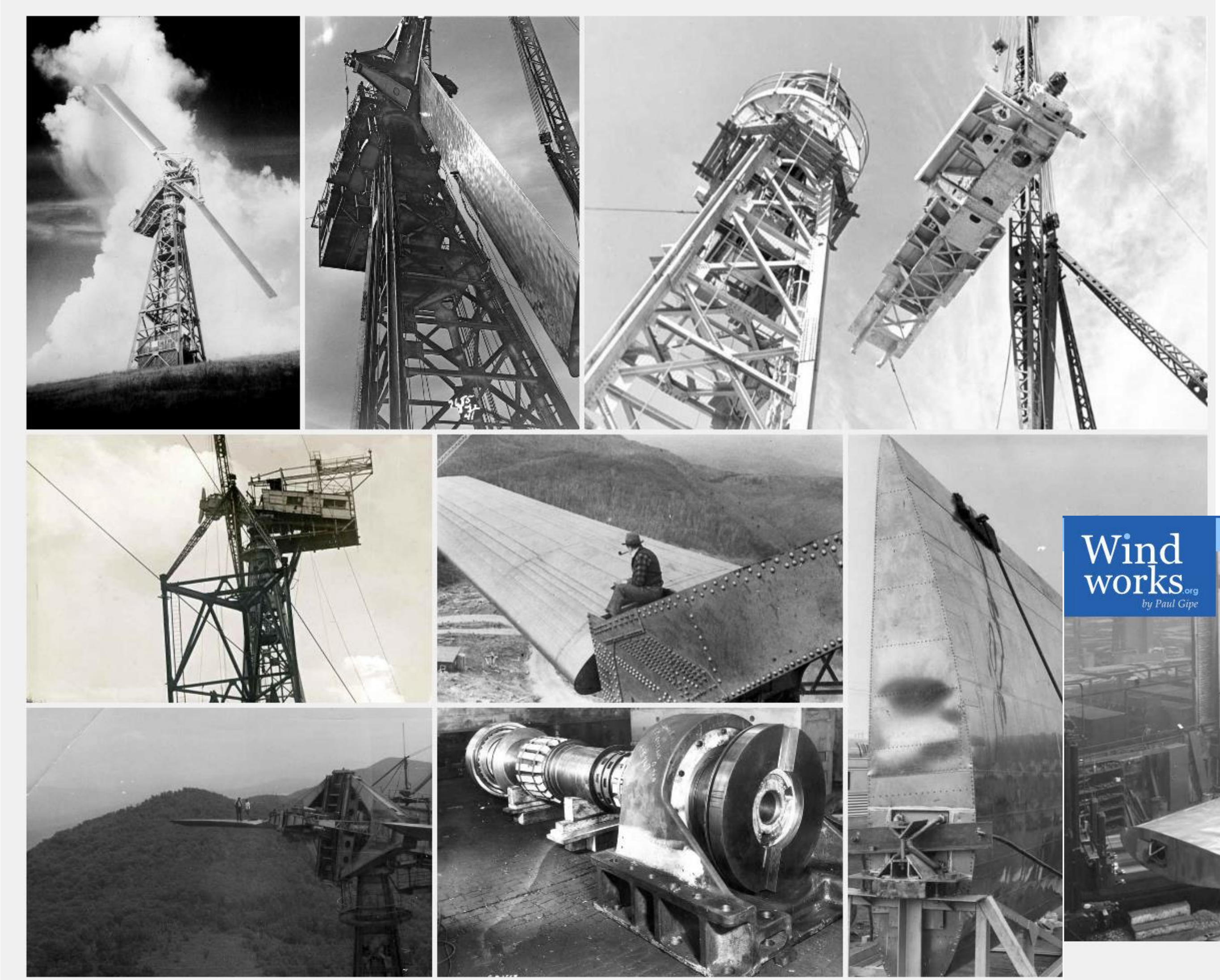
