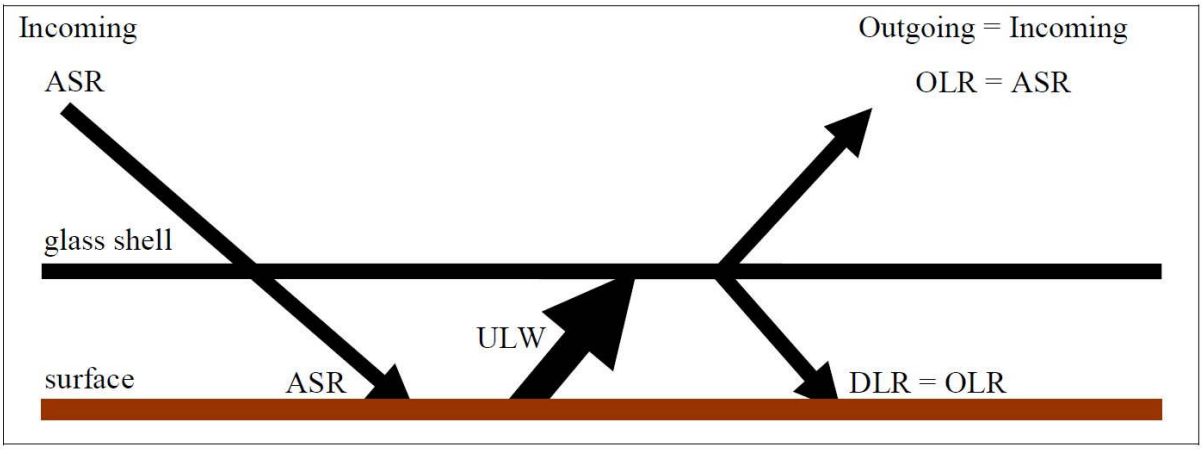
Conclusions

HARMONIA PLANETARIS

Stations of a cooperation

Pictures of an exhibition

I. Schematic model of a planet closed into a glass-house
(SW-transparent, LW-opaque, non-turbulent):



Basic feature of this geometry:

The surface energy flows are unequivocally predetermined by the energy flows at TOA.

E(SRF) = ASR + DLR = ULW **= 2OLR**.

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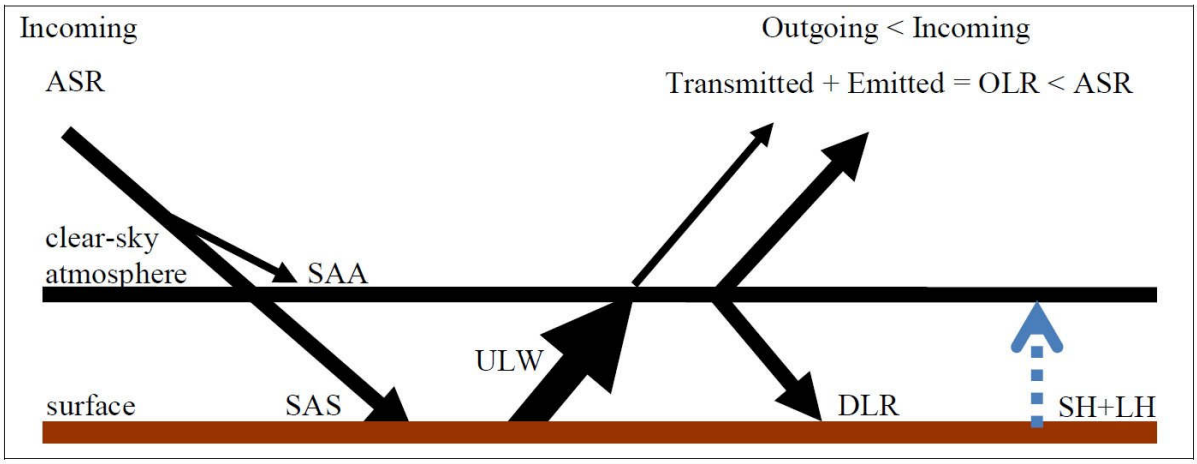
II. Schematic model of the clear-sky part of the Earth's atmosphere (semi-transparent in SW and LW, turbulent):



In the cloud-free part of the atmosphere the reflected solar radiation is less, the absorbed solar radiation is more than in the global average all-sky case.

