IAUC Newsletter

International Association for Urban Climate

www.urban-climate.org

Issue No. 21
February, 2007.

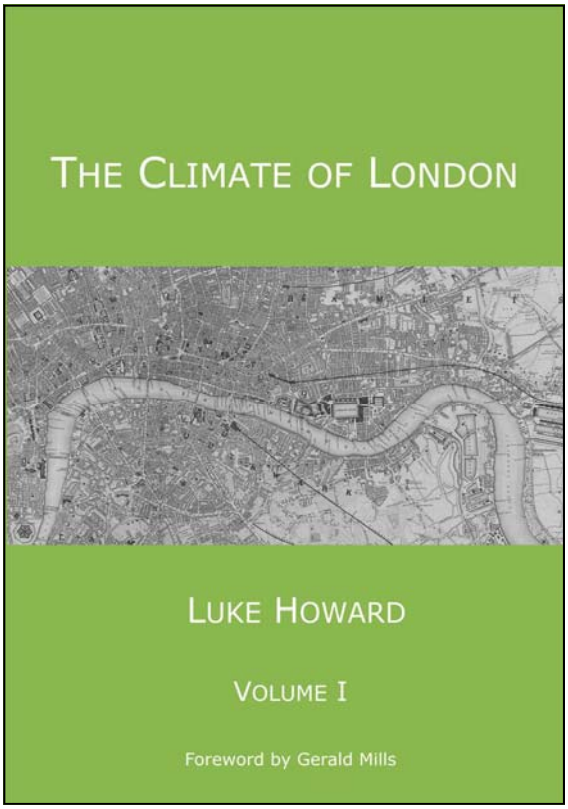
President's Column

Welcome to the first newsletter of the IAUC in 2007. The new year has brought a few changes in the executive of the IAUC Board. Sue Grimmond has completed her term as President. On behalf of the Board and members of IAUC I want to extend my sincere thanks to her. Since the summer of 2003 Sue has very ably and with a lot of energy and foresight presided over the IAUC. To a large part it is because of her determined actions that IAUC is the prospering society it is today. Amongst Sue's many achievements I would like to particularly mention the introduction of this flourishing newsletter, the promotion of strong linkages with other cognate organizations such as WMO and the supervision of the recent, very successful and popular ICUC6 in Göteborg (Sweden). For the next 3 years I will take over as President and Jennifer Salmond will be the new Secretary. I am looking forward to work together with Jenny who I am sure will be a very competent assistant in this joint venture.

The future of IAUC, I believe, depends on three needs which will be my highest priority during my tenure:
Communication. ICUC meetings have been very successful in the past and should remain a central focus of IAUC. The selection of the host for ICUC7 will be an important task. The excellent newsletter enjoys wide distribution and continues to grow. It ought to have strong support. The urban climate e-mail list and the webpage will remain important portals for the exchange of information of interest to urban climatologists. I will support an expansion of the webpage to make it the information portal of choice for students and educators interested in urban climate issues.
Outreach. IAUC should develop in such a way that younger generations will be inspired to join. One focus of our outreach activities should be on the developing world, India and China. The reward for doing this well is sustained growth in membership as well as continued relevance and representation in regions where urban climate related problems will become increasingly important in the coming decades.
Participation. IAUC functions well because of the dedication and enthusiasm of individual members. Besides Board members I would like to include more general members in administrative and organizational activities. This will be essential for IAUC to achieve the future we desire. If you have any constructive suggestion or would like to become involved please feel free to contact me or Jenny Salmond (j.salmond@bham.ac.uk).

With your support I will work towards an IAUC that continues to develop a strong profile.

Matthias Roth
geomr@nus.edu.sg



The IAUC Edition of Luke Howard's The Climate of London is nearly complete. This edition is based on a second edition of Climate produced in 1833, which consisted of three volumes. The IAUC edition will be published in two parts. The first part comprises Volume I, which provides a description of the elements of climate as observed from the vantage point of London. It contains Howard's assessment of the urban heat island phenomenon. The second part, comprises Volumes II and III, which contain Howard's daily observations. We expect that both volumes will be ready for purchase within a month and the membership will be informed of their availability.

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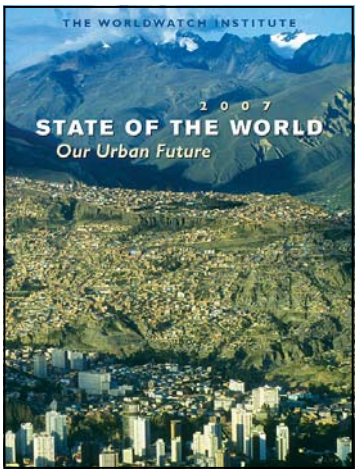
Urban Climate News

Cities Key to Tackling Poverty, Climate Change
Worldwatch Institute – January 10, 2007 – 6:01pm



Washington, D.C.—If global development priorities are not reassessed to account for massive urban poverty, well over half of the 1.1 billion people projected to join the world's population between now and 2030 may live in under-serviced slums, according to State of the World 2007: Our Urban Future, released today by the Worldwatch Institute. Additionally, while cities cover only 0.4 percent of the Earth's surface, they generate the bulk of the world's carbon emissions, making cities key to alleviating the climate crisis, notes the report.

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State of the World 2007 includes in-depth case studies—CityScapes—of the following cities:

- Timbuktu, Mali: Greening the Hinterlands
- Loja, Ecuador: Ecological and Healthy City
- Lagos, Nigeria: Collapsing Infrastructure
- Freetown, Sierra Leone: Urban Farms After a War
- Los Angeles, U.S.A.: End of Sprawl
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- Brno, Czech Republic: Brownfield Redevelopment

(Source: http://www.worldwatch.org/).

Progress towards an urban model comparison experiment

At ICUC-6 held in June last year at Göteborg, we announced our intention to undertake an urban model comparison for the surface energy balance. Whilst things have been moving slowly, we have made progress!