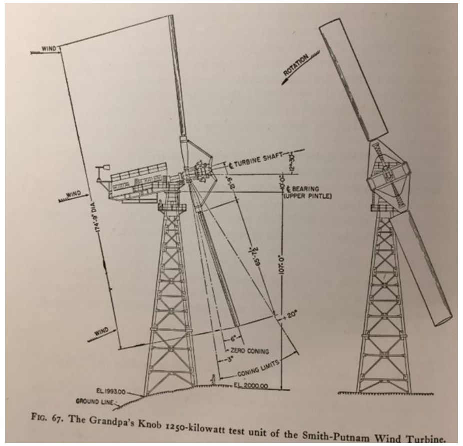
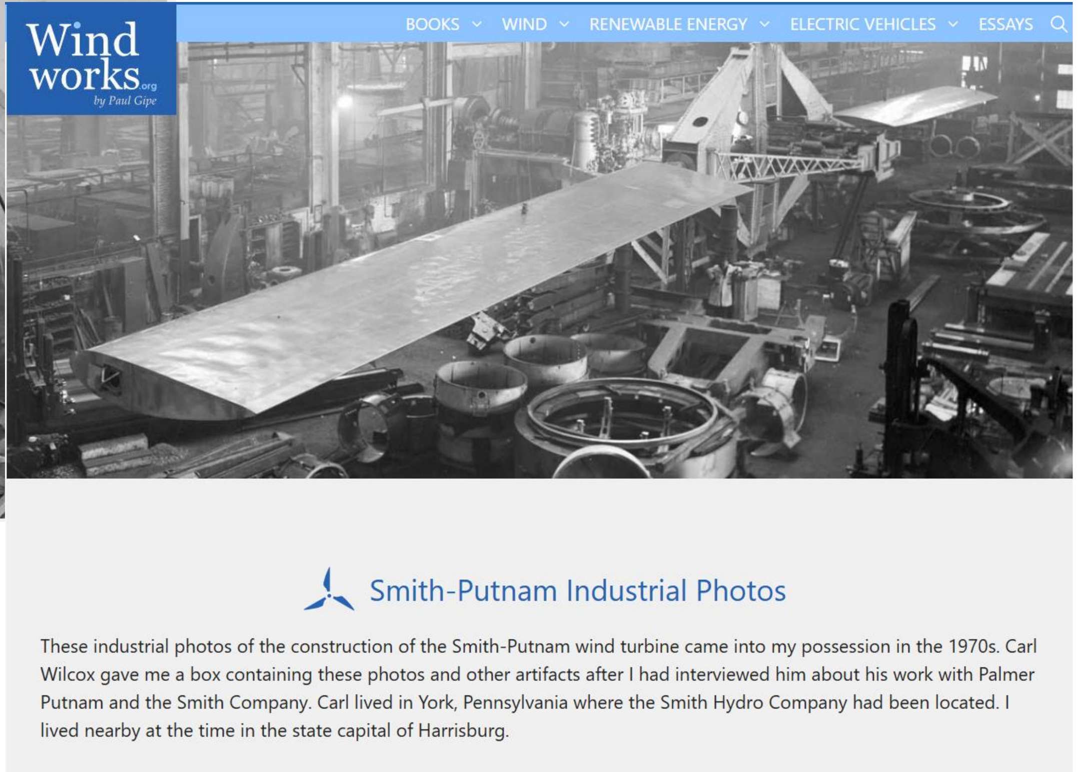
