that it is primarily non-noradrenergic, although some noradrenergic cells in the area postrema were doubly labeled (*14*).

These results indicate that a series of interrelated central noradrenergic pathways play an important role in the relay of visceral sensory information to the hypothalamus by way of the NST (Fig. 2A). The projection of the NST to parvicellular parts of the PVN is primarily noradrenergic, and non-noradrenergic cells in the NST project to another noradrenergic cell group (A1), which in turn innervates vasopressinergic parts of the PVN and SON. Hence, separate noradrenergic inputs may simultaneously influence neuroendocrine and autonomic modes of hypothalamic regulation (through the A1 group) or may influence the autonomic mode alone (through the A2 group). Since the projection from the locus coeruleus is confined to the periventricular part of the nucleus it may rather selectively modulate anterior pituitary function (*3*).

Because the NST receives visceral sensory information from cranial nerves IX and X, the circuitry outlined in Fig. 2 may be involved in a wide range of visceral responses. For example, considerable physiological evidence suggests that it plays an important role in the regulation of blood pressure and volume. Information from atrial stretch receptors, aortic baroreceptors, and carotid body chemoreceptors, which is relayed by these nerves, influences the secretion of vasopressin (*15*), as may inputs from osmoreceptors in the hepatic portal venous bed (*16*). Such information has been thought to affect vasopressin release through a direct projection from the NST or through a disynaptic route involving the parabrachial nucleus (*17*). The present results indicate, instead, that visceral information reaches vasopressinergic neurons in the hypothalamus by way of the A1 group (see Fig. 2A). Of course, it remains to be determined whether the dendrites of magnocellular neurons extend into parvicellular parts of the PVN and whether cells in the parvicellular division project to the magnocellular division.

Because overlapping inputs to specific parts of the parvicellular division of the PVN arise in the A1 and A2 groups, both regions may influence outputs from the PVN to spinal and medullary autonomic centers (Fig. 2B), pathways that act in concert with vasopressin release during homeostatic responses in the cardiovascular system. It has been shown (*6*) that increased blood pressure due to vasopressin release and tachycardia due to reciprocal changes in parasympathetic and sympathetic tone are elicited by electrical stimulation of the PVN, and that the PVN maintains a tonic inhibitory control over the heart rate component of the carotid sinus reflex. Central noradrenergic pathways may also be involved in several types of hypertension in animals, as well as in man (*18*), and the hypotensive actions of the α-noradrenergic agonist clonidine may be due in part to an effect on these pathways (*19*).

Our results are thus consistent with a substantial body of evidence linking the NST, the ventral medulla, and the PVN and SON to the regulation of peripheral cardiovascular homeostasis. Changes in peripheral blood pressure may also be accompanied by coordinated changes in the intracerebral microvasculature. The circuitry we have outlined here may be directly involved in such integration as well, since stimulation of the locus coeruleus, which receives a direct input from the A1 group, affects intracerebral blood flow and capillary permeability (*20*).

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Ice-Rafting, An Indication of Glaciation?

In an otherwise excellent article, Herman and Hopkins (*1*) appear to believe in the old myth that ice-rafted material in deep-sea sediments indicates glaciation in the surrounding continents, and can be used to date the onset of such glaciations.

In fact, most ice-rafted material in marine sediments probably comes from coastal winter ice, where both the area and the possibilities for picking up material are far greater than in a glacier (*2*). Today there is a considerable amount of sediment ice-rafting around Denmark, without any glaciation (*3*). There are some exceptions from this rule: (i) During an Antarctic-type glaciation there will be too little ice-free coast for the formation of winter ice; (ii) at the very southern limit of ice-rafted material (in the North Atlantic), ice-rafting will probably be due to icebergs, because they will melt later, and be transported further than coastal ice because of larger size and smaller ratio of volume to surface.

It is difficult to discriminate between material transported by icebergs, and coastal winter ice; both will be transported by the same systems of wind and current. The presence of many contemporaneous shallow-water organisms (foraminifera and molluscs) in ice-rafted deep-water sediments (*4*) may be an indication of transport by coastal ice, since the possibilities of picking up unconsolidated sediments with organisms in them is considerably higher in a normal littoral situation than in the calving front of a glacier.

