Greenhouse Effect Theory within the UN IPCC Computer Climate Models - Is It A Sound Basis?

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28 January 2019

This was published as a PROM paper in 2016
See Principia-scientific.org under
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Abstract

It is almost impossible these days to avoid the climate science debates about how we are not 'green' enough and that we are 'destroying the planet' through the burning of "fossil fuels". Apparently we, as we are repeatedly told, have to save the planet from humanity and most importantly, we have to save the planet from (computer modelled) man-made global warming.

This paper and accompanying Excel workbook (**Link 1**), Diagrams section (**Link 2**) and Reference Quotes section (**Link 3**), will attempt to put these debates into a proper perspective with regard to the scientific basis. It will be shown what calculation method was originally put into the climate model which is the acknowledged forefather of all current computer climate models. This method is presumably still being used to calculate greenhouse effect 'theory' within all current UN IPCC computer climate models, as it has never been stated, in any published literature, that any other method has been used, nor have there been any changes made to the original method.

Link 1 – Workbook 1
Link 2 – http://www.tech-know-group.com/Derek/diagrams.pdf
Link 3 – http://www.tech-know-group.com/Derek/quotes.pdf

Background and history

Link 4 - http://www.ipcc.ch/

Current United Nations Intergovernmental Panel on Climate Change (UN IPCC) computer climate modelling is making dire projections with regards to this planet's future, principally (supposedly) due to human activities. Those being human activities which cause carbon dioxide (CO_2) to be emitted to the atmosphere, i.e. any human activity at all (e.g. from cement manufacture, driving your car, heating your home, or even just simply breathing). According to the UN IPCC computer climate models, the extra carbon dioxide emitted due to human activities is accumulating in the atmosphere and this will intensify the so called 'natural greenhouse effect', which will cause (in the near future according to the computer model projections) dangerous man-made global warming. This raises questions with regard to the 'greenhouse effect' and 'theory' projected by UN IPCC computer climate modelling, which we are going to (supposedly) affect so dangerously by our CO_2 emitting activities.

The first question it would seem reasonable to ask, is "Who is the father (or mother) of what we now know as greenhouse effect 'theory'?" The answer to this question, it appeared, was unearthed by Alan Siddons (in 2013) and it was a hypothesis first put forward by Balfour Stewart in his 1871 book "An Elementary Treatise On Heat", page 228, Fig. 55.

Link 5 - https://books.google.de/books?id=9ggFAAAAQAAJ&printsec=frontcover&hl=de&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false

Balfour Stewart did not suggest that the shell, envelope or atmosphere radiated twice the amount of energy that it received from earth's surface, but it would seem many people later misinterpreted the hypothesis in that manner.

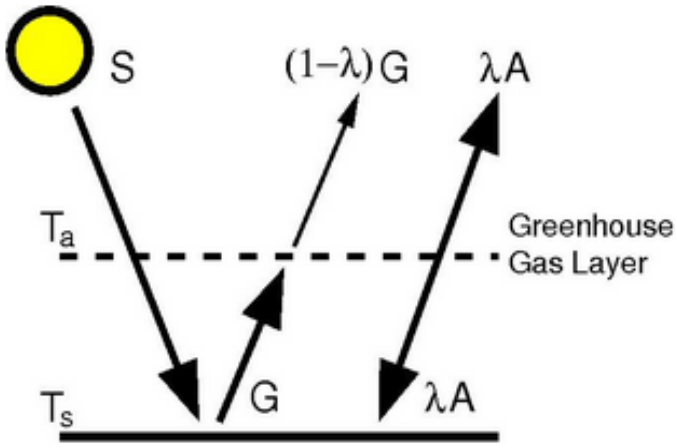
Stewart clearly stated the atmosphere radiated half the amount it received both up and down. Certainly in energy terms the statement "1 in (to the atmosphere from earth's surface) = 2 out (of earth's atmosphere)" became a recognisable feature of the hypothesis as it was later developed. More recently the 'theory' has been attempted to be explained as an earth's surface and atmosphere system, in a manner best described as "1 in to the system (from space) and 1 out of the system (to space) whilst 2 are circulating within the system (between the surface and the atmosphere)".

Below is a diagram using the more recent approach by Gavin Schmidt (NASA).

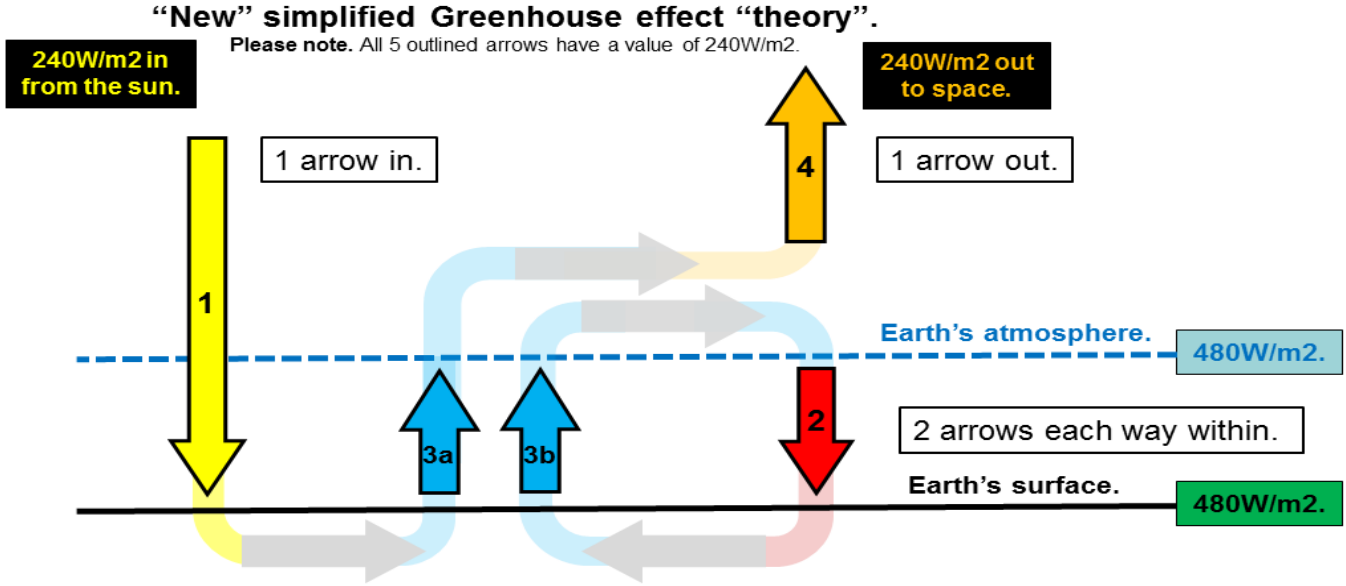
Link 6 - http://www.realclimate.org/index.php/archives/2007/04/learning-from-a-simple-model

