

were very industrious in this way; the latter published at Basel in 1536 a curious dictionary, *Lexicon Symphonum*, an early attempt at comparative philology, in which he compares Greek, Latin, German, and Slavonic. We must find space for a mention of the writings of Dubravius (c. 1489-1553), bishop of Olmütz, although he used the Latin and not the Bohemian language. His work on fish-ponds and fish (*Libellus de Piscinis et Piscium qui in eis abundant Natura*, 1547) is not altogether unknown to Englishmen owing to the citations in Izaak Walton, with whom the bishop was a great authority. His most important work, however, was his *History of Bohemia* in thirty-three books, from the earliest times to the coronation of Ferdinand I. at Prague in 1527, the termination of Bohemian independence. In 1533 appeared the first Chekh grammar, by Benes Optat. Verse-writers abounded at this time, but no poet of eminence. Veleslavin (1545-1599) was an indefatigable worker, being, like Caxton, both printer and author. The Latin herbal of Andrew Matthiolus, physician to the archduke Ferdinand, was translated by Thaddeus Hajek. Some good works on law appeared, and there are quantities of sermons. Simon Lomnický (b. 1560) wrote a great deal of poetry; he was the laureate of Rudolph II., and also wrote a triumphal song for the elector Frederick when chosen king of Bohemia by the Protestants. He was severely wounded at the battle of the White Mountain and spent the rest of his days in poverty; but there appears to be no truth in the story that he became a public beggar. The claims of Lomnický to be considered a poet are but meagre; he writes little better than rhymed prose. There is some merit, however, in his comic pieces and satires. At this period flourished the chronicler Hajek, who appears to have been a priest, and who died in 1553. His work is interesting, but altogether uncritical, and he does not seem to have cared much about truth. He gives us all the old Chekh sagas, and fortunately uses the Chekh language. His book attained great popularity, and was translated into German. Indeed, it was almost the chief authority for Bohemian history till towards the close of the 18th century. The travels of Christopher Harant in the Holy Land are full of learning and of curious matter. A new edition was published in 1854. The author perished on the scaffold on the memorable 19th June 1621, when Bohemia lay completely at the feet of the Hapsburg conqueror. Harant started for his journey in 1598, he and his companions being dressed as Franciscan friars. There is also the account by Wenceslaus Vratislav of Mitrovitz (1576-1635) of his three years' captivity at Constantinople,—a work full of picturesque incidents. The letters of Karl ze Zerotin (d. 1636), one of the Moravian Brethren, who was for some time in the service of Henry IV. of France, have been edited by Brandl. With the battle of the White Mountain in 1620 terminates what has been called the golden age of Chekh literature. In 1615 the diet had made a resolute effort to protect the national language. But now the country became Germanized, and books in Chekh were eagerly sought out and destroyed. In addition to its sufferings during the Thirty Years' War, Bohemia had the misfortune to lose many of its most valuable manuscripts, which were carried off by the conquerors. For nearly 200 years Bohemia ceased to be counted among the nationalities of Europe. Here and there a patriot laboured in the interest of his country, such as the Jesuit Balbin or Balbinus (1621-1688), who was professor of rhetoric at Prague and author of *Epitome Rerum Bohemicarum* (1677) and also *Miscellanea Rerum Bohemicarum* (1680-81). His services to Bohemian literature were considerable, but his writings are in Latin. Many authors of repute were, however, at this time in exile, and of these no one has earned a greater renown than Jan Amos Komenský (frequently styled by the Latin form of his name, Comenius). This eminent man was born at Nivnitz near Hungarian Brod in Moravia and was the last bishop of the Moravian Brethren. After the battle of the White Mountain he fled to Poland, which at that time had not altogether lost its spirit of toleration. Here he was joined by some Polish dissidents and formed the nucleus of a religious society. In 1681 he published his *Jansia Linguarum Reserata*, in which he developed a new theory of learning languages. This work became very popular and has been repeatedly translated. He afterwards visited England and Sweden, and in 1659 gave to the world his *Orbis Pictus*, which also enjoyed great reputation as an educational work. He died at Amsterdam in 1670. It would be impossible in a brief sketch like the present to give a detailed list of the writings of Komenský. Of his Bohemian works we may mention the prose poem *Labyrint Světa a Raj Sráček* (The Labyrinth of the World and Paradise of the Heart) and his *Informatorium Školy Mateřské*. He also translated the Psalms into Chekh. In 1656, on the destruction of the town of Leszno by fire, Komenský lost some of his most valuable works still in manuscript; we may especially regret his *Poklad Jazyka Českého* (Treasury of the Bohemian Language), upon which he had been engaged from 1612. During the latter part of the 17th century and the greater part of the 18th the language and literature of Bohemia steadily declined. A few scribblers appeared, such as Rosa, Pohl, and Šimek, but their names are hardly deserving of mention. But Gelasius Dobner and Martin Pelzel were valuable workers in the field of Bohemian history.

