychophonetic*, relates to gram-

mar and will be discussed in a moment. American English has two pronunciations of /t/, one of which is a flap, as in words such as *Italy*, and one of which is not a flap but rather is aspirated, as in the word *Italian*. Which of these two pronunciations is used in a given word is entirely determined by the nature of the sounds appearing around it, and this is an example of what Baudouin called an *anthropophonic* alternation, and more specifically, a *divergence*: “this kind of contemporary, live split of a psychologically homogeneous phoneme into two or more phonemes we shall call *divergence*.”³ And if the parallelism that forms the alternation is completely general, leaving no word an exception to it, then he called it a *purely anthropophonic phonetic* divergence.

Typically there is something about the immediate context that either enhances a sound or suppresses it: a consonant may well be enhanced if it is followed by a vowel, or suppressed in some way if it is followed by a consonant, for example. That environment may be said to “cause” the divergence, but the causality is not simple and elementary. In some cases, the causes might be general, applying to all languages at all times, while in other cases,

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¹Bloomfield, 1939 (1939).
²Halle, 1962 (1962)
³Courtnay, 1972:171.
the cause might be a “transient temporary force which acts only in a particular period of a
given language.” And just as important, these forces may operate synchronically, or not—and if not, then they “belong to the past of a given language; and finally, the effects being
described may be either obligatory or optional.”

The effects of divergences may go unnoticed, Baudouin underscored: “Since the prop-
erties of the phonemes \[x\] and \[y\] are not individual, psychological properties that are
stored in the brain center, but conditioned variants which depend on the phonetic environ-
ment . . . rather than on psychological factors, the anthropophonic variants of the dependent
phoneme may go unnoticed.” For Baudouin, as we see, there are psychological properties
that are stored in the brain center, which are the foundation for a number of distinct re-
alizations of the stored element whose differences are logically dependent on surrounding
sounds. This is the heart of pure phonology.

The other sort of alternation was what Baudouin called a psychophonetic
alternation or “correlation”, and the two examples from English given earlier (dine/dinner, life/lives) are
psychophonetic alternations; an even better example from English is sing/song, because
the difference there is linked to nothing other than a grammatical (that is, psychological)
condition. Sound differences of this sort are not the logical effect of a surrounding sound;
they are the logical effect of something that lies within the grammatical system. The term
correlation was adopted by Roman Jakobson in the 1920s, as we will see below in Chapter
9, where we discuss other antecedents of the term correlation.

Baudouin strikingly emphasized that this shifting of one phoneme to another is an option
for morphology “in the same way as it utilizes mobile word-forming morphemes (affixes),
i.e., prefixes, suffixes, desinences, etc . . . And like the suffixes or prefixes, the correlatives
may serve to distinguish morphological categories.” [176]

Baudouin emphasized that the vowel-gradation widely discussed in the Indo-European lit-
erature was “closely connected with a correlative alternation of phonemes in which one
member of the alternating pair has a zero-phoneme, i.e., lacks any phoneme,” which he
wrote as “\[x\]|\[\emptyset]\],” and just as with divergences, correlations may be productive, or their
productivity may be waning. (It would be a mistake to ask what the causes are for the
correlations of a language: they are what they are, and they exist because learners learn
them from their environment. If we wish to learn more about them, then we may under-
take historical and comparative linguistics, but that is something outside of our study of the
language itself.) Furthermore, we do not expect the sounds related by correlations to be
phonetically similar. [181].

It is important to bear in mind that the theoretical work involved in defining and justifying
the phoneme was the development of a practical effort to develop writing systems, both for
languages that had not yet been provided with an orthography, and for languages whose
orthographies were sadly out of date, at least as some people saw it—like English or French.
And we can learn a good deal about how sophisticated people thought about sound systems
if we pay careful attention to a discussion of the orthography proposed for a language such
as Zulu, a Bantu language of South Africa, that did not have an orthography in the mid

\[1\]73.
19th century. A series of three papers was published in the *Journal of the American Oriental Society (JAOS)* in the early 1850s about a proposed orthographic system for Zulu. Lewis Grout, an American missionary in South Africa, had already published a lengthy paper on Zulu morphology in the first volume of the *JAOS*, in 1849, and he followed up with a paper on phonology and orthography in 1853, to which two responses were published. The first was by Josiah W. Gibbs, professor at Yale and one of the three editors of the journal; it was followed a bit later by a paper by C. A. Holmboe, a Norwegian linguist from Oslo. We can see how they thought about symbols and sounds from their discussions.

Grout’s account gives the impression that he has studied Zulu and thought a good deal about it, but has not quite made the transition from thinking about Zulu from an anglophone’s point of view to that of a linguist (or a zuluphone). He worried about phrase-final vowels, whose vowel quality was difficult to determine, but noted that in many cases, he could add the locative suffix *-ni*, and the uncertainty vanished. If a word with the locative ends in *ini*, then the original word ended in *i*, if it ended in *eni*, then the original ended in *e*, and so on. But this sophisticated linguistic thinking does not help him decide just how many distinct vowels there need to be in the orthography: he hears a range of vowels between *e* and *i*, for example, and between other pairs of vowels for which he proposed to assign basic symbols. Those intermediate vowels do not need their own symbols: “those which are really intermediate between two different vowels may doubtless be gathered under one or the other fundamental and distinct vowel cognate, without inconvenience or violence to the language.” And Gibbs agrees with him entirely: “There are also in this language many intermediate gradations of sound between *p* and *b*, and between *f* and *v*. But these, as is suggested by Mr. Grout, it is neither necessary nor expedient to indicate... These different grades will naturally arrange themselves under the two extreme sounds.” p. 471. Today we would not agree with that at all.

But the most interesting part of the account is the treatment of clicks. The proposal that Grout made is the one that has been adopted today, using the letters *q, x, and c* for what Grout called the palatal, the lateral, and the dental clicks. Gibbs did not like that—he thought that it would lead to confusion, and suggested that a rational system with new geometric symbols would be best: he suggested ✷ as a basic symbol for clicks, with or without a horizontal or a vertical line to give the different points of articulation (and other elaborations to indicate other complexities, such as nasality, by adding diagonal lines at one corner or another), such as: ✷ ✷ ✷

From our point of view today, the most interesting comment was made by Holmboe, in response to Gibbs’s proposal to add a set of new symbols for the various clicks. He was skeptical that Zulu really needed four or more symbols for the clicks; he suspected that the different pronunciations were predictable from context. Here is how he put it:

> As to the clicks, Messrs. Grout and Gibbs propose four varieties of form for each of them. I do not doubt the existence of that number of perceptible varieties of sound, but I doubt the necessity of making use of so many signs in order to express them all. It is the case in every language that a letter exhibits certain differences of pronunciation,

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1. p. 429.
caused by its contact with other letters, but it may nevertheless always be written with the same sign, without leading to confusion. If the varieties of the clicks have this origin, it is superfluous to multiply signs for them. If, on the other hand, there are in these languages words, or forms of words, which would be confounded, if the signs of the clicks were not varied, I acknowledge that it would be necessary to vary them.