The Greenhouse Effect

The basic case is set up like so: Solar radiation coming in is $S = (1 - a)\mathrm{TSI}/4$, where a is the albedo, TSI the solar 'constant' and the factor 4 deals with the geometry (the ratio of the area of the disk to the area of the sphere). The surface emission is $G = \sigma T_s^4$ where σ is the Stefan-Boltzmann constant, and T_s is the surface temperature and the atmospheric radiative flux is written $\lambda A = \lambda \sigma T_a^4$, where λ is the emissivity – effectively the strength of the greenhouse effect. Note that this is just going to be a qualitative description and can't be used to quantitatively estimate the real world values.



The above diagram by Schmidt is possibly more easily understood with the help of the below diagram.



1) Solar input = 240W/m2 to the earth's surface, every second.

2) Atmospheric back radiation adds a further 240W/m2 to earth's surface. Earth's surface therefore receives 480W/m2.

3a and 3b) The surface radiates the 480W/m2 it has received, and the atmosphere wholly absorbs this radiated energy.

4) The atmosphere which has received 480W/m2 radiates that energy both up and down. Half becomes atmospheric back radiation (arrow 2), and the other half is OLR to space (arrow 4).

It appears evident then, that Balfour Stewart is not the father of what is currently modelled as greenhouse effect 'theory'. However it does appear that he is the father of the hypothesis that was, and has since been, developed into greenhouse effect 'theory' as it is computer modelled today.

Maybe the question is better phrased as: "Who put greenhouse effect 'theory' into current computer climate models?" To answer this question the reader is referred to the paper linked to below.

Link 7 - httpwww.principia-scientific.org/publications/PROM/PROM-Alker-Modelling_History_of_Climatology.pdf

For comparison purposes the interested reader should also refer to

Link 8 - https://www.aip.org/history/climate/GCM.htm

The two pieces are quite different, but it becomes apparent they are describing the same history; albeit from somewhat different perspectives.

The reader is also referred to the Reference quotes section at the end of this paper. Within the quotes there is considerable information and detail that puts at least some meat on the bones of the story that is the development of greenhouse effect 'theory' within climate modelling. The whole story is simply too long, complex, involved and boring to recount here. Links 4 and 5 may be of interest in this respect.

However, the story in short is that Lewis Fry Richardson (LFR) is commonly credited as the father of modern computer climate modelling. This is because he took Vilhelm Bjerknes' graphs and plots approach and developed it into a purely mathematics only approach. LFR's model was published in 1922, in his book "Weather Prediction by Numerical Process" (WPNP), before computers had been invented. It was not well received at the time because it was (far) too complex to be calculated by hand and it had produced the wrong result in the one trial run LFR had done with it. LFR's climate model was forgotten about by almost all. In 1948 Jules Gregory Charney faithfully put LFR's climate model into the newly invented computers of the day. That computer model is what has been developed in to the plethora of such models today. However the models of today are all still basically the same model that LFR published in his 1922 book "WPNP".

Link 9 - https://archive.org/details/weatherpredictio00richrich

It is commonly stated, by many respected sources within current climate science, that the climate models of today are still basically the same 7 differential equations that LFR explained in his 1922 book "WPNP"; albeit the equations are now in a much more complex form. Thus it appears that LFR put greenhouse effect 'theory' in to what have been developed in to the current UN IPCC computer climate models.

When one reads LFR's 1922 book, that was originally written before 1911, it is apparent that some explanations are missing or incomplete. In several cases LFR refers the reader to other papers for the explanation of what is calculated and how it is calculated. This is the case for radiation theory within his climate model.

Specifically LFR refers the reader to two papers in this regard. These papers are

1) The Heat Balance of the Atmosphere.
W. H. Dines. F.R.S., F.R. Met. Soc.
Quarterly Journal of the Royal Meteorological Society
Volume 43, Issue 182, pages 151–158, April 1917

Link 10 - http://onlinelibrary.wiley.com/doi/10.1002/qj.49704318203/abstract

2) Atmospheric and Terrestrial Radiation.
W. H. Dines. F.R.S., F.R. Met. Soc.
Quarterly Journal of the Royal Meteorological Society
Volume 46, Issue 194, pages 163–174, April 1920

Link 11 - http://onlinelibrary.wiley.com/doi/10.1002/qj.49704619405/abstract

W. H. Dines' 1917 and 1920 papers explain what he and LFR refer to as radiation theory, that later became more commonly known as radiative transfer theory and that is now called the (radiative) greenhouse effect 'theory'.

Thus the answer to the question "Who put greenhouse effect 'theory' into climate modelling?" is that W. H. Dines. F.R.S., F.R. Met. Soc. produced the mathematical process ('theory') and he and Lewis Fry Richardson put this into the climate model that LFR was developing. According to LFR and his short history of writing the paper that is included in the Reference quotes section, this was started in earnest in 1913 and presumably was all but finished before Dines published his 1920 paper. It should also be noted that LFR extensively helped Jules Gregory Charney in the late 1940's and into the early 1950's, when Charney put LFR's mathematical climate model into a (by then invented) computer.

