of hopeless difficulty. Nevertheless we are able, by attending to the condition of similarity of the motion in different cases, to compare the viscosities of the different gases for as many groups of corresponding pressures as we please. Setting aside certain minute corrections which would have vanished altogether had the moment of inertia of the vibrating body been sufficient to make the time of vibration sensibly independent of the gas, as was approximately the case, the condition of similarity is that the densities shall be as the log decrements of the arc of vibration, and the conclusion from theory is that when that condition is satisfied, then the viscosities are in the same ratio. Pressures which satisfy the condition of similarity are said to "correspond."

It was found that on omitting the high exhaustions, the experiments led to the following law :—

The ratios of the viscosities of the different gases are the same for any two groups of corresponding pressures. In other words, if the ratios of the viscosities of a set of gases are found (they are given by the ratios of the log decrements) for one set of corresponding pressures, these pressures may be changed in any given ratio without disturbing the ratios of the viscosities.

This law follows of course at once from Maxwell's law, according to which the viscosity of a gas is independent of the pressure. It does not however by itself alone prove Maxwell's law, and might be satisfied even were Maxwell's law not true. The constancy however of the log decrement, when the circumstances are such that the molar inertia of the gas may presumably be neglected, proves that at any rate when the density is not too great that law is true; and the variability of the log decrement at the higher pressures in all but the very light gas hydrogen is in no way opposed to it, though Mr. Crookes's experiments do not enable us to test it directly, but merely establish a more general law, which embraces Maxwell's as a particular case.

The viscosities referred to air as unity which came out from Mr. Crookes's experiments were as follows :—

Oxygen	1·117
Nitrogen and carbonic oxide	0·970
Carbonic anhydride	0·823
Hydrogen	0·500

The viscosity of kerosoline vapour could not be accurately deduced from the experiments, as the substance is a mixture, and the vapour-density therefore unknown. Assuming the relative viscosity to be 0·0380, the vapour-density required to make the experiments fit came out 3·408 referred to air, or 49·16 referred to hydrogen.

When once the density is sufficiently small, the log decrement may be taken as a measure of the viscosity. Mr. Crookes's tables show how completely Maxwell's law breaks down at the high exhaustions, as Maxwell himself foresaw must be the case. Not only so, but if we take pressures at those high exhaustions which are in the same ratios as "corresponding" pressures, the log decrements in the different gases are by no means in the ratios of the densities.

It would appear as if the mechanical properties of a gas at ordinary pressures and up to extreme exhaustions (setting aside the minute deviations from Boyle's law, &c.) were completely defined by two constants, suppose the density at a given pressure and the coefficient of viscosity; but that specific differences come in at the high exhaustions at which the phenomena of "ultra-gas" begin to appear; and that to include these, an additional constant, or perhaps more than one, requires to be known.

ANIMAL REMAINS IN THE SCHIPKA CAVERN

ON December 6, 1880, Prof. Schaaffhausen gave a lecture to the Lower Rhine Society in Bonn, on the discoveries made by Prof. Maschke in the Schipka Cavern, near Stramberg, in Moravia. In this cavern were found remains of Bos, Ursus, Elephas, Rhinoceros, Leo, and Hyæna, besides roughly-hewn implements of quartzite, basalt, and flint, and some incisor teeth of Ursus, which were cut into on both sides at the beginning of the crown, perhaps because people did not yet know how to bore a hole into the root. Carbonised animal bones in numerous small fragments were met with. A solitary human relic was found in a protected place at the wall of a side passage of the cavern, and near a fireplace. It was the fragment of a lower jaw, amid ashes and inter-breccia of lime. The same layer contained mammoth remains and stone implements. Of the jaw only the front part with incisors, one canine, and the two premolars, of the right side remained. The latter three teeth were still in the jaw undeveloped, but were visible, because the front wall of the jaw was wanting. The largeness and thickness of the jaw, first of all, were remarkable. The teeth-development corresponds to the first year of life, but the jaw and the teeth are as large as those of an adult. As is the rule with man, the first pre-molar seemed nearest being cut; next to it came the canine, then the second pre-molar.

