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International Species Inventory System



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file K

17 March 1981

A Program of the American Association
of Zoological Parks and Aquariums

TO: Ed Kohn ✓
Sandy Friedman
Nick Reindl

FROM: Nate Flesness

RE: Bauman visit / Gruenerwald Equid Sanctuary site visit

I spoke yesterday with Bill Gruenerwald regarding the arrangements for Jan and Inge Bauman and myself to visit Canyon Colorado Equid Sanctuary as his guests. I asked if Nick Reindl, as acting Captive Breeding Specialist Group Przewalski's Subcommittee Chairman (Whew!) could accompany us to Canyon Colorado.

Bill Gruenerwald replied that Nick was very welcome to come, but at another time. He is also expecting Jim Dolan at this same period and that is all he can handle at once.

I am to notify Gruenerwald of any changes in the Bauman's itinerary we become aware of. He is expecting the Bauman's and myself to be at the airport around noon on Tuesday, the 28th, to be picked up by his aircraft, unless I call and change the time.

Ed

'Extinct' horses sighted in China

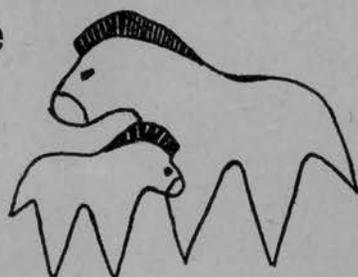
PEKING (AP) — Mongolian wild horses, thought to be extinct in China, have been sighted in the Junggar basin of northwest China's Sinkiang province, the official Xinhua news agency reported today.

Workers in a survey team saw seven or eight wild horses with foals last summer, Xinhua said.

Dispatch 3/27/81
pa 6a



Foundation on
preservation and protection
of the



Przewalski horse

cc: Nate
Sandy
JW

Mr. E. Kohn,
Director Minnesota Zoo
12101 Johnny Cake Ridge Road,
Apple Valley,
Mn 55124
USA

Rotterdam, April 15th 1981

Dear Ed,

Thank you very much for your telegram. We are very happy that you arranged that Nic Reindl can go to New Mexico to visit the territory for the future semi-reserve. Jim Dolan will also come and this is a very constructive way to get things started in a responsible way. We look forward to visit you all again and to see the zoo with the new developments. Unfortunately we had to change our travel scheme a bit to be able to visit George Rabb at Chicago. Does it suit you that we will arrive on Saturday 25 April on 16.59 o'clock in Minneapolis with plane U.A. 603 from Chicago? We stay at Washington from 18 April - 24 April with the family Baird, Route 1, Box 145, Aldie, Va 22001 Phone 703-327-6720.

With best wishes
Yours

Jan
Jan and Inge Bouman

*Ed
Nate leaves Sat. afternoon
you
Have for Guernwald trip.
- will return.*

Handwritten scribbles and initials

EK from SF

TO: North American Przewalski's Horse Breeders Group -- participants and other interested parties

FROM: Oliver A. Ryder, Ph.D., Coordinator

Just over one year has passed since the organization of the North American Przewalski's Horse Breeders Group. During the past year much has been accomplished but, of course, there is still much that remains to be done. The first anniversary of the formation of the group seems an opportune time to review the activities of the last year and bring all interested parties up to date.

Shortly after the November 18, 1979 meeting in San Diego, informal minutes recording the main aspects of the breeding plan and other recommendations and agreements were circulated to all participants. Copies of the informal minutes along with letters inviting participation in the group were sent to institutions that maintain E. przewalskii but were unable to send a representative to the organizational meeting. Responses were excellent and every institution in North America exhibiting E. przewalskii (except the Alberta Game Farm) has indicated their willingness to participate in the group.

I have written an article describing the formation of the breeding group including the historical aspects, genetic considerations, and animal exchanges and movements that have occurred as a result of the cooperation between breeders. This article has been submitted for publication (Biological Conservation) but no word of its acceptability has been received from the editor. Nonetheless, a copy is enclosed for your information.

As the manuscript details the initial animal movements have led to a significant reduction of inbreeding in affected institutions. Additional animal movements are anticipated or have occurred since the manuscript was written. The Overton Park Zoo in Memphis and the Los Angeles Zoo are cooperating to establish a breeding group in Los Angeles. The Los Angeles Zoo and the San Diego Wild Animal Park recently exchanged young mares in order to broaden the genetic background of herds at both zoos.

At the organizational meeting several specific recommendations were agreed upon and I can report progress in most areas. The formation of a depot for surplus stallions was given strong approval and I was asked to inquire whether the Conservation and Research Center (CRC) of the National Zoological Park (NZN) might be willing to house stallions not currently being used for breeding. Informal discussions with staff at the NZN and CRC have underscored their willingness to provide this much needed service. New holding facilities are being built and it is hoped that these will be available for temporary holding of a number of E. przewalskii stallions. In point of fact, I believe there are few stallions of breeding age not being used at the moment.

Two suspected infertile animals (one stallion and one mare - at different institutions) were tentatively identified. It is a pleasure to report that both

have become parents and their fertility is no longer questioned. In the process of examining these two cases, considerable useful information has been gathered. Most importantly, however, our overall lack of knowledge about important aspects of the biology and physiology was underscored.

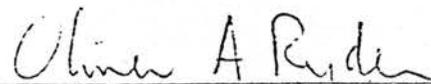
The Fourth International Symposium on the Przewalski's Horse was held last June in Marwell. I was asked to briefly describe the North American Przewalski's Horse Breeders Group at that symposium and also to the Wild Horse Specialist Group of the S.S.C./I.U.C.N. The initiative of the American breeders in forming such a group was warmly received. In fact, several European breeders are interested in future participation. At the symposium there were opportunities to speak with Prof. Veselovsky of the Prague Zoo and Prof. Bannikov of the Moscow Veterinary Academy concerning access to offspring of Orlika III, the last wild-caught mare, and Robert-Orlik of Munich-line breeding. As a result of these discussions initiatives are underway and I believe there is a good chance for success towards our goal of introduction of the Orlika III/Robert-Orlik bloodline into the North American stock.

