

first operations. Reverses were necessary to call postal authority to a better sense of the real state of things. M. Garnier Pagés, a member of the new Government, invented the carrying by balloons of aerial pigeons, and the second balloon ascent was the occasion of the first pigeon expedition.

One of the aéronauts known to our readers is Mangin, the proprietor of the unfortunate "Union," of which the wreck was fully described, who tried an ascent a few days after Durioff. He made a foolish agreement with the Post Office, to carry with his poor worn-out balloon a weight of 1,000lbs., but the balloon was unable to retain a single puff of gas, and the attempt was doomed to failure.

Two or three days afterwards, Mangin tried another ascent with the "City of Florence," a large balloon of 1,200lbs. capacity and belonging to Eugène Godard.

The "City of Florence" was inflated and fitted up by its proprietor, and left the ground on the morning of a clear day, with a light north-easterly wind. It carried with Mangin a medical man practising at Lyons, with a special mission from the Government for the eastern departments. The ascent succeeded very well, and Dr. Lutz was landed safely. But the landing of Lutz gave rise to a singular circumstance. A Prussian spy, having read in the papers that Lutz had come down from the heavens, presented himself at Dijon as the real Lutz, and acted in accordance with that suggestion. The fraud was not discovered without some delay and some trouble, but owing to some peculiar circumstances it was at last exposed, the false Lutz was seized, tried by a court-martial, condemned to death, and shot on the spot.

Amongst singular ascents one was executed two or three days afterwards by Louis Godard, carrying with him two merchants. Godard's balloon being too small for the purpose, he fixed one additional balloon to the end of a long narrow piece of wood, and in the middle of that long singular bridge there was a second balloon of no more than 100 cubic metres. The floating of this extraordinary trio created a great deal of amusement among our Belgian people, and is in itself an aerial aeronautical success; Godard landed near Nantes, where the Prussians had not yet set their feet.

Next to Godard's singular ascent, we must mention the one executed by Trignot for carrying Gambetta to his post at the head of the Government. An accident took place in the air while it was open, and the balloon emptied itself at an extraordinary rate, landing, against the will of the aéronauts, in Prussian territory. If sharpshooters had not come to the rescue, Gambetta would have been made a prisoner. Kératry was in the same manner sent in a balloon, and succeeded in escaping after some adventurous feats.

We must mention the ascent conducted by the elder Tissandier, as well as the one conducted by his younger brother. The first of these two ascents was remarkable for the firing at it by the Prussians when the balloon was passing over Versailles. Tissandier, as well as his brother, fell beyond Prussian territory, but not far from the enemy's force.

From the time of the landing up to the present moment, the brothers Tissandier have tried twice to return to Paris; but they ascended from Tours, which is a bad station for such a purpose. The first time their balloon was sent towards the south; the second time it ascended too high, and the brothers were conducted into a frozen cloud, which compelled them to come down. This second ascent was tried during the night, which is a decidedly awkward time, as an aerial traveller is unable to find his way to the land.

Returning to Paris will be tried, however, and is a great object to be attained, but for success to be secured requires more powerful means. I must not omit my own arrival in Belgium in a balloon. The "Egalité," which I employed on that occasion, had a younger brother called "Liberté." The "Liberté" was inflated with pure hydrogen, prepared specially for the purpose. It was the old captive of the Universal Exhibition, fitted up and carefully repaired for the purpose. "Liberté" was intended to carry ten persons, besides 3,000lb. weight of letters. It had two cars attached, the one fastened to the other by eight ropes. The upper car was intended for passengers, the lower one for letter-bags. Everything had been carefully prepared; bags of sand had been attached round the upper car, and a hole had been cut into the bottom to permit communication between the two cars. Unhappily, when the process of inflation was half finished, the wind began to blow with such violence that people holding the net let the ropes loose with so much force that the balloon escaped, turned round like a whirlwind,

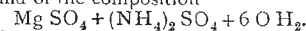
being lost in a minute in the clouds, and leaving thousands of spectators in consternation. "Liberté" was seen turning round two or three times again between different strata of clouds, and was finally observed turning no more, ascending no more, but falling straight like a meteoric stone. The fall took place within the Prussian lines, and it remained in the hands of the Prussians, who were enabled to repair and to use it for their purposes.

