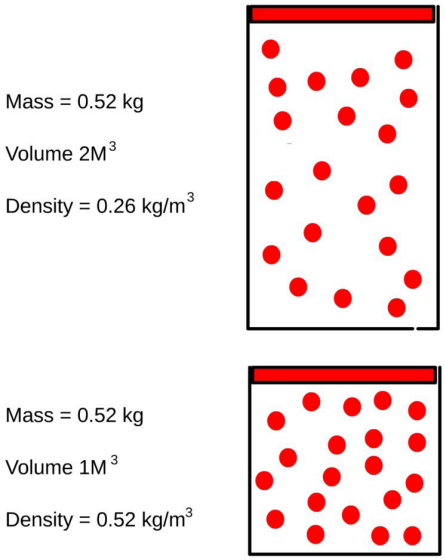
Mass Density

by Roger Munday

It is observed that an increase in energy applied to a volume of gaseous matter results in an increase in volume combined with a co-incidental reduction in its mass density.

It is stated, as in the NASA images below, that if a 1M³ volume of a gas of a mass density of 0.52 Kg/M³ is enclosed in a flexible container at STP, and energy is applied to the gas to double its volume to 2M³, the mass density of these enclosed gases is reduced to precisely 0.26 Kg/M³.



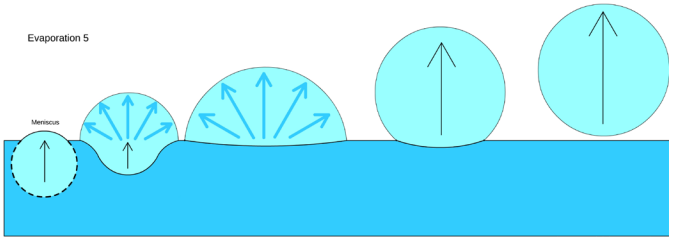
Density = Mass/Volume

In kinetic theory terms the contained atoms increase in kinetic velocities and move to greater separations, and the theory states that the individual masses and volumes of the atoms remain at the same values and that the reduction in overall density is a result of the expansion of a mass-less, interstitial vacuum, which by definition has no qualities that can exert any influence on these contained atoms.

And if we apply this concept to the observed evaporation of liquids from their surfaces such as water and mercury which occur at any temperature down to and below 0°C (as is observed in arctic regions), the initial evaporation is not that of individual atoms, which would be invisible, but of gaseous globules composed of many millions of atoms that are of sufficient volumes to diffract light (in the case of mercury U/V light) and so are visible as they, in both cases, rise rapidly upwards and disperse into the atmosphere.

When water is heated in a container globules of gas are formed at the bottom surface where the heat is applied and these are observed to detach from this surface and rise and progressively expand in volume and, as depicted in the diagram below, then to break free through the surface meniscus, at which point the gas is clearly visible in the atmosphere.

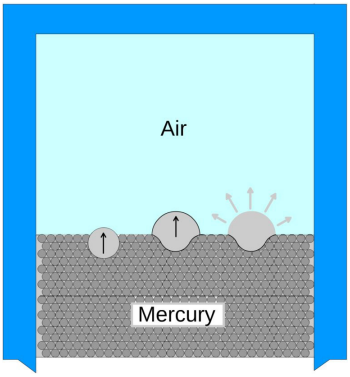
However in some natural circumstances where water evaporates naturally, such as the evaporation of a small drop mentioned, this evaporation may not be visible as the globules of gas formed may not be of sufficient volumes to diffract light.



In 1648 Blaise Pascal carried out a Barometer type experiment, where he filled the glass tube partly with mercury up to 35 mm from the open end and inverted the tube into a bowl of mercury, with the air duly rising above the liquid.

https://www3.nd.edu/~powers/ame.20231/webster1965.pdf

He observed that bubbles were then formed at the mercury surface and rose out of the liquid and disappeared into the air above it, as depicted in the diagram below.