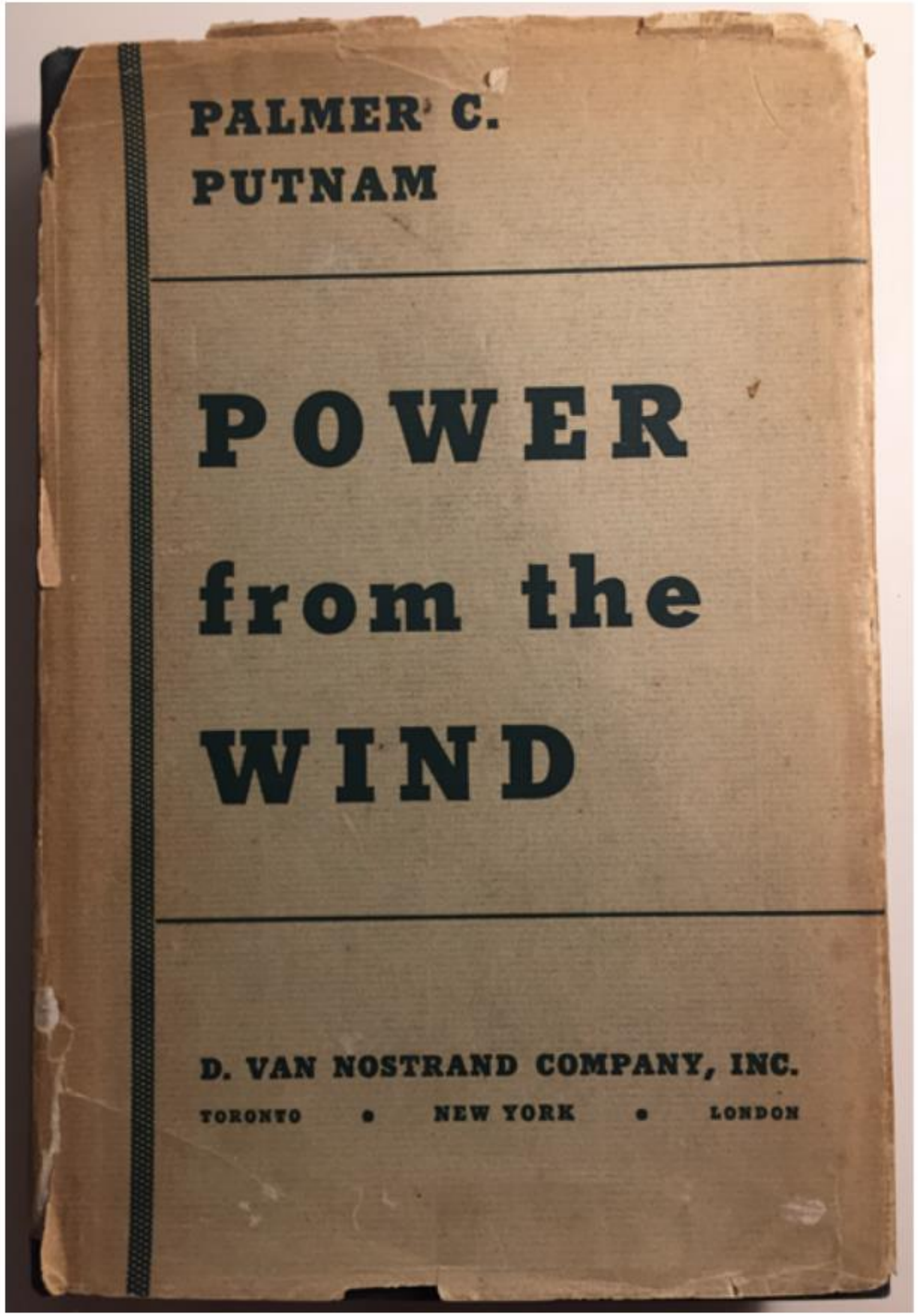
