Evert Fluid - Technolgy - Basics

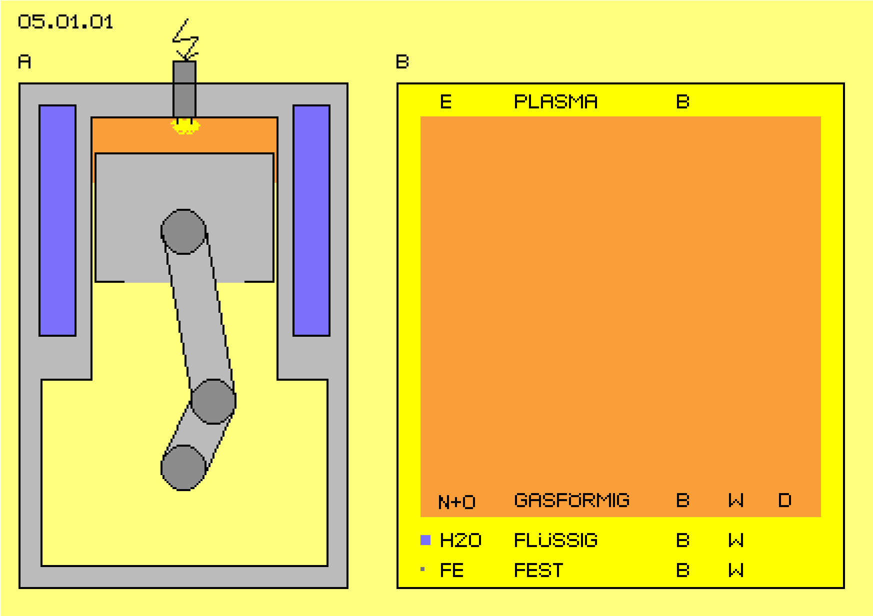
The chapters of the old website were reviewed,
reduced to relevant points and ordered by subject.
Here at first some basic, nevertheless important aspects.

05.01. Flight through Nothing, Structure within Chaos

Real World of Particles
Following section primary talks about well known world of particles and only some differences to the difficult world of the aether are mentioned. At first some known and banal facts are listed, which however become important at following chapters. Our experienced world exists of parts which we handle steady and manifold, e.g. by building machines. At picture 05.01.01 (left at A) very schematic is shown a cross-sectional view through a popular construction - through the combustion motor.

Crank shaft turns within the engine block, the crank and the connecting rod are moving a piston up and down within a cylinder, the cubic capacity varies its volume, air is drawn in and compressed, fuel is injected and fired, heat comes up and presses down the piston, exhaust fumes are pushed off and the surplus heat is drawn off by coolant.

This machine uses materials of all three physical states: solid bodies (grey) for parts of the motor, liquids (blue) for cooling, gases (red) as throughput-medium - and above this, even the fourth physical state of plasma (yellow) might come up for short moment by ignition spark.



At this picture right side at B some properties of physical states are marked. Especially striking is the relation of volumes for comparable (by weight) masses of atoms resp. molecules. Iron (FE) exists of rather heavy atoms sitting nearby each other (small grey point). Water molecules (H2O) are lighter three times and arranged at loose compounds, so likely mass of water takes seven times wider volume (here marked by blue square, seven times larger than the grey FE point).

However, again seven hundred times more volume takes the air (N+O) at normal conditions (red square). The air-atoms weight nearby like H2O, however are spread much wider. Gas-atoms are really negligible small in relation to the volume they demand - tiny points within a huge sea of Nothing - by common understanding. By my understanding however, the space is filled up with the aether (E) and also these material particles are nothing else than aether, each only as a special motion pattern of that plasma.

Motion, Heat, Density
Motion (B, German Bewegung) is common for all physical states. Plasma is pure aether movement, atoms of gases fly steady through space, liquids are soft and pushed down by gravity every slight slope, stationary solid bodies seam resting

however their atoms are trembling on and on. The materia of all physical states thus are steady moving, from solid via liquid to gaseous, however at increasing larger distances. The plasma resp. the aether as the common background of all occurrences naturally is also steady moving - however keeping nearby stationary (thus similar to the ´stationary´ trembling of solid bodies).

The expression of speed resp. intensity of particles movements is called ´heat´ (W, German Wärme). Atoms of solid bodies can tremble more or less intensive, e.g. from ´cold to red-hot iron´. Particles of liquids can move relative to each other, more or less fast, or even condensate or vaporize. Gas particles race through space most fast, or calm down becoming liquids. So ´heat´ is the expression of the intensity of movements of particles - thus is not to apply at the partless aether plasma.

The universe is assumed to be extremely cold, however only because out there are very very few material particles to hit onto a thermometer. Light races through the universe - however that ´electromagnetic wave´ is not ´warm´, only if the light hits onto material particles their trembling might increase. So heat resp. temperature exists only at the level of material occurrences and also there it appears only by ´interaction´, i.e. if intensities of movements of particles are exchanged. All processes within the aether itself, e.g. previous light-radiation or also the vortices pattern of electrons are movements indeed, however that interaction-conditioned term of heat does not match. The aether by itself has no temperature (and thus also the Free Aether of the universe shows no temperature).

Analogue is the situation concerning the term of ´density´ (D). Really variable density exists only at gases, e.g. within the cylinder of previous combustion engine. Liquids show different density based on temperature, the liquids however are not really compressible. Likely behave the solid bodies with its nearby steady density, just because their atoms or molecules are near next neighbours already by normal conditions. The smaller and dense the particles are, the less can vary the relative density - and thus the term of ´density´ is not to apply at the gapless plasma: the aether is a homogenous substance without any possibility for changing its density.

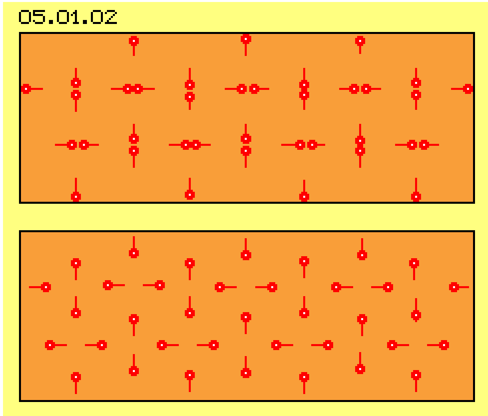
Strange Ideas
So I underline once more, the terms ´heat´ and ´density´ are inapplicable to ´my´ part- and gapless aether. That´s like the term heat naturally is not applied at diverse physical fields, i.e. electric- or magnetic- or gravity-fields are neither cold nor warm. The term density sometimes is used concerning fields, however fields describe forces, so ´strength´ would better fit than density. So there are physical occurrences which also don´t show the properties of heat and density (just because previous fields are direct affects of aether movements, without building independent and locally separated entities of material kind).

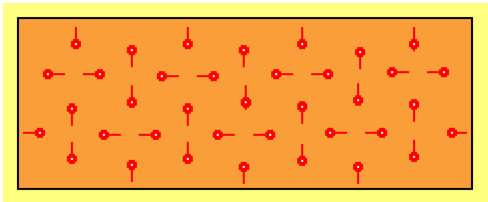
My aether thus shows no property of any ´elasticity´ and occurrences are not based at any ´dilution or thickening or condensation´ of any compressible substance, like often assumed at many theories. These theories talk about ´crystallization of vacuum´ or ´virtual particles´ - without any explanation how and why resp. only to cover unsolved problems of these world-views.

Movements within Gases
At the following are discussed only the occurrences of gases, because their particles

have the best chance for free motions and, same time, the inevitably occurring effects clearly become obvious.

At picture 05.01.02 is marked an area of gas by light red. The red points represent atoms. The red line of each atom marks the way moved before. This picture shows no real relations: much too many atoms are arranged at that area, the atoms never show such strict order. the atoms do not move only at these vertical and horizontal tracks.





So this picture, like the following animation, only demonstrates how atoms of gases can move at ways through each others and how they collide repeatedly, mutually or at the surrounding wall. It´s common understanding, these collisions occur ´perfect elastically´ (thus without loss of kinetic energy), speeds and directions are only exchanged from one particle to the next particle (represented here by lines of same lengths resp. likely distances at each time unit).

This picture also corresponds to the common understanding, as motions straight line and constant speed are assumed. However, not all particles show exact same speed but only similar speeds (by bell-shaped spreading). It´s also assumed, particles of gases show no attracting nor rejecting affects (besides polarized particles, e.g. the ´mixture of gases H2 and O´ resulting a liquid state).

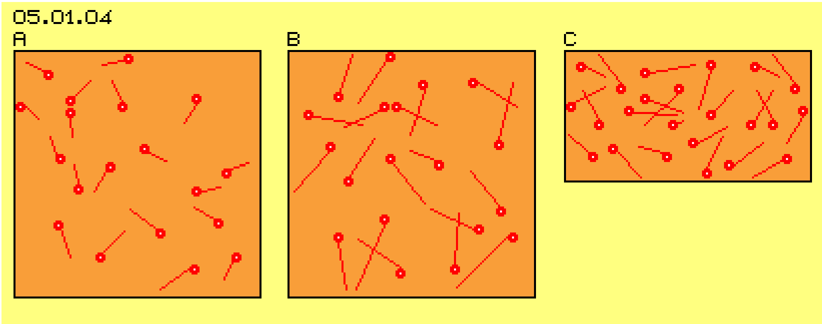
As here the movements are reduced to horizontal and vertical directions, it seams the atoms would not come far ahead. At reality, all atoms move into chaotic directions and inevitably results the possibility for some atoms to move unbelievably fast far ahead within the space (see below).

Emptiness within Gases
Picture 05.01.04 at A shows some more realistic relations concerning ´chaotic´ directions into which the atoms are moving this very moment. Completely unrealistic however still is the density of atoms (the relation between atom-diameters and total area drawn here). Real relations are not to show at paper or screen, but following example might give good idea.

´Nordic-Walking´ is up-to-date and thus many health-conscious walkers assemble at vast plane. As pure nature is boring, an ´event´ is arranged: all members spread out at a field and on command everyone starts walking into a direction as they like it, however all times straight ahead. ´Score-surface´ is one square-meter and at each hitting, the partners exchange their directions. The aim of that event is ... however events became an end in themselves.

Anyway, some walkers meet colleague already some few steps later, other walkers collide finally after some hundred meters or even later. The aim of this comparison is to demonstrate the ´emptiness´ of gases. At normal conditions, atoms move one thousand times their diameters straight ahead until colliding. As the ´score-surface´ here is defined by one square-meter, walkers on average would have to walk one kilometre until meeting next partner - and probably no series of that boring event would come up - and it´s rather hard to understand, why gas-particles don´t stop their stupid racing through the void.

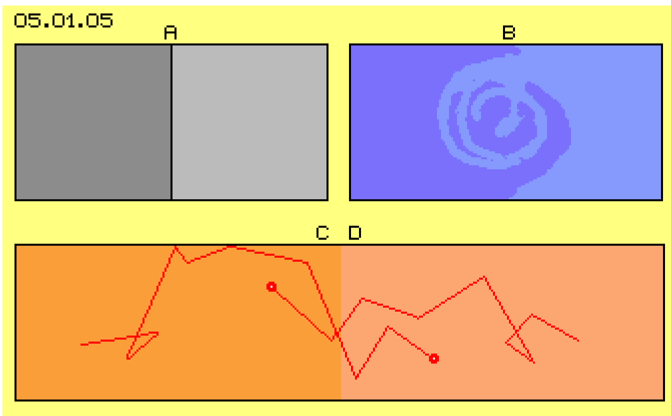
Known Thermodynamics
Picture 05.01.04 at B schematic shows increased heat (in comparison with A). Atoms move some faster, thus the are hitting stronger at the walls and resulting some heavier trembling. Opposite, if the walls are warmed up, naturally the gas becomes heated correspondingly - inevitably every ´heat flows from warm to cold´ - like generally known (resulting increased entropy).



Right side at C now the available space for given number of atoms is reduced. The atoms thus hit early and quite frequent onto walls resulting increased ´pressure´. At previous piston engine, the available volume is reduced when the piston moves into the cylinder. That moving ´wall´ rejects the atoms faster, so same time the heat increases.

So, I used simple examples in order to demonstrate the reality of ´nearby empty´ gases (because atom-diameters of 10^-10 and distances of 10^-7 hardly can produce a real imagination). These facts are well known for long times, specialists know all relevant terms and formula. So, I mentioned these facts only in brief, only by common words and by simple examples to give an idea of the real relations and processes within gases - and because not everything is like it seams to be and common sciences don´t draw all consequences or don´t draw best benefits of (for example see absolutely insufficient level of utilization of combustion engines).

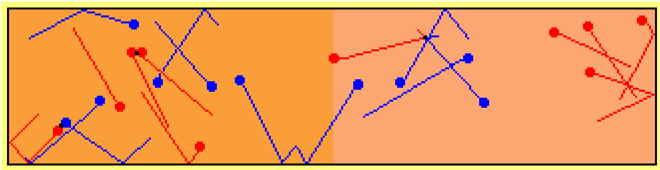
Mixture
At picture 05.01.05 at A are sketched two solid bodies (dark grey and light grey) and it´s obvious, these bodies can not be ´mixed up´ (as long as they stay in solid physical state). Essential property of solid bodies is, their particles build a strong compound with commonly a ´hard´ border towards outside.



At B are sketched two liquids (dark blue and light blue). The compounds of liquid-particles are not thus rigid, but the particles remain next to neighbours as a rule. Liquids can be stirred (like sketched here) or can be shaked for mixing up.

At C and D is sketched two gases within two areas (dark red and light red). Two particles and their potential tracks are marked. Within gases exists such a wide emptiness and particles move ´chaotic´, so they must not stay near neighbours (like at previous extreme schematic picture 05.01.02).

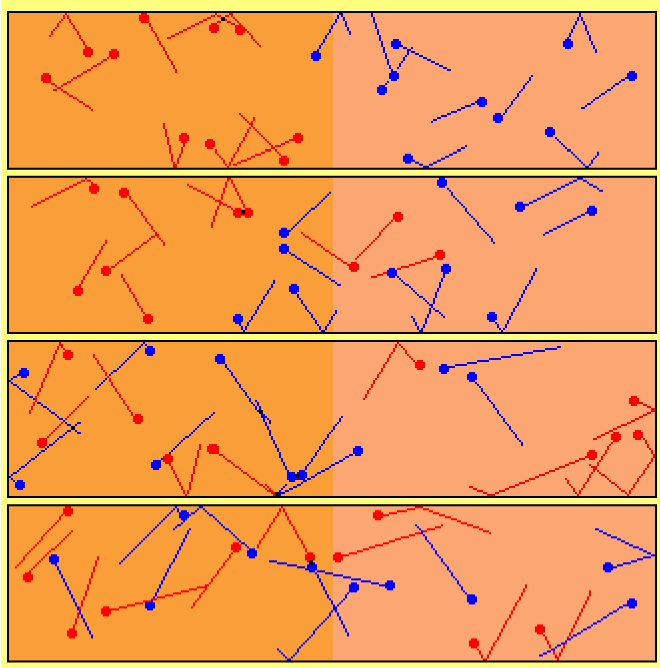
Scents for example spread remarkable fast and small mass of is sufficient for immediate detection within a wide room (e.g. if a diva with her exotic perfume enters the stage). Strong kinetic forces are ´inherent´ at gases and very dynamic processes occur. Different gases mix up rather fast and completely, autonomous without external intervention (like previous stirring of liquids).



