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Molt Migration of Scoters at Cape Peirce, Alaska

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ABSTRACT. There is presently little specific information on the molt migrations of scoters in the Nearctic. We conducted migration watches from 21 June to 31 July 1984 (total of 96 h) and from 5 to 15 July 1985 (total of 36 h) during daylight hours to estimate abundance and species composition of scoters engaged in a molt migration at Cape Peirce, southeast Bering Sea, Alaska. We counted 22 897 scoters moving west past the observation site in 1984, the year in which we probably made observations over most of the migration period. Allowing for daylight hours without watches, an estimated 66 500 scoters passed in 1984. Peak passage occurred on 11 July in both years. Species composition of migrants in 1984 was approximately 77% white-winged scoters (*Melanitta fusca*), 12% surf scoters (*M. perspicillata*), and 11% black scoters (*M. nigra*). Most of the migrants were adult males, probably migrating from breeding grounds in Interior Alaska. Our findings suggest that a large and presently undescribed molting area of white-winged scoters exists somewhere in the waters of western Alaska or eastern Siberia.

Key words: scoters, seaducks, molt migration, Cape Peirce, Togiak National Wildlife Refuge, Bering Sea, Alaska

RÉSUMÉ. Il y a actuellement peu d'information spécifique sur les migrations de macreuses ayant effectué la mue dans le Néarctique. On a effectué des observations d'oiseaux migrateurs entre le 21 juin et le 31 juillet 1984 (96 h au total) et entre le 5 et le 15 juillet 1985 (36 h au total), pendant la journée, pour évaluer l'abondance et la composition des espèces de macreuses qui effectuaient une migration après leur mue, à Cape Peirce, au sud-est de la mer de Béring en Alaska. On a dénombré 22 897 macreuses qui allaient vers l'ouest à partir du site d'observation en 1984, l'année où les observations ont probablement été faites sur la plus grande partie de la migration. Si l'on tient compte des heures de clarté où l'on n'a pas effectué d'observations, on estime à 66 500 le nombre de macreuses qui sont passées en 1984. Le passage a atteint son maximum le 11 juillet chaque année. En 1984, les espèces d'oiseaux migrateurs comprenaient environ 77% de macreuses à ailes blanches (*Melanitta fusca*), 12% de macreuses à front blanc (*M. perspicillata*) et 11% de macreuses à bec jaune (*M. nigra*). La plupart des oiseaux migrateurs étaient des mâles adultes qui effectuaient leur migration à partir des aires de reproduction de l'intérieur de l'Alaska. Nos recherches laissent supposer qu'il existe, quelque part dans les eaux situées à l'ouest de l'Alaska ou à l'est de la Sibérie, une vaste aire de mue pour les macreuses à ailes blanches, qui n'a pas encore été identifiée.

Mots clés: macreuses, canards de mer, migration d'oiseaux ayant effectué la mue, Cape Peirce, Togiak National Wildlife Refuge, mer de Béring, Alaska

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INTRODUCTION

The occurrence of molting congregations and molt migrations in seaducks (tribe *Mergini*) has been reviewed by Salomonsen (1968) and was later expanded upon for some species by Joensen (1973) and Kumari (1979). The phenomenon of molt migrations for this group in America is less well known (see Bellrose, 1976; Palmer, 1976; Ross, 1983). In western North America, small numbers of all three scoter species are known to molt within the winter range in coastal waters of British Columbia (Savard, 1981) and southeastern south-coastal Alaska, possibly as far west as the Aleutian Islands (Palmer, 1976). Specific molting areas outside of the winter range are known on the Yukon and Alaska coasts of the Beaufort Sea (Vermeer and Anweiler, 1975; Salter *et al.*, 1980; Johnson and Richardson, 1982) and in the central Bering Sea (Dau, 1987). Movement of post-breeding males and non-breeders to these molting sites has only partially been described (Palmer, 1976; Johnson and Richardson, 1982). A genuine molt migration as described by Salomonsen (1968:6) takes place: ". . . when an individual may shed the flight- and tail-feathers . . . In a special area which is reached through a pre-moult migration starting in adult birds from the breeding range and in immature birds often directly from the winter quarters or from intermediate stations during spring migration."