I feel that the first year of existence of the cooperative breeding program for E. przewalskii in North America has been a successful one with significant progress toward our goals having been made. Furthermore, as a cooperative group, we have shown that it is possible for zoos and private breeders to take the steps necessary for proper genetic management. In this regard, I think it important to publicize our effort. This is the reason why the enclosed manuscript was written. Just recently, for example, articles critical of E. przewalskii breeding practices appeared in New Scientist and Audubon. Only by spreading the word of the positive programs underway can these criticisms be addressed. Perhaps the magazines and newsletters of the various institutions participating in the North American Przewalski's Horse Breeders Group might wish to carry short articles about their institution's participation in this significant program for management of an endangered species.

Several institutions have kindly provided blood and skin biopsy specimens from their E. przewalskii as opportunity has permitted. These samples have added significantly to the genetic analyses of North American E. przewalskii. This is an ongoing project and I would like to renew the request that appropriate samples be taken when animals are immobilized or subjected to necropsy examination.

Thank you for your continuing cooperation and for keeping me up to date on the status of your E. przewalskii groups.

Best wishes for the holiday season.



Oliver A. Ryder, Ph.D., Coordinator
North American Przewalski's Horse
Breeders Group

A COOPERATIVE BREEDING PROGRAM FOR THE MONGOLIAN WILD
HORSE, Equus przewalskii, IN THE UNITED STATES

Oliver A. Ryder
Elizabeth A. Wedemeyer

Zoological Society of San Diego
San Diego, California 92112 USA

Running title: PRZEWALSKI'S HORSE BREEDING PROGRAM

Submitted for publication in *Biological Conservation*

ABSTRACT

The Mongolian wild horse, Equus przewalskii (Poliakov, 1881) has been propagated in captivity for ten generations. Well over a decade has passed since the last confirmed sightings of E. przewalskii in its historic range. Concern over the extent of inbreeding which has occurred during the captive propagation of this endangered species has led to numerous recommendations for management of captive stock as genetic populations rather than isolated collections. In November, 1979, a meeting was held of North American Przewalski's horse breeders at which time a coordinated breeding program was considered and adopted by all institutions breeding E. przewalskii in the United States. As a result of this agreement, a number of animal movements between zoos have occurred with a projected decrease in the extent of inbreeding of foals of the next generation. The history of propagation of E. przewalskii in the United States and the genetic considerations involved in the management program are discussed.

The Mongolian wild horse or Przewalski's horse, Equus przewalskii, was first described by the Russian zoologist Poliakov (1881). Colonel Nikolai Przewalski obtained a skull and skin of a wild horse in the Mongolian district of Kobdo and sent the specimens to I.S. Poliakov who named the horse after the Polish-born Colonel in the Czar's army. The Przewalski's horse is the only true wild horse; numerous localities around the world have populations of feral horses but these are all derived from domestic horses, Equus caballus.

Anecdotal records supply most of the data on the size of populations of the Mongolian wild horse and its range in historic times. In the last one hundred years this species was restricted to Dzungaria in the south and west and the Gobi Altai to the northeast. No confirmed sightings of Przewalski's horse have been made in well over a decade (Bannikov and Lobanov, 1980) and the last population in the wild may very well be extinct. The high steppes of the Gobi Altai may not have been optimal habitat for the wild horse but in fact their last refuge from predation by humans for meat and skins and from competition with domestic livestock. In prehistoric times, the Przewalski's horse probably had a range that extended throughout Europe and into Asia. The cave paintings at Lascaux, for example, depict dun-colored animals with bulky heads, upright manes, lack of forelock, and other external features which together constitute the morphological attributes of Equus przewalskii (Mohr, 1959).

The first living Przewalski's horses to be brought out of the wild were captured in 1899-1901. Although more than fifty young wild horses were delivered into captivity during that period, the current population

of this species traces its ancestry to eleven animals captured at the turn of the nineteenth century and a single mare brought out of the wild in 1947 (Mohr, 1959; Bannikov and Lobanov, 1980). Over seventy institutions now maintain Przewalski's horse and on January 1, 1979 there were 338 individuals in captivity (Volf, 1979). The captive specimens are distributed in three main geographic groupings: Europe, the Soviet Union, and North America.

Initial breeding in isolated zoos produced approximately thirteen lines of wild horse (Bouman, 1977). Most of these lines died out and three or four lines exist now. One line which remains was the result of breeding at Tierpark Hellabrunn and is referred to as the Munich line. The second prominent line resulted from successful breeding in the Prague Zoo (Czechoslovakia) before 1965 and is referred to as the old Prague line. The international studbook of the Przewalski's horse shows that in 1906 at Halle an der Salle a domestic horse mare was mated to a Przewalski's horse stallion (Mohr, 1959, Volf 1961-1979). A male hybrid resulted and proved fertile when mated to a Przewalski's mare. The offspring from the hybrid was incorporated into subsequent breeding and eventually into the old Prague line. Thus, descendants of the old Prague line have domestic horse genetic influence (varying today from 1½ to over 15% "blood composition").

The first Przewalski's horses to arrive in North America were from the 1900 importation to Europe. The Bronx Zoo received a pair in 1902 that were sent on to Cincinnati. In 1905 the Bronx Zoo received another pair which they kept and bred successfully. A mare bred from the Bronx pair was sent to Philadelphia as was a stallion bred in Cincinnati. Offspring from the Bronx were also sent to Sidney, Australia. In the

mid-1930s progeny from the lines established at Philadelphia, New York (Bronx), and Washington, D.C. (from Philadelphia's breeding) were sent to Europe where they enormously influenced the breeding in both Prague and Munich. Unfortunately, in the United States by 1956 only four individuals remained from the earlier breeding; none of these remaining horses produced viable offspring. In 1956, 2 stallions and 4 mares were imported from Munich to the Catskill Game Farm, Catskill, N.Y. Further importations from Munich occurred in 1957 (1 ♂, 1 ♀) and 1963 (1 ♂, 2 ♀). Successful breeding ensued at Catskill and 37 Przewalski's horses were transferred to other zoos, mainly in the United States and Canada (Hawthorn and Heck, 1978). At this time the great majority of Przewalski's horses in North America derive from the breeding at Catskill and are of Munich-line ancestry.

There is one group of Przewalski's horses in the United States not of pure Munich-line ancestry. Exhibited by the Minnesota Zoological Garden (MZG) and jointly owned by that institution and the National Zoological Park (NZA), this herd contains a mixture of old Prague line, Munich line and Orlica III (the last wild caught mare obtained in 1947) ancestry. The herd in Minnesota (referred to hereafter as MZG/NZA) was obtained from the breeding groups at Marwell Zoological Park and the London Zoological Society's Whipsnade Park. At the present time, this herd is the only one in North America to have genetic input from the last Przewalski's horse brought out of Mongolia in 1947, Orlica III.