Sometimes I have to excuse for simple examples, sometimes for confusing presentations. This animation for example is rather heavy, because too hard for our visual sense (even showing only two pictures each second). The animation shows left side an area and at the beginning ten red particles are spread randomly. Right area shows correspondingly ten blue particles. Each particle starts moving into arbitrary direction. The animation shows the ´flight-traffic´ by twelve steps and each track moved is marked by lines.

One must really concentrate to detect the wandering of particles. The process is much easier to realize by follow of still frames. Picture 05.01.07 thus shows four phases of the motion process, picture 05.01.08 shows four (other) phases with each position of red and blue particles.

05.01.07



Even this ´airspace is absolutely overcrowded´, first particles reach the other end already after few ´moves´ (at this example after eight). The mixture is completed after short time (here e.g. red and blue particles are spread likely within both halves after twelve moves). Never ever particles will be divided like at the beginning.

No equal Spreading

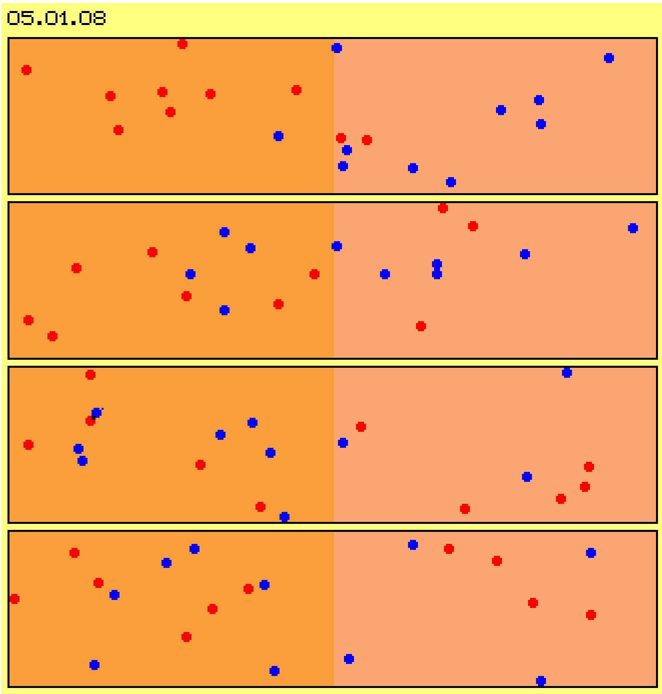
The process of merging not only occurs at the border of both areas, but some particles ´fall´ into randomly free spaces far ahead. Remarkable is, the particles are not spread equal at that face, but ´clusters´ come up all times, however with changing members and steady changing structures. Likely remarkable are ´bubbles of total void´ coming up correspondingly, which naturally are not steady and not resting stationary.

In spite of an equal spreading by a total view, thus at every moment exist structures in shape of accumulations of particles and corresponding empty areas. Each structure however is dynamic, i.e. existing only intermediately and of varying shape. Opposite to generally known stabile structures of solid bodies (e.g. previous engine), these structures are changing and transient, nevertheless permanently existing.

The motion directions at the very beginning were arranged randomly (´chaotic´), however this chaos does not last long time. Very conspicuous are situations where some particles move rather parallel, even narrow aside each other. So locally much ´kinetic energy´ is assembled, even with likely structured movements.

Just at these areas of ´well ordered motions´ the particles are crowded and thus building an area of increased ´density´ (and correspondingly other areas intermediately show much less density).

We know well, the particles of solid bodies show a compact order, e.g. arranged by grid-structures. We also know, particles of liquids are near next by relative constant distances (even at liquids already clusters are dominant). We know gases behave ´chaotic´ because particles fly confusing all around and collide all times into all directions. Nevertheless our imagination of chaos is much too ´rigid´.



We know for example, the pressure within a gas is ´omnipresent´, so we assume regular hits of particles onto all walls. Thus we assume same time, the particles are equal spread within the space. That´s correct in total, however formula of thermodynamics represent only summary results - like probability calculus presents final result of frequencies (at dice- or roulette-game or any other process controlled by coincidence).

The essential characteristic of coincidence and chaos however is, an equal spreading is never present, so in gases the distances between particles are never likely and the directions of movements are not totally different but likely at some areas. Opposite, based on coincidence and chaos it´s inevitable, an imbalance exists continuously, concerning momentary spreading of the particle positions like their movement directions. Only in total view might result the apparent state of ´average´ occurrences.

In reality, the chaos and coincidence are characterized by dynamic structures. Well, we are handling ´stabile structures of solid particles´ day-in day-out and thus we do hard with structures of permanent changes (see confusing animation upside). Nevertheless these motions structures are as real as ´solid bodies´, even they come up at changing locations and by changing shapes.

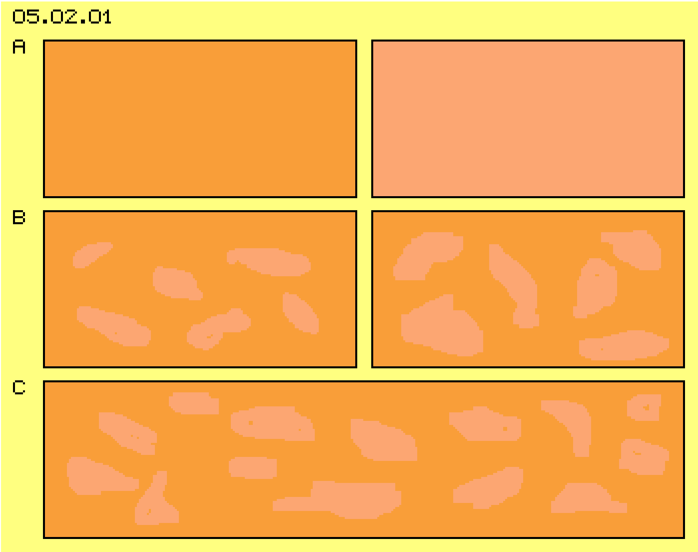
Factor of Order
Admitted: these examples show a little bit too much order - because the narrow walls work as ´factor of order´. The particles are reflected at these walls like mutually by other particles, however not anywhere in space but exactly at this straight line along the walls. In principle however, also gases not limited by solid borders show uneven spreading, thus different space between particles and accordingly momentary preferred directions of motions (and a view into the universe is a convincing example).

The ´First principles of thermodynamics´ however tell, all processes show losses, lastly by heat, this minor energy produces entropy, so the universe will die heat-death and before that event won´t exist any chance for perpetuum mobile. That entropy does not exist, neither within the universe nor within the ´closed system´ of any gas-tank. Admitted, it´s hard to handle these changing structures or even to use the kinetic energy inherent of gases. Previous hint concerning the ordering function of the tank-walls for example points to some possibilities (like discussed at later chapters).

Evert / 10.10.2006

05.02. Three Times Suction-Effect

Bubbles within Nothing
At previous chapter was discussed how gases can be merged. Now shall be discussed how gases of different density mix up. At picture 05.02.01 at A an area of relative high density (red) is shown left side, and right side an area (of same gas) with less density (light red) is drawn.



We know by previous considerations, particles of gases are not spread equally but inevitable come up ´bubbles of nothing´ on and on. At this picture at B some of these bubbles (light red) schematic are marked. Naturally these particle-free areas are larger if less particles exist within an area (here sketched by wider bubbles right side).

At this picture at C now the wall between both areas is taken off. Particles of previous dense area by majority now fall into areas less dense. In principle comes up a migration movement from high to less density. Short time later anywhere exists likely density - in general - while really still exist areas of most different presence of particles, in steady changing shapes.

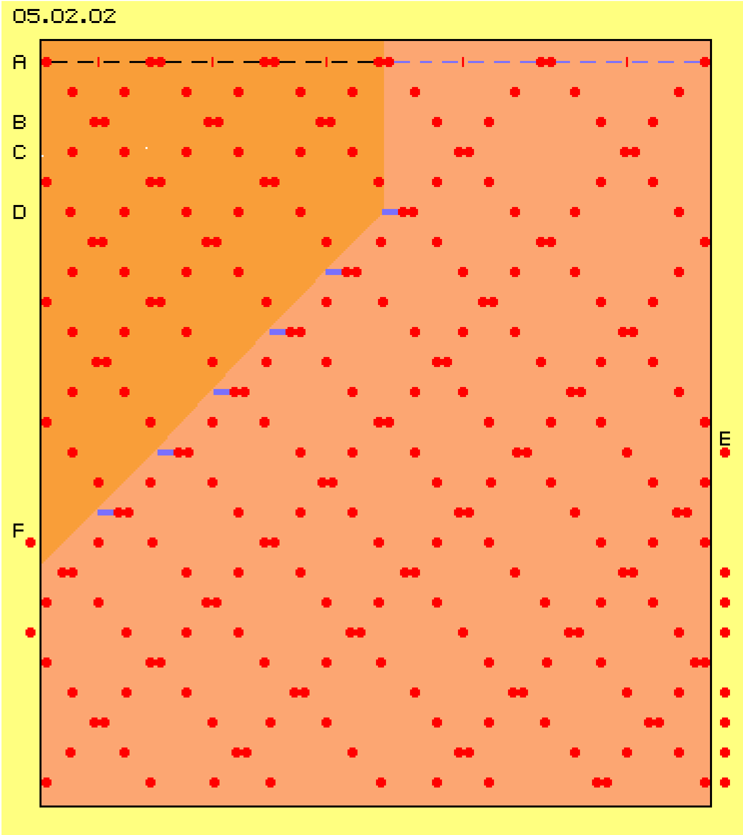
Flows in Bundles
Naturally this process of balancing the densities - and thus also the pressures - between two areas is well known and calculable by formula. However I want to point out, that balance-process occurs not only at the borderline, not only by single atoms there, but all times real ´bundles´ of particles fall into ´empty spaces´ by relative close configurations.

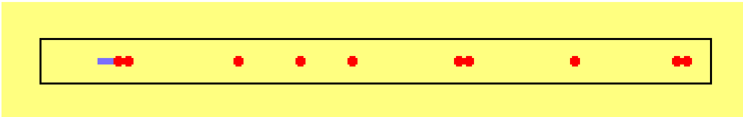
In addition I want to point out, these suction-areas not at all affect any ´attracting force´. They only allow particles, occasionally pushed into that direction, to fly longer distances until next collision. As they fly off their previous position relative long, they can come back only some later. Meanwhile an other particle, again hit into likely direction, can follow at likely track, so momentary come up flows of likely directions.

Back-affecting Suction
In general, gas particles move chaotic into any directions. At the start of previous chapter, movements schematic were reduced to horizontal and vertical directions. Now here the density-compensation theoretic occurs from left to right side, so at picture 05.02.02 the movements are drawn only into horizontal directions.

At dense area left side the distances between collisions are assumed two steps long (black lines). At the area less dense, right side, these distances are three steps long (blue lines). At the beginning, six particles (red points) are positioned at the dense area (red) and only four particles at the area less dense (light red).

At first row A the starting situation is drawn. Each one particle is positioned at walls left and right side. Between, each two particles momentary collide (after four black steps left resp. six blue steps right side). At second row the particles are drawn after each one step- resp. time-unit.





Starting from situation marked at A, the particles flow off each other resp. off the walls. They collide after two units (at row B) already within the dense area, however finally after three units (at row C) within the area less dense.

The particle left side of the border between both areas (at row D) now can fly one unit further right side (marked by thick blue line) until colliding next time. After each two further steps, next particles at new border can move further towards right into relative empty spaces. So it takes only short time, all particles move towards right side - respective opposite, the previous dense area becomes ´empty´.

At E the first particle finally leaves the area towards right side, at F a new particle comes into the area observed from left side. So it´s (realistic) assumed, areas of high and less densities reach far out towards left and right side. However already this local section and simple drawing clearly show, a ´suction area´ affects backwards into the area of higher density resp. low density wanders into neighbouring area of higher density. Suction does not pull particles towards itself - but the suction-area moves into the area of higher density – like the animation obviously shows.

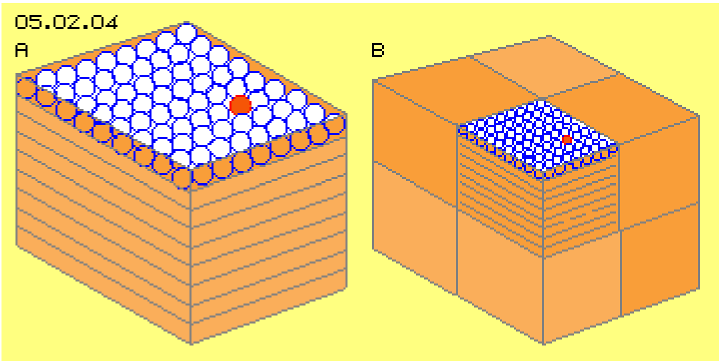
Naturally also these facts are known (more or less), even strict consequences often are not drawn off. Here this process is demonstrated only by some few particles. Naturally this process analogous runs concerning previous ´bubbles´: these relative empty areas wander into areas of originally higher density. All particles wander from high to low density - and local areas of relative emptiness wander, in opposite direction, into areas of higher density.

Emptiness of Gases

At previous picture with its motions only in horizontal directions, collision occur only by given rhythm, also because starting with schematic spread and equally positioned particles. I want to show once more an example which demonstrates the emptiness of gases and inevitably existing ´bubbles of nothing´.

At picture 05.02.04 at A is sketched a box with some 50 cm long edges, containing glass balls at nine layers with each nine rows. These 729 balls are transparent (here marked blue) and only one is visible (here marked red). This is nearby the relation of water molecules in liquid shape (all places of the box are occupied) to water steam (where the gas takes the whole volume, however only one place is occupied).

Only one layer (marked dark) is occupied while the resting eight layers (marked light red) are empty. At B this cube is drawn once more by smaller scale and seven likely boxes in addition (so total volume would be one cubic meter). In average each box should take one red ball, which would correspond to theoretic equal spreading. In reality however this would be an extreme exceptional case.

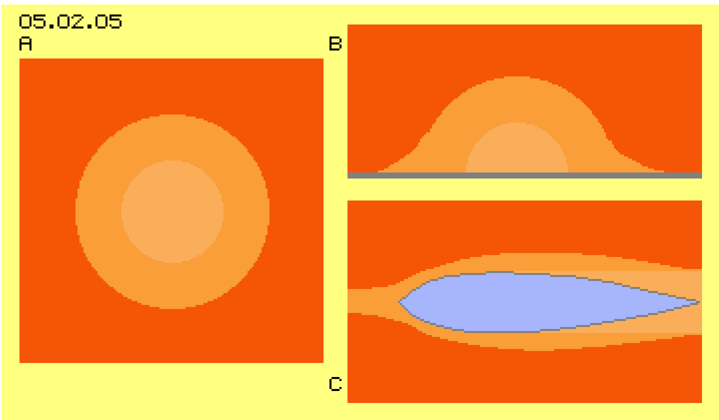


Spreading by pure chance most probably would result, within one box are placed two balls and at an other box even three balls. Same time thus three boxes (marked light red) will be totally empty. And again, most probable at least two empty boxes are positioned aside each other. Even within most wider volumes with corresponding much more occupied positions, inevitably are wide ´empty bubbles´ within.