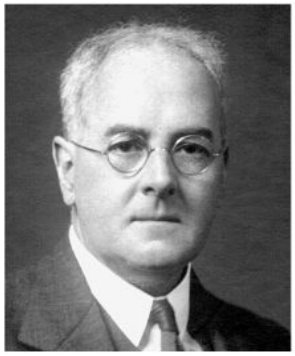
Link 12 - http://mathsci.ucd.ie/~plynch/Publications/JCP.pdf

Lynch
explains that LFR's calculation methods are still the basis of computer climate modelling to this day.
That is why trying to understand what LFR calculated is so important.

http://mathsci.ucd.ie/~plynch/Publications/JCP.pdf
P. Lynch, The origins of computer weather prediction and ..., J. Comput. Phys. (2007),
doi:10.1016/j.jcp.2007.02.034

"Richardson began serious work on weather prediction in 1913 when he was appointed Superintendent of Eskdalemuir Observatory, in the Southern Uplands of Scotland. He had had little or no previous experience of meteorology when he took up this position 'in the bleak and humid solitude of Eskdalemuir'. Perhaps it was his lack of formal training in the subject that enabled him to approach the problem of weather forecasting from such a breathtakingly original and unconventional angle. Richardson's idea was to express the physical principles which govern the behaviour of the atmosphere as a system of mathematical equations and to apply his finite difference method to solve this system"

"Richardson's forecasting scheme amounts to a precise and detailed implementation of the prognostic component of Bjerknes' program. It is a highly intricate procedure: as Richardson observed, 'the scheme is complicated because the atmosphere is complicated.' It also involved a phenomenal volume of numerical computation and was quite impractical in the pre-computer era. But Richardson was undaunted:



Perhaps some day in the dim future it will be possible to advance the computations faster than the weather advances.... But that is a dream.

Today, forecasts are prepared routinely on powerful computers running algorithms that are remarkably similar to Richardson's scheme – his dream has indeed come true."

"Richardson's brilliant and prescient ideas are now universally recognized among meteorologists and his work is the foundation upon which modern forecasting is built."

Lewis Fry Richardson (1881–1953)

Lynch 2007

LFR states in his 1922 book that there are few exceptions to the 2nd Law of Thermodynamics (LoTs). This is not correct however. There are no known exceptions to the 2nd LoTs. If there were any known exceptions then it would not be a Law (of Thermodynamics). If anyone finds an exception to the 2nd Law there is going to be a major upset in physics. So, it is most peculiar that several times LFR and (later) other respected commentators within climate science, stated that Bjerknes' mistake was to include the 2nd LoTs in his calculation and graphs method, from which LFR developed his modelling approach.

LFR, and (later) again other respected commentators within current climate science, such as Peter Lynch (2007) state that LFR corrected Bjerknes' mistake by conserving mass in favour of the 2nd LoTs. This is also not correct. One cannot conserve mass whilst ignoring violations of the 2nd LoTs. That simply is not physical, it is not possible. It invalidates whatever LFR is doing.

A simple version of the 2nd Law of Thermodynamics is that 'cooler (or the same) cannot heat (or add energy to) hotter (or the same)'.

The method that Dines used and that LFR incorporated into his climate model for atmospheric back radiation (as will be shown later in this paper), is done in violation of the 2nd LoTs. The justification for the method used is that it is supposed to conserve energy. However (as will be shown later in this paper), the method used creates and destroys energy, which also cannot be done. This is why in this paper, greenhouse effect 'theory' is in speech marks. It is to denote that it is not a theory at all, let alone proven.

It is in fact a failed hypothesis. One cannot ignore violations of, or knowingly violate, the 2nd LoTs and have a physical theory. FIRSTLY one would have to disprove the 2nd LoTs - and that has never yet been done.

This gives rise to the next logical question.

What is the Radiation theory that Dines and LFR put in to the climate model?

Please also see the accompanying Excel workbook (Link 1), Diagrams section (Link 2) and Reference Quotes section (Link 3) to this paper.

In Table 1 of Dines' 1920 paper, the radiation theory that was incorporated into LFR's climate model is given. The table is somewhat difficult to read at first glance, but it becomes considerably easier with the aid of some construction lines.

TABLE I.—METHOD OF CALCULATION.

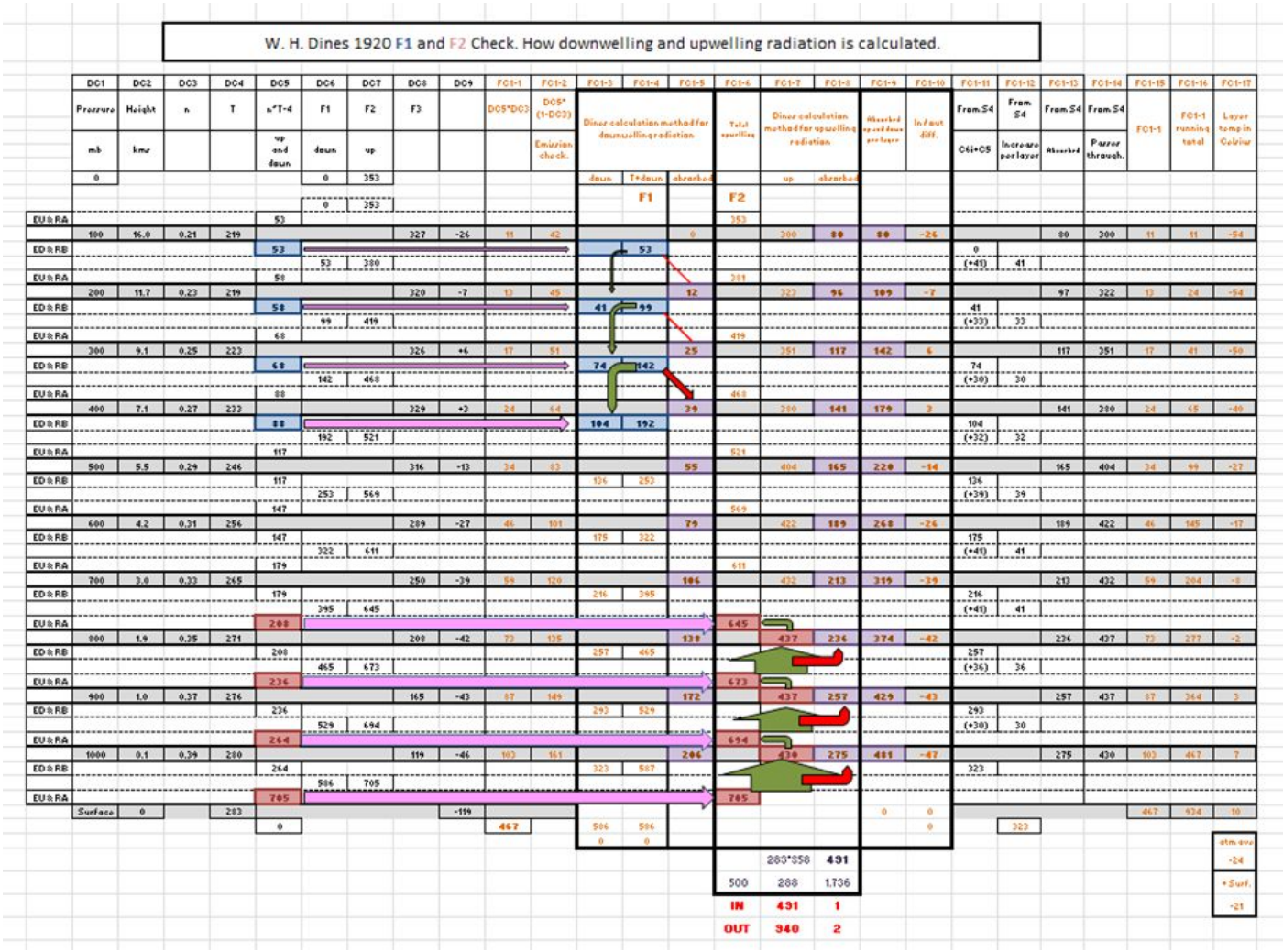
Pressure. mb.	Height. k.	η.	T.	$\eta\sigma T^4$.	F_1.	F_2.	F_3.	
0					0	353	353	
		·21	219	53				−26
100	16·0				53	380	327	
		·23	219	58				− 7
200	11·7				99	419	320	
		·25	223	68				+ 6
300	9·1				142	468	326	
		·27	233	88				+ 3
400	7·1				192	521	329	
		·29	246	117				− 13
500	5·5				253	569	316	
		·31	256	147				− 27
600	4·2				322	611	289	
		·33	265	179				− 39
700	3·0				395	645	250	
		·35	271	208				− 42
800	1·9				465	673	208	
		·37	276	236				− 43
900	1·0				529	694	165	
		·39	280	264				− 46
1000	0·1				586	705	119	