A proposal for funding was submitted to the National Environmental Research Council (NERC, one of the UK's research funding bodies) towards the end of last year and we are currently awaiting the first round of reviews. This proposal concentrates on the big science questions for the comparison, namely:

- What are the dominant physical processes in an urban area?
- What is the appropriate level of detail for a model to be fit for purpose?
- What information is required for such models?
- What should future observational campaigns include?

In order to achieve a successful comparison there needs to be a significant amount of preliminary work and design of the comparison infrastructure. To move this work forward, the Met Office has funded King's College London to undertake a number of these initial tasks including:

- Creating a model inventory that can be used to classify the models
- Creating a test forcing dataset that can be used to enable the participants to undertake any developments required to take part in the experiment.
- Assessing observational datasets in urban locations and identifying a suitable dataset for the experiment.

As part of the test dataset, it is hoped that an initial limited comparison will be achievable, giving information that will be valuable for the analysis of the data for the full comparison experiment.

So far there has been a good response from the modeling community with about a dozen groups already completing the model survey (see below). Whilst this is sufficient numbers to give a worthwhile comparison, it would be better to include additional models that we know exist in the community and of course the models that we do not know that exist!! So this is a request for all modeling groups who have not engaged so far with this experiment. If you would like to be included, then please go to the comparison website (http://www.kcl.ac.uk/ip/suegrimmond/model_comparison.htm) and follow the instructions for filling out and returning the model questionnaire. Alternatively, please contact either Martin Best (martin.best@metoffice.gov.uk) or Sue Grimmond (sue.grimmond@kcl.ac.uk) for any further information.

Urban Climate News

NEWS RELEASE
15 January 2007

New approach to urban flooding to be tested

Fifteen new projects will consider how to reduce the impacts of urban drainage flooding in towns and cities across England and how best to adapt to the inevitable consequences of climate change. More intense and frequent rainfall events are expected as a result of climate change. The studies, announced by Defra today, will pinpoint areas at risk, identify the causes and consider the best ways of managing urban drainage to reduce future flooding.

Flooding from surface water and urban drainage in towns and cities currently costs the national economy £270 million on average each year, according to the Government's own research. But this could increase by up to £15 billion by the 2080s, if action is not taken.

The projects were announced during a visit by Ian Pearson, Minister for Climate Change and Environment, to Great Yarmouth, where residents have recently suffered from surface water flooding. Welcoming the launch of the £1.7 million pilots Mr Pearson said:

"Adapting to the impacts of climate change is vital if we are to manage the risks of flooding and coastal erosion. We can't ignore the consequences which is why we need to start adapting now.

"The issue of urban drainage flooding is of growing concern to towns and cities across England. Many homes and businesses have already suffered from the devastating impacts. But climate change will make the problem of urban flooding more serious because of the increased likelihood of more intense and frequent rain storms.

"These 15 pilot studies will test new approaches to reduce the future impact of urban drainage flooding on people's lives and their businesses. This will help us understand the problem of surface water flooding better in urban areas and will help us consider how arrangements can be improved in future."

The flooding of homes and businesses in towns and cities is typically due to a range of factors, including high river levels, concentrations of overland flow following heavy rainfall, limited capacity of drainage systems and blockage of waterways and drainage channels. Some problems can be isolated to a single cause but more often it is a combination of factors which causes the worst flooding.

Urban flooding is particularly challenging to manage – partly because several different organisations are responsible for different aspects of the problem including water companies, the Environment Agency, local authorities and the Highways Agency. The Integrated Urban Drainage pilot projects will see the various bodies working together to develop solutions and will help Government consider the best arrangements for reducing flood risk in our towns and cities.

The pilots will also provide new tools and techniques for mapping and managing surface water following heavy rainfall events and bring more clarity on responsibilities for those managing urban flood risk.

Among the projects to receive the go-ahead include:

- Thames Water will lead a project in North Brent, London where there is a significant history of flooding in the area from sewers and rivers. The partners in the project will produce a joint drainage strategy to alleviate sewer and river flooding for a wide range of potential rainfall events.

- Birmingham City Council and partners will work to gain an improved understanding of a whole range of flooding issues in the Upper Rea catchment, an area which includes the former Rover car plant in Longbridge and in which significant redevelopment is expected.

- In West Garforth, Leeds, culverted watercourses are a major cause of flooding, but responsibilities for the problem are unclear. Leeds City Council and partners will develop practical ways to overcome such problems of ownership, especially for urban culverts owned by several different organisations.

Sources: Text from http://www.defra.gov.uk/news/2007/070115b.htm and images from http://www.foresight.gov.uk/Previous%5FProjects/Flood%5Fand%5FCoastal%5FDefence/

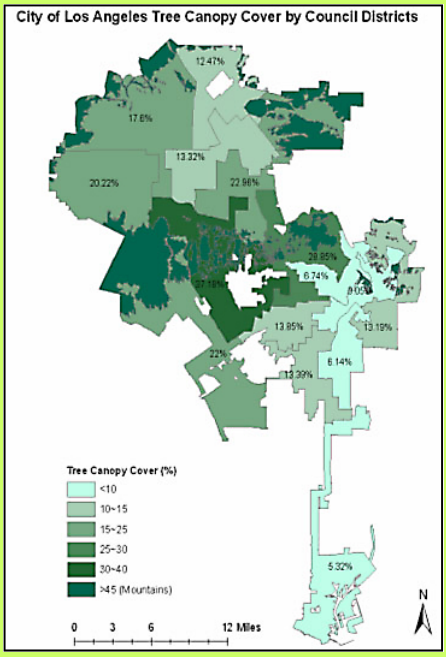
Urban Climate News

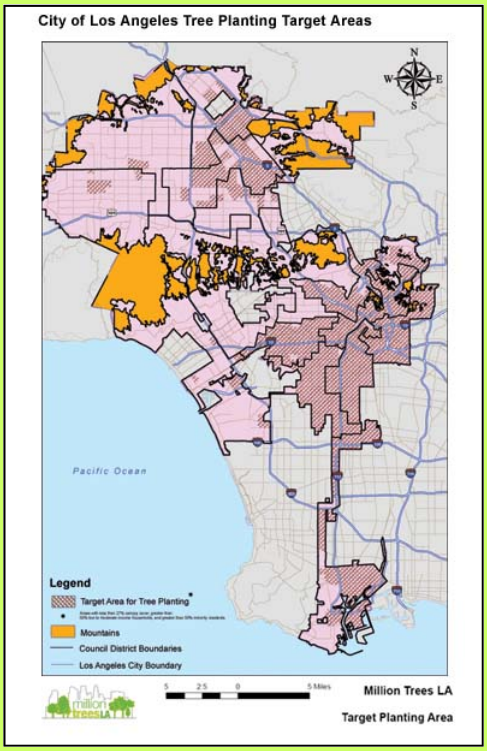
Los Angeles has begun a project to plant one million new trees. As described on the associated website (http://www.lacity.org/test/mtla07112006/) the project is an attempt to make LA a green, sustainable city. As part of the scheme a tree canopy analysis was carried out (right).