While the husbandry of captive propagation of E. przewalskii has allowed its continued existence as a life form in spite of the decline and apparent extinction of the population in the wild, there is cause for concern of the future of the species. Pinder and Binkham (1978) list

the Przewalski's wild horse as an example of a captive self-sustaining population. However, the demographic and genetic analyses of Bouman (1977) and Bouman and Bos (1979) demonstrate serious cause for concern for the long-term survival of the captive populations. Consanguineous matings have produced generations of horses increasingly inbred. Increased juvenile mortality and decreased life span indicate a reduction in fitness through succeeding generations. The natural reservoir of genetic variability which constitutes the gene pool of the species has been diminished by management procedures such as small population sizes, selection and overemployment of certain stallions for breeding.

Fig. 1

Indeed, inbreeding coefficients of foals born to Munich-line parents in North America have increased since the first importation to Catskill in 1956 (Figure 1). The rate of increase of the inbreeding coefficients of the Munich-line Przewalski's horses in North America has been greater than the rate of increase that would occur if in all cases least-related animals were paired for inbreeding.

Fig. 2

As all the Przewalski's horses currently in captivity derive from twelve E. przewalskii and one E. caballus, and since pedigree information does exist (Mohr, 1959; Volf, 1961-1979), it is possible to calculate the percentage of genetic contribution of each founder in currently living individuals (Figure 2). The data in Figure 2 are presented for North American animals of both pure Munich-line (Catskill) descent and the more genetically heterogeneous animals (MZG/NZP) resulting from admixture of Munich, old Prague and new Prague stock. The greater genetic heterogeneity of the MZG/NZP herd is graphically evident in Figure 2 which indicates that this herd had genetic contributions from three founder E. przewalskii and the one founder E. caballus in addition to the nine

founder E. przewalskii which are common ancestors to both Munich and Prague lines.

There are at least two independent lines of evidence demonstrating that considerable genetic variation was present in the Mongolian populations of E. przewalskii that provided the founder animals for captive propagation of the species. Several authors (Mohr, 1959; Mohr 1969; Heptner, 1961; Herre, 1967) have discussed the external morphological variation in the phenotype of Equus przewalskii. Indeed, photographs of some of the founder animals and their descendants are available and clearly demonstrate variation in coat coloration, tail morphology, eye coloration and head shape. Many of these traits can be seen still segregating through recent generations of the Mongolian wild horse. Evidence more recently accumulated also indicates that considerable genetic variation existed in the Mongolian populations of E. przewalskii. Studies of blood groups and electrophoresis of proteins and enzymes of the blood have detected considerable genetic variation within the genome of the wild horse (Podliachouk and Kaminski, 1971; Scott, 1979; Putt and Fisher, 1979; Trommershausen-Smith et al., 1979; Ryder et al., 1979; Ryder et al., 1980). Because considerable inbreeding has already occurred during the captive propagation of E. przewalskii, we can be certain that the extent of genetic variability within the captive population has been reduced. The corollary of the previous statement is that an even greater extent of genetic variation existed in the free-living populations which formed the basis of the captive stock. Thus, we know that considerable variability existed in the gene pool of this species in nature before its probable extinction.

Nevertheless, it is the gene pool itself which must be preserved through subsequent generations if the captive-bred Przewalski's horses

are to truly represent their noncaptive ancestors and provide individuals fit for reintroduction into nature. Consequently, breeding programs must be designed with consideration of genetic, demographic, and behavioral factors to insure the preservation of the natural reservoir of genetic variation--the gene pool--through succeeding generations.

There are four factors which must be considered in order to maximize the preservation of genetic diversity during captive propagation: founder effect, genetic drift, consanguineous mating, and selection (Seal, 1977; Denniston, 1977; Franklin, 1980; Benirschke et al., 1980). Each of the factors can affect the preservation of the gene pool and will be discussed briefly.

The number of founders for a captive breeding group limits the proportion of the total genetic variation present within the founder population in comparison to the parental population from which the founders were derived. Originally discussed by Mayr (1942, 1963), and expanded in quantitative terms by Nei et al. (1975), the proportion of genetic variance remaining in small populations is: $1 - \frac{1}{2N}$ where N is the number of founder animals for the small population. Thus, a population which traces its ancestry to 9 founders (e.g. Munich-line E. przewalskii) could at best preserve 94.4% of the genetic variance present in the founders.

Genetic drift is the term applied to the random fluctuations in gene frequency in a population from generation to generation. If breeding populations are small, the random drift of gene frequencies will result, over generations, in the fixation or loss of alleles within a population (i.e. reduced genetic variability). In a small, genetically isolated,

population the average initial heterozygosity (H_0 , a measure of genetic variability) decreases with each generation, t , and also depends on the effective population size, N_e . The proportion of heterozygosity remaining after t generations is given by: $H_t = H_0 \left(1 - \frac{1}{2N_e}\right)^t$. The clear management implication is that the rate loss of genetic variation increases as the effective population size decreases. Increasing N_e increases the proportion of genetic variation retained in a population through generations (Figure 3). It is important to note that the effective population size is not the same as the number of individuals in the population. The effective population size, N_e , depends on the number of individuals contributing gametes to subsequent generations: $N_e = \frac{4(\text{number of } \sigma\sigma \times \text{number of } \varphi\varphi)}{(\text{number of } \sigma\sigma + \text{number of } \varphi\varphi)}$. Several practical implications for programs to maximally preserve the natural variation within the gene pool can be drawn. The most important consideration is that if only a single male (stallion) is employed in a breeding program, the effective population size cannot surpass 4 no matter how large the number of females (mares). A corollary of the preceding statement is that all sexually competent individuals should contribute to reproduction insofar as is possible. Furthermore, herd stallions should be rotated in successive breeding seasons so that individual females bear young by different males during their reproductive lifetime. "Surplus" stallions are only surplus in terms of holding space for animals; there is no such thing--genetically speaking--as a surplus male.