If for example previous boxes are arranged by nine into all three dimensions (in total 729 boxes) and within that volume 729 balls are positioned totally by random, most exact would remain 243 boxes without any ball within (known as ´2/3-law´ of probability calculus, e.g. at Roulette). No matter how wide an area is assumed, by previous suction-effect particles of relative dense areas fall into areas of nearby now particles, not one by one but by large bundles of particles as common flows.

Order by Walls

At picture 05.02.05 at A schematic is shown an area of low density (light red) and surrounding area of high density (dark red). Particles fall into the relative empty area, by parts also through that area. Opposite, the area of low density (light red) expands radial.



At this picture at B a relative empty area is positioned aside of a wall (grey line below). The particles fall into that empty space, also towards the wall and are rejected. This happens also at area already thinned out (light red) alongside of the wall. At these cases, rejected particles leave behind some free space, into which however (from side of the wall) no other particles follow. So that empty area indeed is filled up rather slowly. At the other hand, these free rooms of thin density alongside a wall allow relative constant flows (suction alongside walls ´pulls´ stronger) and opposite, thin areas spread much wider along walls.

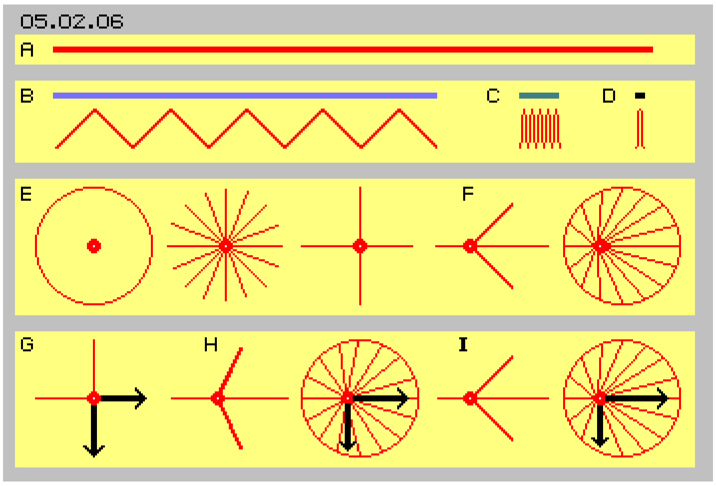
At this picture at C well known example of this effect is shown: a ´flow-conform´ shaped body (blue). This body can be stationary within a flow or can move through stationary fluid. At any case this body displaces fluid at its most wide diameter and further back comes up an area of relative less density (marked light).

This area is filled up and same time renewed again. The area of relative emptiness wanders through space (when the body is moving) or wanders relative to the flow (if the body is stationary), so contrary to flight- or flow- direction. As mentioned upside, the area of low density (light red) spreads alongside the walls of the body, finally reaching far ahead of the ´nose´. Small resistance of flow-conform bodies is based on these effects, as in front of the body autonomously and steady comes up relative emptiness and alongside the walls exists relative likely flow.

The suction area at the rear end does not affect by ´attraction´, however allows particles to fall into that area (by their molecular speed), not only at the end of the body, but already much far at front within that area thinned off - a well known process. The speed of flows alongside walls is faster than further outside. Such differences of speeds produce special results – a second shape of suction-effect, discussed at the following.

Speed
The speed of sound is common for us, e.g. when counting the seconds between flash and thunder, calculating three seconds per kilometer. The particles of the air however move much faster, need only two seconds per kilometer. At picture 05.02.06 diverse speeds are shown schematic.

The red line at A represents the molecular speed of air, somewhere in the region of 500 m/s respective 1.500 km/h. The length of the blue line at B represents the speed of sound with some 300 m/s resp. 1.000 km/h. The red zigzag-line shows, the sound won´t move straight ahead but wanders ahead by ´deviations´.



A storm or hurricane are called wind-speeds which are only one tenth of, e.g. 30 m/s or 100 km/h (grey line at C). The particles of air move at tracks much longer, into diverse directions, much more all over the place than moving forward. Even once more longer are the deviations at technical applications of gases, as their speeds mostly are some few m/s or km/h (black line at D).

Potential Movements
At this picture at E a resting particle (red point) is drawn. After a collision and after one time-unit it will be positioned somewhere at the circle sketched. Aside of, some of possible tracks radial are drawn. At previous considerations were observed only the movements showing into horizontal and vertical directions.

If now all particles and their molecular movements are overlaid by a general forward-movement (here from left to right side), corresponding figures at F are representative. By total view, the back-showing movements are shorter and the movements into direction of flow are longer. The movement into cross directions now show some ahead. All potential positions after a collision (at this circle) are shifted little bit ahead. Here however this shifting is overdrawn, would correspond to sound-fast hurricane (which only local might achieve the maximum speeds nearby 300 km/h).

Static / dynamic Pressure
At this picture at G schematic is sketched (by black arrows), at ´resting´ gases exists ´static´ pressure likely towards all sides (e.g. measured when the particles are rejected at the face of a pressure-sensor.) At H is sketched a particle generally moving to right side, so its sideward motions no longer hit right angles at the wall, so cross to the general direction of the flow, now exists only a reduced ´static pressure´. Corresponding stronger is the ´dynamic pressure´ into flow-direction (marked by arrows of different lengths at H).

The faster the general movement ahead, the more directions sideward are shifted to directions ahead and correspondingly the static pressure merges into dynamic pressure. At this picture at I previous extreme fast movement is drawn once more with its very reduced static pressure and most strong dynamic pressure. These relations of pressures mainly are discussed and calculated by formula of fluid-sciences. However I am more interested in real movement processes and its representative motion pattern, e.g. if flows of different speeds run aside each other.

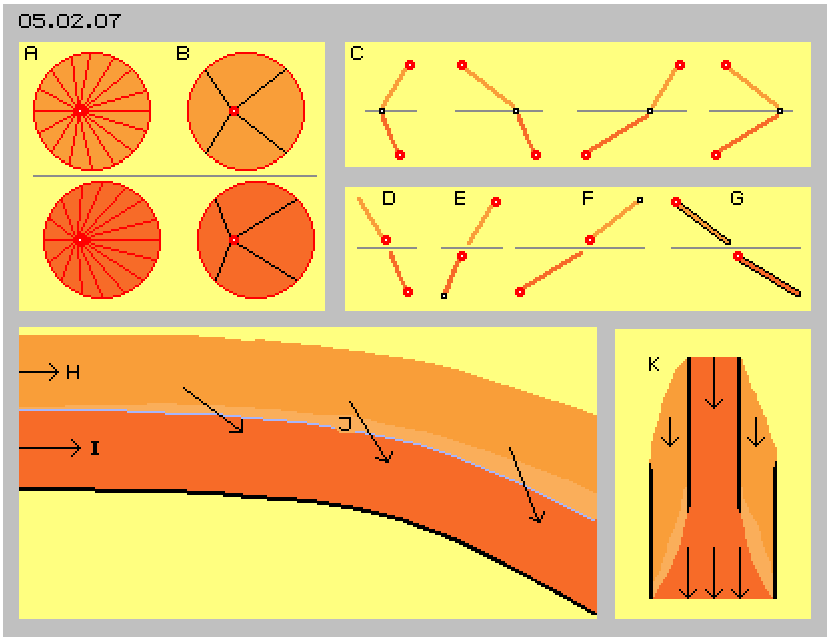
Diagonal Interactions
At picture 05.02.07 at A, previous schematic figures of potential movement directions are shown once more, upside of a slow flow (light red) and below of a fast flow (dark red). At previous discussions, horizontal and vertical movements were taken as representative for processes. Likely representative are motions into diagonal directions (thus each showing 45 degree to horizontal or vertical directions). If the molecular movements are overlaid by a general flow, these diagonals are shifted correspondingly forward, like sketched at B, again for the slow (upside) and the fast flow (below). These particles with these potential tracks of motions thus are representative as movement-types resp. -pattern for flows of different speeds. So these potential ways are representative for ´average´ movements of both flows.

At C schematic are drawn four collisions (at the black points), which typically are resulting from previous diagonal movements at the border (grey line) between both flows. Like at any collision, both particles exchange directions and speeds. This corresponds to previous processes by normal conditions of resting gases or e.g. if gases are mixed. Here practically comes up a mixture of movement compounds of flows running by different speeds.

These four typical collisions at C occur as both particles move towards each other. At row below now are sketched four other meeting situations, where both particles move into likely directions. The particles schematic are drawn upside and below of the theoretic border line, so no collisions really would occur. In reality however both movement-types are mixed up within a border area (by previous types of collisions), so these typical ways of involved particles really will cross mutually.

Collision at likely Directions
At D both ways show back-upward, so counter the general flow direction, and towards the slower flow. The below way is shorter, so the particle of the fast flow will run only behind the particle of the slow flow, without compelling collision. At the other hand, both particles fly ´against the current´ and thus they are soon pushed ahead, both again into likely directions.

At E also both ways show backward, now however down towards the faster flow. Again the below way is shorter, so well could be ´rammed´ by upside particle (at the by black point marked below). Practically occurs a ´rear-end collision´ and the particle of faster flow is pushed back faster. Both particles still are moving against the general current, so resulting delay of fast flow resp. pushing it back-downward.



At F opposite case is sketched as both ways show ahead-upward. The below particle flies faster and hits the upper particle rear-end. Both particles go on flying into these directions and thus the slow flow becomess accelerated forward-up resp. the faster flow extents into the slower flow.

After collisions more or less frontal, the particles fly still at ´chaotic´ ways. Here however, at these collisions by similar directions with these rear-end collisions, the particles still fly nearby each other and commonly into likely directions. So besides areas of total mix-up with motions cross and fro, inevitably come up areas with real crowds of particles flying in shape of dense flows well ordered.

Without or delayed Return
Decisive effect between neighbouring flows of different speeds however is the movement pattern shown at G (marked by black lines). Both particles fly ahead-downward, so into the general direction and towards the faster flow. The upside particle moves slower than the downside particle, won´t catch up but will fly further on behind. Thus a new particle is integrated into the faster flow, without any resistance.

Within the fast flow, backward showing movements are more rare, less collisions occur and particles are less thrown back. So the new particle will never come back into the slow flow or only with some delay. This particle becomes missing as partner for collisions at its original area. Next particle of slow flow, randomly hit into likely direction, can follow unhindered the way of previous particle or at least the position of next collision is shifted ahead-downside.

These movements correspond in total to the processes of suction areas (like discussed upside at picture 05.02.02). Also within faster flows naturally exist previous ´bubbles of relative emptiness´ (like discussed at picture 05.02.01), into which crowds of particles fall at likely tracks. These ´new´ particles hit rarely frontal towards ´old´ particles and thus are rarely pushed back against the general flow. Much more collisions there occur ´rear-end´, so many particles fly nearby next into common direction ahead.

Bending towards faster Flow
That´s the reason and process of well known effect: neighbouring ´strings of flows´ all times are bended towards the faster flow. At picture 05.02.07 is sketched a slow flow (H) besides a faster flow (I) and diagonal arrows mark the way of previous diagonal movements. These ´new´ parts leave ´emptiness´ behind, marked as light area (J).

The faster flow affects like suction towards the neighbouring slower flow. However, there are no particles ´pulled in´, but ´voluntary´ only these particles enter the fast flow, when pushed randomly into fitting directions. However not only that bending comes up but also previous existing ´empty bubbles´ are filled up (and that flow now really shows higher density). New particles fly with molecular speed into the gaps, diagonal forward, so that speed becomes a part of the existing (average) speed of the fast flow. All particles all times fly by molecular speed, now however more particles fly in better order forward, so the flow indeed becomes accelerated.

A faster flow thus affects like suction, integrates neighbouring particles, into direction diagonal-ahead, resulting increasing density with a better structured order and the flow is accelerated. These processes can work at its best if flows run alongside bended wall (marked as black curve).

Water-Jet-Pump
Analogue respective based on these effects, functions any water-jet-pump, like schematic shown at picture 05.02.07 at K and which works naturally also with a gaseous medium. The pump-performance comes up without corresponding input of energy, because the pump must not ´pull and drag´ particles inside, not possible at all when pumping gases. These pumps really are a ´perpetuum mobile´ that kind, energetic higher level (increased throughput) is achieved without ´energy-consumption´.

At these processes occurs no energy-transformation at all (and thus considerations concerning energy-constant are totally irrelevant). The only process is, the vectors of molecular movements are structured into likely directions, naturally never completely, but only to a higher level of order is ´organized´. That ´organizing-work´ mostly needs few efforts or even null energy - e.g. because every bended wall already will do.

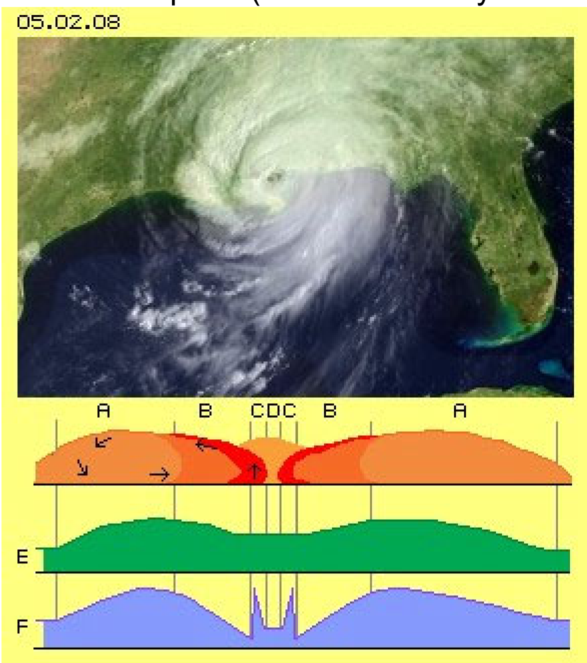
Driving Hurricanes
Previous ´motion-types´ at the border of flows with different speeds are theoretic movement-pattern, useful for explaning the ´incredible´ suction-effects and autonomous self-acceleration - as really every whirlwind obviously demonstrates. Starting affect of tropic whirlwinds is the evaporation of water (contradicting laws of thermodynamics as potential-differences come up autonomously, reducing entropy). The water steam is more light than the air, so lift results (interesting effect because autonomously comes up a force with vector contrary to the vector of original gravity).

The starting affect of the whirlwind-rotation is the turning of the earth resp. the ´Coriolis-Force´ (which is no independent force but only an effect of inertia).

As common sciences allow no possibilities for Perpetuum Mobile nor ´self-acceleration´, the obvious acceleration of the rotating vortex is explained by transformation of heat- into kinetic-energy. Some other explanations state, the static pressure of the environment is transformed into the dynamic energy of flow. This might be right in general, at the other hand sciences know well, any different pressures immediately are balanced (like described upside at picture 05.02.01) and the process is finished when the pressures got equal. So that continuous acceleration is not to explain only by these common ideas.