One million new trees in the City of Los Angeles will create an extraordinary environmental legacy that will serve as a watershed for other environmental changes.

- *The City of Los Angeles will be transformed to a green, sustainable city.*
- *It is a Community Effort*
- *Many of the one million new trees will be planted by City departments on public property. Others will be planted throughout the City by individual volunteers, community groups, organizations, and businesses.*
- *Million Trees LA is a cooperative effort between the City of Los Angeles, community groups, businesses, and individuals working together to plant and provide long-term stewardship of one million trees planted where they're needed most.*
- *Million Trees LA will take several years and build on other programs that plant and care for the urban forest.*
- *Trees that maximize sustainability – with a preference on native and drought tolerant species – are recommended.*
- *We're working with the USDA Forest Service, PSW Research Station, Center for Urban Forest Research, Davis, CA to prepare a science-based tree canopy analysis to identify priority areas using satellite imagery and recommend the right kinds of trees that will give the greatest ecological and societal benefits.*
- *Special attention will be given to schools, underserved communities, and those areas along the Los Angeles River.*
- *We're forming Public-Private Partnerships to plant large numbers of trees and to help fund Million Trees LA.*
- *We need the people living and working in this great city to volunteer to plant and care for trees on their private property. Everyone can help!*

Tree Canopy Analysis





A tree canopy analysis was conducted to determine where trees are located and the canopy area coverage. This allows for strategic planting in the future. The City of Los Angeles currently has a tree canopy cover of 18%. The national average for tree canopy cover is 27%.

Source of images: USDA Forest Service, PSW Research Station, Center for Urban Forest Research, Davis, CA

Urban Climate News

Abstracted article from an online Newspaper serving Arizona State University published on Tuesday, January 30, 2007.

Pervious concrete feature helps reduce urban heat island impact

by Kyle Snow

The parking lot, located in front of the ASU Art Museum on 10th Street and Mill Avenue, could be the future of parking because it reduces urban heat island impact. Urban heat island refers to the fact that urban cities are generally hotter than surrounding rural areas because of the amount of pavement, which absorbs heat, said Jay Golden, director of the National Center of Excellence, an extension of the ASU Global Institute of Sustainability. Pavement usually makes up about 40 percent of the materials used to construct an urban city, Golden said.

An example of pervious concrete. Source: www.concreteparking.org/images/

Pervious concrete, developed by the NCE, allows water to flow through and infiltrate the ground. It also reflects ultraviolet rays, Golden said. "ASU is going to be showcased nationally for what we're trying to do with the parking lot," he said.

The New American Parking Lot, which is wired up with sensors, serves as an experiment - if it does what researchers project it will, ASU could send guidebooks to various counties in Arizona showing the benefits of using the pervious material, Golden said. Researchers also installed sensors in regular parking lots so they can compare data, he added.

The negative effects of urban heat island could be decreased if everything with the pervious pavement goes as expected. The pervious concrete could also affect the runoff of rainwater in an urban city. Joby Carlson, a research lab manager for NCE, said when rain falls in an urban city with regular pavement, 55 percent of that water is runoff, and only 15 percent penetrates the ground - the rest is evaporated. The water that penetrates can go either to the surrounding vegetation, like trees, or all the way down to groundwater.

But the runoff water can go to a variety of places, one of them being infiltration basins, which can sometimes affect public fields or streams. "All of the nasty stuff that's out on the road is concentrated and then put into soccer fields or streams, and it's killing fish and increasing algae growth," Carlson said. But with pervious pavement, 10 percent is runoff and 50 percent directly infiltrates the ground, Carlson said.

This ultimately causes vegetation to thrive, the energy demand to decrease and the air quality to increase, Golden said. Toxins can be filtered and degraded by Earth's natural processes, so the researchers aren't worried about gasoline and other pollutants entering the soil, Carlson added. The research would probably take up to three years in order to get complete results, Golden said.

THE BUDAPEST TIMES

Excerpts from

City can't take the heat

Budapest, January 22, 2007

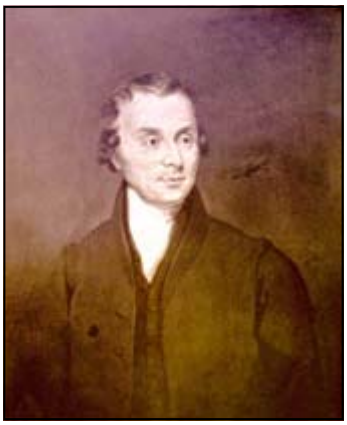
By Michael Müller

Meteorologists are predicting heat records for this summer. Environmentalists are already warning of the dangers and calling for more efforts to build Hungary's cities in a way suited to the challenge of climate change. Budapest is badly equipped for high temperatures. The Clean Air Action Group has called for climate maps to be produced, based on western models, which would have to be taken into account when making urban development decisions.