Here we describe the migration of predominantly white-winged scoters (*Melanitta fusca*), with smaller numbers of surf (*M. perspicillata*) and black (*M. nigra*) scoters, presumably to molting areas in western Alaska. We observed migrating seaducks from the tip of the Cape Peirce Peninsula, located in southwestern Alaska on the Bering Sea coast, to assess the magnitude and timing of the molt migration. We conducted migration watches concurrent with studies of population size and productivity of breeding seabirds.

STUDY AREA AND METHODS

Cape Peirce is within the Togiak National Wildlife Refuge and forms the southernmost tip of a peninsula projecting into the Bering Sea separating Bristol Bay from Kuskokwim Bay. The area is dominated by treeless coastal tundra and steep, rocky seacliffs containing a large seabird colony of over 100 000 birds, mostly common murres (*Uria aalge*) and black-legged kittiwakes (*Rissa tridactyla*).

We conducted migration watches from a single location at the top of a 115 m cliff facing south and overlooking the Bering Sea. This site provided unobstructed views to the south and east, the direction of oncoming scoter flocks. Most scoters flew below the level of the observer and were silhouetted against the sea, facilitating detection of flocks. We observed migrating waterfowl for two-hour watches during daylight periods from 21 June to 31 July 1984 and from 5 to 15 July 1985. One or two watches were scheduled per day, except on occasional days of heavy migration, when we

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observed for 6-12 hours per day. Times of watches were chosen randomly (by use of a random numbers table) for each day. We counted scoters (and other waterfowl) as they crossed an imaginary north-south line through the Cape Peirce observation site. The single observer scanned the horizon for migrating birds and made identifications with the aid of binoculars (7-10x) or a spotting scope (15-40x).

We tallied waterfowl by species (and sex and age when possible, following Palmer [1976]) within each flock. In addition, the observer recorded direction of movement and time of day (Alaska Daylight Time [ADT=GMT−9h]). We conducted watches between 0600 and 2400 h in June and between 0700 and 2200 h by late July. These times correspond with the available daylight at this latitude. We observed for a total of 96 h in 1984 and 36 h in 1985. Watches were occasionally cancelled due to inclement weather (e.g., fog or heavy rain), when conditions precluded visual observations of migrants. We did not census during a 7 d period from 20 to 26 July 1984 because of a combination of observer absences and stormy weather.

We tallied the numbers of westward migrating scoters for each 2 h watch period and then subtracted eastward-moving birds from count totals. We estimated total passage for the 1984 data from these 2 h rates by obtaining an average rate for each 7 d period, then extrapolating over all daylight hours for that week. We only used watch hours selected randomly prior to field observations for estimating population totals; auxiliary counts were not included in calculations. For a 7 d period in late July for which we had no counts, 2 h rates were calculated from the immediately preceding and following two counts to estimate passage for that week. We did not calculate confidence limits on these estimated totals because of the irregular nature of data collection and the absence of data during hours of darkness. We attempted to refine the total daytime migration estimate by looking for consistent variations in volume throughout the day, but no regular patterns were evident. Two day-long counts during peak migration suggested there was no consistent pattern of bird passage in relation to time of day. We conducted counts in 1985 during the peak migration period to confirm that the migration observed in 1984 was an annual event. We also summarized information on the nesting distribution and solicited additional sightings of molting or migrating flocks of all three scoter species in an attempt to clarify the origin and destination of the birds migrating past Cape Peirce.

RESULTS

Flocks of scoters were first observed moving west past Cape Peirce on 23 June 1984, when 6 flocks totaling 36 birds were counted during a 2 h count period (Fig. 1). Migrating scoters were then seen during every count until 27 July 1984 and on every day during the 11 d observation period in mid-July 1985. Although the migration continued through 28 July 1984, during the following 2 days only 9 and 6 scoters were counted respectively, suggesting that most of the migrants probably had passed. We conducted four additional counts between 9 and 15 August, but only 59 migrating scoters were seen.