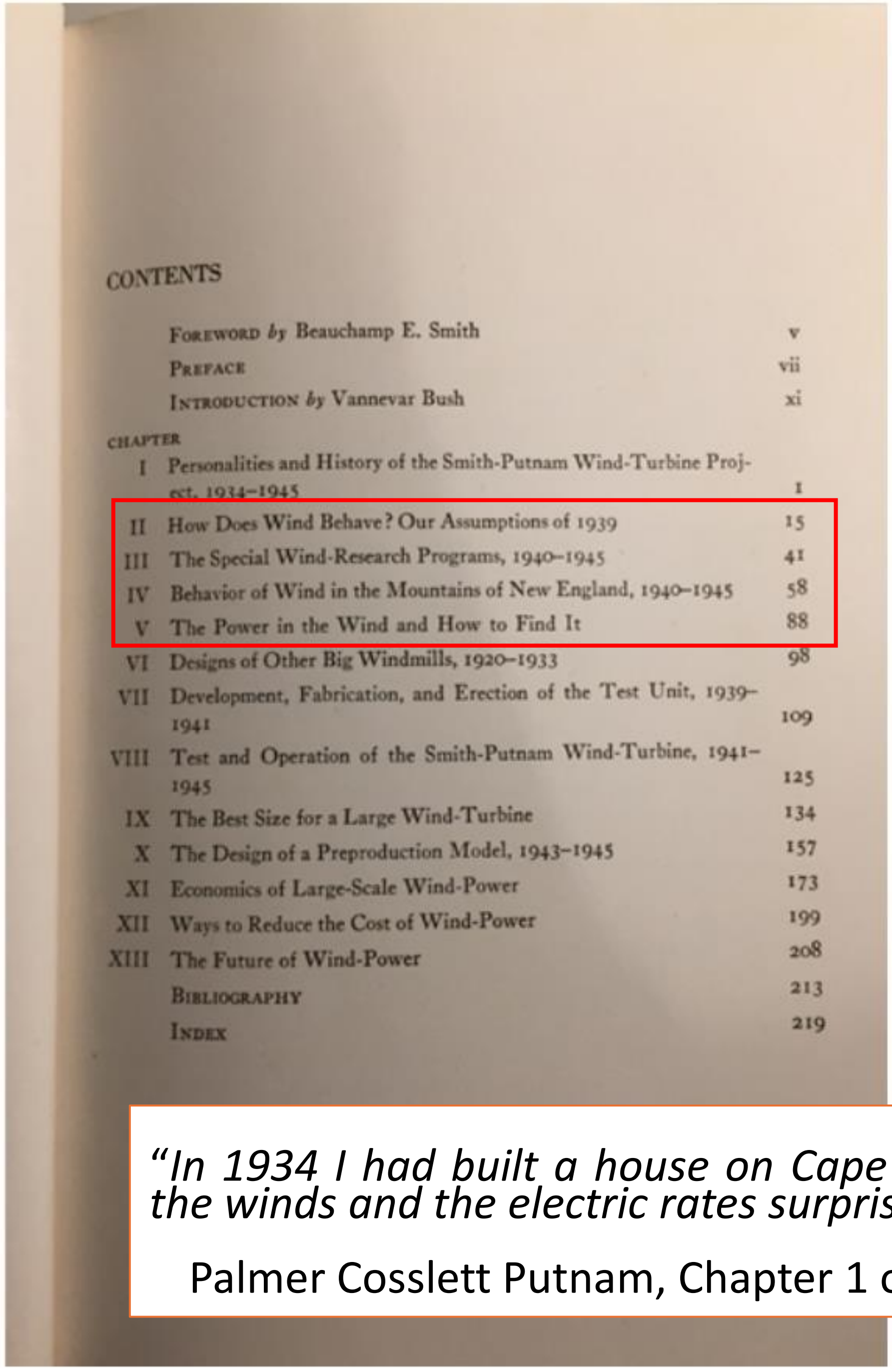


