direction was south-west to south; the highest wind velocity was eight miles per hour.

Indiana. — The special feature of this report is the minimum temperature of 50°; the highest temperature noted was 96°, and the rainfall varied from 2.83 to 7.72 inches.

Iowa. — In this state the weather "was very favorable to the crops, being fair, nearly normal in temperature, with an excess of rainfall, and southerly winds prevailing." The greatest rainfall was that of nearly ten inches in north-eastern Iowa, from the 20th to the 23d inst. A number of severe squalls and local storms were reported, which did much damage. Insolation has been high, because cloudy days were rare; the sun thermometer exceeded 140° on twenty-one days.

Kansas. — The report includes one station only, — Topeka; and the month is reckoned from June 20 to July 20. On fifteen days the temperature exceeded 90°, the maximum being 98°. "On June 23, just after a heavy rainstorm, the air having had a temperature of 65° to 70° all the forenoon, the temperature suddenly rose more than 20°, in consequence of a hot current of air from the south. This lasted but half an hour, when the temperature fell as suddenly as it had risen."

Missouri. — The temperature has been considerably below the normal; there being but five instances since 1837, when lower average temperatures in July have been recorded. A minimum of 52° was observed. On the 13th a destructive wind-storm passed through the north-western and northern portions of the state. A railway train, near Browning, was blown from the track, and many towns suffered much damage. This storm was not a tornado, but 'a steady straight blow for upwards of half an hour.'

New Jersey. — The maximum temperatures range from 91° to 98°, the minimum from 52° to 61°, the rainfall from 2.21 to 4.38 inches.

Ohio. — The mean height of the barometer, 30.025 inches, was higher than that of either of the three months preceding. A minimum temperature of 43° was reported. The rainfall ranged from 1.55 at Lebanon to 7.23 at Quaker City, and was above the July normal. "The railway weather signals were continued during July, and by examination of the reports it is found that eighty-six per cent of the predictions were verified." The predictions are those of the U. S. signal office.

Tennessee. — The temperature ranged from 56° to 98°. A range of 0° was reported from Smithville on the 7th. The rainfall ranged from 1.20 to 7.99 inches. Rain fell on the average on nine and two-thirds days, but the rainfall was rather unevenly distributed. "In some localities the extensive rains have greatly injured the crops of wheat, oats, and hay that had been cut, causing the former to sprout, and rendering much of it unmarketable, while in other localities a continuous drought has materially lessened the chances for the growing crops, which were full of sap, and it will require very favorable conditions during the coming month to even partially restore them." W. U.

THE MEETING OF SWISS NATURALISTS.

The sixty-sixth annual reunion of the *Société helvétique des sciences naturelles* took place this year at Zurich, Aug. 6–9. As at all these Swiss meetings, discussions were happily mingled with daily banquets, at which toasts were offered to fatherland, to guests, and to the older honored names in Swiss science, — Studer, Heer, and Mousson, founders of the society. Sometimes German, and sometimes French, was spoken, and sometimes both by one speaker in the same speech. This year this venerable society gathered men of many countries, and Zurich received them cordially. Daubrée and Hébert of Paris were there; Lory of Grenoble, Credner of Dresden, Fritsch of Halle, Fontannes of Lyons, Hughes and Madame Hughes of Cambridge, Blanford of London, Dewalque of Liège, Kölliker and Fick of Wurzburg, Kundt of Strasburg, Clausius of Bonn, Szabo, Schuler, and Wartha of Budapest, Wislicenus of Wurzburg, Krauss of Stuttgart, von Hauer, Suess, Neumayr, Mojsisovics, and Goldschmidt of Vienna, Vilanova of Madrid, Beyrich and Richthofen of Berlin, Capellini of Bologna, Giordano of Rome, Wiedmann and His of Leipsic, and Seguin of New York.

From communications to the *Journal de Genève*, under initials which we presume to refer to the well-known physicist, Raoul Pictet, we glean the following account of the scientific sessions of the meeting, which began on the morning of Aug. 7.

Mr. Cramer, professor of botany at the university of Zurich, and president of the assembly, opened the meeting with a very noteworthy address before an interested audience of more than three hundred persons. He reviewed the chief progress of the natural sciences, and laid particular stress on the study of those minute organisms which constitute life within life, and whose appearance and development accompany epidemic diseases among men.

Reports on the various commissions (on finance, geology, geodesy, earthquakes, etc.) were followed by two communications from Profs. V. Meyer of Zurich and H. Fol of Geneva.

Mr. Meyer traced the progress of chemistry under the influence of the ideas of Mendelejeff and L. Mayer. He explained how these investigators had been able to classify all simple solids under five distinctly separated families. All these bodies are similar as to their general properties, the gradual increase of their atomic weights, the similarity of their chemical reactions, their atomic volume, etc. These likenesses are so striking, that the memorable discovery of gallium by M. Lecoq de Boisbaudran of Paris was foreseen three years before that simple body was separated. The density and atomic weight of this metal had been determined by calculation before its actual presence was demonstrated beyond doubt by the well-known experiments of the French chemist.