And today the rapid evaporation of mercury is shown in this video:-

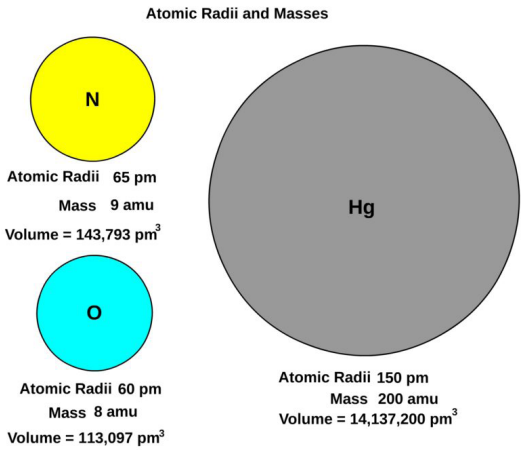
https://www.youtube.com/watch?v=lpZF88fqrl8

As these gaseous mercury globules eventually disappear from view, this means that they dissipate into smaller clusters and eventually into single atoms that do not diffract light.

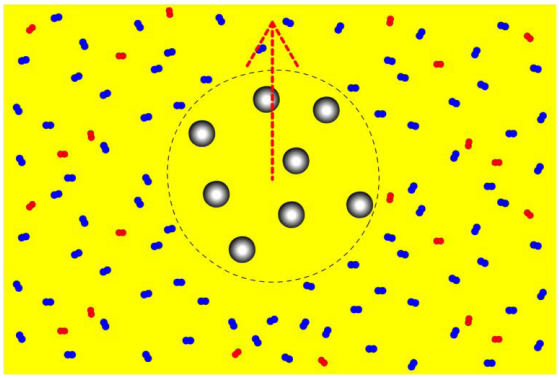
But the specific gravity (SG) of mercury in its gas state is stated to be 6.9, and so this gas, whether as globules or as individual atoms, should not rise at all through the atmosphere with a SG of 1.18, let alone rise at the observed rapid rate.

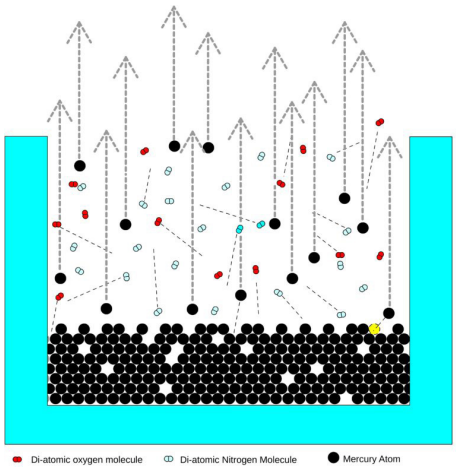
In kinetic theory terms, as the contained atoms (as depicted in the NASA images above) increase in kinetic velocities and move to greater separations and the theory states that the individual masses and volumes of the atoms remain at precisely the same values and, as the increased volume of interstitial vacuum has no mass, the collective mass of the constituent atoms is unchanged.

The atomic radii of nitrogen and oxygen atoms are stated to be 65 and 60 pm (picometres) respectively and that of mercury is 150 pm, their respective masses are 8, 9 and 200 amu, while their relative volumes, in cubic picometres, are as depicted in the diagram below.



In these hypothetical circumstances the elevation of either a ‘kinetic’ globule of mercury gas as in the first diagram below, or that of a single mercury atom of 200 amu in the second diagram, upwards through an atmosphere of nitrogen and oxygen molecules of less than 18 amu, is inexplicable and logically speaking impossible.

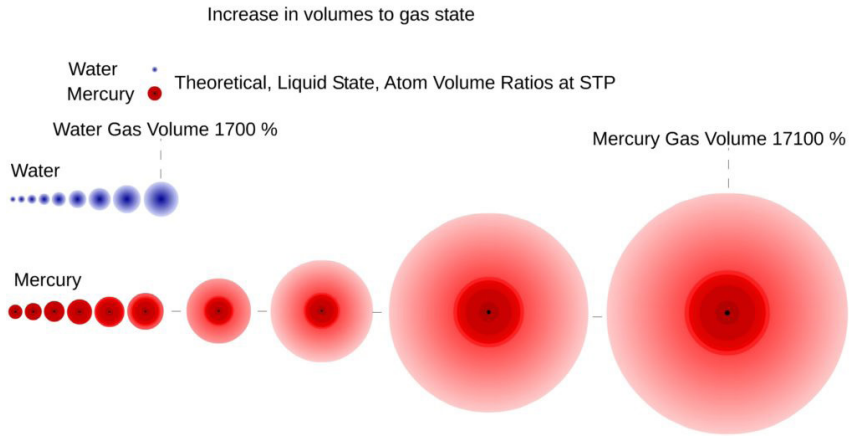




It is observed that in the change of state of water to a gas, 1 cc of liquid expands to 1700 cc (1.7 litres) of water vapour of a mass density of 0.0048 g/L, and if a 1 cc drop is placed on a surface it will evaporate completely within an hour or two at STP.