The Smith-Putnam turbine, a 1MW prototype (New England, 1940s)








CONTENTS


PALMER COSSLETT PUTNAM

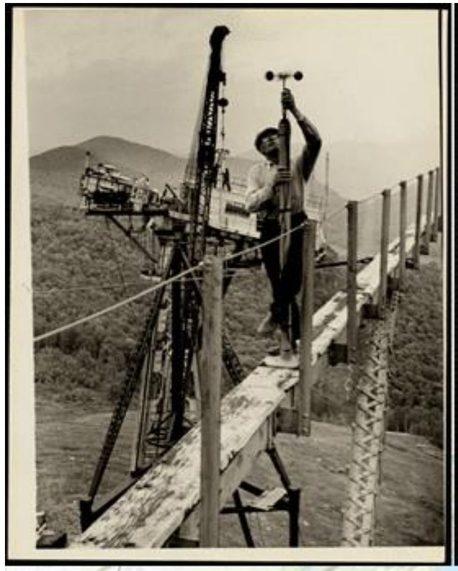
Manager of the Smith-Putnam Wind-Turbine Project.

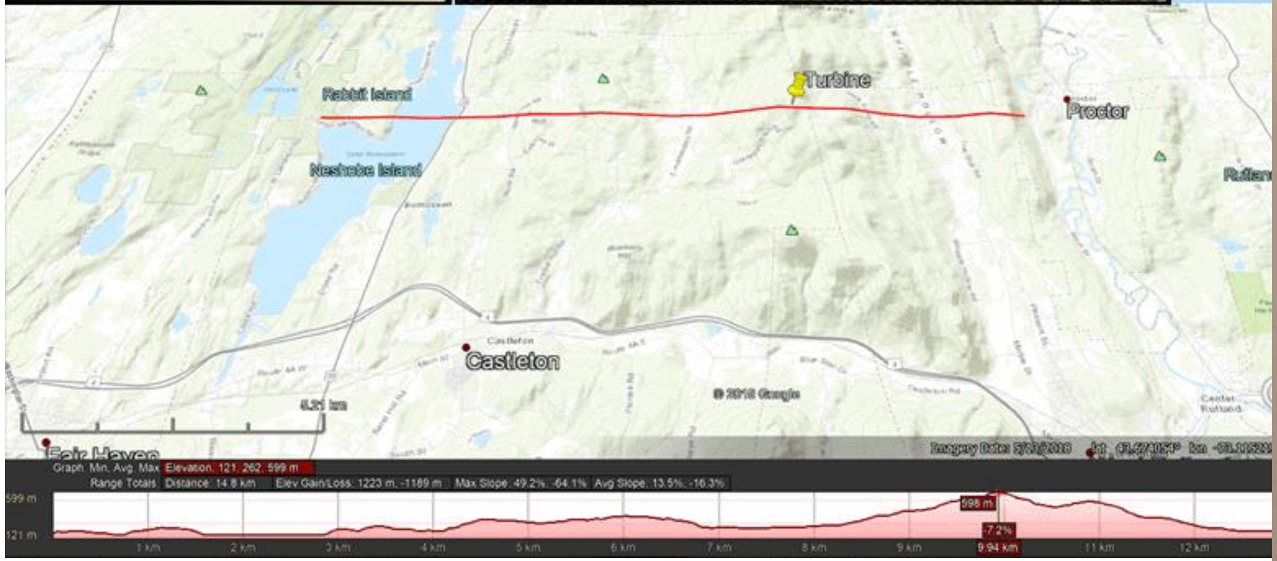
Putnam's project summary includes <u>tens of pages on wind resource studies</u>.

"In 1934 I had built a house on Cape Cod and had found both the winds and the electric rates surprisingly high".

Palmer Cosslett Putnam, Chapter 1 of "Power from the Wind"