Seeing that I was unable to recover my balloon, I managed to get another constructed. The new balloon, though smaller than "Liberté," was larger than any other balloon in existence in Paris. It had a measurement of 3,000 tons instead of 2,000, the average. The ascent was delayed by an accident which happened during the process of inflating; a hole was discovered round the appendix, and the valve was open. For the three following days the weather was unfavourable, and the passengers were obliged to come back every morning, but the following morning several thousand people witnessed the ascent, which was very successful. After having landed in Belgium, I came to London on my way to Tours, and purpose shortly attempting to re-enter Paris by the same means.

W. DE FONVIELLE

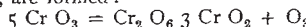
SCIENTIFIC SERIALS

Annalen der Chemie und Pharmacie, viii. Suppt. Bd. 1 Heft. This number opens with a paper "On the occurrence of Ammonio-Magnesian Sulphate in the lagoons of Tuscany," by Dr. O. Popp, who has observed that a double salt of ammoniac and magnesian sulphates is of constant occurrence, together with ammoniac sulphate and boric acid, in the lagoons. He also remarked that the relative amounts of boric acid and ammoniac sulphates are inversely proportional, so that those containing large quantities of boric acid contain but little ammoniac sulphate, and *vice versa*. The salt, which separates out either during the concentration of the water or in the crystallising vessels, is obtained pure by recrystallisation in forms belonging to the monoclinic system, and of the composition

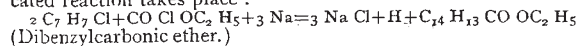


In the natural double sulphate Mg is often replaced by the isomorphous Mn and Fe.—"On the origin of the Boric Acid in the Fumaroles of Tuscany" is by the same author. After a criticism of the theories of Dumas and Bolley on this subject, he quotes the observations of Woebler and St. Claire-Deville, that boric nitride heated in the presence of aqueous vapour is decomposed into boric acid and ammonia, and that at a high temperature boron and nitrogen combine directly; they remarked that the presence of ammonia salts together with boric acid in volcanic craters and the lagoons of Tuscany might be due to such a decomposition. This the author also considers to be the probable explanation, and assumes that boric nitride is present in these volcanic localities, which comes in contact with water at a high temperature, forming boric acid and ammonia; this latter combines with sulphuric acid, formed by a process of roasting from the layers of pyrites, or of coal containing pyrites, which would also account for the presence of marsh gas and free hydrogen in the lagoon gases.—"On Chloranil and Bromanil," by J. Stenhouse. A modification of Grøbe's method of preparing chloranilic acid is described. Chloranilic ether was obtained by the action of ethylic iodide on the silver salt. Nitric acid of sp. gr. 1.45 oxidises chloranilic acid to chlorpicrin and oxalic acid. By the action of bromine on chloranilic acid a compound of the formula $\text{C}_6 \text{Br}_8 \text{Cl}_3 \text{OH}$ was obtained. Bromanil is readily obtained by the action of a mixture of one part iodine and two parts bromine on phenol. Bromanilic acid was prepared in a similar manner to chloranilic, and in all its reactions found to be analogous. A compound, $\text{C}_6 \text{Br}_{11} \text{O H}$, was obtained by the action of bromine on it.—"On Coumarin, Hydrocoumarin, and Hydrocoumarinic Acid," by C. Zwenger. The author observes that the preparation of coumaric acid from coumarin is attended with considerable difficulty, inasmuch as the acid is first formed at a temperature at which the potash readily causes a further decomposition. A most characteristic and delicate reaction for coumaric acid is the fine pea-green colour of its solutions when viewed by reflected light, and which is perceptible when only traces even of the acid are present. As is well known, melilotic acid is obtained by the action of nascent hydrogen *in excess* on coumarin; the author finds, however, that if the coumarin be kept in excess a new acid, which he calls hydrocoumarinic, is formed. This acid is derived