Unit of energy used for the amount of radiation is one gramme calorie, per square centimeter, per day.

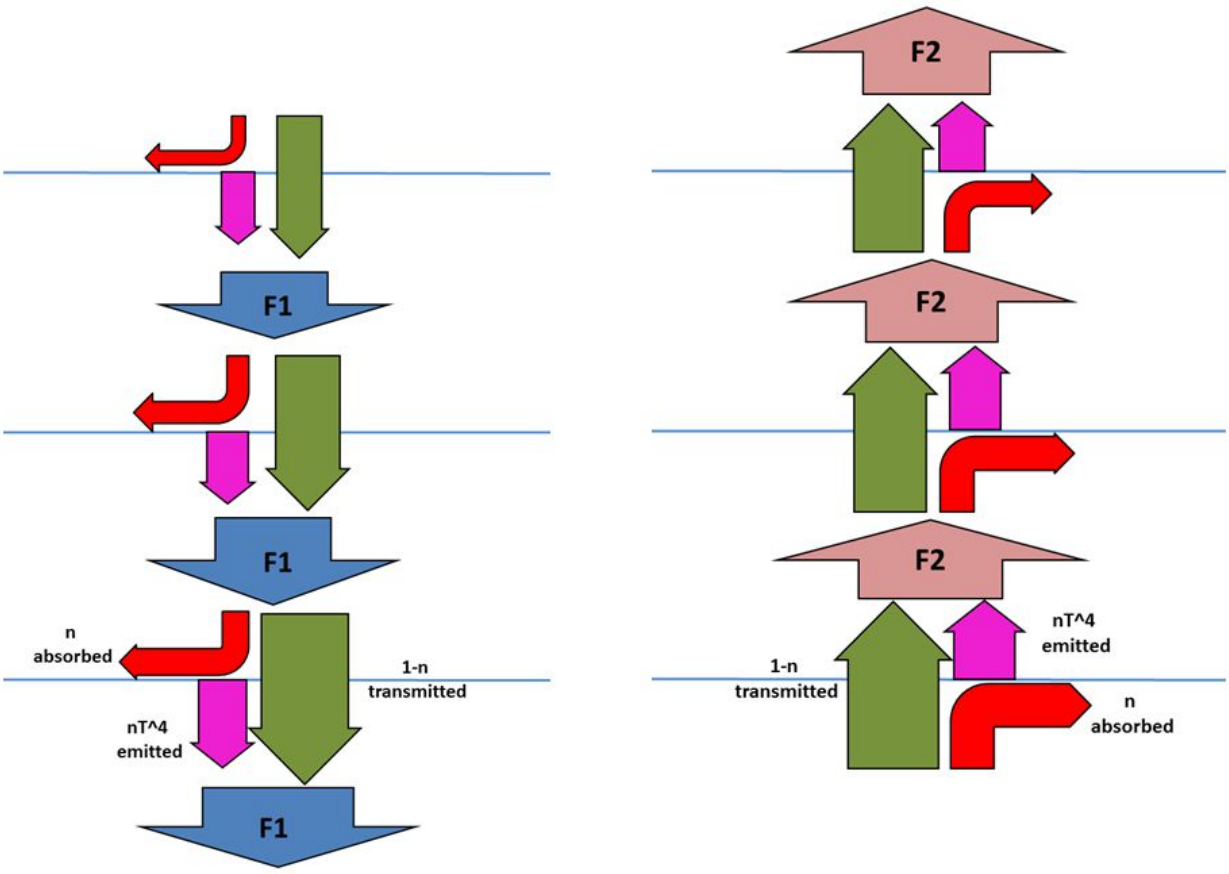
n =	Emissivity of atmospheric layer.
T =	Temperature degrees kelvin.
n^T-4 =	Radiation emitted each side of atmospheric layer.
F1 =	Downward emitted flux.
F2 =	Upward emitted flux.
F3 =	F2 - F1. The amount the layer is being cooled or warmed by some other process and or processes, because no change is occurring in the layers temperature.