(3) The true study of the Slavonic languages may be said to have begun with Joseph Dobrovský. In 1809 he published *Ausführliches Lehrgebäude der böhm. Sprache*. In 1822 appeared at Vienna his great work *Institutioes Linguae Slavicae Dialecti Veteris*. Dobrovský died in 1829. The strange thing about him is that, in spite of all his labours, he had no faith in his native language and despaired of its revival. But, like Columbus, he was destined to accomplish greater results than he expected. Joseph Jungmann (1773-1847), another regenerator of the Chekh language, was author of the great dictionary and an esteemed translation of *Paradise Lost*. Besides these works he wrote a history of Bohemian literature. Kollar (1793-1852) and Čelakovský (1799-1852) both earned a considerable reputation as poets,—the first by a series of sonnets called *Slavy Deera* (The Daughter of Glory), under which title he celebrates the praises of all Slavonic lands and at the same time his love for the daughter of a German pastor; the second by his "Echo of Russian Songs" (*Ohlas Písní Ruských*) and the "Rose with a Hundred Leaves" (*Růže Stolistá*). A good poetical style was now formed for the Bohemians, and a host of minor poets appeared for whose names we cannot find space. Karel Erben (1811-1870) has left some excellent ballads in his *Kytice* (Garland). His genius was kindled by the folk tales with which Bohemia abounds. He conferred a benefit upon Slavonic students by his interesting collection of national tales previously alluded to; moreover, he was a sound scholar and an indefatigable antiquary. *Epigrafi diplomatice necnon epistolaria Bohemiae et Moraviae*, extending to 1253, and editions of Harant's *Journey to the Holy Land* and Nestor's *Chronicle* are monuments of his industry. A great impulse to Bohemian poetry was given by the discovery of *Labuřin Soud* and of the *Kralodvorský Rukopis* by Hanka. Vítězslav Halek (1835-1874) has left two volumes of poems, which were reprinted in 1879 under the editorship of Ferdinand Schütz. Halek presents a twofold appearance, first as the writer of a series of narrative pieces of a half dramatic character, reminding us of the *Idylls* of Tennyson, secondly as a lyrical poet. In his "Heirs of the White Mountain" (*Dědicové Bílé Hory*) he has chosen a patriotic subject which must find its way to the heart of every Bohemian. He has been fortunate in having some of his poems wedded to the music of Dvořák. Jan Neruda (b. 1834), still living, has written "Flowers of the Churchyard" (*Hřbitovní Květy*), published in 1858, and a volume of poems called "Cosmic Songs" (*Písně Kosmické*). According to some Bohemian critics the greatest of their modern lyric poets is Adolf Heyduk, born in 1836 and still living at Pisek. Much of his poetry has been inspired by the south of Europe. His "Forest Flowers" (*Lesní Květy*) were gathered, as he tells us, while wandering amidst the delightful scenery of the Sumava or Böhmerwald. Heyduk, although a Slovak, has avoided the Slovakish dialect, which has been used by Holly, Sladkovič, and others. His patriotism is very conspicuous in *Cymbal and Guitar*. One of his most popular works is *Dědu Odkaz* (The Grandfather's Bequest), the grandfather being the genius of the country, who instructs the poet. Some very elegant verses, showing a true feeling for nature with feminine delicacy of expression, have been published by Mademoiselle Henrietta Pech, who writes under the name of "Eliška Krasnohorská." Her first volume was published in 1870 and entitled *Z Máje Žití* (Life in May). Her "Poetical Pictures" (*Báseňské Kresby*) show great power of word-painting. M. Josef Vaclav Eládek (b. 1845), who has published several volumes of original poems, besides translations from English and other languages, shows considerable lyrical power. The most voluminous, however, of the modern writers is Emil Bohus Frida (b. 1853), who uses the pseudonym of "Jaroslav Vrchlický." He has been astonishingly active; among his principal productions may be mentioned the following,—*Mythi* (Myths), which he divides into two cycles; the miscellaneous collection "From the Depths" (*Z Hlubin*), which is inscribed to Vítězslav Halek, and seems to be inspired by the same scenery as kindled Halek's fancy; *Duch a Svět* (The Spirit and the World), fine lyrics, the motive of which has been supplied by Greek mythology. He has subsequently published *Dojmy a Rozmary* (Impressions and Fancies), and, besides other translations from various languages, a version of the *Divina Commedia* in the terza rima of the original. He is also the author of some plays which are much esteemed, especially *Drahomíra*. Dr J. Durdik, J. J. Kolár, and L. Straupeň have attained celebrity in this branch of literature. Some good poetry has been written by Svatopluk Čech. Some critics rank him as the greatest poet of the modern school since the death of Halek. In addition to poetry he has also published three volumes of tales (*Povídky, Arabesky, a Humoresky*), collected by him from his various contributions to magazines. Many of these show considerable humour. Another poet by no means to be passed over in this brief sketch (which only attempts to grasp the salient facts with regard to these authors) is M. Zeyer, who has published a series of epic pieces, called *Výšehrad*, after the well-known Chekh stronghold or acropolis at Prague. The subjects are all taken from the Old Bohemian legends on Libuša, Vlasta, Lumír, &c. Zeyer has adopted the Slavonic metre as we find it in the Servian songs collected by Vuk Stephanovich. Besides these poems