Professor Meyer concluded by showing the indebtedness of science to men who think, to men

who found theories on experiments, and then verify the truth of their hypotheses by renewed investigations. It is beyond question, that the labors of Mendelejeff and Meyer are the point of departure of a rational classification of matter, and that they have been a fertile source of useful chemical discoveries.

Professor Hermann Fol of the university of Geneva described his studies on animal individuality. In the lower animals, individuality is a different thing from what it is in the higher, such as the mammifers. But this law of individuality among the vertebrates is not without exception; and we all know the wonder which is excited by the sight of creatures with some member double, such as are often exhibited at shows, or may be seen in museums.

For a long time we have tried to explain the origin of these anomalies. Two theories have been proposed, — that of the creation of two distinct beings, and that of the partial division of one primitive simple. Neither of these theories quite accounts for the phenomena observed. The new and essential fact which Mr. Fol presented comes under the general law, that in these abnormal cases two heads always appear in the egg at the commencement of its development. The body forms immediately behind; and these two trunks, coming together, are so perfectly united that the two primitive heads are very near each other at the outset. In the first place, then, only the higher part of the body is duplicated in these montrosities; yet these two parts may become completely separated, resulting in twins, which so closely resemble each other that even the parents find difficulty in distinguishing them.

Mr. Fol has investigated the causes of the appearance of two embryos in one egg, by a very neat method. He asphyxiated the eggs of Echinus by immersion in Seltzer water (containing pure carbonic acid); and he ascertained that in this unhealthy condition, maintained for a moment, two germs at the instant of passage into life could simultaneously have birth.

Our individuality is one of our most cherished ideas. The great philosophers Descartes, Kant, etc., did not investigate even the possibility of a multiple individuality: it is interesting to observe the flexibility of that idea under the disturbing influence of special conditions of the origin of life.

Mr. Fol exhibited plates representing different kinds of montrosities: two heads and one body, a little body projecting from the eye of a child otherwise relatively well formed, etc.

Professor Herzen of Lausanne, in closing the session, invited all the doctors present to observe an exceedingly interesting case, — that of a man who was on the point of dying from hunger, the results of strangling, when M. de Cérenville of Lausanne began his experiments. This skilful surgeon arranged a stomachic fistula by which the man ate. He was regularly supplied with food, recovered his strength, and rapidly improved. Mr. Herzen took care of this man at his laboratory, and studied the phenomena of digestion according to the process which recalls the well-known Canadian case of M. de Beaumont.

The next morning the association met in sections in different halls. Unfortunately the gift of omnipresence was not given to man, and the members of one section could with difficulty glean here and there any knowledge of what was taking place in the neighboring halls. Besides it would take a volume to contain such a quantity of material, of which a *résumé* will appear in the September number of the *Archives des sciences physiques et naturelles.*

The following account treats only of the subjects taken up in the single section of physics.

Professor Clausius of Berne was elected, by acclamation, president; and Mr. Weber of Neuchâtel, secretary. Mr. F. A. Forel submitted a very interesting paper on the variations of temperature which the Swiss lakes undergo, from summer to winter, and from morning to night. It seems that in an average year the variations of temperature in the year are scarcely noticeable at a greater depth than 60 to 80 metres; above that, the surface of the water is for these lakes between 4° and 5.4°, the highest temperature corresponding to that of Lake Geneva. The variations are felt at a mean depth of ten metres.

After a lively discussion of the manner in which the currents of water influenced by these variations of temperature are set in motion, Prof. Charles Soret of the university of Geneva submitted the results obtained with his new apparatus, the refractometer. This first set of experiments dealt especially with the crystals of the alum-series whose radical is an alkaline metal. This very clear communication was especially remarkable for the skill with which the young professor set forth his subject with a great number of new facts in a comparatively short time. He was followed by his father, Prof. L. Soret, who presented a paper for Mr. L. E. Sarasin, and demonstrated by figures and curves the values of the index of refraction of fluor spar, a crystal, which, since the important works of Cornu and L. Soret, has taken so important a place in the construction of the achromatic lenses of spectroscopes. This paper was marked by extreme precision.

Mr. L. Soret presented a communication to the section of chemistry, belonging in great part to the section of physics. He set forth how the absorption bands seen in the spectra of solutions of albuminoid substances could be used in ascertaining the chemical nature of these solutions. These absorption bands are found especially in the ultra-violet; and, thanks to the fluorescent eye-piece invented by the speaker, their presence renders an analysis very rapid and simple.

Professor Clausius of Bonn gave us a lesson in mechanical electricity: he considered the problem of the production of electric currents by mechanical means. All the knowledge of this scholar, this enthusiastic and ingenious investigator, was necessary to obtain the final solution of so complicated a problem. The paper was heartily applauded.