To underline the gravity of the issue, environments point to the example of Paris, when in 2003 an unusually hot summer killed some 14,000 mostly elderly people. Environmentalists argue that the tragically high number of victims could be traced back to deficiencies in housing and a lack of parks and green spaces. Paris city council took measures to prevent a repetition of the catastrophe: anti-glare devices, for instance, were installed, the insulation of flats was improved, and it was decided that green zones need to be expanded and more fountains should be built. "The increasing dangers due to high summer temperatures make it clear how much a new way of thinking is needed for city-planning," the deputy chair of the Clean Air Action Group, Erzsébet Beliczay said. She described the climate maps as an important city-planning aid, whose observance, for example, is already mandatory for urban development decisions in German cities. The maps illustrate air currents and other climate conditions of the city area, thereby enabling more circumspect city-planning. In Germany there is a regulation that temperatures in the city centre are not allowed to be more than 5 degrees higher than in surrounding areas.

The Clean Air Action Group has plenty of suggestions as to how hot summers in a metropolis could be made more bearable: rain water could be collected in cisterns where it could be evaporated and contribute to cooling the air, or the water could be used for spraying streets and squares. Green plants could be placed on the facades and roofs of apartment blocks, and green strips put down between tram tracks. By contrast, Beliczay labels ventilation ducts, which are relatively common in Budapest, as the greatest menace in hot weather. "The realisation that life cannot exist without air may hit companies too late," warned the environmentalist.

‘My pretensions as a man of science are consequently but slender’: Luke Howard’s intellectual milieu.



Luke Howard (1772-1864) was a pharmacist by profession, but a meteorologist by inclination, and it was his amateur (and very British) fascination with the weather that led him to devise the classification and nomenclature of clouds that remains in international use today. He was also a pioneer in the study of urban climate, his twenty-year instrumental record of London’s weather forming the heart of his landmark publication The Climate of London (2 vols, 1818-20), for which he was elected a Fellow of the Royal Society in 1821.

Born in London in 1772 to devout and commercially successful Quaker parents, Luke Howard was dispatched at the age of eight to a strict Quaker boarding school in Burford, Oxfordshire, where the rote-learning of Latin grammar dominated the curriculum to the exclusion of science and mathematics. ‘My pretensions as a man of science are consequently but slender’, as he later wrote in an autobiographical essay, although his lifelong habit of keeping daily weather notes was established during his time at school, where, as Howard recalled, the view from his dormitory window afforded a fine view of the wide Oxfordshire sky. He was struck by its constantly changing patterns, remembering ‘one remarkable configuration of the Clouds in a full sky, because it was of rare occurence’, and had been fascinated by the lurid sunsets of 1783 that resulted from the sulphurous haze thrown up by the eruption of the Laki fissures in Iceland. After leaving school in 1787 Howard served a seven-year apprenticeship with a pharmacist in Lancashire, and it was during this period that he began to spend his evenings studying French, chemistry and the natural sciences, describing the impact of the works of Antoine Lavoisier (1743-94) in particular as ‘like the Sun’s rising after a night of moonshine’. His real scientific education had begun. On his return to London Howard intensified his autodidactic regime, attending regular lectures and evening classes around the city, including those given by the flamboyant Irish émigré Bryan Higgins at ‘The Society for Philosophical Experiments and Conversations’ in Greek Street, Soho. Most of Higgins’s pupils were Dissenters, mainly Quakers like Howard, who, debarred from attending English universities, as well as from joining the traditional guilds, searched elsewhere for education and employment. Science, technology and modern languages were at the heart of this pragmatic new form of learning, and when Higgins left London in 1796, Howard and his associates established their own scientific debating club known as the Askesian Society, which they ran effectively as a private polytechnic. At their evening meetings, members and visiting speakers gave lectures and demonstrations on a range of subjects including galvanism, gunpowder, chemical attraction, divining rods, laughing gas, ventriloquism, and the malleable properties of zinc. Dozens of similar organisations were also being set up across the country, the majority of their constituents being young men and women employed in the new science and technology-based industries that were soon to transform the British economy. Such clubs and societies allowed their members to keep abreast of the latest research and developments in their relevant fields, as well as offering wider social and intellectual benefits. ‘Amusement here with science is combin’d/ To please, improve, and cultivate the mind’, as one anonymous poet characterised the atmosphere of these associations, vital conduits for the new forms of knowledge that powered the industrial revolution.

By 1802, when Howard gave his paper on ‘The Modifications of Clouds’, he was settled with a young family in Plaistow, then a village six kilometres east of the City, having taken over the management of a large and profitable chemical manufacturing laboratory. At Plaistow, Howard once more found the time to spend on his meteorological researches, building a small observatory on the roof of his house (now sadly demolished) and writing up his notes and observations, framing them in the light of recent atmospheric theories, especially those advanced by the Manchester Quaker John Dalton (1766-1844) in his Meteorological Observations of 1793. Dalton’s contention that condensed cloud droplets do not ‘float’, as previously thought, but fall continually under the influence of gravity, was instrumental in shaping Howard’s conviction that clouds, far from being ‘airy nothings’, were subject to ‘the same fixed Laws which pervade every other department of Nature’. He was convinced that clouds supplied the visible clues to the otherwise invisible processes of the atmosphere, and that learning to read them would turn the key that unlocked all other meteorological mysteries. His simple but penetrating insight, based on his years of direct observation, was that clouds might have many individual shapes, but they have few

basic forms, and at an Askesian meeting in December 1802 Howard delivered his now famous paper, in which he proposed that every cloud belonged to one of three principal types, to which he gave the Latin names: cirrus (meaning 'fibre' or 'hair'), cumulus ('heap' or 'pile'), and stratus ('layer' or 'sheet'). Moreover, in recognition of the clouds' essential instability, he also introduced a sequence of intermediate and compound modifications, such as cirrostratus and stratocumulus, in order to accommodate the regular transitions occurring between the cloud types.

Howard had not been the first to attempt a classification of clouds — only the previous year Jean-Baptiste Lamarck (1744-1829) had proposed a list of descriptive terms in French — but the immediate success of Howard's system was due to his use of universal Latin (his school education had at last come in useful), as well as to his emphasis on the mutability of clouds. By applying Linnean principles of natural history classification to phenomena as short-lived and changeable as clouds, Howard had arrived at an elegant solution to the problem of naming transitional forms in nature.