he has written a good historical novel entitled *Andrzej Chernisheff*, which deals with the reign of Catherine II. of Russia. In 1880 appeared two other tales by the same writer, *Romance concerning the Faithful Friendship of Amisa and Anil*, and a strange book of Oriental tales styled *Báje Šošany* (Stories of Susannah). As with us, the social romance or novel of domestic life has latterly been much cultivated among the Chekhs. The legends and tales current among the peasantry have also been carefully collected, first by Božena Němcová (1820-1882), whose *Slavenske Povesti* had a very great success. She was followed by Madame Mužak, authoress of some of the most popular of the modern Bohemian novels. Her "Country Romance" (*Vesnický Roman*) has been translated into French. Excellent pictures of rural life have also been given by Vaclav Smilovsky (a nom de plume of Smilauer), who has written a great many novels, as the "Old Organist" (*Starý Varharník*), *Martin Oliva*, &c., much in the style of Auerbach and Zschokke. Other writers of historical novels are M. Bohumil Cidlinsky and Vaclav Vlček. Madame Zofie Podlipská, sister of Madame Mužak, is known as a popular writer of social romances. For an account of the historical labours of Francis Palacky, see PALACKÝ. Among the pupils of the great historian the first place must be given to Vaclav Vladivoj Tomek (b. 1818), now professor of Austrian history in the university of Prague, whose chief production is a history of that city, which he has carried to a fifth volume. In 1849 he published the first volume of a history of the university of Prague, which seems never to have been completed, and in 1880 a biography of the Bohemian hero Žižka. He appears throughout as a most accurate and painstaking writer. Vocel (1803-1871) is the author of a valuable work, "The Early Days of Bohemia" (*Pravěk Země České*), which we have quoted already when treating of Slavonic ethnology. Alois Šembera (1807-1882), whose literary activity extended over a long period, wrote voluminously on Bohemian history and literature. He was professor of the Bohemian language at the university of Vienna. In a work on the western Slavs (*O Západních Slovanech*) he maintained that the Chekhs, Moravians, Slovaks, and Polabes were settled much earlier in the countries which they at present occupy than many historians have been willing to admit. As a critic, Professor Šembera is an iconoclast and has attacked many of the (supposed) early monuments of the Chekh language. Dr Antonine Gindely, born at Prague in 1829, has proved himself to be a most conscientious and enthusiastic worker in the field of historical research. In order to collect materials for his publications he travelled in various parts of Bohemia, Poland, Germany, France, Belgium, Holland, and Spain. The results of this diligence have appeared in a collection of valuable historical works, such as the *History of the Bohemian Brethren*, *Rudolph II. and his Times*, and later a *History of the Bohemian Revolt of 1618*. The brothers Joseph and Hermenegild Jireček have won a reputation in Bohemian literature by many useful works. They have conjointly published a book in defence of the *Kralodvorský Rukopis* which is well worthy the attention of those who wish to make themselves acquainted with the literature of this vexed question. Joseph is now occupied in editing in a cheap form some of the most interesting monuments of early Bohemian literature. In 1880 Hermenegild published a valuable *Collection of Slavonic Laws*, containing an almost complete series of the early codes of the Slavs in the original languages. Joseph Jireček is also author of a useful chrestomathy of Bohemian literature with biographical and critical notices. Joseph Constantine Jireček (son of Joseph, born in 1854), formerly a *privatdocent* of the university of Prague, has devoted himself to Bulgarian history and bibliography. In 1872 he published a *Bibliography of Modern Bulgarian Literature*, and has written a *History of Bulgaria*, of which a German translation has appeared. Joseph Emler and Karl Tieftrunk have been co-operators with Dr Gindely in his "Old Monuments of Bohemian History" (*Staré Paměti Dějin Českých*). The former has also edited the second volume of the *Regesta Bohemica* and since 1870 has been editor of the "Journal" (*Časopis*) of the Bohemian museum. Karl Tieftrunk has written several useful works, among them the *History of Bohemian Literature* from the earliest period to the present time, and the interesting monograph on the opposition of the Bohemian states to Ferdinand I. in 1547. The *History of Bohemian Literature* is very carefully written and gives in a short compass much valuable information. An elaborate work is now appearing in parts by F. Backovsky, entitled *Zevrubné Dějiny Českého Písemnictví Doby Nové* (A Complete History of Modern Bohemian Literature) from the year 1774 to the present time. There is also a work by Jerábek, *Early Days of Romantic Poetry*. Many valuable contributions to Bohemian history have proceeded from the pen of Dr Joseph Kalousek (b. 1838). Vincent Brandl and Beda Dudík have devoted particular attention to Moravian history and antiquities. The former, among other works, has edited the letters of Karl ze Žerotín, previously mentioned. Beda Dudík, a Benedictine monk and historiographer of Moravia, has published some valuable works on the history of that portion of the Bohemian kingdom and has also written a *History of Moravia*. Like the great work of Palacky, it was first written in German, but has since appeared in the Bohemian lan-