Consanguineous matings or inbreeding increases the probability that offspring will receive identical genes through descent. The degree of inbreeding in any individual is measured by the inbreeding coefficient, F , which is a unitless number between zero and one quantifying the degree of relatedness of the parents. Inbreeding increases the proportion of homozygotes to heterozygotes and therefore increases the expression of

recessive traits. Since most genes for deleterious traits are thought to be recessive, inbreeding increases the probability of appearance of inherited defects in a population. Whereas inbreeding may not alter the frequency of alleles in a population, it nonetheless may decrease the genetic variability of individuals through reduction in heterozygosity and accumulation of recessive deleterious alleles.

Selection reduces genetic variability through elimination of alleles associated with genotypes which have been selected against either by artificial means (deliberately choosing breeding stock) or naturally (susceptibility to disease). Whereas the latter case may actually increase fitness through selection, selection of breeding stock on the basis of conformity to a hypothetical type or morphology reduces genetic variation and increases inbreeding in subsequent generations.

The four factors of founder effect, drift, inbreeding and selection seldom exert an effect in the absence of one of the others. Frequently, drift works in conjunction with selection, founder effect, and inbreeding to reduce the genetic variability--and fitness--of captively managed populations.

Whereas it is true that numerous calls have been made for proper genetic management of Przewalski's horse, including animal exchanges and loans between isolated breeding groups, comparatively little has been accomplished toward this end. Proper genetic management of E. przewalskii would, of course, optimally include participation by all owners and breeders throughout the world. While this is a desirable and necessary ultimate goal, more limited organizational structures for geographic and national cooperation can often be more easily initially arranged.

Born out of concern for the long-range situation of E. przewalskii breeding groups in the United States and Canada, a meeting of North American owners and breeders of Przewalski's horse was held in San Diego, California in November, 1979 (Table 1). Early in the agenda the status of E. przewalskii breeding in the United States was considered in light of the preservation of the gene pool. The gene pool of E. przewalskii and the causes of the diminution of genetic variability in captive-bred populations have already been discussed above. Table 2 serves as a synopsis of the herds in captivity in North America.

Given the properties of E. przewalskii populations in North America, the participating owners and breeders reached a unanimous decision to manage their stock as populations rather than isolated collections according to genetic considerations in order to maximize the preservation of the gene pool. For the present time, it was anticipated that the two separate lines of Przewalski's horse in the United States will not be fully admixed. Several lines of reasoning were participatory to this decision:

1) Effective population size of Munich-line individuals in North America. With an effective population size of greater than thirty individuals (Table 2), a very substantial proportion of the variability currently present in the gene pool of N. American stock can be preserved. Over the next five generations (approximately 15-25 years) fully 92.5% of the current variation in the gene pool can be conserved employing only breeding stock currently in the United States. This percentage will increase if the effective population size increases with rapidity.

2) Increase in inbreeding coefficients. In a reproducing population with $N_e=32.6$, avoidance of inbreeding mating schemes will reduce the rate of

increase in the average inbreeding coefficient of foals born to 0.015 per generation--a very modest figure. While it would be highly desirable to reduce inbreeding coefficients, this could only be achieved for Munich-line E. przewalskii in N. America by (1) genetic input from a minimally related Munich-line stallion imported from Europe, (2) genetic input from a pureblooded offspring of the last wild-caught mare, Orlica III, (3) genetic input from a Prague-line stallion. It was agreed that option 2 would be the most desirable.

3) Owners of Munich-line E. przewalskii are reluctant to introduce old Prague-line genetic background into their future breeding stock. It is universally agreed today that it was an unfortunate circumstance that the Mongolian domestic mare was used for breeding at Halle an der Salle in 1906. Nonetheless, approximately two-thirds of all E. przewalskii individuals in the total captive population have the domestic Mongolian mare in their pedigree. Insofar as the long-term variability of Munich-line E. przewalskii is not unduly threatened, owners of Munich-line animals are reluctant to have their breeding mares mated to stallions with domestic horse genetic input. Consequently, the breeding program will be under constant review over the next decade and the results of breeding closely followed. During this interim period for the practice of the breeding plan, research into genetics, genetic diseases, pathology, and behavior of the captive population should be undertaken. After a period of approximately ten years, an assessment of the results of the breeding plan could be made with respect to the desirability of crossing the breeding lines.

Under the breeding plan, the as yet small herd at Minnesota (MZG/NZP) will receive genetic input from surplus Munich-line stallions.

The herd presently at Minnesota is the most genetically diverse breeding group in the United States and five individual animals in that herd have genetic input from Orlica III. All animals in that herd have domestic horse genetic input, varying from a low of 1.5% to a high of 15.6%. The average percent of domestic horse "blood composition" in the MZG/NZP herd is 8.6% (Table 2). Use of Munich-line stallions for breeding with the MZG/NZP mares would reduce the proportion of domestic horse ancestry in foals born of such a cross and would initially also reduce average inbreeding coefficients of foals. The well-being of the MZG/NZP herd is considered to be essential because of the broad genetic base it represents.

Most breeders have very limited space for holding animals not currently being used for breeding in a polygamously breeding species such as E. przewalskii. This space availability problem is particularly acute for males who must leave the herd during their second year. In nature these young stallions would presumably be ejected from the herd of their birth and would eventually attempt to gather a herd of mares themselves. In captivity the young stallions must be removed to avoid aggressive conflict with their father which would likely, without intervention, result in the death of the young males. Males in such straits are often called surplus males, although as mentioned earlier they are surplus only in terms of available space, not eventual genetic usefulness. Consequently, the establishment of one or more depots for extra stallions was deemed most desirable. The Conservation and Research Center (CRC) of the National Zoological Park at Front Royal, Virginia was agreed to be an optimal site. Space is being reserved at the CRC for extra stallions, and in the future a breeding group may also be

established at that facility. Several aspects of the stallion pool were formalized at the breeder's meeting. Any participating collection could borrow an animal from the stallion pool. Under normal circumstances a stallion would be borrowed for a minimum period of two years and a maximum of four years, during which time he must be in a breeding group. Each stallion would be positively identified by an ear notching system and a lip tattoo. Blood typing studies of the stallions would also be performed to aid in identification.

The breeders' group agreed to pool information on nonbreeding animals. Suspected infertile adult animals will be identified and examined by a local equine specialist for obvious causes of infertility. Infertile animals may be moved to a location such as a veterinary school where experts could attempt to identify the organic causes of the animal's infertility.