Extensive measurement campaign





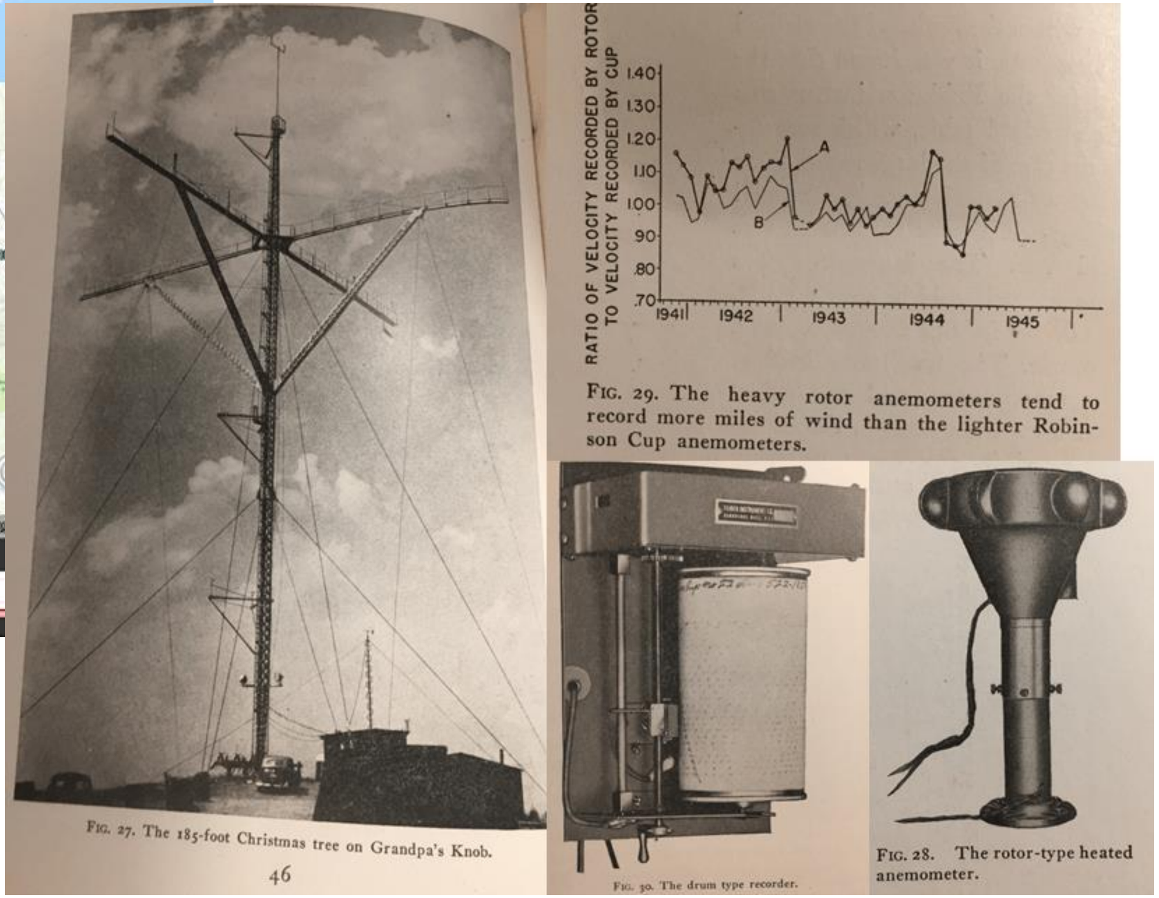


FIG. 27. The 185-foot Christmas tree on Grandpa's Knob.

46

FIG. 29. The heavy rotor anemometers tend to record more miles of wind than the lighter Robinson Cup anemometers.

FIG. 30. The drum type recorder.

FIG. 28. The rotor-type heated anemometer.

Wind resource assumption: very windy...

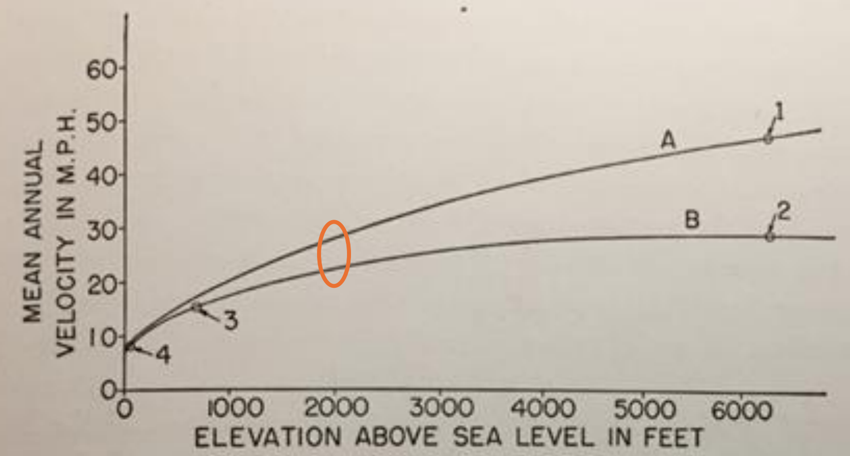


FIG. 9. Assumed variation of mean annual wind velocity with variation in elevation above sea level, in New England.