guage. Extracts from the interesting diary of Žerotín have been edited by him in the *Mährische Geschichtsquellen*. Through his efforts twenty-one Bohemian manuscripts which had been carried away to Sweden at the time of the Thirty Years' War have been restored, and are now preserved in the state archives of Brünn. Among these is the *Legend of St Catherine*, many words in which are said to explain difficult passages in the *Kralodvorský Rukopis* and to furnish testimony to its authenticity. Jakub Malý (d. 1885) was the author of many important articles in the *Slovník Naučný*, the Chekh *Conversations-Lexicon*, and of a popular history of the Bohemian people. He also wrote a grammar of Chekh for Englishmen, besides assisting in the translation of Shakespeare, which has been produced by the joint labours of many Bohemian scholars. In 1868 was published under the editorship of Erben the second volume of the *Vybor z Literatury České*, a very important work, containing specimens of the old Bohemian authors. The first volume had been edited by Schafarik, for an account of whose literary activity see SCHAFARIK. Valuable works on philology have been written by Martin Hattala, by birth a Slovak, who is now professor of Slavonic philology at the university of Prague. One of his most important productions is in Latin, *De Contiguarum Consonantium Imitatione in Linguis Slavonicis*. He is a defender of the genuineness of the two celebrated manuscripts, the Zelenohorský (i.e., "that which contains the judgment of Libuša") and the Kralodvorský. Among sound philologists are reckoned Drs Gebauer and Geitler. The former has contributed some valuable papers to the *Archiv für slavische Philologie*, edited by Professor Jagić of St Petersburg. The latter, born in 1847, is at present professor of Slavonic philology at the university of Agram. He commenced his studies at Prague under Alfred Ludwig, the translator of the *Vedas*, and Hattala, and at Vienna under Miklosich. Having begun with a dissertation in the *Časopis* on the present condition of comparative philology, he published in the same year a work on the Old Bulgarian language. In 1873 he made a tour in Russian and Prussian Lithuania, that, like Schleicher, he might study that interesting language from the mouths of the people. He afterwards published the results of his travels in his *Lithauische Studien*. He has since written a treatise on the Albanian alphabet (*Die Albanesischen und Slavischen Schriften*, Vienna, 1883). In this an attempt is made to connect the Glagolitic and Albanian alphabets. A valuable work was written by Antonin Matzenauer (b. 1823), entitled "Foreign Words in Slavonic Languages" (*Cizí Slova ve Slovanských Rečech*). Excellent works on classical philology have been published by A. Kvičala and Vaniček. Natural science was successfully cultivated by Jan Svatopluk Presl (1791-1849), professor in the university of Prague, and Jan Ev. Purkyně (1787-1869), professor of physiology in the same university. As regards moral philosophy, the first part of Dr J. Durdik's *History of Recent Philosophy* has just appeared, which extends from Kant to Herbart. Throughout the whole period of the resuscitation of Bohemian literature the society called the *Matica Česká* has worked energetically, printing its excellent journal or *Časopis* four times a year, and also issuing some of the old Bohemian classic and meritorious works by modern authors. It was a great triumph for the Chekhs when a part of the instruction of the university was allowed to be carried on in the Bohemian language. A new magazine (*Slovanský Sborník*) made its appearance at the beginning of 1884. The *Listy Philologické* (Philological Leaves) is still published. Recently a new literary journal (*The Athenæum*) has been started, which seems to be more or less modelled upon its English namesake.