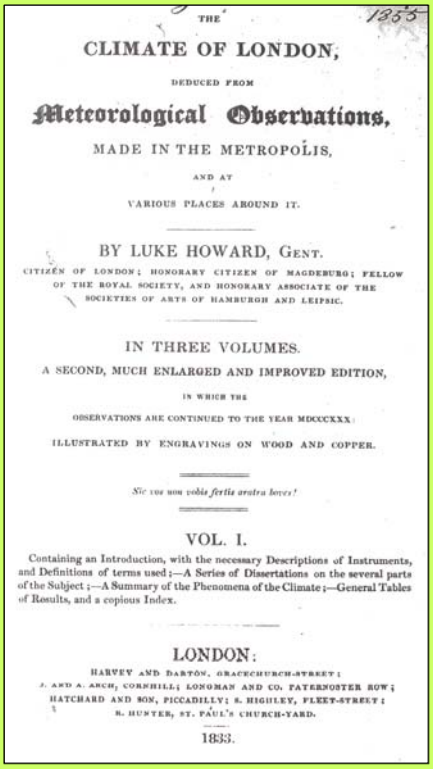
Once published, the cloud classification was soon in use around the world, and in 1896 it was officially adopted (with minor amendments) by the World Meteorological Organisation. Howard's scientific reputation was secured, and although he remained a full-time pharmacist (his company became the first in Britain to manufacture quinine), he continued his meteorological activities, contributing weather columns to a variety of journals, while continuing to keep a daily meteorological register. It was from these instrumental records that Howard put together the first volume of The Climate of London, a pioneering work of urban climatology (the second volume appeared in 1820), in which he makes an early identification of the city's urban temperature effect, 'an artificial warmth, induced by its structure, by a crowded population, and the consumption of great quantities of fuel in fires', as he presciently described it. In 1823 he became a founder member of the Meteorological Society of London — a forerunner of the Royal Meteorological Society — but the following year he and his wife moved to Ackworth, Yorkshire, leaving the flourishing pharmaceutical business in the hands of their sons.

Although Howard continued with his meteorological research, his life in Yorkshire became increasingly devoted to charitable and educational work, as well as to a series of doctrinal controversies within the Quaker movement, which culminated in his defection to the Plymouth Brethren in 1836. In 1842 he published an unconvincing treatise identifying an eighteen-year cycle in British weather, comprised of a seven-year rise followed by a ten-year fall in average temperature and rainfall; this was followed by his Barometrographia (1847), a visually impressive folio volume in which annual fluctuations of the weather were plotted against the phases of the moon, using large circular diagrams traced by a self-recording barograph, in an attempt to determine the extent of lunar influence on climate. Neither of these later publications proved remotely influential — meteorology was developing rapidly as a science, and was leaving amateur observers such as Howard behind — but he remained well respected for his cloud nomenclature as well as for The Climate of London, which was republished in an expanded edition in 1833.

Luke Howard died in London in 1864, living just long enough to see the advent of the professionalization of modern meteorology, having been one of the last of the amateur observers to make a major contribution to the field. 'Never, probably, was Science wooed more entirely for her own sake', as his obituary in the Friend suggested, 'never was there a more thorough "labour of love" than that which he bestowed.'

Richard Hamblyn, University of Nottingham
Author of The Invention of Clouds: How an Amateur Meteorologist Forged the Language of the Skies (London: Picador, 2001).

The Climate of London



THE

CLIMATE OF LONDON,

DEDUCED FROM

Meteorological Observations,

MADE IN THE METROPOLIS,

AND AT

VARIOUS PLACES AROUND IT.

BY LUKE HOWARD, GENT.

CITIZEN OF LONDON; HONORARY CITIZEN OF MAGDEBURG; FELLOW OF THE ROYAL SOCIETY, AND HONORARY ASSOCIATE OF THE SOCIETIES OF ARTS OF HAMBURGH AND LEIPSIC.

IN THREE VOLUMES.

A SECOND, MUCH ENLARGED AND IMPROVED EDITION,

IN WHICH THE

OBSERVATIONS ARE CONTINUED TO THE YEAR MDCCCXXX:

ILLUSTRATED BY ENGRAVINGS ON WOOD AND COPPER.

Sic vos non vobis fertis aratra boves!

VOL. I.

Containing an Introduction, with the necessary Descriptions of Instruments, and Definitions of terms used;—A Series of Dissertations on the several parts of the Subject;—A Summary of the Phenomena of the Climate;—General Tables of Results, and a copious Index.

LONDON:

HARVEY AND DARTON, GRACECHURCH-STREET;
J. AND A. ARCH, CORNHILL; LONGMAN AND CO. PATERNOSTER ROW;
HATCHARD AND SON, PICCADILLY; S. HIGHLEY, FLEET-STREET;
S. HUNTER, ST. PAUL'S CHURCH-YARD.

1833.

The original front cover of Howard's Climate of London published in 1833.

Luke Howard & THE CLIMATE OF LONDON

The Pioneer of Urban Climatic Studies

While Howard is most famous for his work on clouds, he also produced a one of the first text-books on climatology entitled THE CLIMATE OF London. The basis for this book is established by his daily observations of the weather elements taken over 25 years. In addition, he supplements his own records with accounts that he gleans from newspaper reports, which he uses judiciously.

His personal meteorological observations were published as monthly tables in several publications from 1806 onwards. In 1818, the first volume of THE CLIMATE OF London was published. The second volume appeared in 1820. In 1833 a new edition was printed that contains a third volume. CLIMATE presents his analysis of the major features of climate: temperature, pressure, wind, precipitation, etc. The second and third volumes consist of his observations and experiments. In addition to this work he published SEVEN LECTURES ON METEOROLOGY (1837), A CYCLE OF EIGHTEEN YEARS IN THE SEASONS OF BRITAIN (1842) and BAROMETROGRAPHIA (1847).