The real process exclusively is based on the ´suction-effect´ of a faster flow at slower movements within the environment, like describes upside at picture 05.02.07. By pure chance, particles of environment with fitting vectors fall into faster flow without resistance, leaving ´emptiness´ at their place of origin, so a continuous process comes up. There occurs only a steady selection of movement vectors. Within the ordered flow more particles can move rather dense into the general direction. The integration of new particles accelerates the speed and density of the general flow.

One must be conscious about the relations: the air weights just nothing, however becomes ´remarkable´ when moving by hurricane speeds. The movements of the particles by themselves however are ten times faster. Even resting air is full of energy, however without ´external effect´. If however only a small parts of originally chaotic movements are ´ordered likely´, an enormous force with ´external affect´ results - without any change concerning the molecular speed (thus without any ´heat´ being involved).



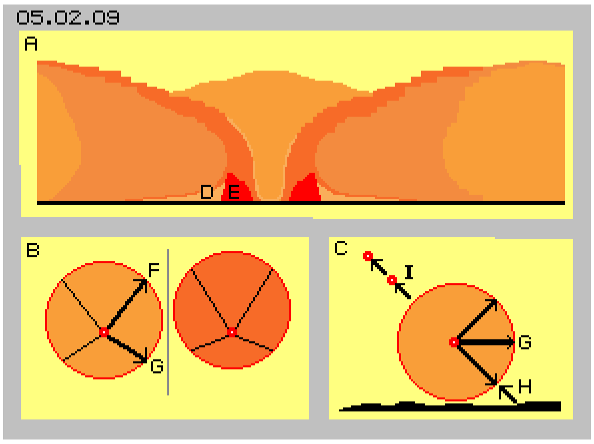
Motion and Pressure
Picture 05.02.08 upside shows a typical hurricane. Below is drawn schematic a cross-sectional view, which shows the known movements of air (see black arrows). The central eye (D, marked light) is some 10 to 40 km wide, the air flows downward, nice clear weather and nearby no winds exist at the ground of this eye. Within a ring (C) at the border of the eye, the air moves upwards vehemently and upside it flows outward (marked dark red). At this area (B, marked red) exist a heavy cloud cover and strong rains.

The vortex system reaches far out much wider (A, marked light red), where the air moves outward and down, so clear and nice weather exists. Alongside the ground, the air masses move back to the centre, by increasing tangential directions

At E schematic is shown the air-pressure at half level of the whirlwind (green graph). This atmospheric pressure corresponds nearby to the weight of remaining air masses upside. Where the air is piled up to most height (between B and A), also the most high pressure is measured.

Totally other results show the measures of pressure near the ground, like marked schematic at F (blue graph). At outer area (A) the pressure increases towards inside, corresponding to downward-movement of air masses there. Further inward (B) the pressure decreases continuously, because there the winds run increasing faster towards the centre (the static pressure is reduced and corresponding dynamic pressure of flow increases).

Pressure and Density
Phenomenal is the sudden rise of static pressure at the area of lift (C), however only downside near the ground. Towards upside and towards the centre, the pressure decreases again to much lower level. This area of exorbitant pressure however is no ´atmospheric pressure´ (weight of air masses plus / minus lifting / falling movements of air) like at ´normal´ low- or high-pressure areas, but it´s a result of the high density at this ring-shaped area.



At picture 05.02.09 at A once more this centre of a whirlwind is sketched by some larger scale. Two areas are accentuated: that area of high density (E, dark red) and an area of relative emptiness (D, light) outside of, both at downside region of the whirlwind.

Winds never are total steady flows but a compound of single gusts, where air locally shows most different density and speeds. That´s a macroscopic appearance corresponding to previous discussed ´empty bubbles´ resp. crowd-wise motions of particles of gases. Into these ´bubbles´ fall gusts, fill up previous areas of low density, the air masses collide and are rejected into other directions.

Within free space, gusts can fall into such empty rooms from all sides. Each gust leaves free space behind, into which the next gust will fall again. If however a gust of wind hits onto the ground, the air is rejected upward - but no other air masses follow from the ground. So again relative empty areas (D) remain. These suction areas near the ground mainly are filled up only from outer areas of the whirlwind. That´s why most heavy storms run along the ground into radial resp. lastly tangential directions.

Order by Walls
Actually one should expect, the radial flow-component should reach totally into the centre and should not stop at the border of eye. Most explorers reason, the rotating air masses move outward based on centrifugal forces (lastly inertia) respective and are not compressible further on (however centrifugal forces would affect already quite outside against any centripetal motion).

Realiter, all particles of air fly chaotic and all times only until next collision. The air as a whole, all times is moving into that direction, where the particles can fly most long distances without ´harmful´ collisions (against general flow direction). Inertia is only involved as the particles move straight ahead and by constant speed between collisions. Inertia of air masses in total - does not exist (and that´s really true).

At this picture at B schematic movement-types of previous picture 05.02.07 are shown once more, by view top-down at the flow. Left side of the theoretic border (grey line) is drawn a particle of slow (light red) and right side a particle of faster flow (dark red). The motion forward-inward (F) of the ´slow´ particle in principle affects the acceleration of the faster flow. The motion into direction back-inward (G) pushes the faster flow together, thus increases its density.

At this picture at C is shown a vertical sectional view through the flow, where one particle is positioned near the ground (black). Previous pressure (G) into direction towards the centre naturally affects not only in horizontal direction, but also diagonal some upward resp. downward (marked by arrows). The downward showing movements are rejected by the uneven ground, so this particle later on flies upward-outward (marked by arrow H). At this area now most ´empty bubbles´ are filled up, so this backward motion will produce collisions (I) by high frequencies. That´s why the radial-inward motions are stopped, building that border of the eye.

Again one should be conscious, even at these enormous fast winds of that region, the particles move nine steps cross and to and fro and up and down - before coming ahead one step into the general direction of the flow. Within these confusing movements, the centripetal motions are stopped and lots of particles whirr around nearby each other - and that´s measured as the exorbitant high pressure at that small ring around the eye. That pressure can only un-stress if the particles escape upwards. So these particle masses of high density really ´explode´ straight up.

Tornado

At the bottom of a hurricane comes up a ring-shaped ´bolt´ of most dense air. The rough ground works as ´ordering-factor´ (like previous mentioned wall), here lastly as a decelerating element. The building up of an eye and a barrier around however is not compelling - if the vortex system can rotate free from the ground.

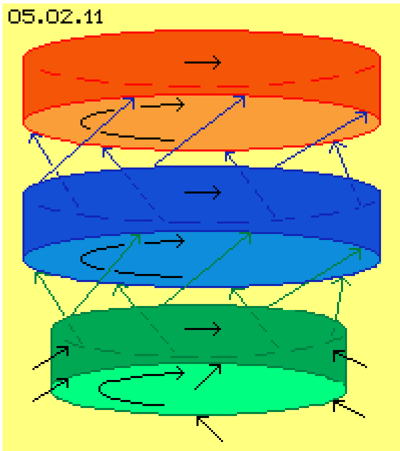
The counterparts of hurricanes are tornados, five examples of are shown at picture 05.02.10. The tornado left side is build out in total, its ´hose respective its trunk´

reaches from the thundercloud down to the water surface. Naturally that hose is only the visible part of that vortex and around it, also air is moving into centripetal like tangential directions.

At the other hand, whirlwind-hoses can show diameters of only some meters, however can be long by kilometers. At downside end of the trunk come up enormous forces, strong enough to lift even heavy parts hundreds of meters up and away. Here for example, the trunk ´sucks´ water upward. Also clear to observe is previous ´explosion´ near and some upside of the water surface. Thus as long as no ´wall´ involves the vortex system, no barrier comes up but a compact vortex exists practically without any eye. Only at the ground resp. the water surface, the dense air of that area scatters into all directions.

Opposite to hurricanes, tornados start by local turning motions within thunderclouds. Afterwards they grow down from the cloud, like pictures right side show most impressive. Water steam, heat differences and corresponding turbulences within the thundercloud well are the trigger for these appearances. At the other hand, such tornados are build out spontaneous also from ´dry´ air movements. The growing and self-acceleration of these vortex systems again is based exclusively on ´suction of fast flows´.

Suction in Slices



Tornados start all times from turning motions, which can come up by pure random. Upside and around a first kernel mostly exist many turbulent movements, so no continuous influx into the vortex is possible. Only from relative calm air layers below of the cloud, an acceleration effect can come up.

At picture 05.02.11 that starting rotation schematic is shown as a turning red disk. The air below is sketched as a blue disk. That second disk could rest at the beginning, nevertheless particles by pure chance could ´escape´ diagonal upward into the turning red disk (marked by blue arrows). The following process is totally analogue to the process described by previous flows of different speeds. Into the new turning layer of air (blue disk), again air below is ´sucked in´, all times upward and in turning sense (marked by green disk and arrows).

Towards the growing hose now also air aside affects with its static pressure, thus compressing the hose radial and same time accelerating diagonal (see black arrows). This schematic drawing explains theoretic that growing and self-acceleration of the vortex-pattern, previous pictures demonstrate obviously the real movements like the development of the system.

In principle just the same effect affects like described upsides as ´suction of fast flow´. Here however these ´flow-strings´ of different speeds are arranged downside of each other. These flow-strings are closed rings resp. based on the general upward-movement, spiral tracks are moving upward.

So these tornados are rather similar to previous hurricanes, however they show also some special properties - and that´s why I call these vortex-systems the ´third kind of suction-effect´.

Continuous acceleration with lastly enormous forces is a result of the fact, differences of speeds exist within the whole volume of a vortex system, from each tiny flow-string to the neighbouring string. Anywhere particles fall randomly into directions, from which they never come back or come back only with delay, so anywhere their molecular movements with fitting vectors become a part of general flow. There is no ´external accelerating force´. The self-acceleration comes from the total volume of that vortex system. These self-organizing systems grow and ´live´ from their inner structure (as long as not influenced from outside and the system lastly collapses).

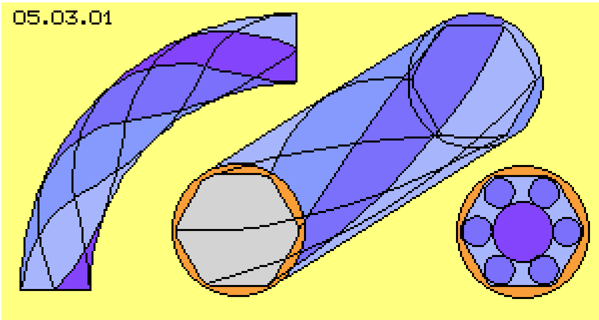
One last time: there are no energy transformations involved like at common technologies (and which thus are bound to energy-constant). No energy-surplus is achieved (however these ordered flows well are used by some techniques and could be used much better). The only process is, the vectors of given movements are ordered some more likely. These actions occur autonomous - because not all collisions produce movements spread equal into all directions, but at these flow-systems many collisions occur in similar directions and thus are less ´harmful´ for the general flow.

Evert / 2006-10-30

05.03. Potential-Twist-Pipe

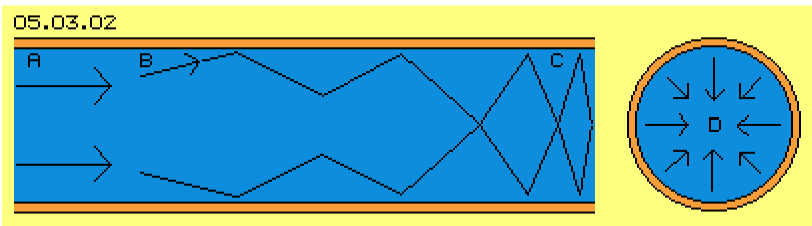
Round-Edge-Pipe
At previous chapters was stated, a wall well has effects onto flows, e.g. based on friction at the ground at previous hurricane. This becomes especially obvious when fluid is pushed through pipes. At the beginning well can exist ´laminar flows´, however short distance later come up vortices alongside the wall. These turbulent flows result resistance and it depends only on the relation of diameter and length until any pipe system becomes self-closing. It makes no sense to increase the pressure because resistance increases disproportionately.

Viktor Schauberger claimed on and on to prefer suction instead of pressure, e.g. to suck fluid through pipes. Increased suction produces less resistance, so previous self-closing never comes up. Schauberger experimented with diverse shapes of pipes, e.g. with twisted pipes and egg-shaped cross-sectional surfaces. However his pipes are hard to produce, so I searched for simpler solutions. These pipes show reduced resistance even if the throughput is done by pressure.



Some years ago at my first Fluid-Technology, I made the proposal of a Potential-Twist-Pipe like schematic shown at picture 05.03.01. The cross-sectional view shows a polygon with rounded edges. Within these edges come up side flows in shape of rotating cylinders, so the central main stream runs at ´roller-bearings´ without friction at the wall. The fluid may not flow only longitudinal through the pipe but with twist, by which these ´rollers´ are build up. In order to keep up the twist, the whole pipe is twisted. Especially necessary is a twist-flow within pipe-bends, because only by this measurement all tracks show same lengths (to avoid the enormous friction losses of common pipe-bends).

Twist-flow within pipes not only reduces the resistance, but also less sediments settle within the pipes, water remains ´alive´ or emulsions keep more homogenous. I had ´enormous demands´ for these pipe systems, however I am no businessman and can deliver only some ideas. Some companies took that idea and for example improved remarkably the efficiency of heat-changers.



Self-blocking System
At picture 05.03.02 schematic is shown the reason of the resistance, left side by longitudinal and right side by cross-sectional view through a pipe (red). A fluid (blue) at the beginning flows parallel (A) to the wall, nevertheless already here some movement components (B) show into direction more or less towards the wall. These movements are not simply rejected by likely angle, but based on roughness of the material are rejected increasingly towards the centre. So a ´barrier´ (C) comes up, (analogue to the dense barrier around the eye of hurricanes of previous chapter).

The problem here is, all pressures affected by the round wall of the pipe show radial and meet at the centre, like sketched by black arrows at the cross-sectional view (D). These pressures again reject mutually into radial directions, so the movements mostly are running cross to the pipes axis, a ´dense plug´ hindering further throughput lastly in total. The theoretic formula of resistance are known and really approved often. However the existing problems of transporting fluids through pipes still demands enormous energies and costs.