by the addition of H_2 to two molecules of coumarin, and has the composition $C_{18} H_{18} O_6$. On heating in a water bath, or even on heating with dilute HCl or H_2SO_4 , it loses water and is converted into the anhydride $C_{18} H_{14} O_4$, which may also be obtained directly from coumarin.—“A New Method of Synthesis of the Organic Acids,” by M. Berthelot. On allowing acetylene mixed with air to remain in contact with dilute potash solution for six months, the acetylene was found to have been converted partly into acetic acid and partly into a bituminous substance, containing C and H and O . Employing a solution of chromic anhydride, a more perfect conversion of the acetylene to acetic acid took place. Allylene treated in the same way gave propionic acid; but it is probable that an intermediate compound $C_3 H_4 O$ is formed by the direct addition of O , and which should also be obtained by the abstraction of OH_2 from propionic acid. Propylene gave propionic acid, acetone, and acetic acid; even carbon was oxidised by this reagent, giving small quantities of oxalic acid. It deserves notice that a solution of pure chromic anhydride is a much gentler oxidising agent than the usually employed mixture of sulphuric acid and potassic dichromate, probably partly by reason of its evolving a smaller proportion of oxygen. By its decomposition, free oxygen and chromic chromate, a salt corresponding to ferric sulphate, are formed:



“On the synthesis of aromatic acids, by A. Wurtz.” By the action of $Na_2 Hg$ on a mixture of chlorocarbonic ether and bromotoluol, the ethers of toluyllic and isotoluyllic acids were formed, which is explained by the fact that bromotoluol is a mixture of two isomeric compounds. On treating a mixture of chlorocarbonic ether and benzylic chloride, the following more complicated reaction takes place:

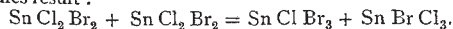


The first action of the sodium is probably to form chlorinated dibenzyl,

$\left\{ \begin{array}{l} C_7 H_7 C_6 H_5 \\ CH Cl C_6 H_5 \end{array} \right.$ from 2 mols. of benzylic chloride, and this by the action of Na and $CO Cl OC_2 H_5$, becomes converted into

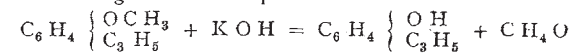
$\left\{ \begin{array}{l} C_7 H_7 C_6 H_5 \\ CH CO OC_2 H_5 C_6 H_5 \end{array} \right.$ By the dry distillation of its lime salt, stilben and dibenzyl are obtained:

$2 (C_{15} H_{13} O_2) Ca = Ca CO_3 + CO + C_{14} H_{12} + C_{14} H_{14}$
—“On the molecular weight of some Protoxides,” by A. Ladenburg. This is really so important and interesting a paper that it is difficult to give an idea of its contents in the short space at our command. Although the determination of the vapour density is still the most certain method of establishing the molecular volume, it cannot be denied that the true interpretation of chemical metamorphoses also affords a means of fixing the molecular formulæ of compounds. The author also considers this to be the case in those reactions which cause a change of type, viz., in cases of direct addition. The molecular volume of the resulting product permits in many cases at least an inference as to the formula of the unsaturated compound. For instance, from the passage of ferrous into ferric chloride, he believes himself justified in drawing the conclusion that $Fe_2 Cl_4$ is the formula of the former, $Fe_2 Cl_6$ being that of the latter, as is proved by its vapour density. The same may be urged of Cr and Mn compounds, although not with the same certainty, and it was to obtain further proofs in this direction that the author strove. By the action of a mixture of 3 eq. acetic and 1 eq. formic acid on manganous carbonate, a compound $Mn_2 (C_2 H_3 O_2)_3 C H O_2$ was obtained, but it is not placed beyond all doubt that this is not a mixture of two salts. A series of experiments with tin compounds were then undertaken with the view to ascertain whether the compound $Sn_2 Cl_6$, intermediate between $Sn Cl_2$ and $Sn Cl_4$ could not be obtained. By the action of Br on $Sn Cl_2$, $Sn Cl_2 Br_2$, $Sn Cl_3 Br$, and $Sn Br_3 Cl$ were formed, revealing the curious fact that similar molecules so react on one another that dissimilar molecules result:

