changes are the result of the interaction of RNA with one or more of the experimental parameters utilized. However, the findings are generally consistent with some of the reported clinical results.

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4. Acquisition is the progressive incremental change in the proficiency of performance as a result of repetitive presentation of conditioned and unconditioned stimuli under controlled conditions. Extinction is the progressive decremental change in performance as a result of repetitive presentation of the conditioned stimulus without the unconditioned stimulus.
5. RNA was purchased from Pabst Laboratories. Preliminary studies were conducted with 10 cent aqueous solution of yeast RNA, kindly supplied by Dr. D. E. Cameron, Montreal, Canada.
6. Sprague-Dawley rats were obtained from Charles River.
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29 April 1963

Discovery of Right Whales in the Gulf of Mexico

Abstract. *Two whales were observed closely for an hour off Sarasota, Florida, by residents who provided observations of structural details which identify only the right whale,* Eubalaena glacialis, *a temperate and subpolar species previously known to range to the Florida east coast, but not to enter the Gulf of Mexico.*

On 10 March 1963, the Gulf of Mexico had a fresh wind and a chop off New Pass, Sarasota, Florida, when Ben B. Sanders and Paul Reeves, residents of Sarasota cruising in a 28-foot (8.4 m) boat, saw two whales swimming west in water only 30 to 34 feet deep (9.4 to 10.3 m). Together with Merton Wilcox, a precision instrument engineer and a consultant to Cape Haze Marine Laboratory, who joined them in another boat, Sanders and Reeves observed the whales from 3:30 to 4:40 P.M., approaching them as closely as 12 feet (3.6 m) in one instance. They described their experience to one of us within 22 hours. The only camera aboard took inadequate photographs, but the details reported to us seem to provide unassailable identification of the whales as right whales, *Eubalaena glacialis* and, thus, the first evidence of this species ranging into the Gulf of Mexico.

According to Sanders, Reeves, and Wilcox, these whales had (i) no dorsal fin; (ii) the mouth cleft in side view, high on the head and arched; (iii) a bumpy area in a ragged patch on the head forward of the blowhole; (iv) a length exceeding 40 feet (12.1 m), in the larger probably approaching 55 feet (16.7 m); (v) a color of charcoal gray and black; Wilcox and Sanders saw inconspicuous whitish patches low on the head near the eye; and (vi) a single spout 3 to 5 feet high (0.9 to 1.5 m). The whales created a slick in the choppy water above and around them, even when not breaking the surface. Most of the observations relate especially to the larger individual which showed itself more freely. The first five items identify only one species known to inhabit North Atlantic waters, the right whale, *Eubalaena glacialis,* and only one item could be construed as evidence against this: observed from behind, the blow or spout should have been double (or V-shaped) and higher (*1*). This incongruity may result from a defect in observation, or possibly from the whales' breathing less forcefully in relatively warm, shallow water. After corresponding on the diagnostic points, we double-checked these observations with the witnesses, and we see no cause to doubt that the animals described were right whales.

The right whale was the easiest and most lucrative species to catch, and by about 1750 it had been reduced in the North Atlantic to numbers too low for further economic exploitation (*2*). Their near extinction so long ago has severely limited scientific knowledge of the southern extent of their original range in the North Atlantic. One specimen from the eastern Atlantic, that would have passed as far south as 36°N. latitude in the Strait of Gibraltar, is known (*3*) from Taranto, Italy, and one from the western Atlantic was observed (*3*) near Charleston, South Carolina (just below 34°N.). One of us (*4*) recorded that a few individuals still reach the Atlantic coast of Florida in late winter, with one occurrence as far south as 26°15′N. Attainment of the upper Florida east coast by a few right whales seems now to be regular (*5*), but there is no previous evidence that this species ranges into the Gulf of Mexico (*2, 6*). By international agreement in 1929, the right whale was protected from commercial whaling (*1*) and since then its western North Atlantic population has evidently increased so that it is now straggling into the Gulf of Mexico.

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2 May 1963

Transpiration by Sudangrass as an Externally Controlled Process

Abstract. *Transpiration from a well-watered sudangrass stand in a highly evaporative environment (Tempe, Arizona, in July) can be considerably increased by exposing a small plot of about 1 square meter to radiative and convective heat input. Thus, the transpiration of sudangrass in a full stand appears not to be determined by any physiological factor during any time of the day.*

A transpiring plant cover may, for purposes of analysis, be compared to an open water surface. However, unlike evaporation from open water, transpiration can be determined or limited by availability of soil water, capacity of water-carrying tissues, and impedance to vapor diffusion in the leaf in interstitial and stomatal pathways.