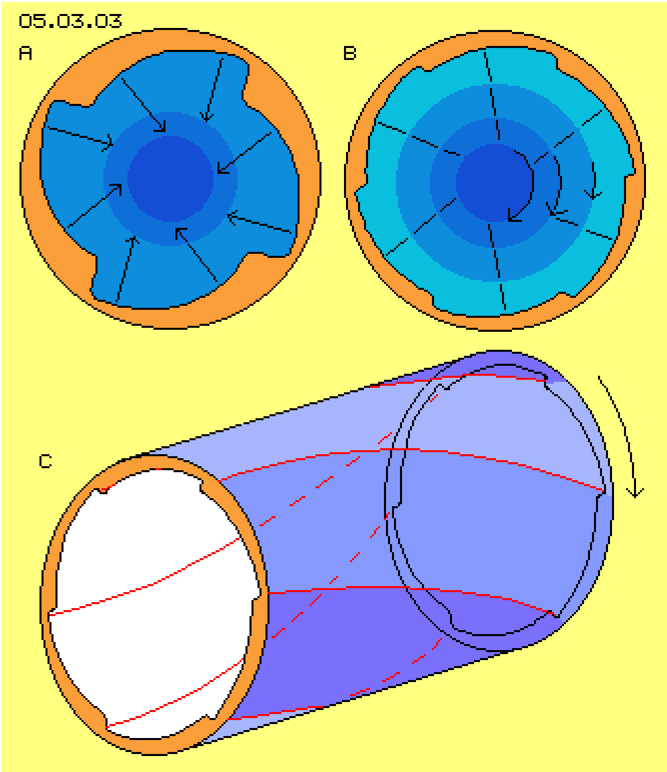
Segment-Pipe
Previous Potentialtwistpipes might reduce that problem, obviously however this solution was not reasonable or simple enough. That´s why I offered a new proposal which concerns the ´core-problem´ and thus could be accepted easier.

At picture 05.03.03 at A is drawn a cross-sectional view of a pipe and its wall is build by four segments. Each segment is nearby one quarter of a circle, however the four circle-centres are is not identical with the centre of the pipe. One end of each segment is shifted a little bit towards the pipe-centre. The differences are bridged by S-shaped parts of the wall.

Naturally the fluid is rejected off the walls into any directions, in total however perpendicular to the wall. These motions- resp. pressures-directions here are marked by arrows. It´s logic now these pressure-directions no longer meet at the pipe-centre (like at previous picture at D), but are affecting ´tangential´ around the centre.

So the particles of the fluid no longer collide frontal within the narrow central space, but the particles in principle ´escape´ mutually at circled tracks. Prevailingly thus results the situation of ´rear-end-collisions´ of previous chapter. The central area (dark blue) like its environment (blue more light) thus becomes turning.

Potential Vortex
At this picture at B a corresponding cross-section of the pipe is drawn, for example now with six segments. The pressures affected from the segments, each right angle to the surfaces, are marked by dotted lines. The pressures are not radial directed but some more tangential. The ring- respective cylinder-shaped fluid layers further inside (each marked by darker blue) thus are driving a twist-flow. The pressure-lines further inside meet that kind, the fluid can ´escape´ only by faster turning movement.



At previous discussed motion processes of hurricanes or tornados was stated, a central nucleus of rotation exists at the beginning, which becomes accelerated by the slower moving environment. Here however, the flow into longitudinal direction of the pipe, at first produces a pressure from outside towards the centre. Finally by that ordered environment pressure (diagonal inward) lastly results that advantageous potential vortex.

At a normal resp. ´rigid vortex´ the particles move at different radius however all times by same angle-speed. Opposite, at potential-vortices the particles inside move faster than particles more outside, like marked at B by arrows of different lengths. Thus only the potential-vortices have internal differences of speeds which are the prerequisite for previous ´suction-effect of fast flows´.

The vortex within the segment-pipe thus is initiated from outside (resp. the wall), nevertheless becomes self-accelerating. That vortex ´pulls´ particles towards the centre, i.e. inside of that vortex not only exists faster speed but also higher density. Opposite, thus near the wall exists less density and thus less resistance by friction comes up. Again it´s to observe, the ´energy-growth´ at the centre needs no external energy input. Only the skilful shape of wall, working purely passive by just normal rejections, results that self-organizing system.

Twisted Pipe
The segment surfaces, some inclined, have a positive effect without any doubt as they result the wanted twisted flow in shape of a potential vortex. Disadvantageous however are the S-shaped bridge-parts between the segments. Naturally also at their surfaces exists rejection, which represents a flow component cross to twist motion.

That reflection however is not absolutely harmful because the twist-flow is not only circling but also a longitudinal motion. The particles thus hit onto these surfaces by angles into diagonal directions. At the other hand these angles would be more flat, if the pipe as a whole is twisted, like schematic shown at this picture at C.

Based on the inclined segments, this example shows a twist flow clock-wise. Into same sense of turning, the pipe could be ´screwed´ as a whole, so these bridge-parts no longer show parallel to the longitudinal axis but some diagonal. It depends on each application of that pipe system, which ´twist-angle´ shows the best results.

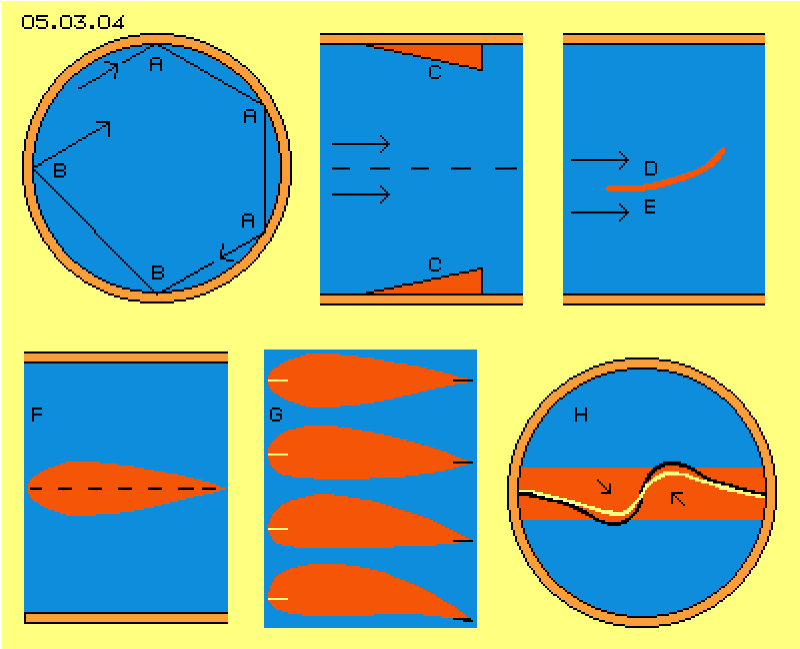
Advantageous Twist-Flow
At picture 05.03.04 upside left is shown cross-sectional view of round pipe, within which twist flow exists (again clock-wise). Fluid flows around at circles, inside free and outside along wall. Anywhere exist also motion components into direction towards wall, for example by angle shown at A. This motion is rejected and is not harmful as particles all times fly back into general direction of twist.

Upside was assumed (perfectly justified) rejection won´t occur mirrored but particles fly back more steep. These situations schematic are sketched at B. Also this result is not bad but advantageous. There comes up inward showing pressure component, which automatic builds up potential vortex (like mentioned upside). So by that simple picture advantages of twist-flow already become obvious.

Guide Fins
A twist flow is easy to achieve also within round pipes. Along the wall, only some guide fins must be installed, like schematic shown at C by longitudinal view. These

surfaces reach from the wall some inward and are bended a little bit in turning sense, like schematic sketched right side.

The guide fins have a pressure-surface D, alongside which the fluid is pressed into the turning sense. Naturally that process affects resistance, so the forward movement is delayed some kind. The opposite side E of the guide fin builds a suction area, into which the particles of the fluid fall into turning sense, compensating previous losses.



That technique may well achieve twist-flows and Schauberger demonstrated that effect with great success. If however only one single guide fins is installed, at long distances no clear twist-flow is guarantee. As an alternative, the twist flow is not initiated from the border but directly organized at the core of the potential twist.

Twist only by Suction
Cross within the pipe, from wall to wall, one can put a flow-conform body (like sketched by longitudinal cross-sectional view at F) without loss of throughput. The free cross-sectional surface is reduced, however correspondingly faster flows the fluid through that bottleneck (theoretic calculable by formula and really approved). The explanation of that effect of flow-conform bodies is described at previous chapter at picture 05.02.05.

From outside to inside this (originally symmetric) body should change its shape like sketched at G from top to bottom. The ´nose´ like the end of the body should shift to one side, resulting a wing-profile. At the suction side (here each upside) fluid falls downside increasingly faster. This flow goes on also behind the edge and the faster flow affects like suction onto the slower flow of the surface below. This ´pressure-side of that wing´ is bended some down, however the fluid won´t affect pressure, because ´sucked-off´ by previous faster flow.

This body affects a twist motion within the pipe, if installed symmetric to the pipe-centre. At cross-sectional view (H) through the pipe (resp. schematic also through that body) the line of nose is marked yellow and line of the rear end is marked black. However the width of that winded wing is much over-drawn, real blades of that ´stator-guide-wheel´ could be constructed much smaller.

This principle shape shows two special properties: within the centre of the pipe comes up a potential vortex which will accelerate autonomously. So this advantageous motion patter of a twist flow will continue relative long within the pipe. At the other hand, that partial deviation of flow into turning motion is achieved without any pressure, i.e. without resistance and delay of the longitudinal movement. As the particles fall into a suction area (respective faster flow) by their molecular speed, the flow in total will be accelerated.

For free
Whoever got convinced by these proposals of the ´Round-Edge-Pipe´ or the ´Suction-Fins´ or the ´Segment-Pipe´ may use these conceptions as he likes it for free. These examples should point out, one may not be contented with known formula and common scientific sentences, but should search for better solutions all times. If the behaviour of particles is observed exactly, the reason for ´phenomenal´ effects are easy to detect and naturally the affects can be used much more effective.

At these processes never occurs any energy-transmission (with the known problems of energy-constant), but only the order of movements is improved. No energy-input is demanded, because motions exist all times in any directions and only a selection of momentary fitting motions must be done. That´s achieved only by organizational measures (as a rule by accordingly shaped walls). These work purely ´passive´ and achieve a better order only by permitting a useful structures of motions.

Billions of kilometer of pipes are installed, all over the world, for the transport of fluids (oil, gas, water, air-pressure, many other liquids and gases). The friction within common pipes needs immense energy-input – and these huge costs could be reduced by previous constructions, by sure.

Evert / 2006-11-05

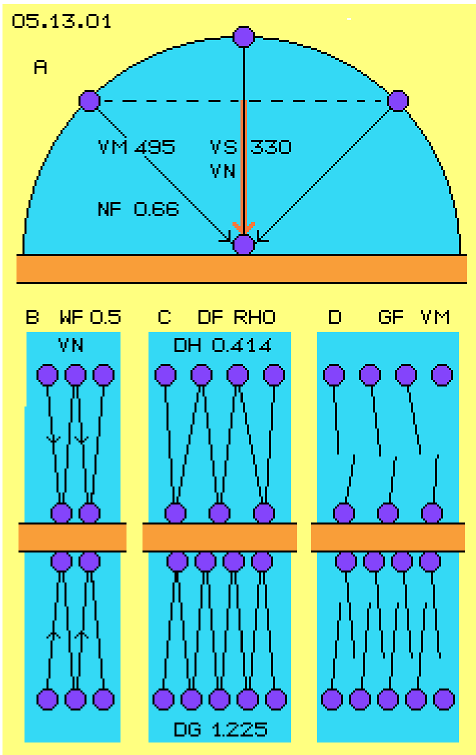
05.13. Explosion / Implosion

Formula of Energy
E = 0,5 * m * c^2 is the most abstract formula between three basic terms of physics. E = 0,5 * m * v^2 is the basic formula for energy of moving bodies of mechanics. That ´speed-by-square-half´, analogue is a factor at diverse formula of flow-sciences. These formula might be sufficient and mostly appropriate, however they are generalizing all times, don´t describe exactly the real background and thus don´t express the essential characteristics of the occurrences. For example, the terms of energy and mass are used nearby ´fictive´ in order to represent most different appearances. The light-speed is called a constant limit for all movement possibilities, however that´s a rather questionable assumption.

Analogue transmission of formula of different subjects of physics well could be permissible, however a pure mathematical handling is ´dangerous´ because probably essential criteria could get neglected. For example, common formula of lift again has that factor speed-by-square, so the lift forces theoretical should raise unlimited - however beyond sound-speed real lift exists any more (but only a mechanical pushing upward is possible).

At flux-sciences many formula of mechanics are used analogue - and this generalized view hinders the view on decisive differences. For example, common techniques prevailing are bound to the application of pressure in shape of ´explosion-technology´, while ´implosion-technology´ is nearby unknown (even Viktor Schauberger vehemently pointed out the important differences four generations ago). At the following I´ll describe these opposite aspects and I´ll work out which special points of view the common flux-sciences don´t take in account. At first however I´ll show, as an example, a formula which only is based on real physical facts.

Formula of Atmospheric Pressure
At picture 05.13.01 factors for the calculation of atmospheric pressure are shown by graphs. At A schematic is sketched a particle (blue) hitting at a wall (red) by the speed of molecular movement, at the air with VM = 495 m/s. At one spot of the wall, the particles arrive from different directions (half-circle light-blue). Representative for all directions are two movements of each 45 degree (see arrows). The sideward thrusts at the wall are balanced, the vertical component as an average is 2/3 of the molecular speed. So the ´normal speed´ VN is less then the molecular speed by ´normal-factor´ NF = 0,66. At air, same time, this corresponds to the sound speed VS = 330 m/s (because the sound wanders also at this zigzag track through the space).



At the following, the length of tracks are drawn by previous length VN. At B the real cause of the factor 0,5 of common formula is visualized. The particles hit by that speed vertical (here drawn some diagonal) onto the wall, are rejected and fly back same way within likely time. So pressure is affected at the wall only each second track (resp. after each second time-unit) - and based on this real fact the ´way-factor´ WF = 0,5 appears at formula of flux-sciences (and not only by analogy e.g. to steady acceleration of mechanics).

At this picture at C is visualized undisputed density-factor DF = Rho: the more particles are within a room (marked light blue), the more particles hit onto the wall within a time-unit. Concerning the atmospheric air pressure, at the ground exists a density DG = 1,225 kg/m^3, at the level of ten kilometres height however DH = 0,414 kg/m^3 up there.

At this picture at D is visualized the speed-factor GF, where normally is GF = VM, thus normal molecular speed (German Geschwindigkeit = speed). Here are drawn particles more ´cold´, which move only some shorter distance within the time-unit (see length of lines). So by given density, these slow particles need some more time until hitting at the wall resp. the frequency of ´pressure-affects´ is proportional to the given molecular speed. That´s the real cause, why common formula of flux-sciences show the factor speed-by-square: once as expression of the ´vehemence´ (VM at A) and second as expression of the frequency (VM at D) of hitting strokes towards the wall. Thus here that V^2 is based on real motion processes - and not only by abstract-theoretic analogy to the V^2 of mechanics laws.

So the formula for calculation of pressure is composed by normal-, way- and density-factor and speed-by-square, thus P = NF * WF * DF * VM^2. Based on previous data of air results P = 0,66 * 0,5 * 1,225 * 495^2 = 100.052 N/m^2 – a rather exact normal atmospheric pressure. Using standard VM = 500,6 m/s would result the norm-pressure of 101.320 N/m^2 - so that´s a sufficient approval for the logic consistency of that new formula like for fitting description of the physical processes of its factors.

Formula and Reality
So this formula represents real facts and processes exactly and thus is suitable for calculations - however for real case still won´t do any good. Well could be determined e.g. the static pressure by measurement-units, however neither the density nor the speed of molecular movement can be measured at a running process. It´s only possible to assume one value and to deduce the other value fictively. Measurement-units well can determine e.g. the speed of flow and the common formula of static pressure P = 0,5 * Rho * v^2 thus is based on flow-speed (and not at molecular-speed like previous formula). However also at that case, speed and density are only fictive averages.