This was a straightforward statement of the phonemic principle as it would be applied to writing systems. It was clear that the principle was implicitly understood by at least a good number of people thinking about language at the time.

Baudouin himself seemed to hedge on the question of whether it is reasonable to think of alternations being changes of some sort. For the most part, he was against taking the idea seriously that there really was a change; the ambivalence he expressed would be echoed sixty years later by Zellig Harris. At times, he was clear in his statement that there were no changes here: “there are neither phonetic changes nor phonetic laws, and there never can be,” because change takes place in the world of space and time, and the differences that we note with alternations are embedded in utterances that are separated in time and space. What we note is “simply the phonetic difference between etymologically related morphemes.” Still, he allowed that these could be called “phonetic change” or “transformation”.

Baudouin saw himself as breaking away from the linguistic scene of his contemporaries, and he made this as plain as day in the inaugural lecture that he gave in 1870, when he was 25 years old. He explained that he saw three approaches to linguistics in the world about him: a descriptive approach, an aprioristic approach, and a “truly scientific, historical, genetic approach.” The descriptive approach was flat, devoid of significant consequences, and boring; the “speculative, philosophizing, aprioristic and childish approach” is pursued by people who recognize the inadequacy of the descriptive approach but do not have the slightest idea how to do linguistics other than by making up hypotheses and then forcing the data to fit the hypotheses, an approach which in the final analysis “is decidedly harmful”; while the scientific approach embodies a set of inductive methods. It views language as “the sum total of actual phenomena, of actual facts,” and as an inductive science, limits itself to two things. The first is comparing phenomena to each other, and the second is to “establish forces and laws…that connect the phenomena and present them as a chain of cause and effect.” The first activity lends order to a large collection of facts, and the second allows for the crucial element of deduction at the heart of science. Baudouin took special aim at linguists who chose to ignore data: “all facts have equal right and can be viewed only as more or less significant; by no means can some be deliberately ignored, and it is simply ridiculous to sneer at facts. All that exists is reasonable, natural, and lawful; that is the watchword of any science.”

Baudouin argued strongly against any confusion of linguistics with its intellectual neighbors. He wrote,
I must caution against the very confusion of linguistics and philology. Philology, as it has developed historically and as it is usually presented by its practitioners, is a conglomerate of knowledge, of detailed information about a variety of matters, and not a science in the strict sense of the word; on the other hand, linguistics is a monolithic and well-defined discipline....In origin, linguistics is everywhere in the debt of those philologists who first studied language for special purposes, that is, as a means of investigating other aspects of the intellectual life of a nation, but then discovered the pleasure of studying language for its own sake and created the science of grammar. . . In his discussions of language, the philologist asks: what is its parentage? Does it boast ancient written records? Does it have a history of several dozens of generations who used it for literary purposes?

But linguistics is something else:

In fact, however, the study of modern languages, accessible to us in all their facts, is far and away more important. My statement may strike some people as eccentric, but the natural scientist will understand me immediately. The study of paleontology presupposes the study of zoology, botany, etc., and not the reverse. As the name itself indicates, linguistics is the scientific investigation of language, or human speech, in all its diversity. Like other phenomena, linguistic phenomena give a first impression of chaos, disorder, confusion. But the human mind has an innate ability to shed light upon seeming chaos and to find harmony, order, system, and causal relationships in it. Linguistics is the goal-directed activity of the human mind to find order in the phenomena of language.

And Baudouin made much the same point with regard to psychology, from the perspective of linguistics:

Two elements are inseparably linked in language: a physical and a psychological one...The forces and laws and the life of a language in general are based on processes which are of concern to physiology (to anatomy and acoustics) and to psychology. But the same physiological and psychological categories make up a rigidly defined subject which is investigated by the historically developed science of linguistics. Most of the questions raised by the linguist are never broached by the physiologist or psychologist; consequently, linguistics must be regarded as an independent science, not to be confused with either physiology or psychology.

We offer this brief discussion of Baudouin’s perspective as an example of what we were referring to in the previous chapter when we talked about internal history of a discipline, one in which we are able to treat his views as relevant to questions that are still active and in play on the contemporary scene.

Ferdinand de Saussure
For the 21st century reader, Ferdinand de Saussure is a character from the late 19th century
who is an amalgam of contradictions, and of all the contradictions, the deepest is this one: he is, today, revered as the great and famous linguist who set linguistics on its course as a modern discipline. He is the founding father of modern linguistics, and perhaps the founder of structuralism more generally, but here is the irony: he himself had no idea at all that this cloak would ever fall on his shoulders. He died a relatively young man—he was 55 years old—and all indications are that he viewed his own attempts to pursue a scholarly career as failures that ultimately led him nowhere. Yes, he finished his career as a professor, but not in an intellectually vibrant city (he was professor in Geneva, not Paris or Leipzig), and he had very few students during his Geneva years. He had written a brilliant essay as a very young man, but it was a vanity publication, and his father had covered the costs to have it published, and Saussure’s quite famous teachers in Leipzig—Brugmann, Osthoff—were always rather dubious about Saussure’s claim to owe none of his ideas to those of the professors whose courses he took. Over the thirty-some years that followed the publication of the book of his youth, he had a publishing record that could be called modest, if we were to be unusually generous, and disappointing, if we were to peer inside Saussure’s head to try to see his own view of himself.

And we do have the opportunity to see a bit of what went on inside his head. Although he published little, he was a man who wrote a great deal, and with the publication of many of his incomplete writings, we understand better what his point of view was. In addition, he left behind a number of manuscripts that described his own view of his life, and how his work related to that of others; most importantly, he wrote a number of drafts in the fall of 1903 of an account of his life, and how things had happened about him and how he had responded to what life had provided.

In the entire history of linguistics, there is no more striking example than Saussure of a brilliant and creative individual who insists that he is a free-floating intellect who has learned little or nothing from those around him, and whose life is made utterly miserable by his efforts to persuade himself of his own intellectual autonomy. His legacy to us consists of work that he did as a young man on the analysis of the vowel system of Indo-European, and the published form of lectures that he gave on the general theory of linguistics—though these lectures were assembled and published posthumously by two linguists who were former students of his, Charles Bally and Albert Sechehaye.

We will examine four periods, and three cities, in Saussure’s life. He grew up in Geneva, where his gifts were recognized early. He was next the brilliant student in Leipzig, then the young genius in Paris, and finally the professor once again in Geneva.