In this report we give data indicating

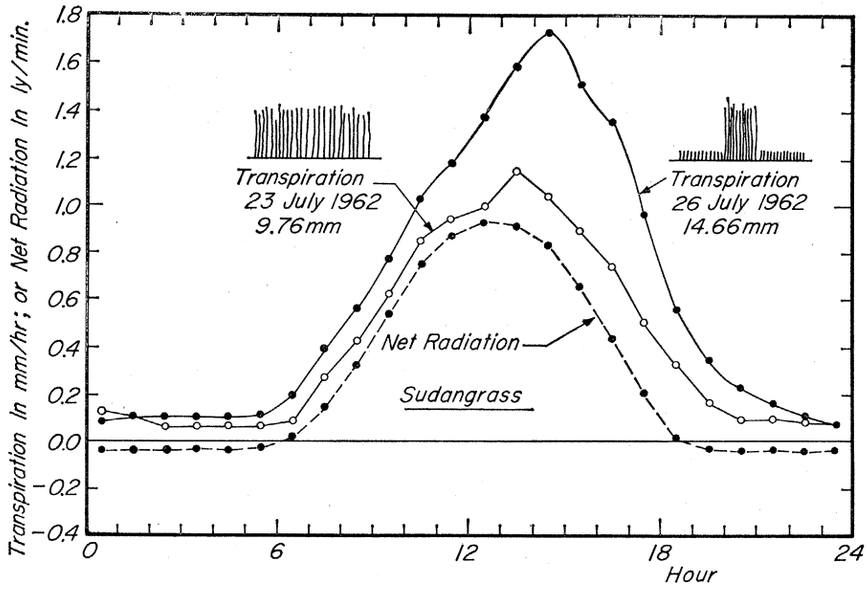

Fig. 1. Transpiration in millimeters per hour from a closed stand of sudangrass on 23 July 1962 at Tempe, Arizona, and from an isolated 1-m² plot of the same sudangrass 3 days later. Also, net radiation in langleys per minute, given as the average for the 2 days, the two values differing by only 5 percent.

that transpiration from a stand of sudangrass under conditions of high soil-moisture content, is fully regulated by external factors, that is, meteorological and morphological, and not by any physiological ones.

The observations were made during the summer of 1962 in the Salt River Valley of Arizona. Sudangrass, planted in May, had developed into a dense stand about 100 cm high by the middle of June. Measurements with miniature net radiometers (*1*) showed that under such conditions net radiation at the soil surface was negligible, implying that practically all water loss from the crop was transpiration. Flow of heat into or out of the soil was also negligible. Water loss was measured continuously with a weighing lysimeter installation (*2*), precise to the nearest 0.01 mm of water.

Table 1. Weather data at Tempe, Arizona, on 23 and 26 July 1962.

Data	23 July	26 July
Total solar radiation	683 ly	668 ly
Total net radiation*	377 ly	399 ly
Maximum temp.	42°C	41°C
Minimum temp.	28°C	28°C
Av. vapor pressure	16 mbar	16 mbar
Rel. humidity at noon	0.25	0.32
Av. windspeed	3.2 m/sec	3.6 m/sec

* Measured at site over sudangrass; all other values, U.S. Weather Bureau—Phoenix airport data (aerial distance to site, 5.0 km).

On 23 July, a clear day, an hourly record of transpiration was obtained, as shown in Fig. 1. Also shown is the energy gain of the surface as net radiation. Evaporation follows and is of the same order of magnitude as the net radiant energy input. However, energy was also derived as sensible heat from the air, particularly in the afternoon, implying that the leaves were cooler than the air. The potential input of sensible heat energy is not readily assessed, and it would be possible to argue that on 23 July physiological factors were involved in determining the transpiration rate.

In order to test such a supposition, the energy input into the crop growing on the lysimeter was greatly increased —both as radiative and, in particular, as sensible heat—by cutting the sudangrass around it. Figure 1 shows the data so obtained on 26 July under virtually identical weather conditions (see Table 1). Transpiration increased greatly as a result of cutting and, again, seemed to follow the energy input as it varied throughout the day. The rate of transpiration, whether on an hourly or daily basis, greatly exceeded values that are ever to be expected for a closed stand. In an unpublished report, W. O. Pruitt, of the University of California, gives as the highest observed value for evapotranspiration from perennial ryegrass at Davis, California, a value of 11.6 mm/day and 1.1 mm/hr.

The drastic response to increase in energy input is taken as proof that in a closed stand as on 23 July, physiological factors played no role in determining transpiration rates. Additional proof results from the observation that, when fully exposed to radiant heat and wind movement on 26 July, the sudangrass showed no visible signs of water stress such as leaf edge rolling or change in color during any time of the day. Furthermore, depression of transpiration at midday was conspicuously absent, even under extreme evaporative demand, as Fig. 1 demonstrates.

We conclude that a full stand of sudangrass under conditions of high temperatures, high light intensity, very low humidity of the air, and sufficient soil moisture—in short, in a highly evaporative environment—can transpire upon atmospheric demand. This should not be construed to mean that a sudangrass stand is physically identical to an open water surface nor that the conclusion would apply to another crop. Both the radiation balance and the convective sensible heat exchange of a crop differ materially from those of an open water surface.

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29 April 1963

Pontine Reticular Formation: Relation to Lateral Geniculate Nucleus during Deep Sleep

Abstract. *Irregular groups of monophasic waves (seven waves per second) appear synchronously in the pontine reticular formation and in the lateral geniculate nucleus during the deep (low-voltage, fast) phase of sleep. The geniculate potentials can be triggered by low-rate stimulation of the pontine reticular formation, but the reverse effect has never been obtained.*

Several recent studies have described the appearance of discrete intervals in the course of normal feline sleep during which the cortical electroencephalogram develops a low-voltage, fast pattern, erratic eye movements ap-