The Stormy Weather Group

In 1943, Project Stormy Weather was assigned to Stewart Marshall, of the Canadian Army Operational Research Group. Working with him were Walter Palmer, direct from honours physics at McGill, and R.C. Langille, from explosives chemistry with George Wright in Toronto. J.T. Wilson as Director of Operational Research, and D.C. Rose as S.A.C.G.S. and head of the Group, assigned the project, which was to make use of the weather echoes that had appeared, primarily as a nuisance, with the introduction of microwave radar. Project Stormy Weather went very well. Availability of prototype MEW and MHF radars at NRC, maintained by NRC, had much to do with the success.

At the end of the war, Marshall went to McGill. Langille and Palmer stayed on with Guy Eon, who had joined the team, and the work they did in the next year demonstrated that weather radar could be quantitative, and so had a scientific future.

Palmer returned to McGill for a Ph.D., his research in weather radar supervised by Marshall. The new Defence Research Board borrowed equipment for use at McGill, and provided modest financial support. Two graduate-student contemporaries of Palmer's took masters' degrees with weather radar as their research topic. These were Kenrick Gunn and Walter Hitschfeld, who spurned weather radar for their Ph.D. topics (for after all, the radar was out at Dawson College) and instead worked jointly on laboratory and theoretical approaches to The Growth of Raindrops from Cloud Droplets by Accretion.

In 1950, the Air Force Cambridge Research Laboratories (as it was to become) undertook substantial support of the work at McGill. Palmer had left for Canadian Celanese by this time, but Gunn and Hitschfeld stayed on as lecturers, and joined Marshall in the Stormy Weather Research Group. The gun-laying radar at Dawson College had been replaced by an American AN/TPS-10A, but USAF with their financial support encouraged the group to emphasize theoretical work at that stage. Thus began a long period of parallel support, with USAF supporting theory and analysis, and NRC supporting the radar observations.

Three men have joined the Group and left again. T.W.R. East came from the British Radar Research Establishment as a graduate student, stayed to become a member of the Group and of the McGill Physics Department, then left for industrial research at Raytheon of Canada. Phillip Langleben came as a graduate student from McGill, but when he subsequently joined the McGill teaching staff he joined Professor Pounder's Ice Research Group. Robert Barklie came from the Admiralty Research Establishment to commence our nucleation studies, then left to join the Tri-Service College at Royal Roads.

R.H. Douglas was seconded to McGill in 1954 by the Canadian Meteorological Service, "to take advantage of the Stormy Weather Group". The advantage was multilateral: Douglas received a Ph.D., contributed notably to the work on snow, spearheaded the Group's contribution to hail research in Alberta (his native Province), became a charter member of the McGill Department of Meteorology, finally became Chairman of the Department of Agricultural Physics at Macdonald College.

E.J. Stansbury transferred to the Stormy Weather Group from the Eaton Electronics Laboratory in 1959. He has guided our work in freezing nucleation from then until this year. For the past three years he has directed the establishment of our short-range lightning-location network. The nucleation work has led to important findings relevant to hail, especially those made recently by Gabor Vali, who went with Douglas to teach physics at Macdonald College, and whom we welcome now as the newest member of the group.