The table could then be put in to an excel sheet. Once in an excel sheet it is merely a question of inserting columns and checking the given figures. This was done within the various work sheets within the Excel workbook and condensed in to one work sheet, the F1+F2 Checks sheet. Dines' 1920 paper, within the text, also simply explains what is calculated. Thus the two can be compared to check what is calculated and if it adds up correctly.

The main figures of interest in the Dines 1920 10 layer model are the F1 (downwelling atmospheric back radiation) and F2 (upwelling Outgoing Long-wave Radiation (OLR) radiation). F3 is merely F1 minus F2, thus F3 is of little further concern. The other columns in the original table are the layer conditions, temperature, pressure, n, amount radiated up and down due to temperature, and altitude. The figures that will be checked in the excel sheet (sheet named F1+F2 Checks) are the F1 and F2 figures.



Once this was done, a diagram of the calculation methods Dines used for the F1 and F2 figures was able to be produced.



For this study, a 10 layer and a 5 layer model were constructed in Excel. Some of the variables can be altered within the constructed Excel models to see how the models react to such changes. The 5 layer model appears to be a lot more sensitive to variable changes than the 10 layer model. Most modern computer climate models appear to use between 11 and 19 atmospheric layers.

What Table 1 is supposed to describe is an input to the base of the system, which is the figure at the base of the F2 column, ie 705. Then, via upwelling and downwelling radiation there are two outputs from the system. These are the figure at the top of the F2 column, which is OLR of 353 to space, and the figure at the bottom of the F1 column, which is atmospheric back radiation to earth's surface of 586.

TABLE I.—METHOD OF CALCULATION.

Pressure. mb.	Height. k.	η.	T.	$\eta\sigma T^4$.	F_1.	F_2.	F_3.	
0					0	353	353	
		·21	219	53				−26
100	16·0				53	380	327	
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500	5·5				253	569	316	
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600	4·2				322	611	289	
		·33	265	179				−39
700	3·0				395	645	250	
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800	1·9				465	673	208	
		·37	276	236				−43
900	1·0				529	694	165	
		·39	280	264				−46
1000	0·1				586	705	119	

Immediately there is something that appears to be incorrect. The system described by the table has an input of 705 and an output of (353+586) 939. Where and how has the increase from input to output occurred, when it is plainly stated there is no other energy source? Why has it occurred? 234 (934-705=234) has appeared from nowhere. It appears energy is being created by the mathematical method being used!

In the Excel workbook on the F1+F2 Checks sheet, coloured arrows have been added to try to illustrate the method of calculation for F1 (down) and F2 (up) and screen shots are also in the diagrams and plot section. It can be seen that a similar looking method is used to calculate both. For the figures in column F1 each layer absorbs the figures "n" of the radiation emitted downward from the cooler layer above. This is cooler heating (as described by adding energy to) hotter. This is a violation of the 2nd LoTs at every layer (except the uppermost layer). That is column FC 1-5 in the excel F1+F2 Checks sheet. This invalidates the 'theory'. Cooler cannot heat or add energy to hotter.

1-n of the radiation total from the above layer is transmitted through the layer AND the layer emits downwards due to its temperature. This total downward radiation goes through the same process in and through the next layer beneath, until earth's surface is reached.

In the F2 column a similar looking process is described upwards, until OLR is emitted to space. In this case as heat is passing upwards no violations of the 2nd LoTs occur.

As can be seen, the F1 and F2 columns appear to add up. However, there are a number of problems, as well as the repeated violations of the 2nd LoTs already mentioned.

Each layer, according to the calculation method used, absorbs an amount of radiative energy from above and below. However, the layer is given as being at an observed temperature, regardless of the energy it has absorbed. The layer then emits due to this observed temperature alone. Put simply, the absorbed energy is discarded by the calculation method.

If one closely looks at the FC 1-3 column and columns FC 1-11, FC 1-12 it becomes apparent that extra energy is added up layer by layer, until 323 of extra energy is emitted downwards to earth's surface at the bottom layer. BUT, only if radiation is considered by itself. That is the result of the misinterpretation of looking at the system from a radiation only point of view. This is an incorrect point from which to view the system. It is literally looking at the system with a radiative obsession ONLY.

The nT^4 column is a misapplication of Planck's Law of Emission. The law assumes the surface in question is emitting to space, which is what the figures in the column show. However, the surface is emitting to other surfaces ie, the layers above and below, in which case it is the difference (only from hotter to cooler) between the two surfaces' radiative emissions that should be calculated.

Link 13 - https://en.wikipedia.org/wiki/Planck's_law

The correct application of Planck's Law would result in far lower figures for upward radiation per layer and no figures at all for downward radiation. The figures in the nT^4 column are what most of the rest of the Dines 1920 table use to calculate from. In other words, if Planck's Law was applied as it should be, there would be no 'theory'. This is the basis of the 'net' arguments those who have taken some interest in the climate pseudo-science debates will no doubt be quite familiar with.

It would appear the answer to such debates is to state - "You have to apply the 2nd LoTs and Planck's law correctly, or disprove them both. If you cannot apply the Laws correctly or disprove them both then you have no 'theory' and therefore no argument."