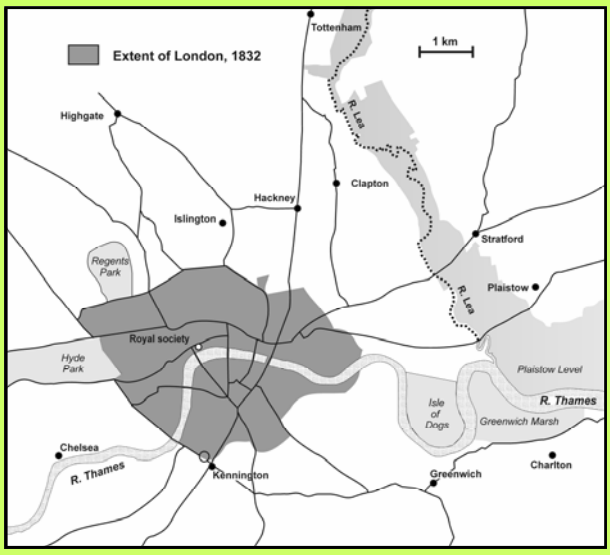
FOR urban climatologists in particular THE CLIMATE OF LONDON is a seminal text as it identifies and describes the urban heat island effect for the first time. More generally, this work shows clearly the mindset of a weather scientist. Meteorology at the time was considered a weak science (compared to astronomy) and there are few records of any length upon which to draw conclusions. Howard's work shows a concern for instrumentation and exposure that is rarely seen in modern studies. Moreover, his analyses are careful and tested against observed data.

Howard's CLIMATE is very modern in many respects. Throughout it he demonstrate a concern for precision both in the use of language and in the practice of making meteorological observations. These characteristics are illustrated in the following passage on rainfall measurements at the Royal Society:

The average Annual rain of the ten years (from 1820 to 1830, omitting 1826) is 17.615 in. which corrected for the elevation of the gauge gives 23.277 — a quantity falling below the real average of the district by more than two inches. It may be said that probably other causes than such as have been stated, and those peculiar to a great city, contribute to this deficiency. It would be very satisfactory to be able to appreciate the action of such causes, and their annual share of effect — but until an Instrument, which is understood to be that of so respectable a Scientific corporation, and the indications of which they have so long been in the habit of publishing, shall be deemed worthy of daily use when Rain is falling, we shall in vain expect from this quarter the data needful even for the construction of the problem.

In the following pages, aspects of Howard's meteorological work are highlighted with examples from CLIMATE. On p10, the first table of observations produced by Howard is reproduced to give readers a sense of the work.

Gerald Mills.



Howard's Observations

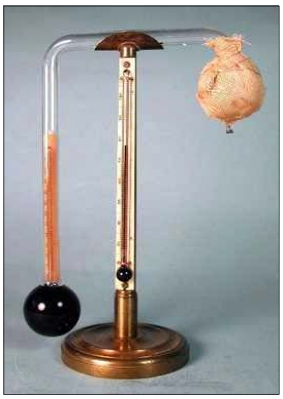
Howard's observations were made at several sites around London: Plaistow, Stratford and Tottenham which corresponded to his work or home-place (see map). Although he took some care to situate his instruments properly, their placement was not 'standard'. With regard to his examination of the urban temperature effect Chandler (1965) remarks that 'unfortunately, his exposures varied and were far from standard — at Plaistow, 1809 a village 6.4 km east of London, the thermometer hung beneath a laurel bush, and at Tottenham, where readings were taken between 1813 and 1816, the thermometer was 3 m above the ground on the north wall of a house'

THE CLIMATE OF LONDON

Howard's Instruments

Howard employed a variety of instruments to observe the weather elements. He routinely measured air temperature, humidity, precipitation, wind direction, electricity and, of course, cloud type.

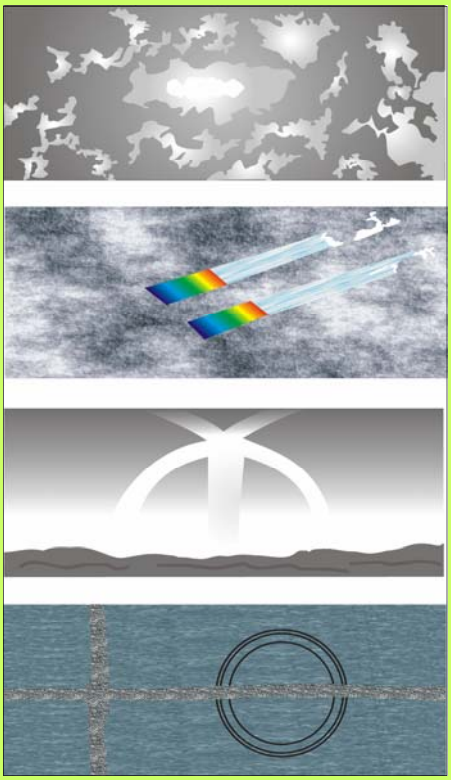
The barometer is perhaps Howard's most useful instrument and it represented a considerable investment on his behalf: *I have possessed for some years an eight-day Astronomical clock, having a Barometer connected with it, made in 1766, by* ***Alexander Cumming****, and which, on the decease of that excellent mechanic, his family allowed me to purchase by a valuation. This curious instrument records, by means of a pencil supported on the quicksilver, and traversing a revolving scale, the movements of the Barometer throughout the year; requiring for this purpose little more attention than the regular winding up of the Clock.*



To obtain humidity he employed an instrument made of whalebone. Later he used Daniell's psychrometer (shown right), an instrument that measures humidity by comparing the temperatures of exposed wet and dry bulbs.

Source: Freunde alter Wetterinstrumente www.freunde-alter-wetterinstrumente.de/).

Howard's Graphics



A feature of CLIMATE is its use of graphs to analyze and describe his observation. This plate (entitled **Manifold Anthelion)** is taken from Volume III and shows various atmospheric phenomena including a partial rainbow.

Howard's London

London in 1820 has been described by Schwarz (2001) as 'a built-up area, itself a kaleidoscope of neighbourhoods, set amidst a large and amorphous region'. During the period of Howard's work (1800-1830) London experienced rapid population growth (from about 1 to 1.5 million) due to a migration from the countryside and a fall in the death rate. Nevertheless, by the scale of today's London, it was small. The map below left is obtained from www.londonancestor.com/maps/london-central-th.htm and shows London in 1845—the red circle represents the extent of the twopenny post delivery. The modern satellite image shows the urban surface in grey and the white circle approximates the same area (Source: www.gesource.ac.uk/highres/hires).