An alternative model to that suggested by Herman and Hopkins (*1*) could be that their unit III was formed when the climate was cold enough for the formation of coastal winter ice, but that the real glaciation started only at the time of unit II.

During a period of general cooling, there may be a time lag between the stage when coastal winter ice is formed and the onset of a glaciation. The length of this time lag depends on the rate of temperature change, the topography on land, and the precipitation and wind systems. In those parts of the North Atlantic where the coastal areas were obliquely uplifted during the Neogene (*5*), the early accumulation of ice on land probably took place on the landward side of the water divide. It may have taken considerable time after the onset of the glaciation before appreciable amounts of glacial ice were drained into the ocean and could give ice-rafted sediments.

Generally speaking, the first occurence of ice-rafting indicates cooling to a level where coastal winter ice is formed. The dating of the onset of glaciation is better made on the consequent eustatic drop in sea level.

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Observations in the nearshore zone of the Chukchi and Beaufort seas confirm that sand and gravel can be lifted from the beach by adfrozen sea ice [for example, see (*1*)], but gravel from beach sources can be readily recognized in cores and bottom samples by its high degree of rounding (*2*). Grounded pressure ridges are also known to lift coarse material from relict sand and gravel patches on the continental shelves of the Bering and Beaufort seas. An area of relict Pleistocene gravel on the floor of northern Bering Sea near Nome (*3*), for example, is surrounded by a halo about a kilometer wide in which bottom muds contain an outward-diminishing admixture of pebbles (*2*), evidently translocated by grounded pressure ridges. Near the stamukhi zone in Beaufort Sea (*4*), floating remnants of once-grounded pressure ridges have yielded mixtures of mud and erratic boulders with attached epifauna, material evidently scraped up from submerged outcrops of Flaxman Formation (*5*). Sand and gravel lifted by grounded pressure ridges, however, appears unlikely to be transported any great distance before melting returns it to the sea floor.

In contrast, ice islands derived from ice shelves off northern Ellesmere Island contain abundant coarse detritus on their upper surfaces and presumably in their interiors (*6*), and some of these ice islands reach and become grounded on the Beaufort Sea shelf. Striated glacial erratics of a different suite of lithologies are found in the late Pleistocene Flaxman Formation of the Beaufort Sea coast (*5*). The Flaxman Formation erratics consist partly of rock types that could reach the Arctic Ocean only by glacial transport from their inland outcrop areas in northern Canada and northern Greenland. Similar erratics are found at Skull Cliff (*7*) in beds that appear to be at least as old as early Pleistocene and equivalent in age to unit II of Herman and Hopkins (*8*). Scanning microscope studies of surface textures of quartz grains confirm that some of the coarse debris of unit I (Pliocene) has also undergone glacial handling (*9*). These are the reasons why we are inclined to believe that glacial icebergs are the major source of coarse erratic material in all three of the zones recognized within Arctic Basin deep-sea cores.

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Interstellar Chemistry: Polycyanoacetylene Formation

We disagree with one of the conclusions reached by Hayatsu *et al.* (*1*) regarding the origin of interstellar carbynes and cyanopolyacetylenes. They found evidence for carbyne fragments in the Allende meteorite in the form $-(C\equiv C)_n$ and $-(C\equiv C)_n-CN$ and, in the laboratory, showed that such carbynes can form metastably at low temperatures from CO and H_2 by a catalytic reaction on chromite. They concluded that this process in the solar nebula formed carbynes on the Allende meteorite. They went on to suggest, however, that the polycyanoacetylenes that have been detected in a few interstellar clouds are produced by fragmentation of polymerized cyanoacetylenes formed on grains, rather than built up stepwise by gas phase ion-molecule reactions.

To the contrary, it was shown by Langer *et al.* (*2*) that the simplest polycyanoacetylene, HC_3N, is produced by gas phase ion-molecule reactions, rather

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