SAA + SAS = ASR > OLR

Further, DLR is higher than OLR, ULW is lower than 2OLR

DLR > OLR

ULW < 2OLR

There is turbulent heat transfer from the surface into the atmosphere, SH + LH > 0.

And still, according to CERES data:

OLR(clear) = 266 W/m2

ASR(clear) = 287 W/m2

SAA(clear) = 74 W/m2

SAS(clear) = 213 W/m2

DLR(clear) = 319 W/m2

E(SRF, clear) = SAS + DLR = ULW + SH + LH **= 2OLR(clear)**

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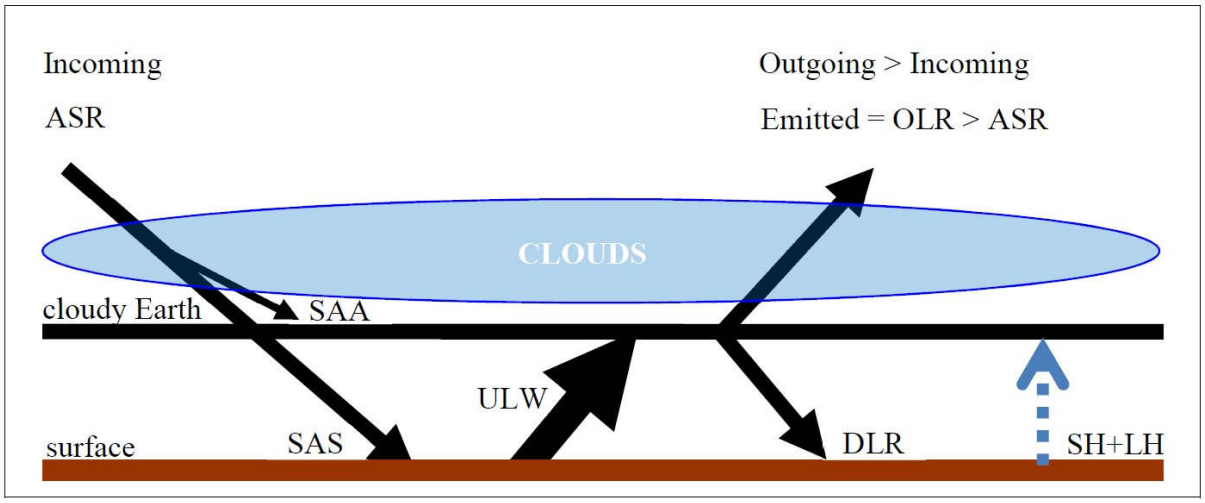
III. Schematic model of the cloudy part of the Earth's atmosphere (semi-transparent in SW, opaque in LW, turbulent):



In the cloudy part of the atmosphere the reflected solar radiation is more, the absorbed solar radiation is less than in the global average all-sky case.

SAA + SAS = ASR < OLR,

There is no longwave surface transmission through the clouds:

STI(cloudy) = 0.

DLR is higher, ULW is lower than OLR, DLR > OLR, ULW < 2OLR, and SH + LH > 0.

And still ...