All owners and breeders agreed to have necropsy examinations performed on their dead animals. A postmortem model to standardize necropsy procedures followed in North America and Europe will be recommended by an existing ad hoc committee under the chairmanship of Dr. David Ashton of the London Zoological Society.

The owners and breeders recognize the great need to gather further information on all aspects of the biology of E. przewalskii. Genetic studies of chromosomes, blood constituents and external morphology are desirable as are detailed studies of behavior and reproductive physiology. In all these aspects, our knowledge of E. przewalskii is minute in comparison to the domestic horse, E. caballus, although methodologies and techniques already in use for domestic horse management could profitably be applied to E. przewalskii.

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Immediate needs of the breeders' group were for recommendations concerning stallion exchanges in order to reduce inbreeding. A coordinator was appointed whose function is to compile and distribute information including animal movements. The group agreed that proposed animal moves will be arranged with the knowledge and approval of the coordinator. In order for the coordinator to make recommendations concerning mating minimally-related individuals, sophisticated computer programs to calculate inbreeding coefficients of potential offspring must be employed. An existing data base and computer program prepared by Jan Bouman and under the care of the Foundation for the Preservation and Protection of the Przewalski Horse in Rotterdam was kindly offered by the Foundation for use by the coordinator. All of the initial stallion and mare movements were recommended on the basis of calculations provided by the Foundation. In the future the computer capability will become available through the Zoological Society of San Diego in cooperation with the computer center at the University of California in La Jolla, California.

Analysis of inbreeding coefficients for potential offspring of mares mated with various stallions provided the information for the first series of stallion and mare movements (Table 3). Each move was devised in order that inbreeding coefficients of the next generation foals might be reduced (Table 4). The movement of the eight stallions thus far has resulted in the pairing of an estimated 23 mares with mates unavailable to the mares before the transfers. The average inbreeding coefficients of foals born to these mares, if the transfers had not taken place, is estimated to be .317. The average inbreeding coefficients of foals born to these same mares but sired after the stallion transfers is estimated to be .260, a reduction of 19.5 percent.

It should be pointed out that the possibility exists for outcrossing the Munich line without introduction of domestic horse ancestry as depicted in the International Studbook; such an outcross would dramatically decrease the inbreeding coefficients of foals born to outcrossed parents. This possibility would involve incorporating the breeding line initiated by the last wild caught mare, Orlica III, (studbook number 231) and the Munich-line stallion, Robert-Orlik (studbook number 146, Hellabrunn 19). Several individuals of this bloodline (both stallions and mares) presently live at the famous Askania Nova breeding station in the Soviet Union and one stallion stands at the Prague, Czechoslovakia, Zoo. For example the average inbreeding coefficient of foals born to sixteen mares owned by the Zoological society of San Diego bred to the stallion Vulkan (studbook number 606, Askania 22) would be $\bar{F}=.115$. If the same mares were bred to the stallion at Prague, Bars (studbook number 285, Askania 3) the average inbreeding coefficient of the foals would be $\bar{F}=.102$ (Bouman, 1979).

Finally, the initial impetus for the formation was the common concern of the Przewalski's horse breeders in the United States for the future of both the Munich and Prague lines--indeed for the entire species. The stallion movements suggested were based solely on genetic criteria. It is recognized that considerable additional research into the behavioral attributes of E. przewalskii populations in captivity needs to be undertaken in addition to the previously identified needs in the areas of genetics, pathology, and reproductive physiology. Despite the desirability of making certain specific matings, individual stallions and mares may be incompatible. These contingencies must be addressed in the future.

Furthermore, it would be highly desirable to develop and employ techniques for artificial insemination and blastocyst storage and transfer in this species. The movement of stallions involves definite risks during chemical immobilization, transport, and release into the new environment as well as considerable expense and detailed, time-consuming permit application procedures. Proper genetic management of this endangered species (and others as well) involving matings between animals located at geographically separated institutions could be greatly enhanced were it possible to transfer germplasm . i.e. ova, sperm, blastocysts, instead of animals between institutions.

ACKNOWLEDGMENTS

The formation of the North American Przewalski's horse breeders group would not have been possible without the selfless interest of the owners and breeders of the horses themselves. Their concern for the future of the species and goodwill in striving to accomplish what seems most genetically sound is manifested in the formation of the group. Particular appreciation should be expressed to J. Bouman, I. Bouman, and A. Groenveld of the Foundation for the Preservation and protection of the Przewalski Horse, Drs. K. Benirschke, J.M. Dolan, Jr., C. Wemmer, K. Ralls, N. Flessness, and T. Foose for providing valuable information and data analyses. We wish to express our appreciation to the Zoological Society of San Diego for their support of the entire project.

TABLE 1. Institutions participating in the North American Przewalski's horse breeders group

(closed)	Catskill Game Farm Catskill, New York		Minnesota Zoological Gardens Apple Valley, Minnesota	(open)
? (part open)	Chicago Zoological Park ^a Brookfield, Illinois	1.0	National Zoological Park Washington, D.C.	(open)
(open)	Denver Zoological Gardens ^a Denver, Colorado	0.2 SD	New York Zoological Society Bronx, New York	(annoyed)
? (part closed) never there?	Los Angeles Zoo ^a Los Angeles, California	.2 SD	Topeka Zoological Park Topeka, Kansas	.0 Rho
(open?) ? wild?	Overton Park Zoo ^a Memphis, Tennessee	1.1.1	Zoological Society of San Diego San Diego, California	5.15.

Coordinator: Oliver A. Ryder, San Diego Zoo

^a Representatives of these institutions were not present at the November meeting but subsequent endorsement and participation by these institutions has occurred.