Saussure was born in 1857 to a family of Calvinist aristocrats of French origin. His family tree included the famous Horace-Benedict de Saussure, alpinist and, along with Jacques Balmat, the first to climb Mont Blanc in 1787. Saussure was thus the scion of a distinguished
Fig. 2.6: Ferdinand de Saussure
family of naturalists for whom a break with traditional taxonomies and classical systems of classification was almost second nature. His childhood and early education was spent in an environment where “the highest intellectual culture had long been a tradition.”

These things, then—the collection of large collections of data, of description, and ultimately the elaboration of an explanatory system of classification—formed a Zeitgeist, a climate of thought and action, that was singularly rooted in the Saussure family, giving each member of the family (but none as much as Ferdinand) what De Mauro (1972,1) calls a scientific forma mentis.

We see just this scientific culture in an extraordinary observation that Saussure made later in his life, in connection with his work on Sanskrit, in a letter he wrote to Meillet (January 4, 1894):

The beginning of my paper on intonation is about to appear...But I am quite disgusted by all of this, and by the constant difficulty of writing even ten lines which do not violate common sense when it comes to facts about language. Preoccupied most of all, and for so long, about the logical classification of these facts, of the classification of the points of view from which we look at them, I see more and more both the immensity of the work that would be necessary to show the linguist what he does; in reducing each operation to its predicted category; and at the same time the great vanity of what we can ultimately do in linguistics.

That was Saussure, out of breath, but what a statement.

Saussure’s education in modern linguistics began in the fall of 1875, when he was 18 years old and a student at the University of Geneva. There he attended lectures by Louis Morel, who had just returned from Leipzig after studying with Curtius. During that freshman year, Saussure carefully studied the work of Bopp, Schleicher, and Curtius.

Saussure was also reading the recent literature by French Indo-Europeanists, and devouring the substance of work in the field at an astonishing rate; here is something he wrote in the second half of that year:

What opinion should I have of Bréal? I haven’t read much by him; but here for example is an article of his on Latin aut...where in the end he does nothing more than repeat what Bopp said, and it cannot be unwitting since he is the translator of Bopp’s Comparative Grammar...In the same article he says in a note: we derive indiges from indu and ga “bring into the world,” an explanation given long hence by Curtius and cited as well in the Comparative Grammar of Bopp translated by Bréal...
In his recent biography of Saussure, John Joseph discussed these diary entries, noting that the hubris in these entries is “obvious,” and indeed it is, and it is matched by any number of remarks that Saussure made at the time.

Saussure left the University of Geneva after that first year. Geneva had been his home, and it was time for him to go elsewhere. In the event, he went to the University of Leipzig, where, as we have seen, the local linguistic world had just seen the establishment of a new school, the Neogrammarian movement, and where prominent linguists of the preceding generation—notably Georg Curtius—had a lot of difficulty taking the movement seriously as something that was really new. But at 19, Saussure was simply too young and immature (the two are not the same thing) to understand how the young teachers he would meet there viewed themselves: from their own point of view, Brugmann and Osthoff were still the young scholars trying to push their new ideas, and defending them from the criticisms of their own teachers. After all, Karl Brugmann was only 27 years old; Hermann Osthoff was 29. They were not prepared to be thought of as the old guys. But when Saussure arrived in Leipzig, he saw Brugmann, Leskien, and Osthoff as the older generation, and he was perhaps ready to be unimpressed with what he found. For their part, the Neogrammarians were not ready to be treated as part of the linguistic Establishment; they were still young and still revolutionaries at heart.

One of the central problems that the Leipzig Neogrammarians were working on was the uncovering of the vowel system of Proto-IndoEuropean: how many vowels were there, what were they, and what were their pronunciations? This too was the question that drove Saussure. Perhaps he was already passionately engaged in that question before he got there, or perhaps not; it is difficult to be sure. Either way, Saussure was hoping to go mano a mano with Brugmann and Osthoff and to be the first to figure out what the vowels were in PIE.

But things did not work out the way Saussure had hoped. On the positive side, he threw himself into his studies and worked very hard, and he became friends with some of his teachers, such as Brugmann (who was not so much older than him, anyway), and rubbed shoulders with all of the active Indo-Europeanists, so many of whom came to town for professional reasons. But the culture and the language, both of which were foreign, put

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1If we are to take Saussure at his word, the choice of Leipzig was of not great significance; he wrote,

> I should add that I was going to Leipzig rather at random, simply because my friends from Geneva, Lucien Gautier, Raoul Gautier, Edmond Gautier and Edouard Favre, were studying there, in the schools of theology and law. My parents preferred, since I was only 18 and a half, a foreign city where I would be surrounded by fellow Swiss. Souvenirs de Saussure, p. 21.)

The reader of Saussure’s memoirs must choose whether to take this on its face, or to see it as a way of underplaying the significance to Saussure’s relative brief but in some respects tragic period in Leipzig—or perhaps better, any responsibility on Saussure’s part for finding himself in the community of leading scholars in the world concerned with the questions that he cared about. We ourselves are of mixed minds on the matter.

2We include here a recollection of Saussure’s from years later, and we are uncertain how seriously to take this anecdote. The reader may decide. Saussure wrote,
him off, and he did not feel like one of the students. And worse yet, he felt he had his own ideas about the Indo-European vowel system, and he wanted to make a big splash, and be recognized as the person who solved the difficult analytic problem of Indo-European structure. By the end of that first year, he had been studying linguistics in a serious way for no more than two years, though he had been thinking about it on his own for at least a year or two more. But Brugmann and Osthoff had quite a few more years on him, and they had (or so he felt) already made their reputations.

This left Saussure in a difficult situation. He wanted to keep up with the competition, which meant going to Brugmann's and Osthoff's lectures, but he did not want to be labeled just as one of their students, and he wanted the scholarly world to recognize him as the original thinker.

The incident that seems to have been really traumatic for Saussure, one that hurt him and defined the difficulties that he had with the German linguists and their lack of recognition for his genius, was the case of the sonant nasal. Even thirty-five years later, he came back to it in his personal diary with a sense of bitterness, and a sense that something had happened that he could not step back from. Saussure wrote a number of descriptions of his life, but none of them was authorized for publication during his lifetime, so we certainly have to take them with a grain of salt, and it is up to the reader to decide how serious Saussure was. The story, in any event, goes back to something Saussure had noticed while he was still in high school.