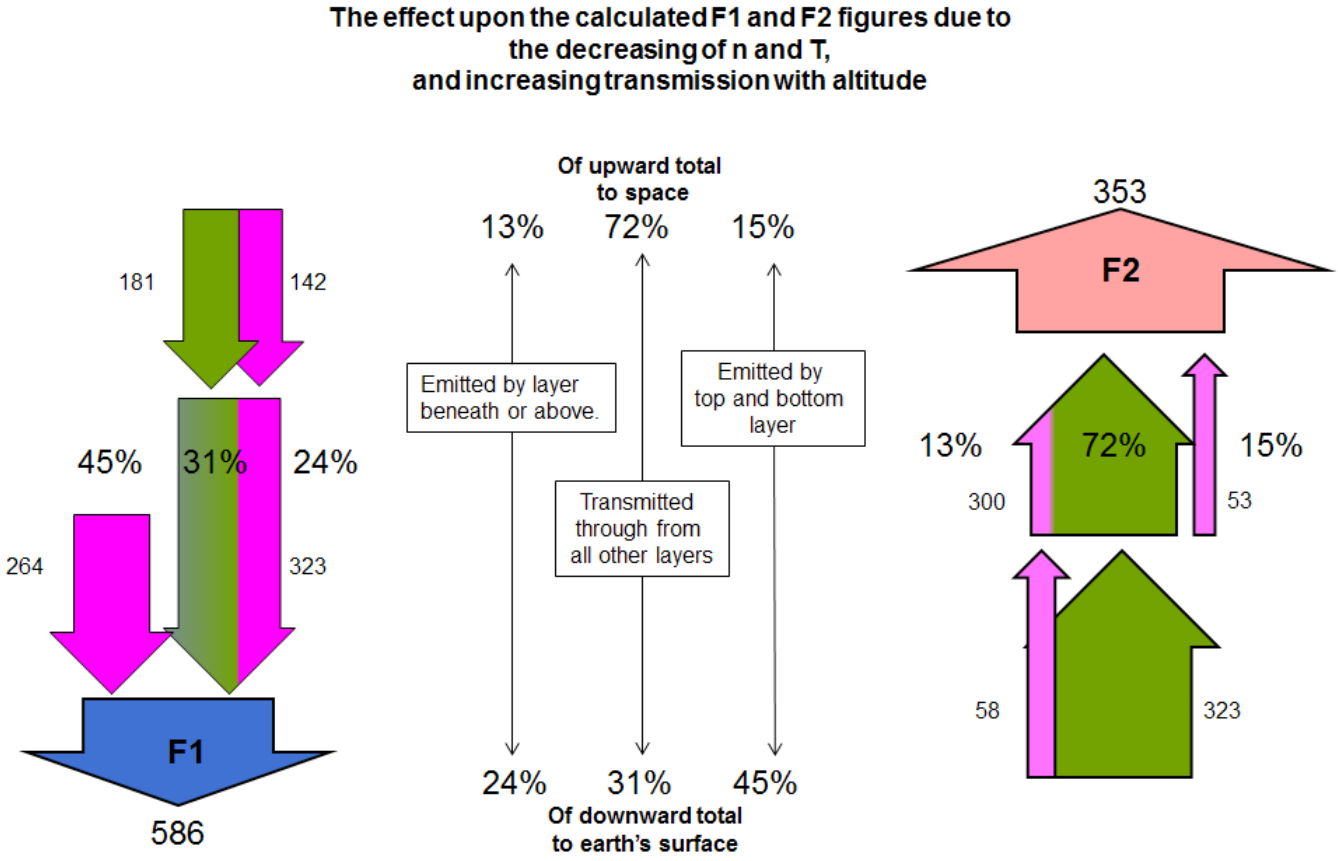
The use of the 'n' number is also peculiar, but interesting, and raises questions of itself. In the 'emitted due to temperature up and down' column (nT^4), 'n' is the portion of radiation emitted up and down that a black body of the same temperature would emit. Eg. 2(n) [up and down] plus 2 (1-n) [left and right] = 1 [what a black body would emit]. It is apparent from this calculation that use of the 'n' number means that each layer of the atmosphere is treated as if it were a perfect black body (BB)!

Whilst calculating the F1 and F2 figures, 'n' is also used as the amount absorbed figure. The logic appears to be n = absorption and n = emission.

Within the calculations of the table it is also apparent that the term 1-n has two different meanings. 1-n is what is laterally emitted in some columns AND it is the amount transmitted in other columns. Logically, it cannot be both in the same table!

There are a number of other more detailed problems with how F1 and F2 are calculated in regard to the way the n number and therefore the 1-n number (in reverse), changes layer by layer - as emissions due to temperature also change layer by layer. Some of these are explained in a little detail within notes on the appropriate diagrams in the Diagrams section. In short, FI appears to compound these issues and F2 appears to cancel out (to some extent) the same issues.

Thus for F2 the uppermost and next layer down determine 28% of the figure and for the FI figure the lowest and next layer above determine 69% of the figure. It is actually the exact opposite calculation and hence it has the exact opposite result.



The amount of energy emitted per layer in the table is purely determined by nT^4 multiplied by 2, regardless of what is absorbed. What is absorbed is simply disregarded in calculating the emissions of the layer. This is the absorbed energy being discarded - in effect it is destroyed.

This explains why, in the 10 layer excel model, the input can be raised (or lowered) dramatically and yet the system does not seem to be affected much by the extra (or less) input. For example in the 10 layer model the terrestrial input has to be raised to the figure of 9,200 in order to raise the F2 figure to 586. This shows that the extra input, layer by layer, is almost all discarded, because 1-n is absorbed, but what is absorbed does not affect the layer's temperature or emissions.

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
	Pressure mb	Height kms	n	T	n^T-4 up and down	Atmos. Back radiatio	Increase in G per layer	Total downward radiation	Downward absorbed		Upward Passes through	Upward absorbed	Absorbed up and down			Dines last column	R-Q Check
								F1 Down		F2 Up					F3		
	Space					0		0		586					586		
					53					586							
0.21	100	16.0	0.21	0.21		0		53	0		533	142	*142*	36	621	-26	-62
					53												
					58					674							
0.23	200	11.7	0.23	0.23		41	41	99	12		616	184	*196*	80	702	-7	-87
					58												
					68					801							
0.25	300	9.1	0.25	0.25		74	33	142	25		733	244	*269*	133	835	+6	-127
					68												
					88					977							
0.27	400	7.1	0.27	0.27		104	30	192	38		889	329	*367*	191	1026	+3	-188
					88												
					117					1217							
0.29	500	5.5	0.29	0.29		136	32	253	56		1100	449	*505*	271	1297	-13	-284
					117												
					147					1550							
0.31	600	4.2	0.31	0.31		175	39	322	78		1403	630	*709*	415	1712	-27	-442
					147												
					179					2033							
0.33	700	3.0	0.33	0.33		216	41	395	106		1854	913	*1019*	661	2373	-39	-700
					179												
					208					2768							
0.35	800	1.9	0.35	0.35		256	41	464	138		2560	1378	*1516*	1100	3473	-42	-1142
					208												
					236					3938							
0.37	900	1.0	0.37	0.37		293	36	529	172		3702	2174	*2346*	1874	5347	-43	-1917
					236												
					264					5876							
0.39	1000	0.1	0.39	0.39		322	30	586	206		5612	3588	*3794*	3266	8614	-46	-3312
					264												
										9200							
	Surface							586		9200							

In the Excel sheet the terrestrial input can be altered to zero, yet the atmospheric back radiation to earth's surface, as calculated by the model, does not change. Each layer of the modelled atmosphere emits due to its temperature, but the temperature for the layer is a given. This, therefore, is emitted energy that has no other source than of itself. This is created (by the model) energy. This happens in the model because what should be a product of the energy flowing within the model (the energy absorbed by the layer) is actually an inserted 'observational value'.