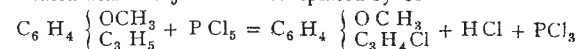


No experimental proof of stannic triethide being $Sn_2 (C_2 H_5)_6$ and not $Sn (C_2 H_5)_3$ had hitherto been adduced; it was prepared by the action of Na on $Sn (C_2 H_5)_3 I$, and its vapour density determined and found to agree with that required by $Sn_2 (C_2 H_5)_6$. The action of Cl on stannic triethide is as follows: $Sn_2 (C_2 H_5)_6 + Cl_6 = 2 Sn (C_2 H_5)_2 Cl_2 + 2 C_2 H_5 Cl$. By the action of 1 first $Sn (C_2 H_5)_3 I$, and then $Sn (C_2 H_5)_2 I_2$ is formed. By the action of sodic ethylate on $Sn (C_2 H_5)_3 I$

stannic ethyltriethide $Sn O C_2 H_5 (C_2 H_5)_3$ was obtained. There then follow a number of similar experiments on stannic methides, &c.—“On Schiel’s chloraluric acid,” by N. Lubavin. Schiel described an acid obtained by the action of chlorous acid on uric acid, to which he gave the formula $C_{14} H_{11} N_3 Cl O_1$ (old atomic weights); this Lubavin proves to be a mixture of ammoniac chloride and parabanic acid. He also mentions an oxalate of urea of the composition $CO N_2 H_4 C_2 H_5 O_4 + O H_2$, the formula of the ordinary oxalate being $2 C O N_2 H_4 C_2 H_5 O_4$. In all the text-books 120° is given as the fusing point of urea; he finds it to be 132° .—“On derivatives of Anethol,” by A. Ladenburg. On fusing anethol (oil of anise) with caustic potash, the following reaction takes place:—



Treated with $P Cl_5$ H becomes replaced by Cl



This body treated with alcoholic potash loses HCl and gives $C_{10} H_{10} O$, a liquid boiling at 240° . All experiments to replace the Cl in chloranethol by $C_2 H_3 O_2$ failed. Anethol combines directly with Br_2 .—“Researches on Vanadium,” by Henry E. Roscoe. In this communication are described vanadic tribromide and oxytribromide; also a large number of meta, ortho and pyrovanadates, among others the artificially prepared vanadinite. As this paper appeared in English in the Chemical Society’s Journal, it has already been noticed in this journal.—“On the second fundamental theorem of the mechanical theory of heat and its application to several decompositions,” by Dr. A. Horstmann. The author has given a popular treatment of the mechanical theory of heat, as he considers that although of the greatest interest to chemists, it has remained comparatively unknown to them by reason of its requiring a somewhat high mathematical knowledge. The decompositions to which it is applied are those of ammoniac chloride and calcic carbonate by heat, and also the expulsion of the water of crystallisation from hydric disodic phosphate.

SOCIETIES AND ACADEMIES

LONDON

Geological Society, November 23.—Mr. Joseph Prestwich, F.R.S., president, in the chair.—1. “On some points of South-African Geology.” Part I.—By Mr. G. W. Stow. In this paper, which was illustrated by numerous sketches, sections, tables, and specimens, observations were made on the stratification of the Jurassic beds of Sunday’s and Zwarktop’s rivers, resulting from researches made by Mr. Stow, with the view of determining the exact position of the several species of fossils found at the exposures on the cliffs of these rivers, and from this the sequence of the various beds. He indicated the existence of at least nine separate fossiliferous bands, pointing out the relative positions of the several *Trigonia*-beds, Hamite-beds, Ammonite-beds, &c. He next treated of the so-called Saliferous beds of the district, and gives his reasons for regarding them as later in age than the *Trigonia*-sandstones above alluded to, and therefore not equivalent to that part of the series named “Wood-beds” by Dr. Atherstone. Other researches of the author related to the Tertiary beds both inland and on the coast. He distinguished three zones on the coast later in date than the high-level shell limestones (Pliocene?) of the Grass Ridge and other parts of the interior. One of the coast-zones he named the *Akera*-bed, from the prevalence of a delicate species of that genus. Another zone was described as following the river-valleys in the form of raised terraces, characterised by the presence of a large *Panopæa*. The latest shell-banks have been thought to be kitchen-middens, but the author regarded them as shore-deposits in place. The author concluded by tracing the probable climatal and geographical changes in this region during geological times, and indicated, as far as his material allowed, the probable migrations of the Mollusca, especially of the *Venericardia* characterising the Pliocene Limestone. Mr. Gwyn Jeffreys remarked that all the shells belonging to the genus *Akera* which he had examined were shallow water or littoral shells. Dr. Duncan remarked on one of the corals as being of a well-known Crag form, the *Balanophyllia calyculus*. Mr. Searles Wood, jun., observed that there appeared some probability on the face of the paper of the shells of the older post-tertiary beds denoting a warmer climate than the present, instead of, as here, a colder.—