The moment I saw the form tetákhatai, my attention, in general extremely distracted, as was natural during this year of covering old ground, was suddenly seized in an extraordinary manner, for I made this mental analogy which is still vivid in my mind even now: legómetha: légontai, consequently tetágmetha: tetákhNtai, and consequently N = a. I left the Collège wondering how n could have become a, and trying to make the sounds in a way that would answer the question. I conceived, in repeating these experiments, that it really was possible to pass from tetákhntai to tetákhatai, but naturally without marking this n with any special sign (such as n-underdot or something else) even in my mind. Its characteristic was for me (which is physiologically right) its

When I gave [a certain presentation] at Curtius’s seminar in 1877 on the fact that a is in alternation with â, M. Brugmann was not present, but finding me the next day in the great court of the university, he came up to me and asked me in a friendly way, as something that interested him, (and this is literally from Brugmann), ‘ob noch weitere Beispiele als stator : stâtus und mater : pâter wirklich für diesen Ablaut vorliegen”. If we were to tell the story today that M. Brugmann asked if there were more than three examples for the ablaut â: a, who ever were to say that would seem to be telling a tall tale. But that is exactly just how little the current generation is capable of judging either the state of affairs in 1877, or the exact role that should be attributed to the researchers in question. Nothing could be simpler, than to open, for example, the Grammaire of Gustav Meyer, who was the first to ignore my name, â:a:o; â : e : ; et â:o:o, to notice these facts that are so clear that nobody had even bothered to look up; and that is why it is, I repeat, very characteristic that in 1877 M. Brugmann himself did not realize that there were a lot of examples [pour un seul fragment] of ablaut, like â: a which seemed new to him in principle (and everything about o could certainly have been taken straight from my Mémoire. p. 23.

1 In retrospect, he emphasized the feeling he had had at the time, the feeling of being an outsider, both because he was Swiss, and because German was not his mother language; these two things made it easier and more comfortable for Saussure to fall into spending time with the other students who were there from Geneva.

2 John Josephs’s translation.
position between two consonants, which caused it to give rise to a Greek \( \alpha \), but it was an \( n \) like any other.

Now three years later, Saussure was a student in Leipzig. Brugmann (not thinking of Saussure, obviously) published a paper on the sonant nasal that was received as a great advance by the Neogrammarian community. Thirty-five years later, Saussure wrote down his recollections of finding this out.

I went to [M. Hubschmann’s] house, to introduce myself to him. He was the first German professor that I would meet, and I was right away delighted by his good mood in receiving me. He began to speak to me almost immediately of Indo-European linguistics, and he asked me if I had read the article, that had come out over vacation, by Brugmann on the sonant nasal. I hadn’t even heard of Brugmann, which was pardonable at that point, especially for me, and so M. Hubschmann explained to me that there had been a flurry of excitement over the past several weeks about the question as to whether there were certain Greek \( \alpha \)s that derived from \( \nu \) [nu], or whether certain \( \nu \)s hadn’t produced \( \alpha \). I couldn’t believe my ears, since in my first meeting with a German scientist, he describes as a great scientific conquest something that I had believed for three and a half years to be just a piece of elementary truth that I did not even dare to mention because it was probably too well known. So I said, a bit self-consciously, that this did not seem all that extraordinary or new. Then Hubschmann insisted on the importance that Germanists were placing on this.

The upshot was that Saussure explained to Brugmann that he did not want to sit in on his lectures for fear of committing unintended plagiarism of sorts, and then he sat down at the end of his first year of classes in Leipzig, in the summer of 1877, and worked non-stop to produce a 200-page masterpiece on the treatment of the vowel system of Proto-Indo-European. This is the \textit{Mémoire on the Primitive System of Vowels in the Indo-European Languages}, an utterly brilliant work that was instantly recognizable as a work of genius by anyone keeping up with linguistics at that moment.

In 1878, Saussure left Leipzig, and the whole group of German Neogrammarians, as quickly as possible, but his reputation as a brilliant young man was unfolding before him. After a brief period in Berlin, when he met Whitney (as we have seen), followed by Paris and Geneva, he worked on his thesis. He went back to Leipzig in 1880 to defend it, and then went back to Paris, crowned in the glory that shone from his thesis, entitled \textit{De l’emploi du génitif absolu en sanscrit}. The scientific atmosphere he found in Paris was very different from that he had lived with in Leipzig. France had been thoroughly defeated by Prussia in 1870; it had lost two whole départements, and such important cities as Strasbourg and Colmar. Revenge was the watchword of the moment. As we noted above, the reasons for the defeat were not obscure: it was not so much that France had been beaten as it was that the administration, the modern university, and the science of Germany had won the war. The recipe for revenge was to redesign the dusty French universities and to match—no, to surpass—the German standards of science. In leading German universities, such as Leipzig, Berlin, and Jena, the jewel of the sciences was comparative linguistics. What had

\footnote{p. 21.}
to be done, therefore, was to build in France a school of linguistics that could challenge, or even replace, the Neogrammarians. The Napoleonic university, the old Sorbonne, was hardly the place where new ideas were going to be received and developed. As is often the case in France (though not in the United States, which has maintained the German model), innovation was to come from the periphery of the classical university system: the Ecole Normale Superieure, the Ecole Pratiques des Hautes Etudes (EPHE), and the Collège de France. These were three of the top institutions in France, and comparative linguistics was a known quantity at all three. Michel Bréal, professor at the Collège de France and man of the hour, recognized the brilliance of Saussure’s Mémoire and recruited him.

And so Saussure would become the founder and leader of the French school of linguistics. As Emile Benveniste, one of the great linguists of this movement, wrote, “Ferdinand de Saussure’s career began in Paris, with the teaching of comparative grammar at the [EPHE] from 1881 to 1891, from the age of 24 to 34, which had a decisive importance for the development of French linguistics.”

As he began at the EPHE, Saussure was 24 years old, his students were 20 years old, his prestige was immense and based on his two books, the Mémoire and his thesis. He had everything going for him: his competence in Germanic languages and Indo-European more generally, his thorough knowledge of the Neogrammarians and their work, his culture and independence of spirit, his new ideas that arguably beat the Germans at their own game—all of this was the mark of the young genius, the charismatic leader of a new school. Maurice Grammont, who would be his student, wrote, “His teaching at the [EPHE] gave birth to a veritable school, the French school of linguistics.” The young Saussure was everywhere on the Parisian scene, at the EPHE and at the Linguistic Society of Paris; he published and gave courses and lectures, and the public came to hear him. Benveniste remembered, later on:

The luster that F. de Saussure shone on our school [the EPHE] is not only the reflection of the posthumous glory that today shines on his name. From the first day those who listened to him—confirming the judgment of those senior to him, Bréal, Havet—had the revelation of his mastery. The initiated knew that three years before, at the age of 21, he had written this Mémoire on the Primitive System of Vowels in the Indo-European Languages which gave new life to the methods and perspectives of comparative grammar, and that his thesis on the genitive absolutive in Sanskrit was the work of a consummate Indianist. The brilliant intuitions on the one hand, and the extreme analytic rigor on the other, and also his charm and distinction, this alliance of such great gifts had seduced Bréal, who, we know, wanted to keep Saussure on a permanent basis.