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
	Pressure mb	Height kms	n	T	n~T-4 up and down	Atmos. Back radiatio	Increase in G per layer	Total downward radiation	Downward absorbed		Upward Passes through	Upward absorbed	Absorbed up and down			Dines last column	R-Q Check
								F1 Down		F2 Up					F3		
	Space					0		0		335					335		
					53					335							
0.21	100	16.0	0.21	0.21		0		53	0		282	75	75	-31	303	-26	5
					53												
					58					356							
0.23	200	11.7	0.23	0.23		41	41	99	12		298	89	101	-15	289	-7	8
					58												
					68					388							
0.25	300	9.1	0.25	0.25		74	33	142	25		320	107	131	-5	284	+6	11
					68												
					88					426							
0.27	400	7.1	0.27	0.27		104	30	192	38		338	125	163	-13	271	+3	16
					88												
					117					463							
0.29	500	5.5	0.29	0.29		136	32	253	56		346	141	197	-37	234	-13	24
					117												
					147					488							
0.31	600	4.2	0.31	0.31		175	39	322	78		341	153	231	-63	172	-27	36
					147												
					179					494							
0.33	700	3.0	0.33	0.33		216	41	395	106		315	155	261	-97	75	-39	58
					179												
					208					470							
0.35	800	1.9	0.35	0.35		256	41	464	138		262	141	279	-137	-62	-42	95
					208												
					236					402							
0.37	900	1.0	0.37	0.37		293	36	529	172		166	98	270	-202	-265	-43	159
					236												
					264					264							
0.39	1000	0.1	0.39	0.39		322	30	586	206		0	0	206	-322	-586	-46	276
					264												
										0							
	Surface							586		0							

This can be shown in the Excel 10 layer model by leaving the terrestrial input at 705 but altering all the layer emissions to zero. When this is done the model produces no atmospheric back radiation to earth's surface (F1 = 0), and little OLR is emitted to space (F2 = 19). Of course each layer's emissions should be a product of the temperature it attains because of what it absorbs, but that, as is clearly shown, is not what the Dines table and model does.

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
	Pressure mb	Height kms	n	T	n^T-4 up and down	Atmos. Back radiatio	Increase in G per layer	Total downward radiation	Downward absorbed		Upward Passes through	Upward absorbed	Absorbed up and down			Dines last column	R-Q Check
								F1 Down		F2 Up					F3		
Space	0					0		0		19					19		
					0					19							
0.21	100	16.0	0.21	0.21		0		0	0		19	5	5	5	24	-26	-31
					0												
					0					24							
0.23	200	11.7	0.23	0.23		0	0	0	0		24	7	7	7	32	-7	-14
					0												
					0					32							
0.25	300	9.1	0.25	0.25		0	0	0	0		32	11	11	11	42	+6	-5
					0												
					0					42							
0.27	400	7.1	0.27	0.27		0	0	0	0		42	16	16	16	58	+3	-13
					0												
					0					58							
0.29	500	5.5	0.29	0.29		0	0	0	0		58	24	24	24	81	-13	-37
					0												
					0					81							
0.31	600	4.2	0.31	0.31		0	0	0	0		81	37	37	37	118	-27	-64
					0												
					0					118							
0.33	700	3.0	0.33	0.33		0	0	0	0		118	58	58	58	176	-39	-97
					0												
					0					176							
0.35	800	1.9	0.35	0.35		0	0	0	0		176	95	95	95	271	-42	-137
					0												
					0					271							
0.37	900	1.0	0.37	0.37		0	0	0	0		271	159	159	159	430	-43	-202
					0												
					0					430							
0.39	1000	0.1	0.39	0.39		0	0	0	0		430	275	275	275	705	-46	-321
					0												
										705							
Surface								0		705							

The energy flow the model is supposed to calculate, and therefore describe, cannot be (and is not) modelled. It is simply a false method, and invalidates the method used and the 'theory' it is supposed to calculate and describe.

Energy cannot be created, and energy cannot be destroyed. The Dines table creates energy and destroys energy. Both Dines and LFR state the method used to calculate atmospheric radiation is based upon the conservation of energy, to correct Bjerknes' mistake of including the 2nd LoTs. However, when one looks at the table a little closer it can be seen that the table does not conserve energy - it creates and destroys energy (in the ways described above). This has been presented in such a way as to give the appearance of conserving energy. What the table describes and is purported to describe, cannot happen in physical reality. This invalidates the 'theory' by the method used to calculate it.

This raises the question: "Does the fact that the calculation method used, that destroys the absorbed energy per layer, have any other effects?" In the text of WPNP on pages 46 to 64, LFR goes into some detail to describe how he incorporates the works and findings from various respected sources (C. G. Abbot, E. Gold, A. Ångström, M. A. Boutaric, F. E. Fowle, W. H. Dines, F. Lindholm, L. V. King, R. S. Whipple and Sir Napier Shaw) and their publications, in calculating how much solar input is absorbed per atmospheric layer. This suggests LFR has included "the best science of the day" in his calculations.

However, because the absorbed energy per atmospheric layer is destroyed, then "the best science of the day" is simply replaced in LFR's calculations with an "observational value".

The ‘theory’ that the Dines 1920 Table 1 describes starts with a misapplication of Planck’s Law, which generates grossly exaggerated up and none existent down radiative emissions figures. Then, layer by layer, part of the downward radiation is added to the layer below in violation of the 2nd LoTs.