Numbers of migrating scoters of all species increased rapidly from 23 June until the movement peaked on 11 July 1984 (Fig. 1). Timing of migration appeared to be similar in 1985 based on the shorter observation period; peak numbers also occurred on 11 July. Migration volume declined rapidly after these observed peaks.

On 11 July 1984 we noted a very large movement of scoters during the morning count period, which started at 0600 h. We continued observations over most of the day until 2200 h to record this large pulse of birds. A total of 12 091 were tallied moving west during 13 h of observation in favorable weather (light northeast winds and 25% cloud cover). In 1984 we counted 22 897 scoters migrating west during all watches, and 6732 were seen in 1985 over a shorter observation period. Total westward migration as estimated for 1984, the year in which our observations apparently spanned most of the migration period, was calculated at approximately 66 000 scoters. Estimated species totals were 51 200 white-winged scoters, 8200 surf scoters, and 7100 black scoters. These totals are minima because we could not estimate nocturnal migration rates (if they occurred) or the number of scoters taking "shortcuts" inland across the Cape Peirce peninsula. We noted a few flocks taking this shorter route, but it appeared that most birds migrated around the cape, at least during the daytime.

The molt migration of scoters was highly directional; over 99.2% of the scoters we observed were moving west in both years. Although we did not regularly record flight heights of scoter flocks, the majority were below the level of the observers (115 m), with many birds traveling only a few meters above the sea surface.

In summer 1984, weather conditions were generally favorable for counting migrating waterfowl, with light winds and little precipitation during most count periods. We periodically scanned the horizon from the watch site with the spotting scope to determine if migration was occurring farther offshore. We rarely detected migrating flocks of scoters by this method in 1984. Weather conditions in 1985 were much less favorable, with strong northwest winds predominating during most watches, particularly during the peak movement period. Scanning the horizon with binoculars or the scope frequently revealed migrating flocks far offshore during windy periods. A higher proportion of the migrants probably passed undetected than in the previous year.

The most abundant species encountered throughout the migration was the white-winged scoter. This species constituted approximately 77 and 71% of all scoters in 1984 and 1985 respectively (Fig. 2); second in abundance were surf scoters (12 and 17%), followed by black scoters (11 and 12%). White-winged scoters predominated throughout most weekly periods in 1984 (Fig. 2).

Scoters were most often seen in species-specific flocks, with only 13.0% of all flocks containing more than one species of scoter in 1984 and 15.8% in 1985. More frequently, migrating scoters were joined by groups of common murres flying between nearby breeding colonies and offshore feeding areas. This behavior was systematically recorded in 1985, when 48.6% of all scoter flocks contained at least one common murre. Murres could frequently be seen joining with and deflecting from scoter flocks near the observation site. Tufted puffins (*Fratercula cirrhata*) also exhibited this behavior; however, they were present in the area in much lower numbers than murres.

For all three species of scoters, the molt migration was primarily composed of adult males (Table 1). We did not con-