Saussure was professionally active throughout the ten years of his career in Paris. He published notes and papers in the journal of the Linguistic Society of Paris, and he moved from being an active member to one of the inner circle. Around 1894, he worked on a book on phonology, though he never finished it, and the manuscript was many years later acquired

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1 Benveniste, 1964, p. 21.
2 Grammont, 1912, p. 387.
Bréal continued to support Saussure, and Saussure was awarded the highest distinction that France could offer, the Legion of Honor, and Bréal also proposed in 1888 that Saussure should take his place at the Collège de France when he stepped down. But that would have required Saussure to accept French nationality, and to give up his Swiss citizenship as well, and Saussure declined. He was not satisfied with his status in France—neither from a financial point of view, nor from a professional one. And he decided, eventually, to go back to Switzerland.

In 1891, Saussure resigned his position in Paris, and returned to Geneva, and the following year he was appointed professor at the University of Geneva. He taught comparative grammar of the Germanic languages, Greek, Latin, and Sanskrit, and while he published little, his research continued, as we know now from the archives of his own notebooks. From 1894 to 1897 he worked intensively on the theory of the syllable, writing much of a book on the subject.

In 1907, the University of Geneva created for Saussure a chair of general linguistics, and he gave a course three years in a row for a small group of students and younger colleagues on what he called linguistic “metaphysics,” reflections on the foundations of linguistics, with the goal of creating a program of research and a coherent method for this science. This material was to become a book, one that would be a worthy successor to William Dwight Whitney’s great book, the book which had captivated Saussure for decades. But Saussure fell ill, and he died on February 22, 1914, before he was able to put any of this new material into publishable form.

But the work did not stop with Saussure’s death. Two years later, two of his students and younger colleagues, Charles Bally and Albert Sechehaye, published *Cours de linguistique générale*, with Saussure’s name as the author on the title page, and the book entered into history. It has been published, translated, and commented on around the world, and is certainly the best known and most widely distributed book in all of linguistics. In the 1920s, Roman Jakobson referred to it as a crucial moment in the awakening of structuralism, and newer readings, first by Benveniste and then by Levi-Strauss, Lacan, and many others, paved the way for a new wave of structuralism in the human and social sciences in the 1960s.

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1 Saussure, 1995. The two manuscripts published a century later by Marchese Saussure, 2002b show us a Saussure who was a phonologist well ahead of his time. His analysis of sonority, syllabification, and awareness of the role of phonotactics is thoroughly contemporary. Cf. Laks 2012 (laks-2012). Consider for example the first appearance of the notion of distinctive feature, this notion which will become so important in the work of Jakobson. Emile Benveniste wrote, (Benveniste, 1964)

One notes in Saussure’s writing the phrase “distinctive features,” which gives it a curiously modern sound. The identity of a language is provided by the sum of its distinctive features, which is to say, by what distinguishes Gothic from the other dialects. This is most likely already the seed of what would be the fundamental principle of Saussurean linguistics, that of distinctive features and oppositions as the defining elements of linguistic entities. And when, in this same report of 1881, Saussure says he has dealt with the phonetics: “graphical system, the vocalic system, the consonantal system,” we can perceive the weight which is imbued in the term system by the author of the *Mémoire*. p. 29
The *Cours* is famous for its dichotomies: synchronic vs. diachronic, syntagmatic vs. paradigmatic, relations *in praesentia* vs. *relations in absentia*, opposition vs. difference, signified vs. signifying, and the biggest of them all: *langue* vs. *parole*, which is roughly the distinction between language and speech. We cannot possibly review all of these here, but we cannot simply leave them be either. Let’s consider just the last one, the crucial opposition between language and speech, which has been picked up by grammarians from Benveniste to Chomsky in order to underscore the primacy of grammar over the speech act, and to justify the position that the science of language is the science of grammar. Speech is an activity undertaken by individuals at given times and given places, for specific ends and purposes, often composed of sentences that are meaningful and yet spoken for the very first time in history. The activities we call speech also include repetitions of phrases and sentences that have been said many, many times. Language is the name we give to the system that unites all of these acts of speech, and which we see as part of the skill and knowledge of a fluent speaker of a particular language.

It would be wrong to ascribe to Saussure the view that language, in his sense, had a priority in any sense over speech (though it is not impossible to draw this conclusion from some of the modern accounts of Saussure’s views). The last sentence of the *Cours* is famous, and might give that impression: “We must study language in itself and for itself.” But the sentence comes from the editors, who were themselves borrowing from the introduction to Bopp’s *Comparative Grammar*. Saussure saw himself as following Whitney, for whom language presented a “double essence,” with language and speech indissolubly linked. There is a duality between the study of language as langue and language as parole, and neither can be studied without taking the other into account. This is apparent in the manuscript on which Saussure was working at the time of his death, and has led to a major reconsideration of Saussure’s thought. Saussure wrote:

> Only linguistics, I dare say, is vast. There are, notably, two parts to it: one is closer to language, the passive warehouse, the other is closer to speech, the active force and the real source of the phenomena which appear little by little in the other half of the system.

In summary:

1. Not what is individual, but rather what is established by social usage, thereby fulfilling the conditions whereby something is linguistic.

2. Not necessarily what is written, but preferably what is spoken;

3. Not with a normative goal or in order to give the rules of proper expression;

4. And finally, with the goal of generalizing observations, to arrive at a theory that is applicable to languages.

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2Saussure, 2002a, p. 273, fragment 3347.
If we read his students’ notes, and the fragments left behind, Saussure’s position is clear: “No doubt, language itself emerges from speech in a certain sense; we need the speech of thousands of individuals in order to establish the agreement from which language will emerge. Language is not the initial phenomenon.” Saussure fully understood the paradox that every linguist must face, which is that without speech, there is no language, but the deepest beauty and structure is found in language, not in speech. This is a paradox of which linguists today are not always mindful, because the computational metaphor for language has made it easy to think of grammar as a thing that exists in time and in space (in someone’s brain, in particular)—a story that will be central to our concerns in volume 2. That was not an option for Saussure in his day. He was deeply sensitive to the fact that understanding a language means discovering complex structures: he was, indeed, one of the great masters of discovering such structure.

**Saussure’s Mémoire**

Let’s return to Saussure’s first work, his *Mémoire*, as he called it: it is brilliant, and you can tell from the first three pages that there is a transcendant intelligence at work. Antoine Meillet would one day call it “the most beautiful book of comparative grammar ever written.” There are two characteristics of the German school of 19th century linguistics which Saussure eschewed: paragraphs of endless data whose significance is left to the reader to figure out, and, at least in some of the earlier writing, a tendency from time to time to get lost in flights of fantasy. Saussure’s *Mémoire* is neither of those: it is sharp and to the point.