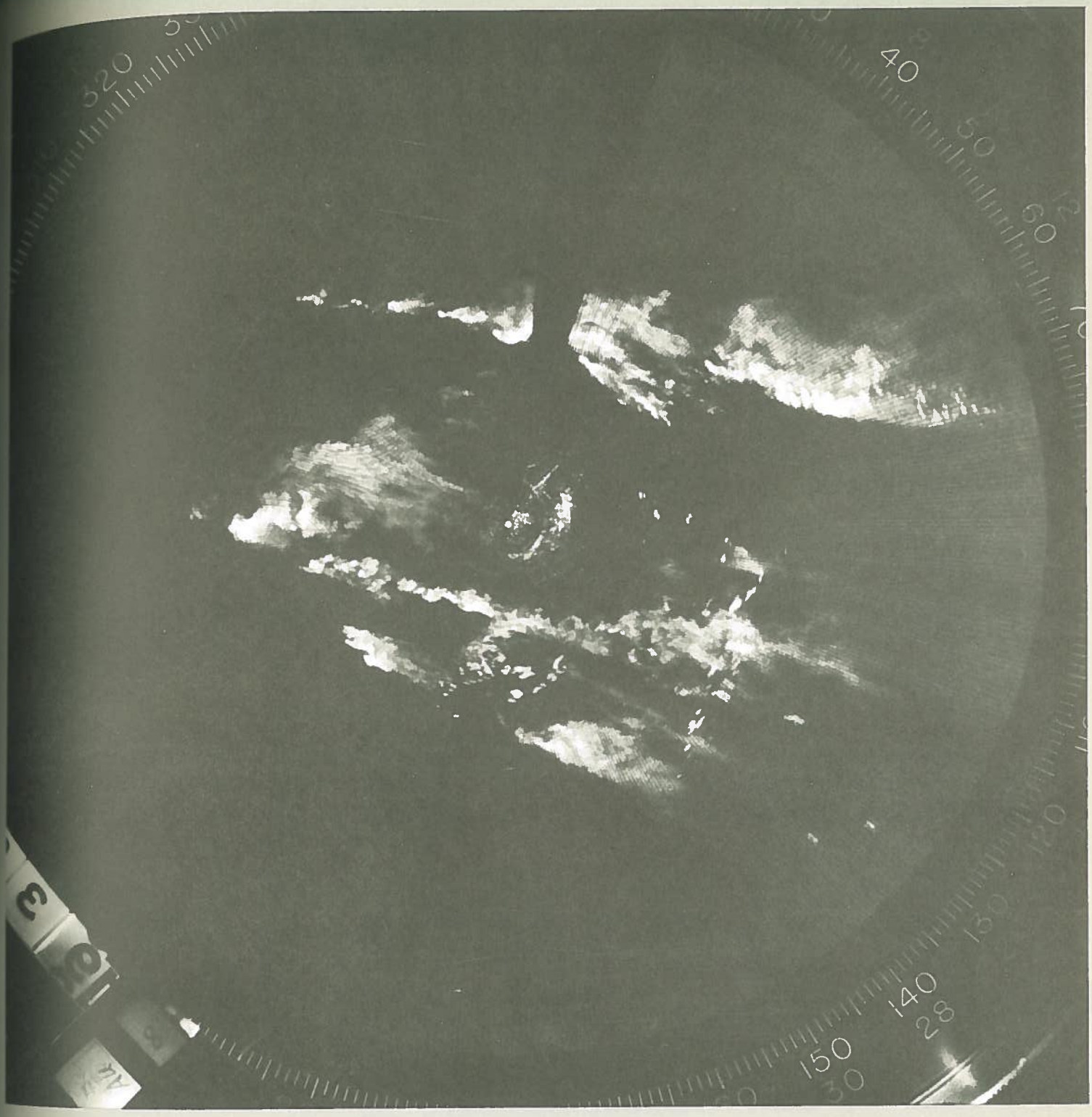
R.R. Rogers joined the Department of Meteorology and the Stormy Weather Group in September 1967. As a Texan from M.I.T. and Cornell Aeronautical Laboratories, he is the first man to join us after maturing as a radar meteorologist elsewhere.

The commencement of the Alberta Hail Project in 1956 made a great difference to the group. It brought the work on snow to a temporary stop, and led to the introduction of laboratory work on freezing nucleation. It absorbed half the attention of the Group, principally in the persons of Hitschfeld and Douglas. Formation of a McGill Department of Meteorology made more change. On the negative side, it has led to a physical separation of Hitschfeld and Douglas and their hail people from Marshall and

Gunn and their rain, snow and radar. Positively, it has provided a considerable number of M.Sc. and Ph.D. candidates in meteorology who choose research in radar meteorology or something closely related.

Administrative opportunities have fallen to members of the Group (and indeed to members of the Department of Meteorology) with appalling concentration. Marshall became first chairman of Meteorology, then chairman of the Senate Committee on Educational Procedures, along with responsibility for television-for-teaching; now he seems to be in the clear again. Gunn became the university's time-table coördinator, then space coördinator; now he directs an Office of Research for Planning and Development. Hitschfeld played through the meteorology chairmanship in par-three-years, and now is Vice-Dean of the Physical Sciences Division. Douglas is Chairman of the Physics Department at Macdonald College. Stansbury has been Associate Dean of Student Affairs, and now is Vice-Dean of the Faculty (of Arts and Science). Only Rogers and Vali are yet unscathed. These positions are fine avenues of service; we see it as vital to sanity and progress that they be viewed as a service alternative to undergraduate teaching, rather than as a joy replacing scholarly activity.