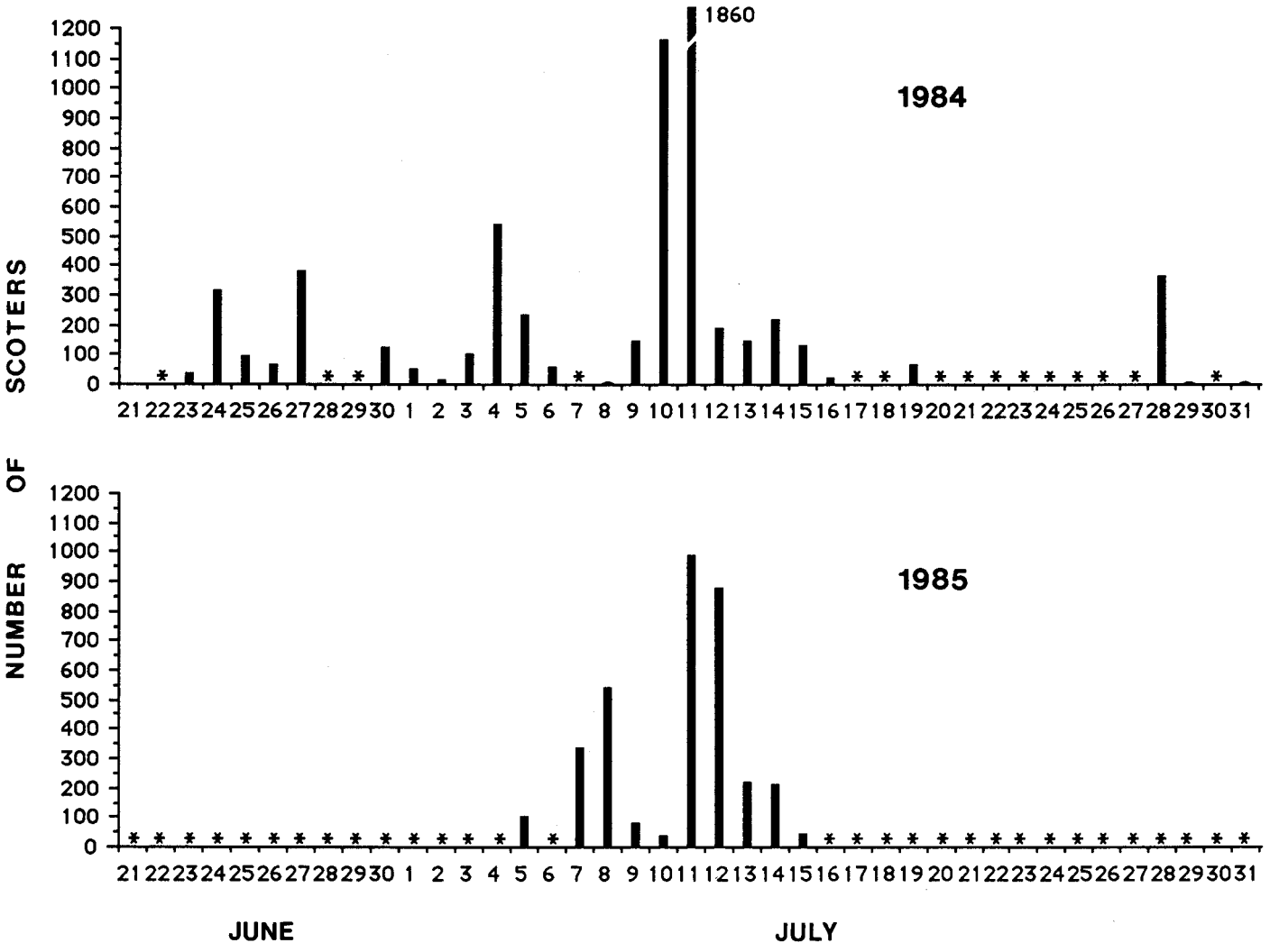

FIG. 1. Chronology of scoter molt migration at Cape Peirce in 1984 and 1985. Data represented are mean numbers of scoters counted per 2 h migration watch for each day. Asterisks (*) indicate days for which we conducted no migration watches.

TABLE 1. Percentages of adult males and other scoters in molt-migrant flocks at Cape Peirce in 1984 and 1985

	White-winged No. (%)	Surf No. (%)	Black No. (%)	All Scoters No. (%)
1984				
Adult males	4547 (91)	1114 (85)	644 (79)	6305 (88)
Others[1]	471 (9)	204 (15)	171 (21)	846 (12)
Total	5018	1318	815	7151[2]
1985				
Adult males	4696 (98)	1048 (91)	587 (73)	6331 (94)
Others	74 (2)	100 (9)	214 (27)	388 (6)
Total	4770	1148	801	6719

[1]This category includes adult females and juveniles of both sexes.
[2]Not all flocks observed in 1984 were classified according to age and sex categories.

sistently distinguish immature males and females from adult females; therefore these cohorts were combined during analysis. Immature and/or female-plumaged birds were more frequent early in the migration. Greater numbers of breeding males followed later, presumably after abandoning nesting females on the breeding grounds.