Saussure’s *Mémoire* begins with some comments that were certain to leave an impression of audacity, pretention, and even cockiness: the third sentence reads, “no other subject is more controversial; opinions are divided virtually beyond limit, and the various authors have rarely applied their ideas in a purely rigorous way.” This young man would explain to his teachers what rigorous really meant! And he then spells out the gist of the analyses given by Bopp, by Curtius, by Fisk, by Schleicher, by Amelung—and then by Brugmann, all in an introduction of five pages, before he gets down to business. And when he does, it is much neater and cleaner than in the earlier books he has cited. One of the striking differences is Saussure’s makes it very clear that he concerned with the evolution of particular phonemes, while the earlier linguistic tradition focused on words and morphemes, leaving it to the reader to translate this into a statement about phonemes, if the reader is so inclined. Let us contrast the way Brugmann (Brugmann, 1886) wrote, for example, when he introduced how he would be employing the notion of ablaut, which refers to the kind of vowel changes we still note today in such triples as *sing-sang-sung*. Here is what he wrote; as the reader can see, this passage is clear if you already know what he means to say, but otherwise you are lost.

The following e.g. stand in ablaut relation to one another: Lat. *da-tus: dō-num; s-iē-s* (O.Lat for *sīs*): *s-iē-mus; >’ag-w*: *straik-āg’-os* (Ion. Att. *strak-hg’-os*); *leip-ein*: *loip’-os*: *lip-e in; >’ag-e-te*: >’ag-o-men; *me-tr-es*: *me-tr’a-si; Goth. aūh-sin*: *aūhs-an-s*: aūhs-n-ē(loc. sg., nom. pl., gen. pl of aūhsa ‘ox’). Skr. *pāc-āmi ‘I cook’*: *pak-tās ‘cooked’ (difference of accentuation).*
Saussure’s style of presentation, on the other hand, is crystal clear: take a look at this chart, for example, exactly as it is found on the printed page.

<table>
<thead>
<tr>
<th>Root vocalism in Indo-European</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full root</strong></td>
</tr>
<tr>
<td>$a_1$</td>
</tr>
<tr>
<td>$a_2$</td>
</tr>
<tr>
<td><strong>Reduced root</strong></td>
</tr>
<tr>
<td>$-i$</td>
</tr>
</tbody>
</table>

It is perfectly clear that three sets of sounds are being proposed, and how each member of one set corresponds to a member in the other. The rest of the explanation is found in the text, just above the chart. The table that Saussure presented was neat and clean, and full of meaning arising out of its structure, just like the periodic table of the elements, or a synoptic edition of the New Testament.

Saussure’s central point concerns the deletion of the vowel of a syllable in Indo-European, what might cause that deletion, and what might prevent it—and what the consequences are when the deletion occurs. Here is a remarkable passage:

The root *wak* is in Sanskrit *vac* and appears as *uc-mās* in the plural... What is this phenomenon? A weakening of the root, no doubt; only it is essential to make it clear that the word *weakening* never means anything other than *deletion of the a*. It would be too vague [c’est laisser trop de latitude que de dire] to say, as M. Brugmann does...“vowel deletion under the influence of accentuation”...Among other examples given we find indo-eur. *sunusú bru*, daughter-in-law for *sunusá* ...When in such a word a *u* drops..., it would be an absolutely abnormal case, and one which we could not take to be parallel and which would in fact be in contradiction with the law of the deletion of the *a*, because a corollary of the law of *a*-deletion is precisely that the *coefficients* of *a* must remain. Let us avoid using the word *samprasāraṇa*: this term, it is true, simply denotes the shift of a semi-vowel to a vowel; but in reality it is equivalent in any linguistic work to: shrinking of the syllables *ya*, *wa*, *ra* (ye,we; yo wo) to *i*,*u*,*r*. In the mind of someone who uses the word *samprasāraṇa*, there is inevitably the idea of a special action of *y*,*w*,*r* on the vowel that follows, and of an absorbing force that the phonemes somehow enjoy. If that is the meaning that we give to *samprasāraṇa*, it is essential that we say that the weakenings we are looking at have nothing to do with *samprasāraṇa*. The *a* drops: that’s all [L’a tombe, voilà tout]. And it is not by means of several distinct phenomena, but by one simple phenomenon, that *pa-pt-ūs* derives from *pat*, and *s-māsi* from *as*, *rih-māsi* from *raigh*...
language (though the actual pronunciation of the vowel may have changed in one, or in both, of the daughter languages). The internal reconstruction task is rather different, and it was especially difficult for Indo-European, because in essentially all of the descendant languages, there are sets of related words in which the vowel of the root has been modified in a regular pattern: the stem of a verb has one vowel in one tense, and a different vowel in a different tense. But the differences were regular and appeared to follow a pattern, if it could only be found. Typically these patterns strongly suggest that one member of the set has a strengthened vowel (one which is stressed, longer), while the other has a weakened vowel (unstressed, or deleted). Saussure aimed to solve both problems with a single proposal for early Indo-European.

The linguist who wanted to solve this task had to be ready to explore an abstract analysis, and to imagine hypotheses in which it did not even matter what the sound was that was posited—a symbol would do, and would serve as the basis for a regularity in the evolution from an earlier stage to a later stage. Saussure’s teacher Brugmann made this point clearly when he wrote about two vowels which he called $a_1$ and $a_2$ (even if the reader might mentally take them as $e$ and $o$, respectively): writing the two vowels that way made the point that it was not the phonetic value that was important, but rather the role that the symbol played in the larger system.

This was the beginning of what would come to be called linguistic structuralism, the moment when what mattered in solving the problem was coming up with a hypothesis that could be expressed in terms of symbols, and which would be rooted—but only after all the symbolic computations had been accomplished—in audible vowels and consonants.

When we read the *Mémoire* today, not just with the eyes of a historian, but with those of a linguist, those of a phonologist, we cannot help but be struck by the absolute modernity of the reasoning presented there. We have already met this feeling of amazement when we read other 19th century linguists, whether it is Humboldt, or Baudouin, or other giants of the field. We indicated at the beginning of this book that this is an essay on continuity (and, yes, rupture), and this is a fine moment to acknowledge and to appreciate the way in which we can read Saussure as a contemporary of ours. We know something about what would happen to his ideas, something that he had no way to know during his lifetime, and we can place him in a genealogical tree to see his ancestors and his descendants, but what is most important is that he can actually speak to us, in our disciplinary language, and with arguments that speak to us today. This is what we mean when we insist that we can read the great and important texts of the discipline, those of Sapir, Bloomfield, or Harris—we mean that we can read them as our contemporaries. It takes a little bit of work at first, but it can be done, and the pleasure of reading a brilliant mind has few equals. Saussure’s theory of the syllable, for example, his analysis of the phonemic system of Indo-European, and his critiques of the Neogrammarians are all pieces of work from which the phonologist who is working right now can learn and to which he or she can respond.