One sees in our present circumstance the desirable use to be made of the research offices in the new radar weather observatory. These must be the eye of the academic storm, where research problems can be approached in the relative quiet of the country, and the Group must have its scientific meetings here, for a change of pace from academic committee meetings. One recalls the late beloved Clifford Purves, after a meeting at which Marshall (yes!) had been a peacemaker, saying that we should be renamed "The Balmy Weather Group". This shall be our Centre for Balmy Weather.



PPI Map from New Radar
Storm lines, 1935 EST 8 Aug 68
Scale: 30 nautical miles per inch
Ground echoes: Adirondacks to south,
Green Mountains south-east

Stormy Weather Group Chronology

MARSHALL PALMER LANGILLE	1943	Microwave Early Warning Radar, Ottawa Time-lapse films
EON PERRY TIBBLES	1944	Microwave Height Finder, Ottawa MEW's at Clinton, Dorval
HARE	1945	The "Bright band" in melting snow Storm Stearing levels
	1946	First "Journal of Meteorology" paper
GUNN HITSCHFELD	1947	M-P drop-size distribution Stepped gain Vertical sections in stepped grey AN/TPS10-A at Dawson College
	1949	Laboratory and theoretical work on growth of raindrops by accretion
KERKER	1950	USAF Contract Scattering by aspherical particles
LANGLEBEN RIGBY	1951	AN/TPS10-A moved to Dorval Development of particle-size distributions
WALLACE EAST, T.W.R.	1952	The "3rd Radar Meteorology Conference" at McGill Airline radar study Fluctuations Microwave properties of precipitation
MELZAK BORDAN POWER	1953	Theory of snow-crystal habit Theory of random coalescence Correction for attenuation Generating level for snow Zenith-pointing radar at McGill
DOUGLAS	1954	CPS-9 at Dorval Trails and trajectories Size-sorting in wind shear
DENNIS	1955	CAPPI (with scissors)
GAHERTY	1956	Generating cells Rain by coalescence Turbulence in snow CAPPI by film conversion
LEGG	1957	Storm height/hail probability (Alberta) Hail and tornadoes
	1958	Electronic and automated CAPPI

BARKLIE	1959	Laboratory growth of snow crystals
GOKHALE		Growth by accretion in ice phase
SUMMERS		Convective storms in severe wind-shear
STANSBURY		Freezing nucleation
	1960	CAPPI in stepped grey scale
		Hail size and reflectivity
		The intensity of hailfall
		Is heterogeneous nucleation stochastic?
		Updraught and accumulation in cumulonimbus
HAMILTON	1961	Attenuation estimates from gauge statistics
WEIN		Automatic attenuation correction
		A theory of hail growth
SRIVASTAVA	1962	Theoretical studies of storm dynamics
VALI		Whole-scope storm profiles
EAST, C.	1963	New observing techniques for snowfall and new-fallen snow
CARTE		Continuity and intermittency of hail
SMITH	1964	NRC Capital Grant
HENRY		Facsimile and areal integration
HOLTZ		Thermodynamics of hail-storm air masses
WEISS		Time-dependence of ice nucleation
LILLESAETER	1965	Attenuation of light by snow
CARLSON		Hailstone temperature
BALLANTYNE		Large-scale convergence and severe storms
ZAWADZKI		Hailstorm cells within the storm complex
DEROME		
CHISHOLM		
ROGERS	1966	Airline radar updated
STRAUCH		Five-dimensional storm census
THYER		Winds near cumulonimbus
WARNER	1967	Loan of FPS-18 by USAF
FETTER		Anonymous gift of observatory building
PELL		Building built, antenna and radome installed
RAO		HARPI
SHAW		Measurement of snowfall by radar
KAPOVITS		Hail intermittency and cells
BARGE	1968	Attenuation reconsidered
HARRIS		Satellite-link attenuation from radar data
BOSTON		Life-cycle of a summer storm
		FPS-18 operational
		13th Radar Meteorology Conference