The only other species of waterfowl migrating during this same period in any numbers was the king eider (*Somateria spectabilis*). We counted a total of 1555 king eiders moving west in 1984. Most of these were immature birds apparently flying to molting sites from winter quarters farther south.

DISCUSSION

Our observations confirm that a significant molt migration of scoters occurs past the Cape Peirce peninsula, and this migration appears to be an annual event. Previous researchers in this area also noted numerous scoter flocks moving west from mid-June through July in 1970 (Dick and Dick, 1971) and 1976 (M.R. Petersen, pers. comm. 1985), but no systematic counts were made in those years. The highly concentrated peak passage period (in mid-July at Cape Peirce) is typical of other molt migrations of scoters. Molt-migrant flocks of as many as 2000 birds were observed in northern Europe by Joensen (1973), and the molt migration of black scoters across the Jutland peninsula of Denmark has been described as "spectacular" by Salomonsen (1968).

The migration that we observed may contain only a small number of black scoters actually migrating to molting sites.

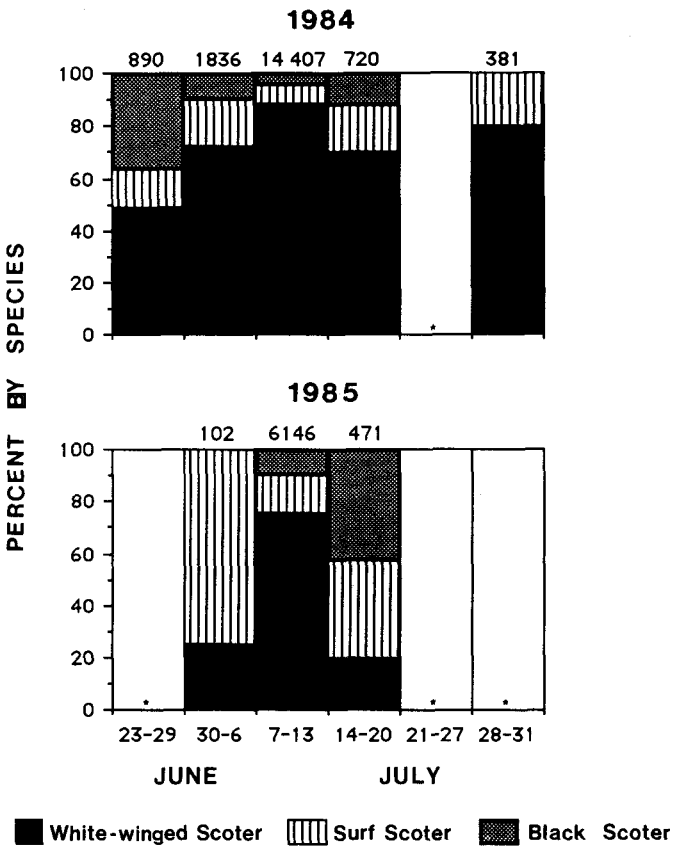

FIG. 2. Percent species composition of migrating scoters summarized by weekly periods. Weekly totals of the number of scoters counted and identified to species appear at the top of each column. Asterisks (*) indicate weeks for which we conducted no migration watches.

Black scoters are known to nest relatively late in coastal western Alaska, frequently delaying nest initiation until early July (Dick and Dick, 1971; C.P. Dau and T. Pogson, pers. comm. 1986). Most of the black scoters we observed in 1984 occurred in late June (Fig. 2), and a relatively high percentage of female-plumaged birds occurred in migrating flocks (Table 1). Thus some of the black scoters we observed probably were still enroute to breeding grounds along the west coast of Alaska.