E(SRF, cloudy) = SAS + DLR = ULW + SH + LH **= OLR(cloudy) + OLR(clear)**

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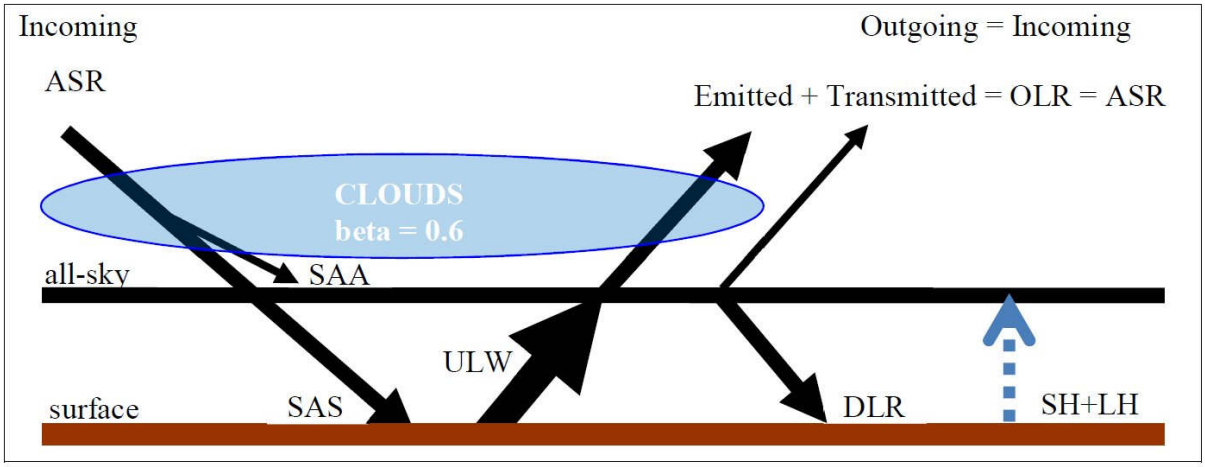
IV. Schematic model of the all-sky atmosphere of Earth
(semi-transparent in SW and LW, turbulent):



In the all-sky mean, Earth maintains a delicate equilibrium on the planetary level between two very different areas: the cloudless and the cloudy parts of the atmosphere. The cloudy part blocks, the cloudless part allows a surface transmission that is equilibrated to the longwave cloud radiative effect.

The cloud area fraction is also part of the cooperation which finally leads to a constrained surface energy budget and a definite energy flow structure:

E(SRF, all) = SAS + DLR = ULW + SH + LH

= OLR(clear) + OLR(all)

= 2OLR(clear) – STI(all)

= 2OLR(all) + LWCRE

as shown in more detail in our energy budget poster.

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As a result of the 'closed-into-a-glass-shell-greenhouse' model,
the energy flows show a discrete, integer-multiple characteristics.

We presented the observed values of the F flux terms in Earth's global energy budget as

$F = F_0 + \Delta F$, where $F_0 = N \times U$; N is an integer, U is a unit flux and ΔF is a deviation.

Based on the published data we have shown that:

with the flux unit U = LWCRE, the elements fit into an all-sky pattern;
with U = LWCRE/ β into a cloudy pattern, and
with U = STI(clear) into a clear-sky pattern.

The ΔF deviations of the observed F values from their F_0 pattern positions are smaller (typically within ±2 W/m2) than ±1σ range (typically ± 4W/m2) of data uncertainty.

According to the data, in the global average,
the sum of the energy flows at the surface seems to be unambiguously determined
by the energy flows at TOA, within an imbalance, separately for the clear, cloudy and the all-sky case:

E(SRF, clear) = 2OLR(clear)

E(SRF, cloudy) = OLR(clear) + OLR(cloudy)

E(SRF, all) = OLR(clear) + OLR(all) = 2ASR + LWCRE.

The cloud area fraction is higly regulated as well, and being attached to the all-sky transfer function as

$\beta_0 = f_0(\text{all}) = \text{OLR(all)}/\text{ULW} = 3/5$.

Consequences

If this pattern is not purely coincidental but represents reality,
then the whole-number units maintain the given proper fractions, ratios and relationships,
and prevent the global state from continuous shifts and smooth internal reorganization.

As long as the all-sky flux values are multiples of LWCRE = OLR(all)/9, it can be inferred that

– The clear-sky and all-sky greenhouse factors occupy their exact pattern positions at

g(clear) = 1/3 and g(all) = 2/5; hence

– Elevated (enhanced) greenhouse effect is not possible.

The term "enhanced, elevated, increased greenhouse effect" is used
as in the IPCC (2013) WGI AR5 Chapter 02 and Chapter 08;
and would mean that ULW grows without increasing ASR or OLR.

If our structure is valid, this is not possible.

OLR(all) is made up from 9 blocks or bricks of units, ORL = 9 LWCRE,
ULW is made up from 15 blocks or bricks of units: ULW = 15 LWCRE.