Experiments also show that if a 1cc drop of mercury was left to evaporate it is estimated that it would take 10 years to do so, and this drop would generate a volume of 17.1 litres of mercury gas.

The images below represent the observed, relative expansion ratios of a 1cc volume of both water and mercury from the liquid states to the gaseous at 1-1700 cc and 1-17100 cc respectively.

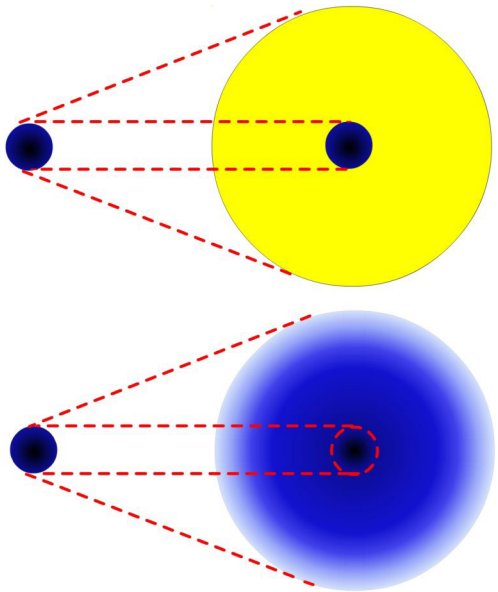


From this experimental evidence it can only be concluded that, for the observed rapid elevation of mercury, the individual mass/densities of single gaseous mercury atoms cannot be greater than the mass/densities of the individual atoms/molecules of which the atmospheric gases are composed.

The first image below is of the change of state, in terms of current kinetic theory, of a liquid atom to the gas state, which by means of a relatively huge input of “latent” heat ultimately generates a sudden and huge increase in kinetic velocities.

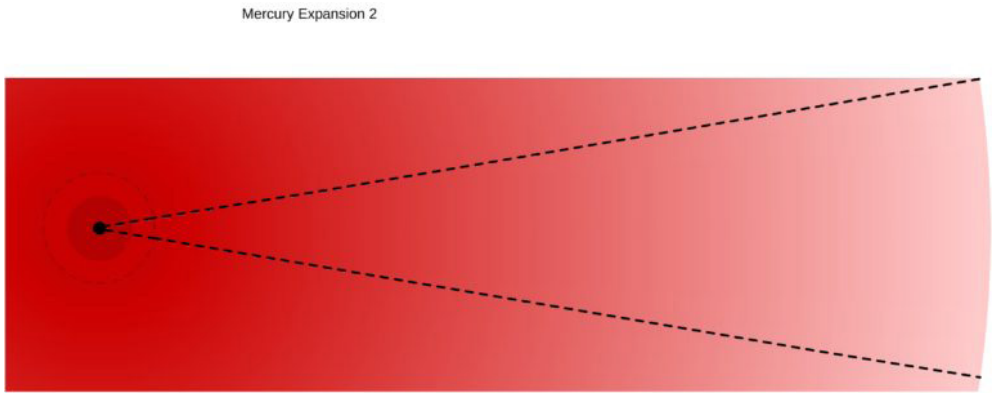
In this context the yellow represents an expansion of the extra-atomic vacuum around an atom that remains at its original volume.

(This introduces the issue of gravity, as the masses of these atoms remain the same and only the mass-less vacuum expands, why then do such ‘gas’ atoms have a lesser ‘gravitational’ attraction to the Earth’s surface?)

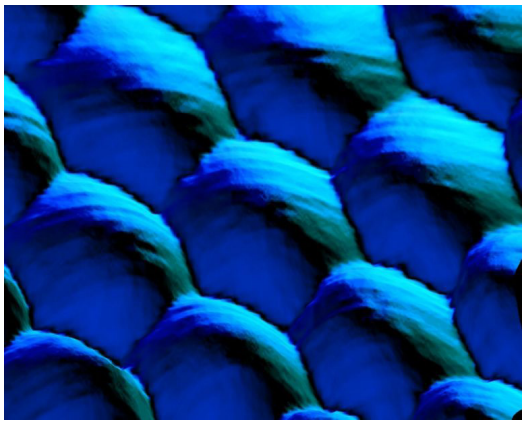


The second image above depicts the physical expansion of the atom due to the absorption of heat energy, where the highly dense atom in the liquid state has progressively expanded and (this perhaps is counter-intuitive to some) the overall mass density has decreased.