This uncertainty is accepted for common calculations and sufficient results confirm this generalization is reasonable. At chapter 05.12. ´A380 and Lift´ (of part ´Aero-Technology´ such common formula did achieve ´reasonable´ results, concerning the static pressure like its counterpart the dynamic pressure of flows. Nevertheless I don´t like these abstractions because essential points of view get lost. I mentioned that several times at previous chapters, however I´ll point out that problem once more by an example of basic importance.

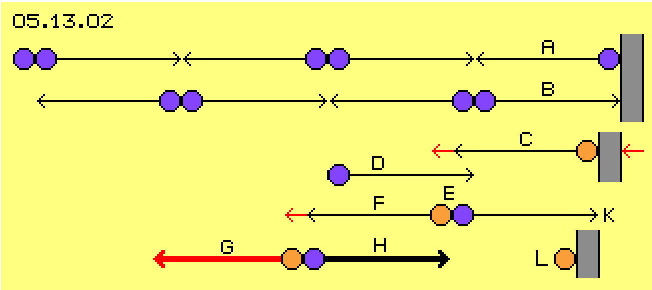
Flow by Pressure
Generally it makes no difference whether a body moves through ´resting´ fluid (like e.g. an airplane) or fluid moves relative to a resting body (like e.g. flow within a pipe)

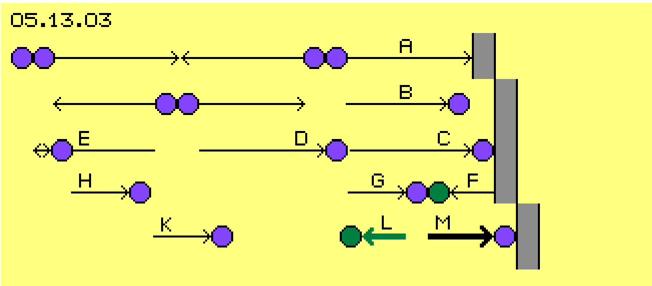
or even the body also is moving (like e.g. the blades of a pump or a turbine). Decisive all times are the relative movements and speeds. At first here is discussed that case, where a flow is generated by a moving body (e.g. a pump-blade or a piston within a cylinder or even a wing with an angle of attack). In general, these bodies here are called a ´wall´ (marked grey).

At picture 05.13.02 particles (blue) of air schematic are drawn, simplistic arranged at horizontal level. Based on molecular movement they fly from one collision to next by normal molecular speed, here just to and fro at horizontal level. At A the particle flies off the wall towards left, same time its left-hand neighbouring particle flies towards right and both collide at the middle. At B, the right particle flies back again in direction towards the wall and its collision-partner flies back to its original place at left side. Analogue other particles further left are ´swinging´ to and fro.

At C now is sketched, the wall (grey) moves towards left same time. A particle (red) hits onto the wall some earlier and thus is rejected some earlier. The particle flies towards left, now however some faster, with its previous molecular speed plus the speed of the wall-movement (see red tip of arrows). Its previous collision-partner flies against it like last time. However now the place of collision E is displaced some further left (in comparison with situation B). Both particles exchange their speeds (and directions), i.e. the left particle (red) now flies with that increased speed F towards left, while the right particle (blue) moves back towards the wall, again by normal molecular speed K.

Also at all following collisions further left, that process is repeated: the places of collisions become shifted towards frontside, the increased speed G is transmitted onto each collision-partner left side (red), while each collision-partner right side (blue) flies back towards right by normal molecular speed H. All movements back towards the wall thus occur by normal speed (H and K etc.), each particle (C and L etc.) is rejected by the wall with increased speed and that acceleration is transferred by each collision further towards left.





Flow by Suction

At picture 05.13.03 now the opposite process is visualized, where the wall moves back towards right side. At first row again the starting position is shown, where particles move to and fro between collisions at horizontal level. After a collision, the particle A flies towards right into direction of the wall. After one time-unit (second row) the particles left side collide once more, while particle B right side has not yet reached the wall, as the wall now is moving back to right side.

Finally short time later (third row) that particle hits onto the wall at C. Within that time-interval, also its collision-partner D did go on moving towards right. Again, its left collision-partner E did collide with its left neighbouring collision-partner (here not drawn) and already is moving back towards right side (see double-arrow at E).

At F is shown the situation after the collision at the wall. The particle got rejected and flies back towards left, now however by decelerated speed (marked green) as its previous normal molecular speed is reduced by the speed of wall movement. Until next collision thus its partner G moves relative faster and thus longer distance towards right. So opposite to previous picture, now here the places of collisions become shifted towards right side (in comparison with first row A).

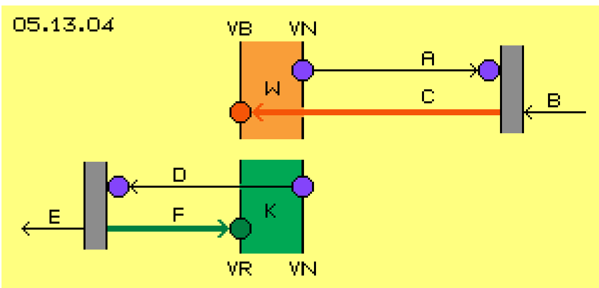
That displacement of collision-locations is much stronger than at previous process, caused by ´delay of return´ of each partner right side and as all particles each left side move unhindered towards right side longer distances. In addition, these left-side particles (G, H, K and M etc., marked blue) fly into direction of the wall by normal molecular speed, while all right-side particles (F and L etc., marked green) fly contrary direction only by reduced speed.

Flow by Heat

At previous fictive experiments thus only a wall is moved towards left or right side and a flow of fluid is generated left side of the wall. If at both cases the wall moves by same speed, naturally the flows must show likely speeds, finally according to the speed of the wall movement. At picture 05.13.04 now both situations are shown once more.

The particle A flies by normal speed VN towards right into direction of the wall. That wall B same times moves towards left, so the particle becomes rejected. Its way-back C occurs with accelerated speed VB (German Beschleunigung = acceleration). This acceleration corresponds to the speed of the wall, i.e. the ´flow´ got produced resulting of speed-difference at both ways. This difference here is marked red because representing heat W (German Wärme).

By right understanding, the ´heat´ is only an expression for the speed of molecular movement. However again that term resp. ´heat-energy´ is used most detached of that real basis and even mixed up with the term of density. Outer space e.g. is told rather ´cold´. However the particles there won´t move slower, but there are only few to hit onto a ´thermometer´ out there. If any atom by any occurrence achieved the fleeing-speed and thus did leave the earth - why should its flight through the ´void´ become decelerated or even stopped? At previous processes however it´s a clear statement: a wall moving forward against air generates a flow by production of heat - in the true sense of ´heat´ as the accelerated speed of molecular movements.



Flow by Cold

The opposite process schematic is shown at this picture below: particle D flies with normal speed VN towards left to the wall. Same time, the wall E moves towards left. After a collision, particle F flies back towards right side, now however by reduced speed VR. So a ´flow´ is resulting from the difference of the speeds at both ways. That difference is marked green as ´cold´ K.

The movements of the wall thus results flowing of likely speeds at both cases, which however show quite different characteristics. Moving-forward of the wall affects pressure, the particles become accelerated beyond previous given speed and thus same time with the flow also heat comes up. Opposite, moving-back of the wall produces a suction area of relative void, the reflection of particles occur with delay. The backward flight occurs slower than by the originally given speed, so same time with flow also coldness comes up. The common formula are based on density and average flow-speed, however don´t pay attention to the different behaviour and function of density nor speed.

Thermodynamics
Opposite to my statements in earlier chapters, nevertheless are involves processes of ´thermodynamics´ - however again not as cause but only as a follow of molecular movements. Previous considerations are based only at one moving wall without any other limitations, so concerning an ´open system´. Results however are comparable within ´closed systems´ e.g. if that wall is represented by a piston moving to and fro within a cylinder.

Affecting pressure demands energy-input and resulting are corresponding stronger kinetic energies in shape of accelerated particle movements and, same time, stronger static pressures, e.g. at compression-phase of piston-machines. At the following expansion-phase the intermediately stored energy affects onto the back-moving piston, however by all ´experience-rules of thermodynamics´ never the energy in total can be regained.

All times, some rest of energy will remain respective escapes as ´heat-loss´ into the environment. That miserable efficiency show all technologies based on pressures, no matter whether air-compressor, combustion- or steam-engines and all other applications with pressure. Finally and unfortunately was deduced by that limited view, any perpetuum mobile never ever could work. Here however comes up the concrete question: previous process of cooling should set free corresponding energy – however, how and where comes up a corresponding surplus of energy - if the laws of ´energy-constant´ still are valid.

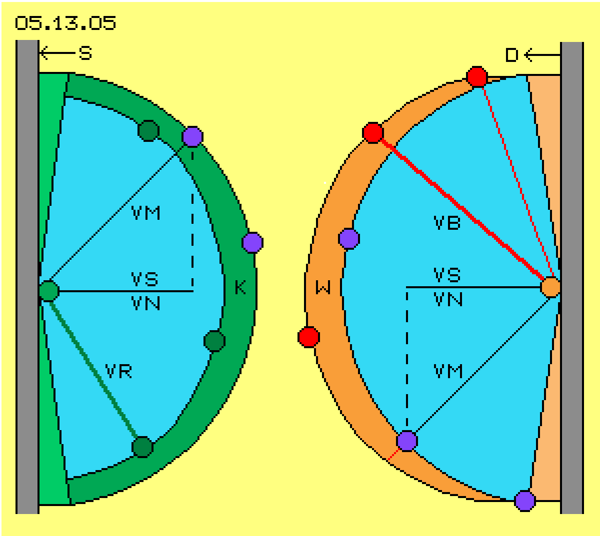
Loss of Heat
Previous pictures simplistic showed movements of particles in horizontal directions. At picture 05.13.05 now again is shown, some particles (blue) fall onto one spot of a wall from any directions. Left side is drawn a ´suction-wall´ S (moving back to left side). Right side is drawn a ´pressure-wall´ D (forward-moving, also towards left). Also drawn are each ways towards the walls, which occur with molecular speed VM. In average, the pressure affects only by component right angle towards the wall, thus by previous ´normal´ speed VN, which same time is likely to sound speed VS.

At the pressure wall D, the particles (light red) are rejected with increased speed VB, ray-like into forward directions (dark red). That ´enlarged radius´ is marked red and practically represents the increased heat W. In reality however, not all particles come ahead that distance. The wall plus the rejected particles wander steady into areas of particles yet not involved - with correspondingly increased frequency of hits. So there arises a dam-up respective stronger static pressure in front of the wall. This resistance rises by square of the wall-speed, until lastly an enormous energy-input is necessary to overcome the ´sound-barrier´.

The generated heat thus is not able to ´clear-up´ the area in front of the wall. Opposite, the increased speed even has a decreasing affect, as it spreads forward-outward into a wider cone-shaped space. Lastly that ´heat-front´ evaporates ineffective, practically as a total heat-loss (within an open system, while within a closed systems the heat is lost only by parts). Really, that area of increased pressure does not reach far out into space, e.g. downside of a wing only a short distances. So the density and corresponding resistance is concentrated near or direct at the ´wall´.

Gain of Density and Order

At this picture left side the corresponding situation of the backward-moving suction-wall S is sketched. Some particles (blue) fall radial towards one spot of the wall by normal speed VN. After the delayed rejection (green), they move back with reduced speed VR, in addition by angles more flat. The particles (green) thus are not rejected so far and wide (only within the smaller are marked light-blue). The difference between the starting and rejected spots is marked dark-green, representing the cold area K.



Corresponding to this cooling-down, the slower particles demand less volume (i.e. the particles are gathered at the smaller blue area). The equivalent to the loss of heat thus is represented by an increased density - plus an unhindered flow into the generated void area (here marked dark-green). From all sides the particles fall into that ´part-vacuum´ and as the wall moves back continuously, the particles can fall into that general direction again and again. They can fly relative parallel and thus rather narrow to each other. So this flow is much stronger than the chaotic ´heat-flow´ of previous situation.

The upper face of a wing represents such a back-stepping wall, however not frontal like at these pictures but positioned diagonal. Opposite to previous ´heat-front´ that ´cold-front´ resp. relative void spreads out forward-upward incredible far. Far upside of the nose of the wing e.g. exists reduced static pressure und increased speed of that ´artificial wind´, most strong however at the front part upside of the wing. Upside above the end of the wing however exists already normal air-pressure, just because the relative void becomes filled up by that generated flow (however all times only up to sound-speed, see special chapter concerning lift at wing).

So previous question concerning the energy-constant got an answer: the loss of kinetic energy by cooling-down is compensated by increased density, plus the flow into the generated ´part-vacuum´, plus better order of vectors of all movements. Within the closed system e.g. of piston-machines that cooling is not compensated, just because no additional flow from outside is possible. Open systems however can be designed that kind, additional fluid is merged into the original flow unhindered and thus well ordered and dense flows are generated. However also closed circuits allow the organization of movement processes that kind, common ´thermodynamic-losses´

don´t come up, but the total kinetic energy of the generated flows inclusive twist are available for external use (see later chapters of corresponding machines).

As an approval might serve the example often mentioned by Viktor Schauberger and confirmed by exact measurements: waters of mountain torrents get lost their potential energy of high level while moving downward. So based on classic view the water or the environment should heat up essentially. In reality however, the temperature of water tends to four degree Celsius, i.e. towards the most high density of water. Naturally everyone immediately thinks at a cooling-effect of evaporation, however decisive reason is the shape of water movements: each bended wall of each stone represents a suction area. The waters fall into the ´void´ by well ordered and dense flows, on and on at spiral tracks into various directions. That´s why the mountain torrents plus the environment are refreshing cool, no matter which general air-temperature exists, without any doubts.

Benefit without Effort

The kinetic energy of these dense and ordered flows naturally is usable, at mountain torrents and by machines as well. By classic understanding no energy is to ´win´, so that usable energy should demand corresponding efforts - like at any orderly power-machine. The general fault of that thinking is, energy can only be transferred from one shape into an other shape. Besides this however, one can use an intermediate existing occurrence. Here for example, a flow is generated by ´cooling down´ the molecular movements and the kinetic energy of these flows are used, before the motions returning to their origin state of chaotic molecular movement.

Previous moving walls naturally represent a suction-wall at one side and same time a pressure-wall at the other side - when organized unfavourably (e.g. at piston machines). These walls must not stand frontal to the flow. For example, the upper face of a wing stands diagonal to the flow, nevertheless generating a void at its rear part and thus also an ´artificial´ flow comes up. If the wing shows only small angle of attack, it has practically no pressure-side. Later chapters will show, also pumps can be designed only with suction-sides (and vice versa a turbine can be constructed only with pressure-sides).