Slovak.—This language or dialect is spoken in the north-western corner of the kingdom of Hungary. It is generally considered to exhibit an earlier form of Chekh, and this is proved by many of its grammatical peculiarities being found in the older Chekh literature. One characteristic of the language is the use of diphthongs in cases where the other Slavonic tongues use simple vowels. For a long time the Slovaks employed Chekh in all their published writings. About the close of the 18th century a separatist movement began. The first Slovak grammar was published by Bernolak at Presburg in 1790. It was followed by those of Dianiška and Viktorin. There is a Slovak dictionary by Loos. The attempt to form a new literary language was to be deplored on many grounds, for both the Magyar and the German have to be resisted. For a short time a literary society existed among the Slovaks, which published useful books and a journal. The Magyars, however, suppressed it, because it was "contra integritatem patriæ," as we were told by one of their ecclesiastics: "The Bohemian naturally resents the attempts at separation by the Slovak, and in 1846 the Chekh Literary Society issued a work entitled "Opinions in Favour of One Written Language for the Chekhs, Moravians, and Slovaks" (*Hlasové o potřebě Jednoty Spisovného Jazyka pro Čechy, Moravan, a Slovaky*). The Slovaks have produced a few poets of repute, such as Holly, Sladkovič, and Chalupka, but their literature is meagre. *Lusatian Wendish*.—This language is divided into two dialects, Upper and Lower, although even these are capable of subdivision. The word "Wend" was previously explained, is a purely German name and is never used by the Slavs themselves. The Lusatians are also

sometimes called Serbs and Sorbs. They are the remnants of the powerful tribes which once occupied nearly the whole of north Germany. The Lusatians in the earlier period of their history were under the dominion of the Poles and afterwards of the Chechs. In the early part of the 17th century the bulk of them had been annexed to the electorate of Saxony, with the exception of the small part about Kottbus, which had belonged to Brandenburg since 1445. In 1815, however, when the states of Europe were rearranged, in most instances with very small regard to the nationalities under their sway, many more of the Lusatians were handed over to Prussia; and, according to the statistics of Boudilovich, at the present time (1886) all the Lower Lusatians, amounting to 40,000, belong to Prussia, as well as 44,000 of the Upper Lusatians. Besides the two dialects specified there are other minor ones, to judge from an article in the Bohemian Literary Journal; but they are too minute to be specified here. The Upper Lusatian dialect shows most affinity with Chekh, especially in substituting *h* for *g*; the Lower more resembles Polish, and has the strong or barred *z*, as in *tos*, "hair." The Upper dialect has been the most cultivated; some good grammars have been published by Seiler, Jordan, and Pfuhl, and there is a copious dictionary edited by Pfuhl in conjunction with others. The language is full of Germanisms and German words and cannot hold out long against the vigorous attempts at denationalization made by its Teutonic neighbours. There is a small Lower Lusatian dictionary by Zwahr, a posthumous work of very little merit. The *Macica Serbska*, the literary society of the Sorbs, founded on the model of the Bohemian Society in 1847, publishes its journal twice a year, which contains interesting articles on folk-tales and folk-lore generally, with popular songs taken down from the mouths of the people.