TABLE 2. Details of Equus przewalskii populations in North America^a

	Catskill-bred (Munich line)	MZG/NZP (Old and new Prague line)
Population in N. America ^{a,b}	25♂ 40♀	2♂ 6♀
Percent of total world population	67	3
Number of founders	9	12
Average percent domestic horse ancestry	0	8.6
Average inbreeding coefficient	0.273	0.142
Effective population size, N_e	32.6	6.0

^aCurrent as of 1 January 1979. ^bDerived from data presented in the International Studbook (Volf, 1979)

TABLE 3. Summary of transfers of Przewalski's horses among North American breeders

<u>Name</u>	<u>Studbook Name</u>	<u>Studbook #</u>	<u>Sex</u>	<u>Previous Location</u>	<u>New Location</u>	<u>Date of Transfer</u>
Bendos	San Diego 18	730	♂	San Diego WAP	Denver	21 May 80
Belzar	San Diego 10	638	♂	San Diego WAP	Bronx	21 May 80
Borkas	San Diego 14	685	♂	Denver	Bronx	3 Jun 80
Vinnie	York 19	723	♂	Bronx	San Diego Zoo	10 Jun 80
Bertland	Catskill 38	381	♂	Bronx	San Diego Zoo	10 Jun 80
Rikor	Brookfield 2	526	♂	Brookfield	San Diego WAP	6 Jun 80
Belda	San Diego 25	a	♀	San Diego WAP	Topeka	31 Sep 80 1981
Lotania	San Diego 27	a	♀	San Diego WAP	Topeka	31 Sep 80 1981
George ^b	York 17	688	♂	Bronx	Minnesota	14 May 79
Kentai ^b	York 14	626	♂	Bronx	Minnesota	14 May 79

^a Studbook number not yet assigned

^b These transfers predate the formation of the breeders group; however, they are endorsed by the group and are based on criteria similar to those adopted by the breeding group.

TABLE 4. Reduction in inbreeding coefficients anticipated as a result of stallion transfers.

	Average <u>inbreeding coefficients of foals, \bar{F}</u>		percent reduction
	previous stallions(s)	replacement stallion(s) ^a	
Denver	.435	.335	23%
San Diego Wild Animal Park	.387	.292	25%
San Diego Zoo	.343	.293	15%
Bronx	.391	.302	21%
Topeka ^b	.335	.288	14%
Minnesota (MZG/NZP)	.137	.096	30%

^a Resulting from mating with least-related stallion still at site.

^b Reduction of inbreeding coefficients of mares transferred from San Diego.

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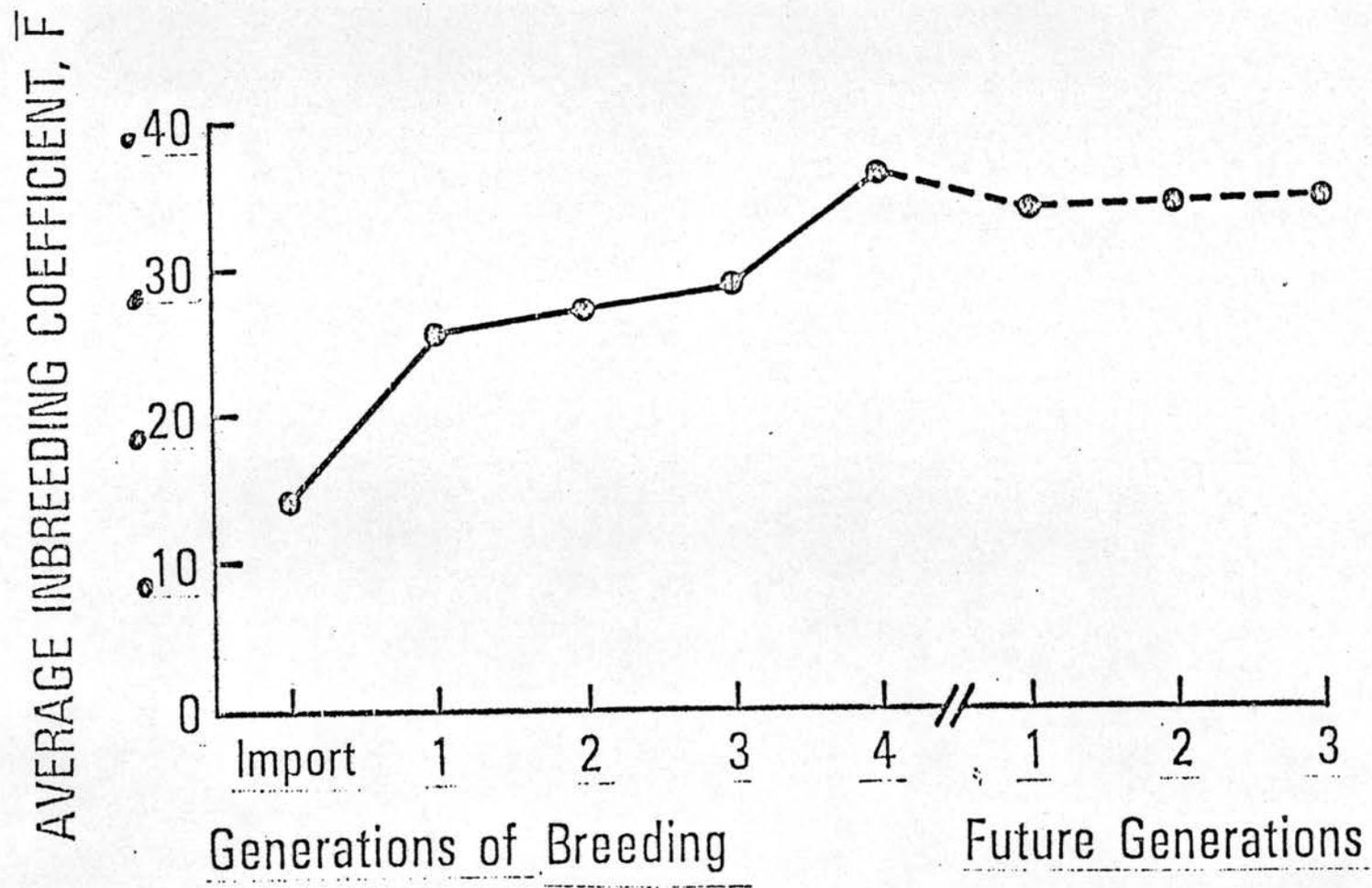
LEGENDS TO FIGURES

Figure 1: Average inbreeding coefficients of Przewalski's horses in North America. Twelve E. przewalskii bred at Tierpark Hellabrunn (Munich) were imported to the Catskill Game Farm 1956-1963. The inbreeding coefficients of the imported animals and their progeny are presented for each generation of breeding (solid line). Inbreeding coefficients of future generations of E. przewalskii in the United States (dashed lines) are calculated on the assumption of a closed breeding system within the United States. Outcross to non-U.S. stock could reduce inbreeding coefficients (see text). After Bouman (1979).