Curve A represents velocities as accelerated by mountain-tops, the example being the value reported in 1935 for Mt. Washington (6300 feet), of about 49 miles an hour, since found to be high by about 5 miles an hour.

Curve B represents free-air velocities.

Point 1	Long-term mean velocity as reported in 1935 by Mt. Washington Observatory.
Point 2	Free-air mean velocity at elevation of Mt. Washington, computed by Brooks.
Point 3	Long-term mean velocity at Blue Hill Observatory, reported by Brooks in 1935.
Point 4	Long-term mean velocity at East Boston Airport (sea level), reported by Brooks in 1935.

Wind resource measured: not that windy after all..

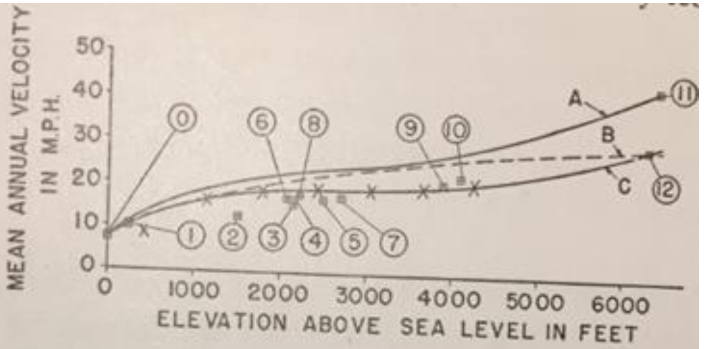


FIG. 43. The 5-year mean velocities observed and estimated at hub-height (140 feet), at the Smith-Putnam mountain-top stations, correlated with similar data for the same period at Mt. Washington, Blue Hill, and East Boston airport, and compared with the observed vertical distribution of the velocity of the free-air in the same height range (sea level to 6300 feet).

Curve B represents the original assumption of Curve B of Fig. 9.

Curve C represents free-air velocities.

Curve A represents accelerated velocities.*

Point 0	East Boston	Point 6	Grandpa's
Point 1	Blue Hill	Point 7	Herrick
Point 2	Pond	Point 8	Seward
Point 3	Biddie Knob	Point 9	Glastenbury
Point 4	Biddie I	Point 10	Pico
Point 5	Chittenden	Point 11	Mt. Washington

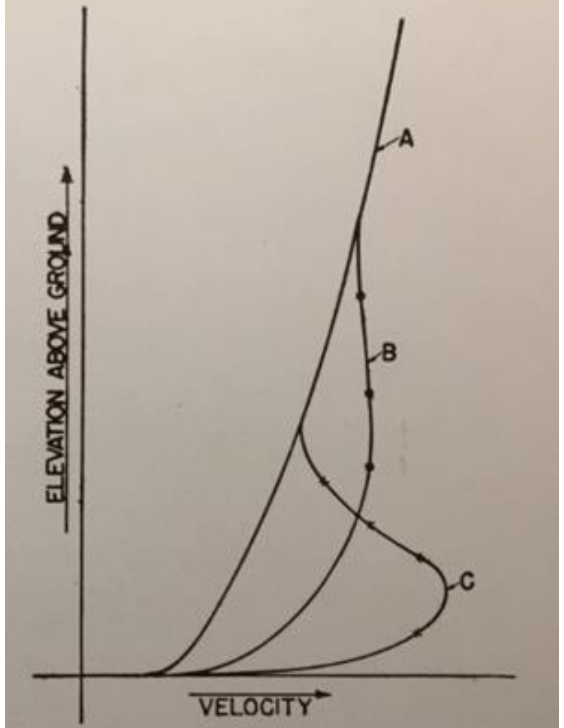


FIG. 14. Assumed velocity distribution above different types of terrain.