The first printed book in the Upper Sorbish language was the little catechism of Luther, published in 1597 by the pastor Worjeh. This was not, however, the first time that any Lusatian or Sorbish words had been printed, for we find the names of plants in that language given in Franke's *Hortus Lusatiae*, published in 1594. In 1706 Michael Brancel or Frenzel published a translation of the New Testament into Sorbish; a little before, in 1689, a grammar had appeared by Zacharias Bierling, entitled *Didascalia seu Orthographia Vandalica*. In 1693-96 Abraham Frenzel, son of Michael, published a dictionary. In 1806 Mohn translated some extracts from Klopstock's *Messiah*. From 1837 a new impulse was given to Sorbish literature: newspapers were printed in the language and useful books translated into it. One poet has appeared among them, Andrew Seiler, a clergyman, who died in 1872. Lower Sorbish has always been much less developed than Upper. The first book printed in it was a collection of hymns and a catechism, by Albin Moller, in 1574. Chojan, a pastor in Lubin, wrote the first

SLAVYANSK, a town of Russia, in the government of Kharkoff, situated 158 miles by rail to the south-east of the town of Kharkoff, on the Torets river and close by several salt lakes. From these salt is extracted to the annual value of more than £10,000; there are also several tallow-works in the place. The Slavyansk merchants carry on a brisk trade in salt, cattle, and tallow. The population (11,650 in 1870) reached 15,400 in 1883.

The ancient name of Slavyansk was Tor. The town, which is supposed to occupy the site of a former settlement of the Turks (Turks) who inhabited the steppes of the Don, was founded in 1676 by the Russians to protect the salt marshes. Having an open steppe behind it, this fort was often destroyed by the Tatars. Its salt trade became insignificant in the 18th century and has only revived during the last twenty years since coal was brought from Ekaterinoslaff.

SLEEP is a normal condition of the body, occurring periodically, in which there is a greater or less degree of unconsciousness due to inactivity of the nervous system and more especially of the brain and spinal cord. It may be regarded as the condition of rest of the nervous system during which there is a renewal of the energy that has been expended in the hours of wakefulness. For in the nervous system the general law holds good that periods of physiological rest must alternate with periods of physiological activity, and, as the nervous system is the dominating mechanism in the body, when it reposes, all the other systems enjoy the same condition to a greater or less extent. Rest alternates with work in all vital phenomena. After a muscle has contracted frequently at short intervals, a period of relaxation is necessary for the removal of waste products and the restitution of energy; the pulsating heart,

grammar between 1642 and 1664; in the latter half of the same century Körner compiled a dictionary. At the commencement of the 18th century Bohumil (Gottlieb) Fabricius published his translation of the New Testament (first edition in 1709); at the end of the same century a version of the Old Testament by Fric appeared. A good collection of Sorbish songs has been edited by Haupt and Schmalzer. According to an interesting article by Hornik in the second volume of the *Slavianski Sbornik*, a number of these Wends emigrated to America and settled in Bastrop county, Texas, where they have divine service performed in their own language, and publish some newspapers.

Polabish.—Of the Slavonic languages spoken in the north of Germany the Lusatian Wendish and Kashoubish are alone living. Of those which are extinct Polabish is the only one of which any memorials have come down to us, and these are but scanty. The language affords a parallel to Cornish, not only in the few fragments which remain, but also in the date of its decline and extinction. It is considered by Schleicher,¹ who has written an excellent grammar by piecing the scanty materials together, just as geologists restore an ichthyosaurus, to have more affinity to Polish than to Chekh, owing to the possession of nasals. This interesting language² expired in the first quarter of the 18th century in the eastern corner of the former kingdom of Hanover, principally in the circuit of Lüchow, which even at the present time is called Wendland. Between 1691 and 1786 certain vocabularies and dialogues in this language (including also a song) were taken down, and from them Schleicher has taken the materials for his grammar and the valuable little dictionary appended to it. Dr Pfuhl printed these memorials in their entirety in 1863-64. The spelling is altogether phonetic, and, owing to the ignorance of the Slavonic peasant and his German interrogators, the former of German and the latter of Slavonic, there are some ludicrous blunders. The two most important of these documents are a German-Wendish dictionary, compiled at the end of the 17th century by Christopher Henning, by birth a Lusatian, and pastor of Wustrow near Lüchow. Divine service is said to have been held in that town in Wendish as late as 1751. Secondly, we have the Slavonic words and dialogues collected by a farmer named Johann Parum-Schultz. His manuscript is still in the possession of his descendants. There is a valuable monograph on the dialect of the Lüneburg Slavs by Biskupski. In the 15th century Slavonic had ceased to be spoken in the island of Rügen, and in the same century it could only be heard from peasants in the market-place of Leipsic, a town (as already stated) with a Slavonic name. What the Slavs, however, have lost in the West they have partly gained in the East, and few languages have a more magnificent prospect than Russian,—the dignity and strength of which fit it to be the tongue of an imperial people. (W. R. M.)