Within the calculation method used, energy is created layer by layer (it has no other source than of itself), and destroyed layer by layer (it is absorbed and then discarded - in effect destroyed). This is all presented in such a way to give the appearance that energy is being conserved, when it is not being conserved.

The mathematical approach (greenhouse effect ‘theory’) only considers (summed) radiation (amounts) and this leads to misinterpretations of the figures. In reality, many other processes are adding and subtracting energy and / or mass (water vapour, liquid water, ice for example) from each layer thus resulting in a net loss or gain of energy to that layer. To (supposedly) only consider what was originally only terrestrial radiation as an explanation of the net energy gain or loss per layer is a gross error and invalidates the ‘theory’ and the mathematical approach used.

It is also of interest to note that in the Dines 1917 paper the earth’s surface was given as a surface at 288K (15C) emitting 500. In the Dines 1920 table the surface is given as being cooler, 283K (10C), yet it is emitting far more energy, 705? It is a physical fact that the same object when cooler always emits less than when it is hotter

Dines mathematical greenhouse effect “theory”. Dines 1917

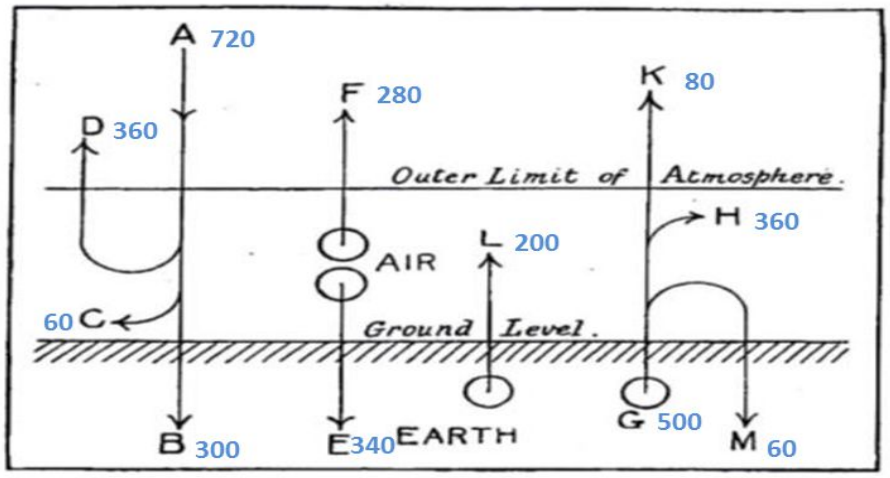


Fig. 1.

How to tell this is the forerunner of computer modelled GH “theory”?
One into and out of the system, B = 300 at earth’s surface, F+K = 360 emitted to space
whilst there is depicted,
two within the system, B+E+M = 700 at earth’s surface, and in the atmosphere, H+L+M+C = 680.
AND,
A colder atmosphere is shown as heating the warmer earth’s surface by atmospheric back radiation.

Dines states in both papers that the earth’s surface is treated as a black body. Dines, for the surface only, changes Stefan’s constant (the Stefan Boltzmann constant) between the two papers. That is how Dines made the cooler surface emit more, although no actual reasoning or justification, involving physics, of the change is given. If the emission for the Dines 1920 table surface temperature is guesstimated using the standard black body curve, then the figure, it would appear, at the bottom of the F2 column should be close to 470.

This would mean that the Dines 1920 table is describing a system in which 470 in = 940 out. ie, 1 in = 2 out. This, it appears, is greenhouse effect (GHE) ‘theory’ being calculated in 1920, and being put into the climate models as we know them and GHE ‘theory’ today.

Conclusion

What Dines and LFR calculated as radiation theory is not a physical theory, it is a failed hypothesis. It is a failed hypothesis because, in the ways described above, it is not a physical hypothesis. The calculation method used is based upon a misrepresentation and use of Planck's Law of Emission, repeated violations of the 2nd LoTs, and creating and destroying energy. Thus the 'theory', whether it is called radiation theory, radiative transfer theory or greenhouse effect theory is invalidated.

Are the computer climate models of today, that are described as using basically the same, albeit much more complicated, differential equations that LFR used, still calculating the Dines model that LFR put into his climate model? It would appear so, unless we can be shown otherwise. If we cannot be shown otherwise then the current computer climate models are not calculating from a sound basis. They are now known to be calculating from a false basis, and are therefore all invalidated.

A return to, and continuation of, the physical approach used by Vilhelm Bjerknes and the great groundwork of the Bergen School of Meteorology that he set up, would seem to be a reasonable suggestion for the future direction of climate science, given that most of that groundwork remains the basis of modern meteorology, albeit that which is not computer modelled.

Links Summary

Link 1 – http://www.tech-know-group.com/Derek/wbk1.xls

Link 2 – http://www.tech-know-group.com/Derek/diagrams.pdf

Link 3 – http://www.tech-know-group.com/Derek/quotes.pdf

Link 4 - http://www.ipcc.ch/

Link 5 - https://books.google.de/books?id=9ggFAAAAQAAJ&printsec=frontcover&hl=de&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false

Link 6 - http://www.realclimate.org/index.php/archives/2007/04/learning-from-a-simple-model/

Link 7 - http://www.principia-scientific.org/publications/PROM/PROM-Alker-Modelling_History_of_Climatology.pdf

Link 8 - https://www.aip.org/history/climate/GCM.htm

Link 9 - https://archive.org/details/weatherpredictio00richrich

Link 10 - http://onlinelibrary.wiley.com/doi/10.1002/qj.49704318203/abstract

Link 11 - http://onlinelibrary.wiley.com/doi/10.1002/qj.49704619405/abstract

Link 12 - http://mathsci.ucd.ie/~plynch/Publications/JCP.pdf

Link 13 - https://en.wikipedia.org/wiki/Planck's_law

Link 14 - http://www.tech-know-group.com/essays/Basic_geography.pdf

Link 15 - http://www.tech-know-group.com/essays/What_is_Man_Made_Global_Warming_Theory.pdf

Link 16 – https://www.youtube.com/watch?v=pOYgdQp4euc