That ´cooling-principle´ also works just with no mechanic walls, because each fast flow represents a relative suction-are for neighbouring slower flow. From the slow flow, some particles are falling into the faster flow. They are rejected with delay and less speed, thus they disappear from their original area or at least come back with reduced resistance. Any hurricane practically represents many included cylinders, from outside towards inside turning faster, so continuously affecting like suction towards the environment. Any tornado practically represents a batch of air-disks turning faster form below towards upside, thus the air is pulled spiral upward.

Both processes of movements can be rebuild by machines, where efforts only are demanded for producing an initial flow. The design of the parts and movement processes must allow self-acceleration working continuously. Finally, it´s only a transmission of static pressure into usable dynamic pressure. The benefit of such kinetic pressure energies is much higher than the demanded energy input for the trigger of such processes.

Not only Heat-Transmission
I oppose vehement against common views of thermodynamics, because these are applied prevailingly in sense of inevitable heat-losses. Each heat-pump achieves three times higher benefits than costs - and physicians don´t like it (even the effects are simply explained by ´common laws´). In addition is common argument, the heat pumps can only serves for hot-water supply and house-heating, however can not produce real ´valuable´ energies - like combustion-technologies (with its miserable efficiency, which is not valuable but extreme expensive if real costs from source to the environmental pollution are calculated).

I oppose against the limited view of thermodynamics, because here it´s not a question of transmitting a little bit heat into other shape (while common technology takes huge losses of heat same time). Heat and cooling are only side-effects of implosion-technologies, decisive however is the usage of the enormous and inexhaustible kinetic energy of molecular movements.

The difference is easy to demonstrate by a well known example: cavitation occurs at fast running ship-props (or in general at pumps), if suction locally and intermediately is so strong, the water can not flow fast enough into the void. A ´hole´ is drawn into water-compound and short time later, the molecules fall into that void area. That suddenly imploding of ´soft´ water demolishes the solid metal. The holes within the metal are not produced by a little bit static pressure nor some more or less heat, but it´s the violence of just normal molecular movements energy, represented by some few water molecules shredding the hard compound of metal.

Project >100
This energy is given and available and it´s the task to use it, not like cavitation as ´workplace accident´ but as a continuous process, with minimum energy-input and extreme high output, with efficiency not nearby hundred percent, but multiple higher. One may no longer be contented about (wrong understanding of) energy-constant or inevitable thermodynamic-heatlosses and one may no longer be ´happy´ all formula theoretic exactly approve that inefficiency and naturally corresponding designed techniques confirm that status-quo. A general ´Project >100´ must be started and explosion-technologies are to replace by applications of implosion in total.

At this chapter once more are pointed out essential differences: production of pressure and heat results resistance by square and thus system-based losses, while at applications of suction the resistance decreases by square to the speeds. Only these techniques allow the usage of the inexhaustible energy of molecular movements, without any damage of environment.

At this chapter multiple statement of the great naturalist Schauberger is confirmed: production of heat by explosion-technology is destroying (and he had foreseen the environmental pollutions) while the organization of processes and usage of ´constructive´ cold by implosion-technology is nature-conform and offers unlimited possibilities. Finally by previous graphs and considerations I was able to understand Schaubergers statements some better - and I hope some Schauberger friends too.

Theses considerations also concern upside formula: their general v^2 does not correspond to real processes (instead of should be used previous normal, accelerated or reduced speeds VM, VB or VR). In addition, these formula use the density Rho however don´t differ whether it´s ´chaotic´ density based on pressure and heat or it´s density based on ordered flows. Common flux-sciences do not pay attention to these specific differences at all.

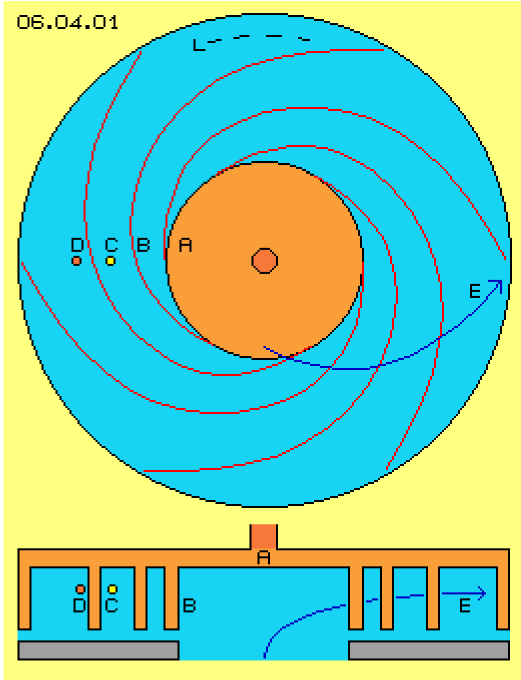
Much more important than formula however is the general starting point for replacing explosion-technologies with their wasting results by nature-conform implosion-technologies. At diverse chapters of that Fluid-Technology are mentioned sufficient proposals for technical realization. If specialists take these points of view, naturally even better machines are build.

Evert / 2007-02-12

06.04. Suction- / Pressure - Blades

Suction- and Pressure-Sides

This chapter shows, as an example, the design of new blades for pumps. Instead of the common usage of pressure, here the effect of suction are used. Picture 06.04.01 at first schematic shows the rotor A (red) of a normal centrifugal-pump, upside by cross-sectional view, below by longitudinal cross-sectional view through the axle. Turning sense counter clockwise here is assumed all times.



Six blades B are drawn, between which canals (light blue) are spiral arranged from inside outward. The fluid moves from the central area outward at bended tracks, here sketched as blue curve E.

A fluid particle D (dark red) is drawn near the front side of a blade. The fluid there is guided ahead in turning sense and outward by pressure of that wall. This outward-motion also corresponds to the direction of inertia. So the movement E showing forward-outward becomes generated by pressure plus centrifugal force.

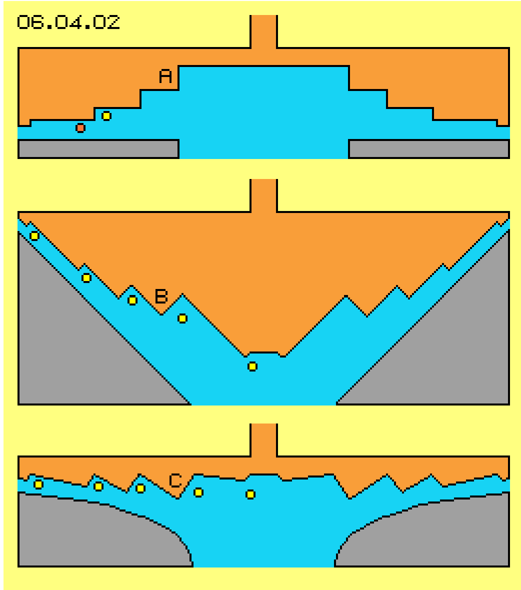
An other particle C (yellow) is drawn near the rear face of the blade. The fluid there is pressed ahead-outward indirectly by the following wall and the neighbouring fluid. At the other hand, that wall moving forward affects suction and the particles fall into these ´empty´ areas without resistance. So the generated flow only partly is produced by mechanic pressure, because particles partly fall into the wanted direction by their ´own movement energy´.

Only Suction-Sides

The blades of previous picture practically represent spiral bands arranged at one level (here e.g. fixed at the plane disk of the rotor). At picture 06.04.02 now schematic is shown, these spiral-bands are pulled apart into axial direction. The below border of one band is connected with the upside border of the next band.

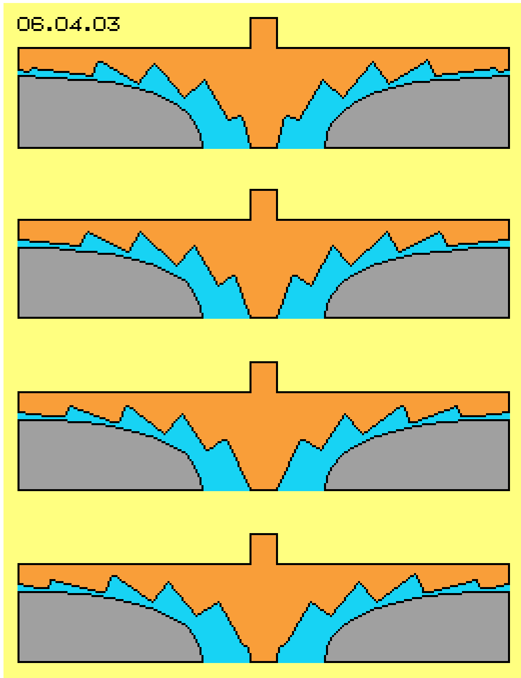
The rotor inside is arranged as a cone-like depression and its inner side is terraced. The inner space of the rotor practically is a negative shape of ´Babylon-tower´, i.e. a round cone with spiral ´ways´ from bottom to top resp. vice versa. A particle (yellow) near the vertical wall follows that back stepping face downward-outward, based on suction. A particle (red) near the horizontal face is moved downward by pressure. Between the rotor and the housing (grey) thus again results a flow downward-forward, supported by centrifugal forces.

At this picture at B the surface of the rotor is cone-shaped, again with these stages of spiral-bands as suction-sides. The particles (yellow) near these back-stepping walls now are guided upward-outward, only by suction. By this arrangement thus no more mechanical pressure is affecting onto the fluid, because the outward-movement



comes up only by centrifugal force (especially if liquid medium is used). These ´teeth´ of blades only show suction-sides however no pressure-sides.

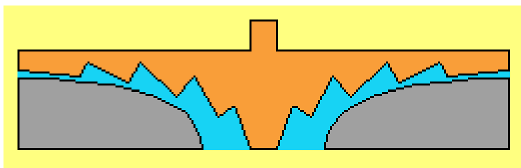
At this picture downside, the housing-wall (grey) is shaped as a round bended surface. The rotor in principle is a plane disk, however the teeth now are shifted somehow different. The fluid, represented by some yellow particles, is dragged by each suction-side from the centre towards the outside border. The ´pressure-sides´ tilt down towards outside, so the canal becomes smaller. However, no pressure is affected but only the cross-sectional surface keeps constant (according to the larger radius and decreased according to the faster flow).



Flow only by Suction
At picture 06.04.03 the housing wall (grey) again is shaped as a round bended surface, now however also the rotor-surface shows hyperbolic curvature, again by tooth-like steps.

´Round edges´ (respective bowl-shapes) are especially suitable for these teeth. The suction-sides practically stand cross to the flow direction (resp. diagonal within space), while each ´pressure-side´ goes off smoothly into the bended surface. So within that concave hole, the teeth can stand one beside the next. In addition, the teeth ´grow-off´ the central round surface and at the other hand, they disappear into the face at the border.

The suction sides of that rotor still are spiral bands (analogue previous picture 06.04.01), arranged some tilted. These bands can be long-winded or can run more radial direct from inside towards outside. The cross-section all times shows these teeth-like steps, however the flow is running diagonal and thus the teeth appear more stretched into flow direction.



At this picture, four positions are shown while the rotor is turning. Each suction side wanders from the centre outward. The following animation shows these four pictures and it becomes obvious how the fluid is pulled outward only by suction.

One can clearly see, the teeth growing off at the centre and there at first makes the fluid turning. Afterward, the suction sides become wider and tilt towards outside.

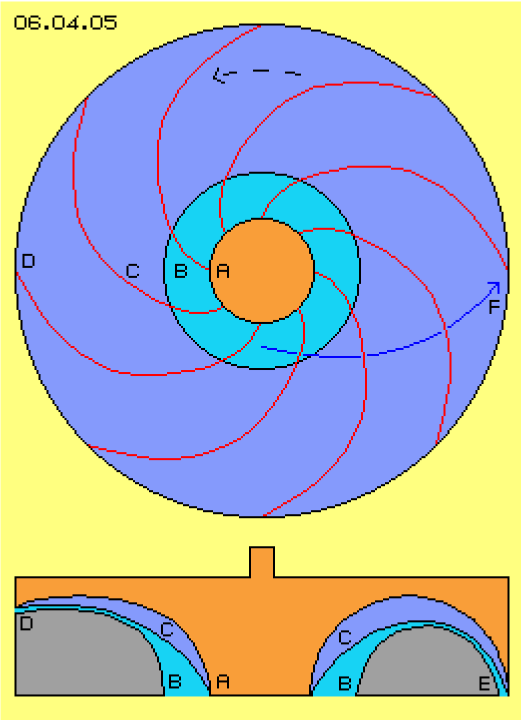
Some more fluid will follow that wall. Towards outside, the suction wall shows less height (and becomes correspondingly longer at the larger radius), finally disappearing completely within the face of the rotor.

At the outlet exists a continuous flat flow all around, generated only by suction, supported by centrifugal forces. So that technique will be optimum for many applications. The flat flow e.g. can be guided tangential into a pipe running al around (a ´snake´). A most strong twist-flow is generated within that pipe, advantageous for many usages.

Free Energy
These suction-blades only use the effect of back-stepping walls for generating a flow. The energy input for driving the rotor is minimum, because the rotor affects null pressure onto the fluid, even no friction of the fluid at the rotor faces is to overcome. So these suction-blade-teeth produce flows with minimum efforts.

The self-acceleration comes up exclusively from the normal chaotic molecular motions, where only these particles can move wider distances, if they momentary and occasionally are hit into the direction of the back-stepping wall. Thus the flows here come up exclusively as the particles show a preferred direction (towards the suction side), flying longer ahead until hindered by next collision.

These particles are rejected at the wall some later and move back slower, so as a side-effect again some cooling comes up. Finally the fast flow at the outlet shows less static pressure, so from inside towards outside exists some pressure potential difference. The stronger static pressure at the inlet thus pushes the fluid from the centre towards outside. In addition, the fluid outside turns faster within space than inside, so by that sense an out-turning potential vortex exists. Here however that´s not the cause of acceleration but only a side-effect.



Centrifugal forces support that movement direction. The centrifugal force by itself is ´for nothing´, however at first demanding according acceleration, normally thus an input by mechanic work. Here however, the particles fly and accelerate ´by own motion energy´ into the direction of suction. Finally at the outlet, the centrifugal force resp. inertia of the flow represents kinetic energy, usable ´for free´.

At picture 06.04.05 previous machine once more is shown by cross-sectional and longitudinal views. The rotor A (red) shows a round curvature, the fluid moves from the inlet B to the outlet D diagonal within space at curved track F. Teeth C resp. the suction sides run spiral and here rather short way towards outside.

Downside at the longitudinal cross-sectional view at left side, the outlet D is arranged aside of the machine. As an alternative at right side is sketched, the canal well could be arranged within a half circle, so the blades C practically are embedded within a ´bowl´ and the outlet E shows back into axial direction. This arrangement could be especially advantageous, if the dent-shaped blades are used at a turbine.

Turbine
Previous pump uses most few pressure because the application of pressure demands high energy input. Much lower power input is demanded for generating a flow via suction. The acceleration comes up ´autonomous´, as the normal molecular motion are transferred into a little bit better structure. Resulting is an ordered flow of high density and thus increased kinetic energy.

Opposite, a flow can be transferred into mechanical turning momentum of a turbine, only by deviation at the turbine-blades. All parts of the medium should be reflected at the pressure-faces. The medium shall not change its direction by falling into an ´empty´ area, thus without affecting pressure in the turning sense of the turbine.