Migrating scoters in the Cape Peirce area regularly flew low (<100 m) over the sea, and usually less than 1 km from shore as they rounded the Cape and headed westward toward Kuskokwim Bay. The majority of molt-migration scoters on the Beaufort Sea coast also flew low (<100 m) over the water (Johnson and Richardson, 1982). In Europe, when molt migration of black scoters occurred during the day, flight was low, over the water, and proceeded around promontories of land; when crossing land, seaducks flew at sunset or in the evening and at great height (see also Salomonsen, 1968; Joensen, 1973; Zhalakevicius, 1978). Northern Bristol Bay contains relatively minor peninsulas of land (e.g., Cape Peirce and Cape Newenham) such that strictly coastal migration may be preferable for scoters, and indeed, our incidental observations indicated few flocks passed over land at Cape Peirce during daylight. Molt migration of black scoters in the western U.S.S.R. has been well studied, including use of radar observations (Zhalakevicius, 1978; Kumari, 1979; Kokhanov, 1983). There, large numbers of scoters migrate overland at high altitudes (1000-2500 m) on a broad front when traveling from the White Sea to the Baltic Sea. We have no evidence to disregard the possibility of nocturnal or broad-front overland migrations of some scoters in our study area.

Both white-winged and surf scoters breed in Interior Alaska and northwestern Canada (Gabrielson and Lincoln, 1959; University of Alaska Museum, unpubl. data; U.S. Fish and Wildlife Service, 1980-1985; Godfrey, 1986; Fig. 3). Black scoters are known to breed on the coastal tundra of western Alaska and on alpine tundra lakes east to the central Alaska Range (Gabrielson and Lincoln, 1959; B. Kessel, pers. comm. 1985; Fig. 3). Scoters migrating from nesting areas in Interior Alaska to molting sites in the Bering Sea apparently move south toward the coast and then west to upper Bristol Bay, passing Cape Peirce on this final leg of the migration. A few flocks of migrating scoters have been observed in mid-summer near Anchorage and in the Glennallen area of south-central Alaska, all flying south at great height (T.G. Tobish, pers. comm. 1985). Because many black scoters nest in coastal regions close to the molting grounds, it is not unexpected that we saw relatively few molt migrants of this species. The low numbers of surf scoters may indicate they may be more prone to night migrations and/or migrating overland to molting areas in western Alaska. Unlike molt-migrant scoters in the western Palearctic and eiders in Alaska, the migration direction of scoters we observed was in the general direction of spring migration (Salomonsen, 1968; Thompson and Person, 1963). The shallow waters of the northern Bering Sea provide ideal habitat for molting scoters and they probably have used this area at least since the late Pleistocene.

Aerial surveys over nearshore waters in the Yukon-Kuskokwim Delta region (Fig. 3) in the 1970s revealed molting scoters numbering in the thousands (Dau, 1987), primarily from mid-July through August. Most of these molting flocks consisted of surf scoters, with smaller numbers of black scoters (100-fold fewer) and white-winged scoters (forming only 0.2% of the total seen). Major molting sites of the large numbers of white-winged scoters passing Cape Peirce have not yet been identified. Likely molting sites are also in western Alaska or eastern Siberia for this species, either farther offshore in the same vicinity as the observations of Dau (1987) or farther north in the Bering Sea.

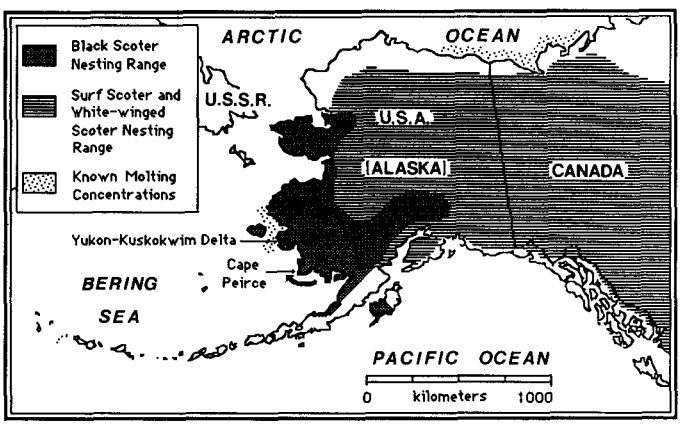

FIG. 3. Approximate nesting ranges of all three scoter species in Alaska and northwestern Canada. The area of molting concentrations of scoters presented by Dau (1987) is also shown. The large arrow indicates the primary direction of the molt migration.

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