TABLE I.

1806.				Wind.	Pressure.		Temp.		T. No. 2		Evap	Rain &c.
					Max.	Min.	Max.	Min.	Max.	Min.		
N.M.	*a.*	11 mo. Nov.	10	N	30.10	30.10	48°	40°			?	
			11	SW	30.10	29.98	50	33			4	
	a.		12	SW			47	34			?	
			13	SW	30.18	29.98	57	48			4	
			14	SW	29.98	29.86	53	48			3	1
			15	SW	29.86	29.70	53	37			6	1
			16	SW	29.88	29.70	48	39			10	
	b.		17	SW	29.82	29.70	53	43			8	
			18	SW	29.70	29.58	55	47			11	4
	d.		19	SW	29.25	29.01	51	35			7	63
			20	SW	29.34	29.04	47	35			15	
	b. c.		21	SW	29.33	29.00	45	31			8	2
	b. c.		22	W	29.63	29.33	43	27			4	
	b. c.		23	SW	29.83	29.46	51	33			2	2
			24	SW	29.83	29.65	56	52			8	
			25	SW	29.46	29.26	57	47			8	3
			26	SW	29.88	29.46	50	39			4	18
			27	NW	30.01	29.90	56	41			0	17
			28	SW	30.04	29.64	60	54			8	2
	e.		29	SW	29.69	29.53	58	36			20	
			30	W	29.69	29.13	45	33			6	4
	f.	12 mo. Dec.	1	SW	29.13	28.63	50	38			8	30
	g.		2	W	29.59	28.63	42	38			8	3
			3	NW	29.67	29.63	43	31			3	2
			4	W	29.67	29.45	50	38			2	2
			5	SW	29.45	29.27	54	48			20	
			6	SW	29.30	29.25	58	33			12	
			7	W	29.03	29.00	47	38			7	6
			8	Var.	29.28	29.00	45	36			0	17
			9	NW	29.42	29.33	44	33			3	9
					30.10	28.63	60	27			1.99	1.86

Notes.- a. Misty, the trees dripping without rain.
b. Lunar halo; very brilliant on the nights of the 22nd and 26th. Two series of the prismatic colours were distinguished.
c. Hoar frost. Some hail on the 21st.
d. The barometer appeared to have descended still lower. Pretty strong signs of positive electricity the 18th p.m. after which very stormy from midnight to sunrise.
e. Wind NW. At 8 p. m. a slight shower, from a mass of clouds passing in the S, in which it is said to have lightened. On exami-nation a changeable electricity was found in the insulated conductor.
f. Very stormy night.
g. Loud thunder about 3 a. m: positive electricity after sunrise. Soon after 2 p.m. a squall from the NW, with snow and finally rain. The conductor was highly charged positive, giving dense sparks. In proportion as the nimbus passed off to the SE this went off, and a weaker negative charge succeeded.

Additional Notes from the MS. Register.- Eleventh Mo. 27. I found the vapour point about noon but one degree below the actual temp. of the air: hence no evaporation. 30. Much wind. [I find in my Notes an observation that on the 3rd of this month, being a very showery day, the rainbow made its appearance thrice, at morning, noon, and evening.]
Twelfth Mo. 1. The barometer took to rising again at sunrise: at 2 p.m. a squall coming on, the electricity became negative.

RESULTS

The prevailing wind has been decidedly SW; often amounting to a gale, more especially in the intervals between midnight and sunrise.
Mean barometrical pressure 29.54 in.; the column almost con-stantly in motion.
Mean temperature, by Six's thermom. 44°.6
Total evaporation 1.99 in. This is probably greater than the eva-poration at the surface of the earth, the gauge being at an elevation of 30 feet and very much exposed to the wind.
Total of rain 1.86 in. a somewhat small amount for the season, though showers have been frequent. Rain noted as fallen by day 0.56, by night 1.30 in.

IAUC Committee Reports

Bibliography

Thanks to everyone for their contributions this month. Please send any further references to papers published since January 1 2005 for inclusion in the next newsletter to j.salmond@bham.ac.uk. As before, please mark the header of your email with 'IAUC Publications 2006'. In order to facilitate entering the information into the data base please use the following format:

Author:
Title:
Journal:
Volume:
Pages:
Dates:
Keywords:
Language:

We look forward to hearing from you soon! Jennifer Salmond and Evyatar Erell

Recent publications in Urban Climatology

(Languages are specified where the publication is known to be in a language other than in English.)