The height of the jaw in the line of symphysis measures, to the alveolar border, 30 mm., to the end of the incisors 39 mm. (In the jaw of a child seven years old the corresponding measurements were 23 mm. and 30 mm.; in a girl nine years old 24 mm. and 33 mm.; in a boy of 12, 22 mm. and 31 mm. The jaws of eight adults measured in height, to the alveolar border, on an average, 31 mm.) The jaw fragment, at its lower border, in the line of symphysis, is 14 mm. thick; under the canine tooth the thickness is 15 mm. (In an ordinary adult jaw the thickness in the line of symphysis is about 11 mm.) Now when the cutting surface of the incisors is placed horizontally, the under part of the prognathous jaw bends so much back that one misses the chin as a prominence. A vertical from the front alveolar border falls 4 to 5 mm. in front of the lower border of the jaw. The hinder surface of the symphysis is placed obliquely, as occurs in a high degree in the anthropoids, and in lower degree in savage races, but has also before been observed in fossil human remains, as in the jaw of La Naulette, to which this jaw from the Schipka Cavern has much similarity. The form of the incisors is adapted to the thick prognathous jaw; the broadest part of the root measures from front to back 8½ mm., whereas the ordinary measurement here is 6 mm. Further the teeth are bent convex in front. The curvature corresponds to a radius of 27 mm. The *spina mentalis interna* is absent, and instead there is, as in the anthropoids, a cavity, at the lower border of which some unevenness can easily be felt. The prominences for attachment of the *Musculi digastrici* are well marked, implying a correspondingly strong development of the antagonistic muscles, the masticatory. All these features were also met with on the jaw of La Naulette, but more developed. It is probable that the jaw of the Schipka Cavern also had the pithecoid peculiarity, that its tooth-line was not horizontal, but rose from the premolars to the incisors, and its body was higher in front than at the sides, because the cutting-surface of the outer incisors sinks obliquely outwards. The size of the canine tooth is remarkable, its enamel crown being 13·5 mm. long. (In the fossil lower jaw of Uelde the canine tooth exceeds the premolars about 3·5 mm. According to measurement on ten European adult skulls with the teeth hardly, or not at all, worn down, the crown of the canine tooth was 11·5 mm. long. Only once, among more than fifty skulls, was it found 14 mm.) It cannot well be supposed that this jaw, caught in dentition, belonged to an individual of giant growth, since in such individuals the excessive growth, according to Langer, first begins about nine to ten years of age. The assumption that some pathological cause had hindered the development of the three teeth that remained within the jaw seems quite groundless. As little can we suppose that in the prehistoric time the teeth development was retarded, and that the change of teeth occurred at a later age, since a quicker development corresponds to a lower organisation. (All mammals come into the world with teeth, and the orang changes its teeth sooner than man.)

The size of the front part of the jaw however may in itself be regarded as pithecoid; and there is more reason for this in that other pithecoid characters are present. The aspect of the grey-yellow bone with small dark branching spots on it is met with often in cavern bones. The enamel of the teeth is quite like that of the Quaternary cave animals; it shows longitudinal fissures with dark infiltration; while near these appear bluish, and in some places yellow, spots.

SOME REMARKS ON PERIPATUS EDWARDSII, BLANCH.

SINCE I learnt from Mr. Moseley's notes on the species of *Peripatus* (*Ann. and Mag. of Nat. Hist.*, v. ser., iii., 263), that one of them, referred by Grube to *P. Edwardsii*, had been obtained from this country, in the neighbourhood of Colony Tovar[1]), I tried to get specimens of this highly interesting

[1] Not Colony *Jowar*, as the name is printed in Mr. Moseley's paper.