They can move only together; the equilibrium all-sky transfer function is

f(all) = OLR/ULW = 9/15 = 3/5,

therefore the equilibrium all-sky greenhouse factor is

$g = 1 - f$ = (ULW – OLR)/ ULW = G(all)/ULW = 2/5 = 0.4,

and no smooth tendency or shift is possible.

Only vibrations, natural or externally triggered,
annual or decadal or centennial or millennial or longer
variability is allowed around the 'grid' (F_0) value.

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If the structure described here is true
– and it seems to us that *all* the fluxes occupy their F_0 position precisely –,

than ULW, and G, and *g* cannot increase without an increase in ASR (or OLR).

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That's why we'll say that the equilibrium greenhouse sensitivity is zero for increasing CO2:

Note:
The latter does *not* mean that CO2, H2O do not have IR emission/absorption.
It means only that, according to the published CERES data,
all the fluxes are sitting in their pre-determined position,
and their value is a whole-number multiple of LWCRE — which, in turn, equals to ASR/9.

Therefore, the whole atmospheric temperature and IR absorption/emission structure
(including the water vapor amount, greenhouse effect magnitude and cloud formation)
is created, organized, prescribed by the complete
albedo - cloud area fraction - SW absorption - LW emission
(and evaporation, precipitation, atmospheric IR transparency, window value etc.)
structure.

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Hence, based on the above considerations, it can be stated that:

- The equilibrium greenhouse sensitivity (EGS) is then zero;

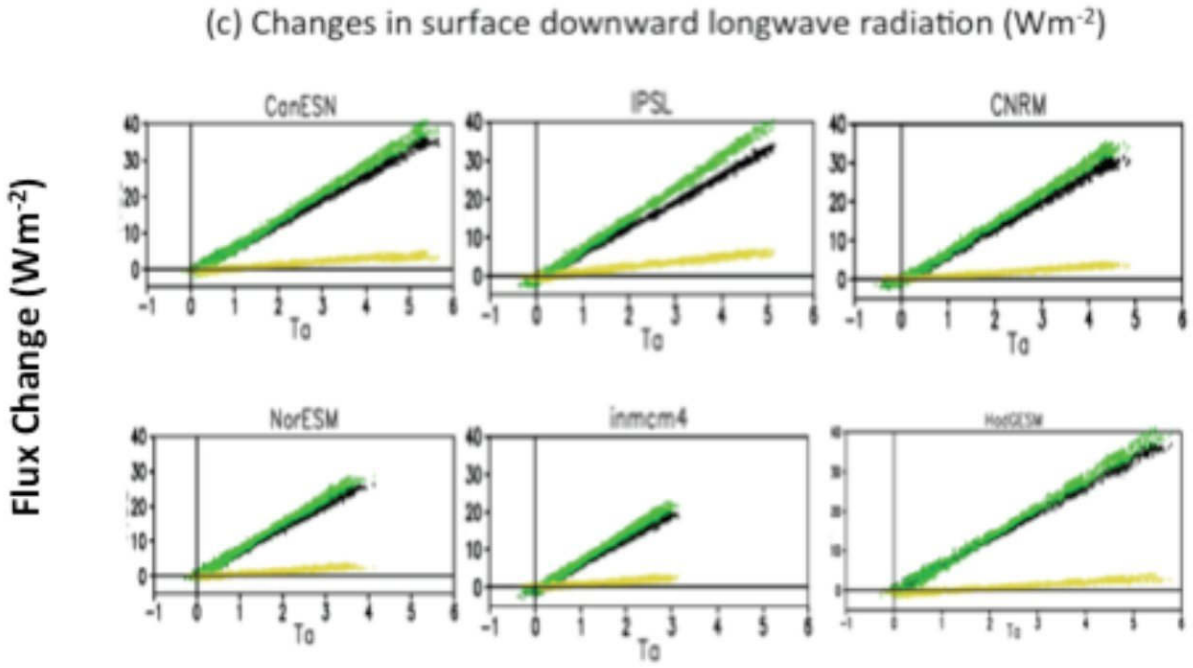
- The equilibrium climate sensitivity (ECS) might contain only secondary (indirect) effects;

- 'Global warming' is not greenhouse warming,

- "Holding the increase in the global average temperature to well below 2 °C above pre-industrial levels",
as the Paris Climate Agreement says, assumes an invalid connection between CO2 and global temperatures.