apparently working without intermission, is in reality not doing so, as there are short intervals of relaxation between individual beats in which there is no expenditure of energy; the cells in a secreting gland do not always elaborate, but have periods when the protoplasm is comparatively at rest. Nervous action also involves physico-chemical changes of matter and the expenditure of energy. This is true even of the activity of the brain associated with sensation, perception, emotion, volition, and other psychical phenomena, and therefore the higher nervous centres require rest, during which they are protected from the stream of impressions flowing in from the sense-organs, and in which waste matters are removed and the cerebral material is recuperated for another time of wakeful activity.

The coincidence of the time of sleep with the occurrence of the great terrestrial phenomena that cause night is more apparent than real. The oscillations of vital activity are not correlated to the terrestrial revolutions as effect and cause, but the occurrence of sleep, in the majority of cases, on the advent of night is largely the result of habit. Whilst the darkness and stillness of night are favourable to sleep, the state of physiological repose is determined more by the condition of the body itself. Fatigue will normally cause sleep at any time of the twenty-four hours. Thus many of the lower animals habitually sleep during

¹ *Laut- und Formen-Lere der Polabischen Sprache*, St Petersburg, 1871.

² To avoid confusion it must be remembered that the word "Polabish" is used somewhat carelessly by ethnologists to denote (1) the Slavonic tribes in north Germany generally, (2) the particular Slavonic tribe on the Elbe (Slav. *Laba*).

the day and prowl in search of food in the night; some hibernate during the winter season, passing into long periods of sleep during both day and night; and men whose avocations require them to work during the night find that they can maintain health and activity by sleeping the requisite time during the day.

The approach of sleep is usually marked by a desire for sleep, or sleepiness, embracing an obscure and complicated group of sensations, resembling such bodily states of feeling as hunger, thirst, the necessity of breathing, &c. All of these bodily states, although on the whole ill defined, are referred with some precision to special organs. Thus hunger, although due to a general bodily want, is referred to the stomach, thirst to the fauces, and breathing to the chest; and in like manner the desire for sleep is referred chiefly to the region of the head and neck. There is a sensation of weight in the upper eyelids, intermittent spasm of the sub-hyoid muscles causing yawning, and drooping of the head. Along with these signs there is obscuration of the intelligence, depression both of general sensibility and of the special senses, and relaxation of the muscular system. The half-closed eyelids tend more and more to close; the inspirations become slower and deeper; the muscles supporting the lower jaw become relaxed, so that the mouth opens; the muscles of the back of the neck that tend to support the head also relax and the chin droops on the breast; and the limbs relax and tend to fall into a line with the body. At the same time the hesitating utterances of the sleepy man indicate vagueness of thought, and external objects gradually cease to make an impression on the senses. These are the chief phenomena of the advent of sleep. After it has supervened there are many gradations in its depth and character. In some cases the sleep may be so light that the individual is partially conscious of external impressions and of the disordered trains of thought and feeling that pass through his mind, constituting dreams, and these may be more or less vivid according to the degree of consciousness remaining. On the other hand, the sleep may be so profound as to abolish all psychical phenomena: there are no dreams, and when the sleeper awakes the time passed in this unconscious state is a blank. The first period of sleep is the most profound. After a variable period, usually from five to six hours of deep sleep, the faculties awaken, not simultaneously but often fitfully, so that there are transient periods of consciousness. This is the time of dreaming. As the period of waking approaches the sensibility becomes more acute, so that external impressions are faintly perceived. These impressions may influence and mould the flow of images in the mind of the sleeper, frequently altering the nature of his dreams or making them more vivid. The moment of waking is usually not instantaneous, but is preceded by an intermediate state of partial consciousness, in which there are feelings of a pleasant lassitude, a sense of repose, a luxurious abandonment of the body to any position in which it may happen to be; and a strange play of the mental faculties that has more of the character of an "intellectual mirage" than of consecutive thought.