- Baik, J. J., Y. S. Kang, et al. (2007). "Modeling reactive pollutant dispersion in an urban street canyon." Atmospheric Environment
- 41(5): 934-949.
- Baklanov, A. (2007). "Urban air flow researches for air pollution, emergency preparedness and urban weather prediction." Nato Science Series. Sub series II, Mathematics Physics and Chemistry 236: 311-358.
- Bi, X., Y. Feng, et al. (2007). "Source apportionment of PM10 in six cities of northern China." Atmospheric Environment 41(5): 903-912.
- Brook, J. R., L. Graham, et al. (2007). "Investigation of themotor vehicle exhaust contribution to primary fine particle organic carbon in urban air." Atmospheric Environment 41(1): 119-135.
- Byun, D. W., S. T. Kim, et al. (2007). "Evaluation of air quality models for the simulation of a high ozone episode in the Houston metropolitan area." Atmospheric Environment 41(4): 837-853.
- Chen, C., B. Chen, et al. (2007). "Low-carbon energy policy and ambient air pollution in Shanghai, China: A health-based economic assessment." Science of the Total Environment 373(1): 13-21.
- Chen, L., K. Mengersen, et al. (2007). "Spatiotemporal relationship between particle air pollution and respiratory emergency hospital admissions in Brisbane, Australia." Science of the Total Environment 373(1): 57-67.
- Chow, W. T. and M. Roth (2006). "Temporal dynamics of the urban heat island of Singapore." International Journal of Climatology 26(15): 2243-2260.
- Coutts, A. M., J. Beringer, et al. (2007). "Characteristics influencing the variability of urban CO2 fluxes in Melbourne, Australia." Atmospheric Environment 41(1): 51-62.
- Das, S. K. and P. A. Durbin (2007). "Prediction of atmospheric dispersion of pollutants in an airport environment. ." Atmospheric Environment 41(6): 1328-1341.
- Freitas, E. D., C. M. Rozoff, et al. (2007). "Interactions of an urban heat island and sea-breeze circulations during winter over the metropolitan area of São Paulo, Brazil." Boundary Layer Meteorology 122(1): 43-65.
- Gehrig, R., M. Hill, et al. (2007). "Contribution of railway traffic to local PM10 concentrations in Switzerland." Atmospheric Environment 41(5): 923-933.
- Gomez-Perales, J. E., R. N. Colvile, et al. (2007). "Bus, minibus, metro inter-comparison of commuters' exposure to air pollution in Mexico City." Atmospheric Environment 41(5): 890-901.
- Hart, M. A., R. Dear, et al. (2007). "A synoptic climatology of pollen concentrations during the six warmest months in Sydney, Australia."
- International Journal of Biometeorology 51(3): 209-220.
- Hasegawa, S., S. Wakamatsu, et al. (2007). "Vertical profiles of ultrafine to supermicron particles measured by aircraft over Osaka metropolitan area in Japan." Atmospheric Environment 41(4): 717-729.
- Hodder, S. G. and K. Parsons (2007). "The effects of solar radiation on thermal comfort." International Journal of Biometeorology 51(3): 233-250.
- Jimenez-Horrnero, F. J., J. V. Giraldez, et al. (2007). "Description of pollutant dispersion in an urban street canyon using a two-dimensional lattice model." Atmospheric Environment 41(1): 221-226.
- Panão, M. J., H. J. Gonçalves, et al. (2007). "A Matrix Approach Coupled with Monte Carlo Techniques for Solving the Net Radiative Balance of the Urban Block." Boundary Layer Meteorology 122(1): 217-241.
- Sahlodin, A. M., R. Sotudeh-Gharebagh, et al. (2007). "Modeling of dispersion near roadways based on the vehicle-induced turbulence concept." Atmospheric Environment 41(1): 92-102.
- Schafer, K., S. Emeis, et al. (2006). "Influence of mixing layer height upon air pollution in urban and suburban areas." Meteorologische Zeitschrift 15(6): 647-658.
- Stenseth, N. C. and J. W. Hurrell (2006). "Focusing on multidisciplinary climate-effect studies." climate Research 32(3): 159-160.
- Tan, J., Y. Zheng, et al. (2007). "Heat wave impacts on mortality in Shanghai, 1998 and 2003." International Journal of Biometeorology 51(3): 193-200.
- Tasdemir, Y. and F. Esen (2007). "Dry deposition fluxes and deposition velocities of PAHs at an urban site in Turkey." Atmospheric Environment 41(6): 1288-1301.
- Vautard, R., P. H. Builtjes, et al. (2007). "Evaluation and intercomparison of Ozone and PM10 simulations by several chemistry transport models over four European cities within the CityDelta project." Atmospheric Environment 41(1): 173-188.
- Venkatram, A. and A. J. Cimorelli (2007). "On the role of nighttime meteorology in modeling dispersion of near surface emissions in urban areas." Atmospheric Environment 41(4): 692-704.
- Williams, C. A., T. M. Scanlon, et al. (2007). "Influence of surface heterogeneity on scalar dissimilarity in the roughness sublayer." Boundary Layer Meteorology 122 (1): 149-165.

IAUC Board & Newsletter

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- Jennifer Salmond (University of Birmingham, UK): 2005-2009, Secretary, 2007-2009

*appointed members

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Newsletter Contributions

The next edition will appear in early April. Items to be considered for the next edition should be received by **March 31, 2007.** The following individuals compile submissions in various categories. Contributions should be sent to the relevant editor:

News:	Dr. J. Marshall Shepherd marshall.shepherd@nasa.gov
Conferences:	Jamie Voogt javoogt@uwo.ca
Websites:	Gerald Mills gerald.mills@ucd.ie
Bibliography:	Jennifer Salmond j.salmond@bham.ac.uk
Urban Projects:	Sue Grimmond sue.Grimmond@kcl.ac.uk

General submissions should be relatively short (1-2 A4 pages of text), written in a manner that is accessible to a wide audience and incorporate figures and photographs where appropriate. In addition we like to receive any images that you think may be of interest to the IAUC community.

Past President

This is the last time I will write this column as President of the IAUC (well actually now past-President) as Matthias Roth has taken up the role of President effective January 2007. I am very proud of all the IAUC has been able to achieve over the last four years. As an organisation we have been able to consolidate our policies and procedures and we have developed a number of awards to recognise leading and junior scholars. More importantly the membership of IAUC and its representation has grown and opportunities to exchange ideas and information (the conference, newsletter, list-serv) have flourished. I want to take this opportunity to thank all of you who have contributed to the IAUC's activities: particularly the Board (past and present members), those who have written articles for the newsletter, and those involved in organising and attending ICUC6. I look forward to remaining actively involved with IAUC and hope that Matthias finds this role as fulfilling as I have.

Sue Grimmond
(sue.grimmond@kcl.ac.uk)

New IAUC Secretary

As Matthias moves into his new position as President of the IAUC it is appropriate to thank him for all the hard work he has put in to support the society in his role as Secretary.

Over the last few years Matthias has worked tirelessly to enable the smooth running of the society. Often working behind the scenes, he has ensured that day-to-day administrative issues are dealt with promptly and efficiently. Together with Sue Grimmond, Matthias has built on the foundations laid by John Arnfield and Tim Oke, and facilitated the continued development of the IAUC into the thriving organisation it is today.

So on behalf of all IAUC members - thanks Matthias! We wish you well in your new position and know that the leadership of the society remains in good hands!

Jennifer Salmond