Mr. Casimir de Candolle repeated, before the members who were present, some experiments to show how sand-ripples at the bottom of our lakes are formed. These facts were applied, in accordance with the ideas of Professor Strasburger of Bonn, to explain certain appearances of envelopes and vegetable cells in fossils.

Mr. Raoul Pictet presented an experimental demonstration of the second law of thermo-dynamics, deduced from the simultaneous working of steam-engines and frigorific apparatus.

Professor Weber of Zurich presented two interesting papers: one, on a dynamic method for the exact measurement of the coefficient of conductibility of heat in liquids; the other paper, on the apparatus for measuring electric units.

Mr. H. Dufour of Lausanne distributed among the audience a set of photographs showing the electric condition of the air, which were obtained by means of a registering electrometer in the new physical laboratory at Lausanne. These curves are so connected with the condition of the heavens, that it is no exaggeration to expect to predict the weather several days in advance, through a careful examination of the variations of electric tension of the air. For fine weather, the electric tension is strong; it sensibly decreases during and before storms; the rapid falling of the curve of the electric potential of the air is always an indication of rain or storm.

The late hour made it impossible to listen to five additional communications which had been announced. The boat for an excursion on the lake awaited its guests; science paled before the beauties of nature. Though continuing to converse on the subjects treated, we all together betook ourselves to the pier. The excursion was delightful. On our return, the streets were illuminated; Bengal and electric lights mingled their dazzling rays. The citizens of Zurich gave us a magnificent reception; and the *fête*, enlivened by an excellent orchestra, was continued to a late hour.

The next morning, Thursday, we listened to three scientific papers which closed the intellectual part of the reunion.

The honors of that morning belong to Professor Suess of Vienna. With consummate skill he set before us the chief points of the modern theory of the upheaval of mountains: he held his audience with great ease, and left a refreshing memory with all who heard him.

This paper, with that of Mr. Heer which followed, will be issued in full in the memoirs of the society.

The afternoon was given up to leave-takings. Seated around the long tables of the hotel L'Uetliberg, thanks and farewell were said again and again. Toasts of gratitude, toasts to the absent, to the present, to Clausius, to Mousson, Oswald Heer, and Studer, founders of the society, were applauded by all, glass in hand.

Appended to this account, appears a list of the principal papers offered in the other sections.

In the botanical section, Professor Heer spoke of the cretaceous and tertiary flora of Greenland; Mr. Schnetzler, of a Chinese primrose in which the sexual organs corresponded to an earlier stage in the evolution of Primulaceae, and on certain relations between an aërial alga and lichen; Mr. Favrat discussed the hybrids of two species of primrose and of other plants, and called attention to the changes in a Cardamines growing in turfy soil. Mr. Andreae spoke of pasturage on the Jura; and Mr. Casimir de Candolle drew attention to a curious Cytisus bearing both red and yellow flowers.

In the chemical section, Professor Krafft read a paper on the preparation of saturated alcohols; Professor Soret, on the absorption of the ultra-viole rays by the albuminoid substances; Professor Schulze, on the composition of cheese; and on phenylamido-propionic acid; Prof. Victor Meyer gave a new method for determining the vapor density of Cl. Br. I. for high temperatures, and reported on a new series of bodies, which he termed *thyophènes*, contained in benzol. Professor Wislicenus of Wurzburg offered a contribution to the theory of Van t'Hoff; and made a communication on the action of chloride of phtalyle and of phtalic anhydride on the ethers of malic acid; Professor Schaer recalled the forgotten works of De Saive (in 1756) on zinc combustion; Dr. Goldschmidt showed the action of hydroxylamine on ketones; Dr. Ceresole spoke of acetacetic acid; Professor Lunge, of the manufacture of sulphuric acid; Dr. Schumacher gave analyses of foods; and Dr. Urech exhibited a laboratory-lamp.

In the geological sections, papers were offered by Messrs. Favre, Neumayr, Schardt, Goll, Mühlberg, Fellenberg, Jaccard, Koch, Chevannes, Mösch, Fratech, and Suess.

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

Geology of Philadelphia.

In Dr. Frazer's notice of my lecture upon the geology of Philadelphia, there is so little of adverse criticism, that it may seem ungracious to reply to the few points regarded as blemishes. Merely in defence of the use made of certain terms called in question, a few words here may not be out of place.

In describing the Philadelphia gneiss as both Huronian and Mont Alban, there is no confusion, if, as is held by many geologists, the former term is generic, the latter specific.

The term 'creep,' as applied to the pulling-over of softened or broken strata downhill, by the action of gravity, frost, etc., is one frequently used in describing such phenomena in regions south of glacial action. It is used repeatedly in this sense, in a report issued by the Geological survey of Pennsylvania, in 1880.

The term 'hydro-mica slates,' objected to, is not only used by Rogers, Lesley, Dana, Hall, and others, but occurs repeatedly in Dr. Frazer's recent geological reports on Lancaster and Chester counties, being used by himself.

The positive statement regarding the absence of glaciation in Pennsylvania south of the terminal mo-