Curve A	Flat country.
Curve B	A rounded ridge, corresponding roughly to Curve A in Fig. 12.
Curve C	A sharp ridge.

Putnam in his 1948 book

"It was not until the summer 1945, [...] that it was learned that the "anomaly" at Mount Washington had been caused by the application of an arbitrary correction to the anemometer records (ed: used for the long-term correcting the on-site measurements). *The correction had been applied by one of the observers without notification to the users of the published data. It is quite likely that we have this observer to thank for the Smith-Putnam Wind-Turbine experiment. If it had been known at the end of 1940* (ed: when they conducted on-site measurements) *that not only was there no anomaly, but also little wind at those elevations below which we did not fear ice, it is likely that the experiment would have been abandoned out of hand".*

Wrong anemometer measurements at Mt Washington ...

"At 16 m/s wind, it developed 1500 kW and at 12 m/s about 700 kW. The plant, however turned out a disappointment. It soon appeared that powerful winds occurred with the same frequency at Grandpa Knob as at Zealand in Denmark and with the great tip velocity the plant did not supply any current till at about 9 m/s wind and with but a low usable energy, at that. Had the mill been constructed so as to rotate at barely half its speed, it might have supplied more than twice the amount of energy and it would not, then, have been necessary to dimension gears and generator for more than 600 kW. Actually, the plan corresponded in size to a 600-kW plant when adjusted to our wind conditions which correspond to those prevailing in U.S.A.".

J. Juul about the Putnam experiment (OEEC technical paper, 1956)

... leading to an oversized turbine and sub-optimal design ...

… plus, an overly tired meteorologist!

S. Pettersen in his memoirs (1974)

As a result, I soon became too heavily engaged in consultant work. Since some of my not-so-well-off students earned their living by part-time work on the turbine project, there was no easy retreat. Eventually, I made a resolution never again to become involved in industrial consulting work.

And according to Sverre Pettersen[26]: *"The meteorology, the wind regimes, icing storms, and damaging gusts became my domain. This turned out to be the least explored area and it soon became the crux of the project."*

Sverre Petterssen

6 languages

Article Talk Read Edit View history Tools

From Wikipedia, the free encyclopedia

Sverre Petterssen (19 February 1898 – 31 December 1974) was a Norwegian meteorologist, prominent in the field of weather analysis and forecasting.[1]

Early life [edit]

Born in Norway into a humble family, he paid for his higher education by working at the telegraph office, and a nursery provided by the armed forces that he joined as a recruit. He studied in Bergen where he met Tor Bergeron during a lecture, and was so impressed by his analysis of a 1922 storm that he joined the Bergen School of Meteorology in 1923. In the late 1920s, he worked at the Geophysical Institute in Tromsø in northern Norway.

Career [edit]

After school, he remained a weather officer in the Norwegian Air Force until 1939. He went to the US in 1935, lecturing on Norwegian meteorological theories to the US Navy and Caltech. In 1939, he was hired by MIT as head of the meteorology department and wrote two important books there: *Weather analysis and forecasting* (1940) and *Introduction to Meteorology* (1941).

With the invasion of Norway, Petterssen returned to Europe and offered his services in England to the Met Office, on loan from the Norwegian Air Force. During World War II, he served as a weather forecaster for bombing raids and special operations.

Pettersen is most remembered for his work in what has been called the most significan

Sverre Petterssen

Sverre Petterssen in Norwegian uniform

Born	19 February 1898 Hadsel, Norway
Died	31 December 1974 (aged 76) London, England
Nationality	Norwegian
Citizenship	United States
Alma mater	Bergen School of Meteorology
Known for	D-Day weather forecast

D-day meteorologist