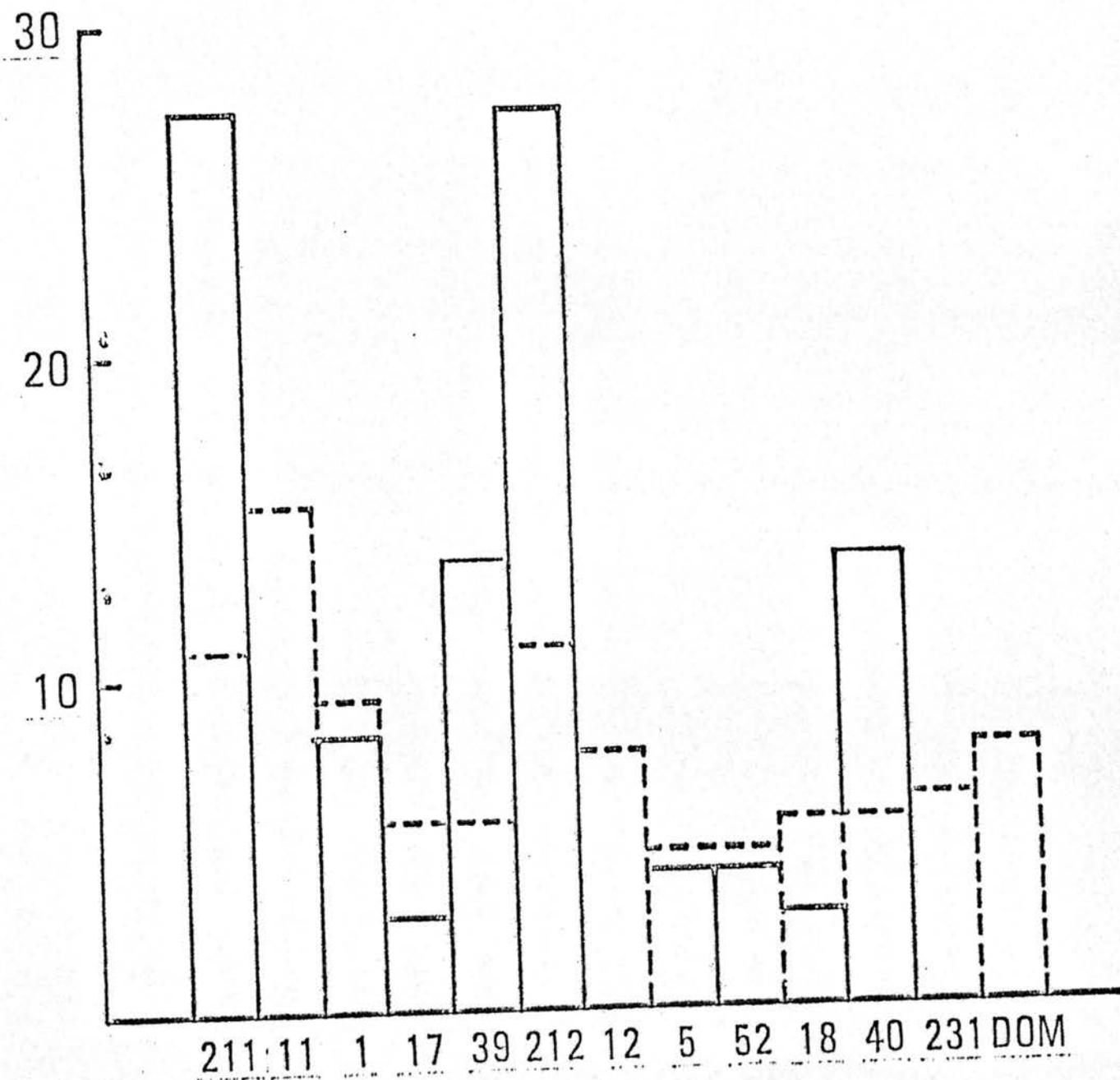
Figure 2: Percent genetic input from founder individuals is presented for all E. przewalskii in N. America. Solid line: Munich-line horses in N. America. Dashed line: horses with old Prague-line ancestry in N. America. Individuals 211, 11, 1, 17, and 39 are males; all others are females. Number 231 is the last wild-caught mare, Orlica III. Dom represents the Mongolian domestic mare whose hybrid son was used for breeding in the early 1900s.

Figure 3: Graphic presentation of the effect of population size on retention of genetic variance.