We may infer further from here that:

The model-predicted gradual 30 W/m2 increase in the flux of DLR to the end of this century, as function of changing surface air temperature forced by a 1% per year increase in CO2, as shown in the Supplementary Information to the Stephens et al. (2012) Nature Geoscience paper, is not possible:



Stephens et al. 2012 NGEO1580 Suppl Inf Figure S2 (c)

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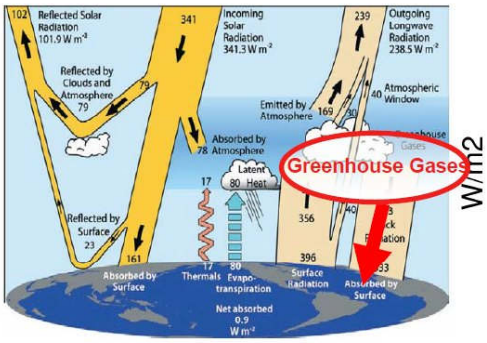
The main consequence of our results can be given in the verifiable form of a forecast:

If the structure we have presented in our paper and in this website is true;
if the flux values continue to occupy their grid position as whole-number multiples of LWCRE;
if LWCRE remains a brick being equal to one-ninth of OLR(all);
if DLR remains to be built up from 13 bricks of LWCRE

then the model-predicted smooth or gradual increase in DLR as a result of increasing CO2,
as shown in a Wild 2011 WMO presentation

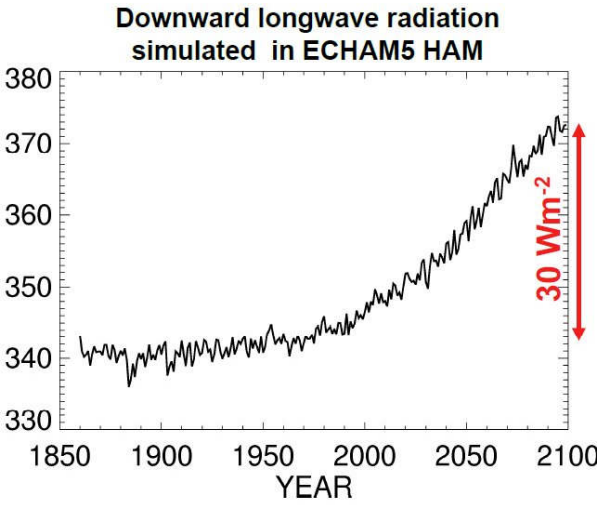
will not happen:

Changes in downward longwave radiation



W/m2

- most directly affected by changes in atmospheric greenhouse gases
- expected to undergo largest change of all radiative fluxes: 30 Wm^{-2} over 21th century



Model-projected increase: 3 Wm^{-2}/decade

Wild et al. 1997 J. Climate
Wild et al. 2001 J. Climate
Wild et al. 2005 Gewex News

ETH INSTITUTE FOR ATMOSPHERIC AND CLIMATE SCIENCE

Slide #27 from the presentation M. Wild (2011) BSRN: Science and Operations Update

Questions and challenges

- Timescale and magnitude of possible fluctuations ("vibrations") around the pattern (grid) positions?

- Systematic deviations from the grid positions?

- "Quantum jumps" between the grid positions ("ground state" vs. "excited states")?

- Same global average with different regional, vertical and/or seasonal distributions?

- Another stable global configuration?

- Another eigenvalue for the albedo $\alpha_0 = 1 - \sin 45° = 1 - \sqrt{2}/2 = 0.293$?

- Another eigenvalue for the cloud area fraction $\beta_0 = f_0(\text{all}) = 0.6$?

- Effects of increasing CO2?

- Behavior of clouds (change in type, height and geographic distribution)?

- Ice ages? The trigger of the interglacial-glacial transitions?

- Where are the limits and the Achilles-heels of the stability of our climate?

- Which are the most dangerous human influences?

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Summary

Our results can be sorted into four different baskets,
each of them representing very specific types of constraints.