At previous pump the blades are designed that kind, they are affecting only by their suction-wall. In contrary sense, the medium may affect only at the pressure-faces of the turbine-blades. That´s possible if previous teeth-shaped structure is applied mirrored respective in contrary turning sense.

Picture 06.04.09 shows a model of a turbine-rotor (without corresponding faces of a housing). The blades are shaped like ´horseshoes´, embedded within the round deepening of the rotor. The inlet flow enters the rotor all around form outside diagonal inward. The outlet flow is running off near the center in axial direction.

The inlet flow is faster than the rotation speed of the rotor. The fluid flies over the flat parts of a tooth, until hitting at a pressure-wall. The deviation occurs all along that wall. All parts of the fluid hit at such a wall, so the complete energy of the flow is transferred into turning momentum. Finally the fluid leaves the machine near the center in axial direction.

The blades of that turbine can be build relative easy - in comparison to the complex geometric of common turbine-blades. Up to now, most effective are working the free-jet-turbines, because also there the fluid is deviated exclusive at pressure-sides of the blades. Previous suction-pump and also that new pressure-turbine may not fit to all applications (at following chapters will be discussed some examples). At any case however, these conceptions are good examples, how the motions of a fluid can be organized at its best.

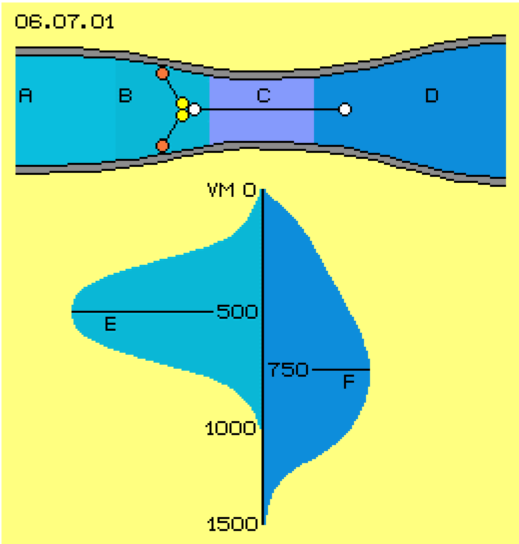
Evert / 2007-05-12

06.07. Acceleration by Nozzles

Manipulation of Density and Speed
At previous chapters was discussed the mechanic motion of a ´wall´. Resulting are changes of the density of fluid-particles and the direction plus speed of molecular movements. However this occurs also by pure ´passive´ measurements, e.g. simply by the shape of walls. This was already demonstrated upside by the Potential-Twist and Segment-Pipes. Well known and often used are the effects coming up within nozzles. A special shape is used at the ´Laval-Nozzle´ - with ´phenomenal´ acceleration effect.

The general shape of that nozzle schematic is shown at picture 06.07.01 by a longitudinal cross-sectional view. The cross-section face A of a pipe (grey) becomes reduced to a nozzle C and afterward the face again increases to a wider diameter D. At area A, in front of the nozzle, exists subsonic flow, within the nozzle area C exists a flow by sound-speed and - rather astonishing - the flow within the wider outlet area D moves by ultrasound-speed. This effect is used e.g. for cutting iron by water-jets.

This phenomenal appearance generally is explained anyhow by likely ´phenomenal theoretic calculation tricks´ - nevertheless it seems not reasonable where from the energy for an acceleration should come. The real essential effect results of collisions of the particles at area B. There exists a higher density, the particles collide more frequent and the chance for multiple-collisions increases.



Here for example are drawn two particles (red) Flying from the wall towards the centre. Both particles meet there (yellow) and same time they hit at a third particle (white). Onto that third now double kinetic energy is transferred, so this particle leaves the nozzle C super-fast into the outlet area D. Both energy-delivering particles remain at this area rather slow.

Shifting Speeds
Not all particles of a fluid are moving by likely speed. Assumed is the ´Gauß-normal-spreading´ like here roughly sketched by bell-shape E below left at this picture. The minimum / maximum of the speeds of air-particles might be 0 to 1000 m/s, resulting an average speed of about 500 m/s. Normally that spreading is rather constant, as normally the speeds and directions are exchanged one-by-one at the collisions. A decisive change only comes up, if the exchange occurs between multiple partners - respective only by these multiple-collisions can result these different speeds. Within these nozzles exist good conditions for multiple-collisions and above this, all involved particles move into a preferred direction (see vectors at B), so these ultra-sound resp. even ´ultra-molecular´ fast motions prevailingly occur in general direction of that flow.

The ´phenomenal´ result is a shifted spreading of molecular speeds, like schematic sketched at F (below right at this picture): strange enough there are more particles with relative low speed ´hanging around´ within the area of the nozzle. At the other hand, there are much more particles with essentially increased speed, flying ´super-fast´ off into the outlet area. The throughput is unchanged, however the spreading of the actual kinetic energy of involved particles is changed. So pure passive measurements (according reduction and following enlargement of cross-sectional faces) are sufficient for manipulating the molecular speeds – up to the fact, soft water can cut solid steal.

Common Nozzle and Laval-Nozzles
Picture 06.07.02 shows two pipes (grey) by longitudinal cross-sectional view, upside with ´normal´ decreasing and increasing cross-sectional face, below with the special shape of a Laval-nozzle. At A the fluid flows by given speed from left to right, at B the pipe becomes more narrow and by known physical laws the flow becomes accelerated. Afterward, the fluid flows through the pipe C some faster (than at starting point A), however that acceleration did not demand corresponding external energy input.

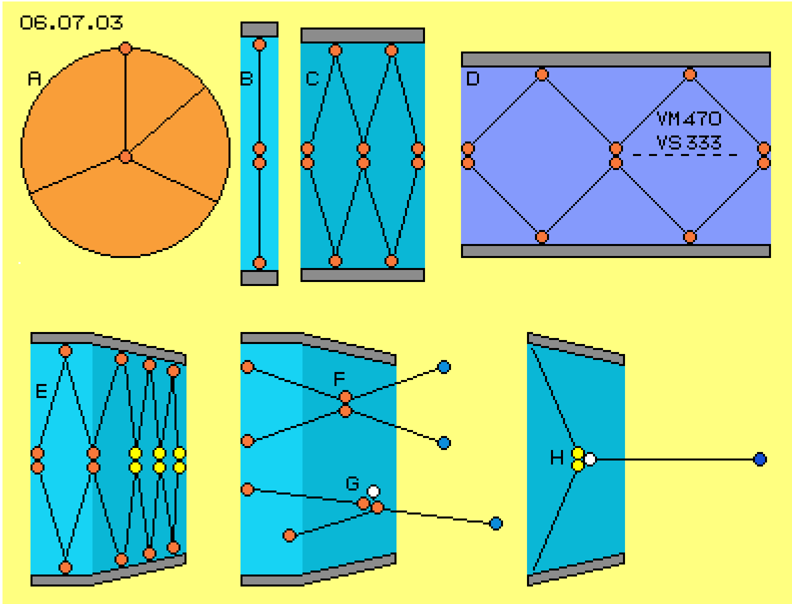
Opposite, if the fluid is flowing off a thin pipe into a wider cross-sectional face D, the flow pressure decreases and the static pressure increases. Strange enough, however not correspondingly. So strange enough, there comes up a well known ´resistance´ and the fluid at E now flows some slower. So the decreasing cross-sections of a pipe is neutral respective positive, while an increasing diameter of a pipe is negative (concerning the fluid throughput and flow-pressure). That´s a well known fact of fluid-sciences. Unknown however is the source for the increased kinetic energy within the bottleneck (and also for the energy ´loss´ within the wider pipe).

About 120 years ago, P. de Laval (and independent also E. Körting) found an experienced construction without that loss of throughput, but with strongly accelerated output. That ´Laval-Nozzle´ schematic is sketched at this picture below. The pipe diameter decreases until a bottleneck and afterward the diameter again increases to a cross-section face wider than before of the nozzle. The walls must be smoothly curved and should not open by more than ten degree. At the convergent inlet area F the flow moves slower than sound speed, at the bottleneck G the flow moves by sound-speed, within the divergent area H the flow might be ultrasound fast.

Model of molecular Movements
Picture 06.07.03 schematic shows the movement process of fluid particles within previous pipe. Starting point is the ´action-radius´ A of a molecule, which moves from its actual position to any place at this circle within one time-unit, pushed there by a collision with average molecular speed. Within gases, these collisions and motions into any direction occur continuously.

At B are drawn two molecules (red points) within a pipe (grey). Representative for any motion, here they are moving only up and down. These particles thus wander from the centre to the wall (there drawn once more) and back. This movement-pattern represents ´resting´ fluid.

At C this molecular movement is overlaid by a motion ahead, i.e. these particles wander within the pipe some forward (towards right) at zigzag-tracks. Naturally these particles still move into any direction, however in general just that distance forward, step by step. The molecular speed is unchanged, i.e. also the distances each time-unit are unchanged. Already that simple model obviously shows, faster flows demand a smaller diameter (if the density and temperature etc. are unchanged). In addition, these particles hit less often towards the pipe-wall and by inclined angle, so these particles affect less static pressure aside towards the wall.



At D is shown the typical movement-pattern of sound-speed. The fluid moves forward within the space by e.g. 333 m/s (VS 333, dotted line), however the molecules fly at these zigzag-ways by molecular speed of 470 m/s (VM 470). Naturally the particles demand even smaller cross-sections and affect even less pressure aside. Correspondingly stronger pressure of that flow exists towards the front side.

Cross-Stroker and Free-Flyer

At E is drawn a pipe (grey) becoming more narrow and the movement-pattern within representing a flow like at previous C. At the diagonal pipe wall, the molecules are rejected and return to the centre more steep, every time more and more steep. The particles still move by likely speed, i.e. the collisions now occur more frequent by shorter intervals. So the fluid there is more dense and the static pressure increases (opposite to common formula). The particles marked yellow here are called ´cross-strokers´.

However there must exist also an other movement pattern, resulting the real experiences of a nozzle. For example, at F is shown the situation of particles, which actually move (nearby) into longitudinal direction within the pipe. If these particles collide, the flow is not delayed. These particles fall off the nozzle into following free space by a speed, nearby as fast as molecular movements, practically without resistance and without affecting pressure aside towards the pipe wall. These particles are really ´valuable´ concerning the throughput, because they leave gaps at their original places and they never will return. So these particles marked blue here are called ´free-flyers´, thus an opposite pattern of previous cross-strokers.

Stationars and Racers

The particles of gases fly by certain speed only as an average, e.g. by previous 470 m/s of air. The speeds however differ and the spreading of speeds is assumed bell-like, by Gauß-spreading. So if tow particles of similar directions meet (like at G), often will occur ´rear-end-collisions´: a faster particle transmits its speed onto a previously slower particle some ahead. The original fast particle now remains (nearby) stationary within the space respective it´s pushed back or aside only a little bit. This movement pattern here is called ´stationar´ because these particles ´hang around´ relative calm within the nozzle area.

At following collisions, they do not show much resistance, i.e. they seem ´light´. These particles are even ´valuable´ concerning the throughput, because at the following collision they might take even high speed with no resistance. So next step they might become most fast ´free-flyers´.

At H now is sketched a combination of previous movement pattern with special importance, especially concerning the Laval-nozzle. Two cross-strokers (yellow) occasionally meet same moment onto a stationar (white) and both transfer their kinetic energy onto that ´light´ particle. Both particles contribute their normal molecular speed and thus they accelerate that ´third´ not only ultra-sound-fast but ´ultra-molecular-fast´ (thus up to maximum of 2*470 = 940 m/s). Both original particles are rejected only a little bit resp. might become ´resting´ stationars. The third particle - here called ´racer´ and marked dark-blue - flies off correspondingly faster.

Naturally these racers won´t fly direct into longitudinal direction of the pipe, so the flow as a whole moves ahead not by double molecular speed. However that movement pattern is the exclusive cause for ultrasound-fast flows of Laval-nozzles. At the outlet of a Laval-nozzle, the diameter of the pipe increases, practically protecting these racers from collisions with neighbours aside. At the other hand, the angle of that opening must be relative small, so within that super-fast flow collisions occur only by similar directions and in shape of previous rear-end-collisions. Above this, an increased volume now is available with corresponding decreased density. The particles have a good chance to fly long distances without resistance, generating that strong and super-fast flow.

Movement Mixture

So the flow at a decreasing diameter of a pipe does not anyhow ´run through the gears´ according to common formula. Already within a normal flow the molecular movement speed differs quit a lot. Within the nozzles however, the motion pattern differ much stronger (while common formula simply work with the average of density, flow- and sound- and molecular-speeds).

The trigger of the acceleration effect is the reduction of the cross-sectional face (smooth and flow-conform), resulting at first increasing density and pressure. The distances between the collisions become shorter and more collisions occur. Irrespective of, some particles fly direct through the bottleneck, also bundles of particles into similar directions, relative near to each other and nearby parallel, without negative collisions. Thus the molecular speed becomes passed-through at direct tracks towards the outlet. Especially by ´rear-end-collisions´ most fast speed is transferred forward. At the other hand, these collisions result particles remaining nearby resting at the spot, affecting few resistance for following collisions. Just these ´stationars´ decisively are accelerated by ´twin-collisions´.

These multiple-collisions naturally occur also at normal conditions within a resting fluid, resulting that normal-spreading of actual molecular speeds. Here however within the bottleneck of a nozzle, these multiple-collisions occur more frequent. As here the normal molecular movement is overlaid by the general forward-motion of a flow, these collisions prevailingly occur with forward-showing vectors. So that speed-diversification (previous Gauß-spreading) now does not occur into all directions likely, but prevailingly into the flow direction.

Within that mixture of ´stationar, cross-stroker, free-flyer and racer´ thus the actual speed is most different. These four particles could move ahead e.g. by 0, 0, 470 and

940 m/s, an average of 350 m/s, thus by sound-speed through the bottleneck of the nozzle - no matter how fast the flow did run originally. So the acceleration is not based on the starting speed and/or any input of forces. That self-acceleration exclusively is based on the transformation of characteristic movement-pattern. Strange enough, in front of the outlet prevailingly these cross-strokers exist and stationars ´hang around´ nearby resting, while from the outlet into the free area these free-flyers with normal or increased molecular speed dominate or even these racers are running up to double molecular speed, thus as a whole by ultrasound-speed.

Naturally, some readers might doubt whether that simple model of movement pattern can really explain that phenomenon. However, that movement pattern of multiple-collision for example, analogue is the exclusive cause for any evaporation, where particles even are kicked off their liquid compound. So that process is most important. As you know, without evaporation of sea-water no clouds would come up, no rain and no water and no living being at land could exist. Likely decisive are these multiple-collisions for changes within any flow - and just also within previous nozzles.

Basics, Aeroplanes, Machines

Many of previous facts are well known. Here however the processes were discussed by a new point of view. Instead of the formal approach of the fluid-sciences, even these ´phenomena´ appearances are explained plausible. Just that final example did show once more, the effect of suction is achieved without energy input. Also the acceleration often is achieved only by fitting design of surfaces.

So enough basic aspects are discussed for the conception of suitable fluid-machines at following chapters. At first however, most interesting aspects concerning aero-technology are discussed at the following part.

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