Let’s turn now to a quite different career, that of the American linguist Maurice Bloomfield.
Maurice Bloomfield

Maurice Bloomfield was born in Austrian Silesia in 1855, and he came to the United States as a boy of 12, just after the American Civil War. With him had come his parents, of course, as well as his sister Fannie and his brother Sigmund (Sigmund would later be the father of the important American linguist, Leonard Bloomfield, whose work we will explore at length below). Maurice Bloomfield excelled at the University of Chicago as an undergraduate, and after obtaining a masters degree from Furnam University in South Carolina, he went to Yale University, where he spent a year studying under William Dwight Whitney.

Whitney, in turn, proposed that he should go to the new Johns Hopkins University to study with Charles R. Lanman, who had been Whitney’s student at Yale and who had just started teaching at Hopkins. Whitney thought very highly of Lanman; after Lanman had gotten his degree from Yale, he had gone to Germany, just as any young American linguist needed to do, and he had studied with Whitney’s teachers in Berlin and TübingenAfter study in Germany, Lanman was ready to take an academic position in the United States, and he started his academic career at Hopkins.

So Whitney sent Maurice Bloomfield to Johns Hopkins, and he received his PhD in 1879. What Bloomfield did next was inevitable: he went to Germany, as his teacher, and his teacher’s teacher, had done. In Berlin, he studied with Albrecht Weber, and in Leipzig with the most important Indo-Europeanists: Brugmann, Leskien, Curtius. In Leipzig, he met Ferdinand de Saussure, and he would remain in contact with him over the years that followed.

A passionate Neogrammarian, Maurice Bloomfield published a paper called “On the probability of the existence of phonetic law” in 1884, in the American Journal of Philology, the principal American journal of linguistics at the time. It was an flattering defense of the Neogrammarian principle of the exceptionlessness of phonetic change. The main problem, though, was that many a Neogrammarian could read that paper and say that with friends like this, who needs enemies? Bloomfield’s defense of the exceptionlessness brings him to a final moment of fervor in which he declares that even if the Neogrammarian principle is wrong, it is right from a larger perspective!—because it made linguists do better linguistics.

Schuchhardt’s long response was published the following year, and towards the end he wrote, “In light of what we have just seen, the thesis of the exceptionlessness of phonetic laws can neither be proven through deductive reasoning, nor inductive reasoning; whoever holds to it must recognize it as a dogma… and that is precisely what [Maurice] Bloomfield did… Bloomfield is quite open about it… [saying] that if the thesis of exceptionlessness of sound laws turns out eventually to have been false, that will have no impact on its value as method, because it has proven itself by its fruits.” Schuchhardt is, quite rightly, aghast at this admission. “Connecting correct results from possibly false premises is contrary to scientific thinking. One cannot simply identify a scientific procedure with a scientific theorem; but many linguists would no doubt be—more or less consciously—in agreement with Bloome 1

1 Alter, 2005, p. 209.
2 pp. 29-30.
Schuchardt scratched his head when he thought about the alternatives that young Bloomfield, and also young Kruszewski, seemed to have left him. He felt that he was being told that if he did not accept that sound laws had no exceptions, then he was saying that language was just chaotic. “[Bloomfield’s] fundamental error, which he shares with others, is a deep one, and it resides in fact in the hypothesis that there exist really, or at least that one could imagine, some domain in which no laws whatsoever would hold.” But that is simply not the case, Schuchardt said. In fact, when we look at the world, we see that there is a hierarchy of contexts in which regularity reigns, ranging from “the caprice of a game of chance all the way to the firmly established rules of the mechanical universe.” It is not that sound changes must have exceptions, but rather that incomplete or sporadic sound can certainly be found—and that is what the Neogrammarians try to rule out.

When Bloomfield returned to the United States, his PhD advisor, Charles Lanman, had just been recruited by Harvard, and Hopkins offered Lanman’s position to Bloomfield, which of course he accepted. He would have a major impact on the early development of linguistics in the United States, not the least through his nephew Leonard, and years later he was chosen to be only the second president of the Linguistic Society of America, in 1926.

Bloomfield would maintain close professional connections with German linguists and philologists for the rest of his life, and he was especially close, in an epistolary fashion, with Max Müller. His greatest recognition came for his work on myths and the Hindu religion but he also contributed significantly to comparative grammar and in Vedic studies, his work is still considered a classic (cf. Stratton and Ewing, 1920).

Franklin Edgerton wrote

His achievements are probably greatest in the field of Indology, where he stands unquestioned as the first of all Atharvanists and in the foremost rank of interpreters of the Vedas in general. To it he has bequeathed a gigantic tool, the Vedic Concordance, unmatched in its usefulness to future investigators, save for the Petersburg Lexicon alone. It is a monument to his insight into the needs of Vedic study, his patient industry, his willingness for self-sacrifice, and his talent for organization... It is as a linguist that he belongs to us. In this field his studies fell at a peculiarly fortunate time—towards the close of the seventies of the last century, the decade of the great discoveries that led to the rebirth of Indo-European grammar and of general linguistics. It was he, more than any other, who brought the seeds of these new sciences to this country and worked for their dissemination. The bibliography, especially for the earlier years, bristles with discussions of special problems in Indo-European grammar that have made his name familiar to the readers of its handbooks.

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1 Bloomfield, 1908; Maurice Bloomfield, Veda.
2 Bloomfield, 1888, Bloomfield, 1884, Bloomfield, 1883.
3 Edgerton, 1928.
Fig. 2.7: Maurice Bloomfield
Grammars, dialects, languages: retrospect and prospect

When we look at linguistics throughout the 19th century from the perspective of an internal history of continuities and of ruptures, we see it as the culture from which our modern discipline has grown. Intellectuals and thinkers of staggering talent created what all hoped would be a new science, but without any certainty that their program would bear fruit in the long run. We have emphasized the fact that the central concern of the century was with time and history, and that focus encouraged a view of language that was more Aristotelian and less Platonist than ever before in the West. In this context, the Aristotelian turn meant the recognition that oral language, uttered at a moment located in time and space, was a central concern, and that variation and dialect formation were an integral part of language. This was not merely an idle observation; variation and dialect formation were parts of a raging sea of nationalism and cultural identity, and linguists were caught up in this vortex as much as anyone else.