The image below represents this exponential increase in mass density of a gaseous atom from the outer extents to the core.

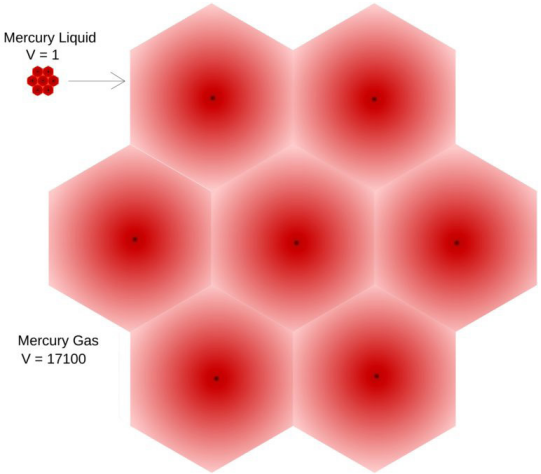


In the electron-microscopy image of platinum atoms below, the outer limits of the component atoms are in direct contact with all adjacent platinum atoms of similar mass densities producing a hexagonal form, while the surfaces in contact with atmospheric gases are hemi-spherical.



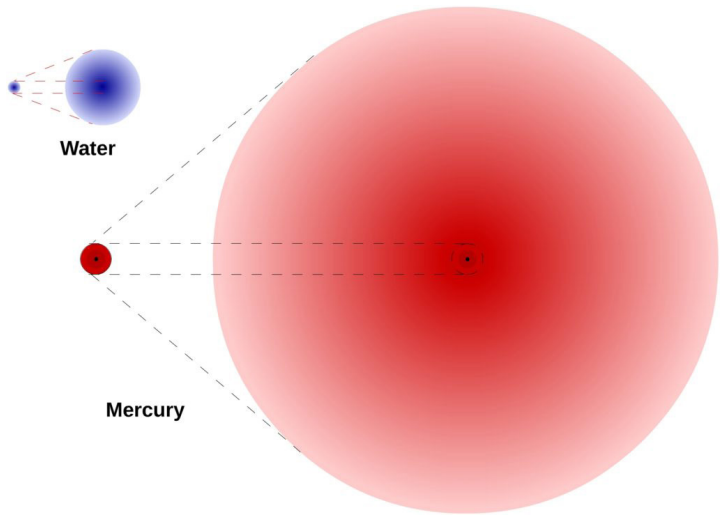
If we apply this structure to that of mercury in its liquid state and to its expansion to the gas, these below are the relative, volumetric dimensions, and so if the mass density of the atom in the liquid state increases exponentially to a core of immense density, when the observed, relatively enormous quantity of mass/energy is imparted/absorbed to generate the transition to the gas state the density of this absorbed mass/energy also is dependent on altitude from the core.

There are therefore progressive changes in density in both directions, which results in a fractional increase in mass and an overall decrease in the mass density of the atoms.



There is just one way that an individual mercury atom can arrive at such a large reduction in mass/density in order to be able to rise rapidly upwards in the atmosphere, and this is due to the progressive absorption of a large quantity of energy which results in a, similarly progressive, and exponential expansion of its matter field, as depicted below.

And as the outer limits of such physically expanded atoms have significantly reduced densities this facilitates the observed, co-incident increases in fluidity with changes of state.



While such a continuous, universal structure of wholly material atoms obviously provides a medium for transmission, for example of that of the Earth's magnetic field, the problem for the science of physics in general is that such a structure of atoms which expand and contract in volumes, brings into question the hypothetical, currently accepted, ultimate structures of all gases, in all circumstances and of all compositions and densities.

But I suggest that it is psychologically impossible for the thousands of theoretical physicists world wide to review their long held and absolute belief in the 'existence' of all-pervasive vacua and/or aethers that patently fail to explain the cohesive structure of the universe as a whole.

http://romunpress.co.nz/romunnose/