The intensity of sleep has been measured by Kohlschütter by the intensity of the sound necessary to awaken the sleeper. This intensity increases rapidly during the first hour, then decreases, sometimes rapidly, sometimes slowly, during the next two or three hours, and then very slowly until the time of waking. This statement agrees generally with experience. As a rule the deeper the sleep the longer it lasts.

Various physiological changes have been observed during sleep, but much remains to be done in this direction. The pulse becomes less frequent; the respiratory movements are fewer in number and are almost wholly thoracic,

not abdominal; all the secretions are reduced in quantity; the gastric and intestinal peristaltic movements are less rapid; the pupils of the eye are contracted and during profound sleep are not affected by light; and the eyeballs are rotated upwards. The pupils dilate slightly when strong sensory or auditory stimuli are applied, and they dilate the more the lighter the sleep; at the moment of waking they become widely dilated. Whilst muscular relaxation is general, there seems to be increased contraction of certain sphincter muscles, as the circular fibres of the iris and the fibres concerned in closing the eyelids. The state of the circulation of the brain has been frequently investigated. The older view was that there was a degree of plethora or congestion of the vessels of the brain, as is the state of matters in coma, to which the state of sleep has a superficial resemblance. Coma, however, is not sleep, but a condition of inactivity of the cerebral matter owing to the accumulation of dark venous blood in its vessels. This has been actually observed in cases where it was possible to see the brain. During sleep the surface of the exposed brain has been observed to become pale and to shrink somewhat from the sides of the opening (Blumenbach). A careful experimental re-
search was conducted by Arthur E. Durham in 1860, in which he trephined a portion of bone as large as a shilling from the parietal region of a dog, and, to obviate the effects of atmospheric pressure, inserted a watch glass into the aperture so that the surface of the brain could be seen. His results are summarized thus:—

(1) Pressure of distended veins on the brain is not the cause of sleep, for during sleep the veins are not distended; and, when they are, symptoms and appearances arise which differ from those which characterize sleep. (2) During sleep the brain is in a comparatively bloodless condition, and the blood in the encephalic vessels is not only diminished in quantity, but moves with diminished rapidity. (3) The condition of the cerebral circulation during sleep is, from physical causes, that which is most favourable to the nutrition of the brain tissue; and, on the other hand, the condition which prevails during waking is associated with mental activity, because it is that which is most favourable to oxidation of the brain substance, and to various changes in its chemical constitution. (4) The blood which is derived from the brain during sleep is distributed to the alimentary and excretory organs. (5) Whatever increases the activity of the cerebral circulation tends to preserve wakefulness; and whatever decreases the activity of the cerebral circulation, and, at the same time, is not inconsistent with the general health of the body, tends to induce and favour sleep. Such circumstances may act primarily through the nervous or through the vascular system. Among those which act through the nervous system may be instanced the presence or absence of impressions upon the senses, and the presence or absence of exciting ideas. Among those which act through the vascular system may be mentioned unnaturally or naturally increased or decreased force or frequency of the heart's action.

Dr William A. Hammond and Dr Weir Mitchell have repeated and extended Durham's observations, with the same general results (1866), and more recently Ehrmann, Salathé (1877), François Franck (1877), and Mosso (1881), by more refined methods of observation, have arrived at the same general conclusions. Mosso in particular has applied with great success the graphic method of registration to the study of the movements of the brain and of the circulation during sleep. He made observations on three persons who had lost a portion of the cranial vault and in whom there was a soft pulsating cicatrix. They were a woman of thirty-seven years of age, a man of thirty-seven years, and a child of about twelve years. By special arrangements, Mosso took simultaneous tracings of the pulse at the wrist, of the beat of the heart, of the movements of the wall of the chest in respiration, and of the movements of the denuded brain. Further, by means of the plethysmograph,—an instrument of Mosso's own invention,—he obtained tracings showing changes in the volume of the hand and forearm; and he succeeded in showing that during sleep there is a diminished amount