The Aristotelian turn was not everywhere, to be sure: if the study of the evolution of Indo-European was central to much of linguistics, then its object was surely in time and space, and yet most linguists were willing to leave wide open the question as to whether the early stages of Indo-European were spoken in Anatolia, or north of the Black Sea, or somewhere else entirely. There was an intense insistence, before the Neogrammarians, that some forms of language (like languages in which stem-internal changes of vowels were more important than adding suffixes!) were better than others, and this insistence was not Aristotelian. But Whitney, and many linguists influenced by him, like Saussure, were willing to see language as anchored in practice and performed by individuals in a community. The importance of Darwinian thinking after 1859 cannot be overestimated: while no one was certain whether Darwinian competition had a counterpart in the world of languages and dialects, Darwin’s ideas served as proof of concept that out of variation within communities could emerge differences which after the fact seemed, and indeed were, qualitative changes. We will take a brief look at how this Aristotelian turn played out in the study of the modern dialects and languages.

While historical and comparative studies of language were new1, the systematic study of the classical languages of Europe was not. Dictionaries (which went hand in hand with normalizations of spelling, in many cases), pedagogical grammars and textbooks, and other sorts of grammars existed for a number of languages. In several cases, the development of this scholarly capital was instrumental in raising a dialect to the status of a language. At the center of this grammar-oriented view was the role played by normativity: there is a right way (and hence, a wrong way) to write things in this language, and we will explain to you what that right way is.

But the study of dialects was something quite new, and with it came a different point of view, one which was essentially descriptive, and one which put much less emphasis on the importance of a written form of the language (though it happened often enough that the scholar who worked on a dialect, often his own, wanted to see an orthography developed for it), to the point where the oral form of language would be even more important than the written. Linguists even today will sometimes be uncomfortable when they need to analyze

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1Auroux, [1994]
a grammatical structure which is perfectly normal in the written language, but very rare in spoken language.

**Dialectology**

The case of Latin, and the Romance languages that descended from it, was particularly clear: what had begun as dialectal variation within the Empire (or occasionally, perhaps, a process of creolization) became distinct languages, each varying in a different direction, each with its own speed of change. Viewed in retrospect from modern times, it was hard to decide when these systems should be called dialects and when they should be called new languages. Whatever they were, they were the intermediate stages, the links in the chain of the genealogical trees that linguists were constructing: how could they not be of great interest to a linguist of this era? Grimm, for example, built his famous grammar of German as a grammar of dialects of German. Later on, Schuchard turned phenomena of language mixing and creolization into a central question of linguistics, and he would become interested in *lingua francas*, pidgins, and creoles of all sorts. Studying dialects involves a serious elaboration and organization of data and observations: it is a descriptive account of how people speak. The 19th century saw the first linguistic surveys, first by questionnaire sent through the mail, and later by field work and direct descriptions. All of Europe was slowly covered by linguistic atlases showing the reach of dialectal characteristics of all sorts: lexical, phonological, morphological.

**Experimental phonetics**

Spoken language thus became the center of interest for a good number of linguists, and they established systems of transcriptions and detailed phonetic alphabets in order to document variation and change. This development paralleled the development of a new science, phonetics, the detailed study of the sounds of language.

Detailed studies of articulatory movement in speech had emerged since the Renaissance, and this material was well known to teachers of diction and of singing, and to doctors dealing with language-related issues. People working with the deaf, like the Abbé de l’Épee in Paris, had developed detailed notations for diagnosis and training, but the greatest advances came from progress in the scientific understanding of acoustics.

In that development, Herman von Helmholtz played a central role. Helmholtz began his career as a physiologist, and eventually became the most famous German scientist of his age. His work on acoustics, on the perception of tone and the decomposition of sounds into formants, had enormous consequences. His coupled resonators were capable of producing vocalic sounds, and the extraction of these formants made it possible to visualize the components of linguistic sound. His presentation of the physics behind speech was clear and detailed; he explained that the “the vowels of speech are in reality tones produced by membranous tongues (the vocal cords), with a resonance chamber (the mouth) capable of altering in length, width, and pitch of resonance, and hence capable also of reinforcing at different times different partials [overtones, harmonics] of the compound tone to which

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1 This is a much more important issue than these brief words would suggest. The treatment of liaison consonants in French, a subject which one of us (BL) has worked on for many years, is one where the determination of what belongs to the spoken language and what to the written language is extremely illusive and difficult—in part, but only in part, because each can influence the other.
which is exactly what we teach students today. He noted, “we find pretty uniformly that the first six to eight partials [overtones, harmonics] are clearly perceptible, but with very different degrees of force according to the different forms of the cavity of the mouth, sometimes screaming loudly into the ear, at others scarcely audible.” He noted that the loudest partial corresponded to the height of the vowel, and noted that the back vowels seemed to have a discernable second partial. His technology was not as advanced as ours today, but he took some of the most important steps in setting the stage for our understanding today of the acoustics of vowel production.

Helmholtz's influence on researchers at the end of the century was considerable, including Jean-Pierre Rousselot, abbey and dialectologist, who was deeply involved in the description and transcription of linguistic sounds and whose work moved into acoustics. Rousselot built a series of devices that were able to trace the formant structure of vowels, and he is often viewed as the true founder of experimental phonetics, based both on his writing (Rousselot, 1897) and the phonetics laboratory he created at the Collège de France in 1897.

At the end of the 19th century, the pace of technological advances accelerated: Charles Cros, and later Alexander Graham Bell, developed systems for the creation and transmission of artificial sound, eventually leading to the patent of the modern telephone in 1876. Even more important, technologies for recording the human voice were developed as well.

With the ability to record and play back sound, to transmit it over distances, and to analyze its spectral properties, the reinvigorated field of acoustic phonetics began to change the way that speech would be studied by linguists at the end of the 19th century. New instruments and new descriptive tools arose hand in hand, and had a profound impact on linguistic studies, nowhere more than in the field of dialectology.

In England, Henry Sweet was a Germanist, with a special interest in Old English and Old Norsk. He developed practical tools for teaching living languages, and his work contributed to the founding of phonetics as an autonomous field of linguistic study.

In Germany, Edward Sievers, who directed the Neogrammarians’ journal, Beiträge zur Geschichte der Sprache und Literatur with Hermann Paul, specialized in articulatory phonetics, and his work Grundzüge der Phonetik constituted a fundamental reference for a whole generation of linguists in Europe and in Russia. He introduced the notion of a scale of sonority, a notion that has remained very important to accounts of syllabification up to the present. In Denmark, at the end of the 19th century, Otto Jespersen contributed to the development of phonetics; along with Sweet and Sievers, Jespersen was involved with the use of phonetics in the teaching of living languages in the classroom, especially English and German. Indeed, throughout the second half of the 19th century, the teaching of living foreign languages underwent tremendous growth throughout the educational systems of the countries we have looked at, and there was a good deal of controversy over the role of oral usage, phonology, and morphology in the classroom.

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1 103.
2 104.
3 Sweet, 1908; Sweet, 1877.