All of the following relationships are based on published observational data.

I.

We showed that the energy flows at the Earth's surface
are completely predetermined by the energy flows at TOA, and can be written as

$$E(SRF, clear) = (SH + LH)(clear) + ULW = 2\ OLR(clear)$$

$$E(SRF, cloudy) = (SH + LH)(cloudy) + ULW = OLR(cloudy) + OLR(clear)$$

$$E(SRF, all) = (SH + LH)(all) + ULW = OLR(all) + OLR(clear) = 2OLR(all) + LWCRE.$$

For the latter, let us repeat it in quantitative form, in W/m2:

$$E(SRF, all) = 106.4 + 399.0 = 239.4 + 266.0 = 2 \times 239.4 + 26.6\ .$$

*

The physical content of this equality may be expressed this way:

The Earth's atmosphere is almost opaque in the infrared:
only one-fifteenth of the surface upward longwave emission reaches TOA
through the open atmospheric window.

In the SW-transparent, LW-opaque non-turbulent closed glass-shell model,
where all surface upward longwave emission is absorbed by the shell,
the surface energy balance equation reads:

$$E(SRF, closed) = 2OLR(closed)$$

According to the best available data,
in the clear-sky part of the Earth we have the same as

E(SRF, clear) = 2OLR(clear).

In the all-sky case, STI(all) is lost in space:

E(SRF, all) = 2OLR(clear) – STI(clear)

but it is gained back by the longwave cloud effect:

E(SRF, all) = 2OLR(all) + LWCRE.

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In the shell model, the greenhouse effect is:

G(shell) = ULW – OLR = OLR.

The glass-shell radiates downward and upward equally:

DLR(shell) = OLR(shell)

therefore

ULW(shell) = E(SRF, shell).

In the all-sky mean, Earth has *higher* DLR and *lower* ULW than in the closed shell model,

and the difference in both cases is the turbulent flux:

DLR(all) = OLR(all) + (SH + LH)(all)

and

ULW = E(SRF, all) – (SH + LH)(all).

II.

We showed that in the above-said LWCRE-modulated 'closed box' model, the energy flows follow a discrete pattern:

the global average clear-sky, cloudy-sky and all-sky energy flows
can be written as integer multiples of the flux element of STI(clear), LWCRE/β, and LWCRE:

$$F = F_0 + \Delta F,$$

with $F_0 = I \times UNIT$,

where I is an integer, and

UNIT(clear) = STI(clear),

UNIT(cloudy) = LWCRE/β

UNIT(all) = LWCRE.

With the numbers,

UNIT(clear) = 66.5 W/m2,

UNIT(cloudy) = LWCRE/β = 44.33 W/m2

UNIT(all) = LWCRE = (1 – β) × STI(clear) = 26.6 W/m2,

depending on the value of OLR(clear) as LWCRE = OLR(clear)/10.

According to the published data, the ΔF deviation of the observed F values from the proposed F_0 equilibrium positions is typically less than ±2 W/m2, much less than the known observation error. This means that all F values are in the neighborhood of their F_0 position within one standard deviation. This suggests that all fluxes in our system occupy their 'grid' position very closely, with only small fluctuations around it, without a detectable systematic deviation.

III.

The amount of clouds seems also highly regulated, and the IR-opaque single-layer cloud area fraction equals to the equilibrium all-sky transfer function:

$$\beta_0 = f_0(\text{all}) = 3/5.$$

IV.

We have also recognized an equilibrium position for the Earth's albedo at

$$\alpha_0 = 1 - \sin 45° = 1 - \sqrt{2}/2 = 0.293.$$

*

If these four types of constraints prove to be long-standing and valid, then they might have a common physical origin, and together represent an energetically prescribed equilibrium state of our climate system.

Recent warming then might not be greenhouse warming but only natural or triggered oscillation (vibration) on historical time scale around the preferred equilibrium state.

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If the reader disagrees with us, it is fine. Let we refer to French moralist Joseph Joubert:

Il est préférable dé débattre d' une question sans la résoudre que de régler une question sans en débattre.

It is better to debate a question without settling it than to settle a question without debating it.