Fig 1



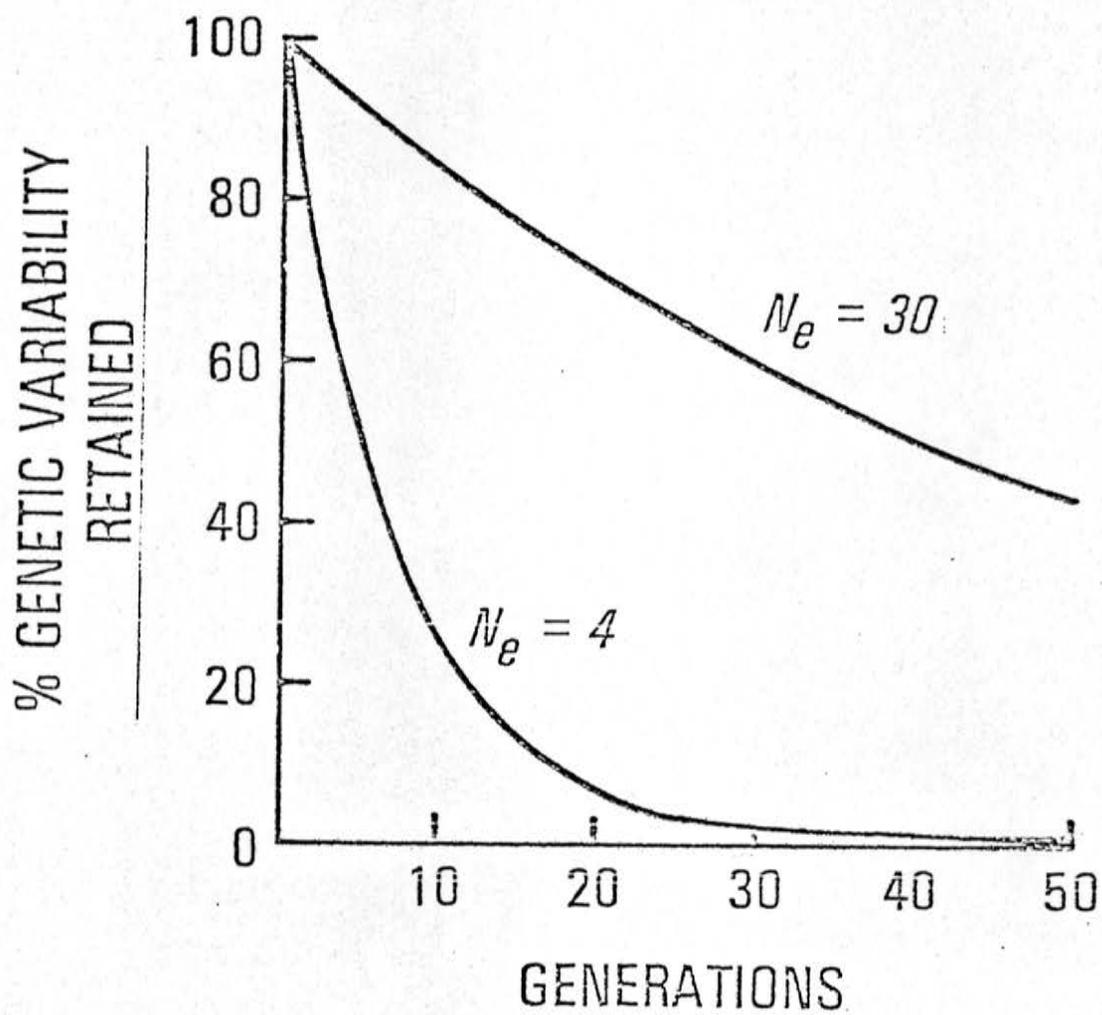
PERCENT BLOOD COMPOSITION



STUDBOOK NO. OF FOUNDER

Fig 2

Fig 3



"Semi-reserves"

- MZC stance re state,
- Permit goal for MZC
- New Mexico

Articles for establishment of Foundation
Board of Directors

- Front Royal: ? Set up articles of a
state jurisdiction for semi-reserve
at or near Front Royal

Peyden: should be part of land -
if Peyden willing to mix lines

1000 committee:

- ① breeding units 10
 - ② less structured reserve of 10,000 acres
 - ③ full reserve
- Stock + control +
improvement system.

Pyrene:

Established groups of horses - both of
independent

3

80 US

(69 pure-line Merin)

- Conway wants to mix

by +15% year +10/year

in 2 years

10 years away from total 300 counts

Brux / NZP /

Dryfit

(Kuporvil + FA waves)

SF + NIG Status?

esp

VIRGINIA COOPERATIVE EXTENSION SERVICE



Department of Animal Science
(703)961-5252

Blacksburg, Virginia 24061

June 23, 1981

TO: Selected Friends of The Przewalski Horse, USA

FROM: A. N. Huff (Educational Advisor), Extension Specialist,
Animal Scientist *Ardon N. Huff*

We have all been members, contacting and/or supporting The Foundation on Preservation and Protection of The Przewalski Horse through Jan and Inge Bouman. They have suggested that we in the U.S. establish first an advisory group and second, through this, possibly found a foundation, USA, linked to the Netherlands group. This would be for communication and educational purposes. We might hold a meeting at Va. Tech next April pending date suggestions from Jan and Inge. (Please suggest dates to me for a one day session.) I am undertaking this as an advisor and would limit my role to this in the future. Membership, etc., will continue as in the past for the foreseeable future. The advisory group does not have to include all members and one does not preclude the other.

If you would like to become a part of such an informal advisory group, please return the enclosed form to me. Many thanks!

cc: Jan and Inge Bouman
(This letter going to lists they have sent to me)

Enclosure

Virginia Cooperative Extension Service programs, activities, and employment opportunities are available to all people regardless of race, color, religion, sex, age, national origin, handicap, or political affiliation. An equal opportunity/affirmative action employer.

An Educational Service of the Virginia Polytechnic Institute and State University and Virginia State University, Virginia's Land-Grant Institutions, with U.S. Department of Agriculture and Local Governments Cooperating.

Return to A. N. Huff, Agnew Hall, VPI&SU, Blacksburg, Virginia 24061 by
September 1, 1981.

I wish to become a part of the Advisory Group, USA, Przewalski Horse

(Please Print or Type)

NAME _____

COMPLETE ADDRESS _____

_____ ZIP _____

TELEPHONE (AREA) _____

Sandy + Neuff
2nd's deans

VIRGINIA COOPERATIVE EXTENSION SERVICE *Ed*

**VIRGINIA
TECH**

Department of Animal Science
(703)961-5252

**VIRGINIA
STATE**

Blacksburg, Virginia 24061

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I wish to become a part of the Advisory Group, USA, Przewalski Horse

(Please Print or Type)

NAME _____

COMPLETE ADDRESS _____

_____ ZIP _____

TELEPHONE (AREA) _____

DEPARTMENT Biological Programs

Office Memorandum

TO : Biological Programs Staff

K

DATE: April 27, 1981

FROM : Nick Reindl

NR

PHONE: 272

SUBJECT: Przewalski Horse Discussion

Jan and Inge Bauman of the Przewalski Horse Foundation for the Preservation and Protection of the Przewalski Horse have been visiting the Zoo for the past two days.

They have agreed to show a thirty-minute film of Przewalski Horses at 10:00 a.m., April 28, 1981 in the Board Room. They will entertain discussions afterwards.

You are all encouraged to attend.

NR:cs



Telegram

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ROTTERDAM 24/21 9 0850

LT

MR E KOHN

MINNESOTA ZOO
12101 JOHNNYCAKERIDGEROAD
APPLEVALLEY/MN(55124) USA

DOES OUR VISIT SUITE YOU FROM 26-28 APRIL PLEASE ANSWER

JAN BOUMAN

COL LT 12101 (55124) 26-28

NNN

432-9010

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1 6124329010 MGM TDBN APPLE VALLEY MN 03-10 0129P EST

PRZ Horse

MINNESOTAS ZOOLOGICAL GARDEN GD
12101 JOHNNY CAKE RIDGE RD
APPLE VALLEY MN 55124

THIS MAILGRAM IS A CONFIRMATION COPY OF THE FOLLOWING MESSAGE:

LT TDBN APPLE VALLEY MN 03-10 0129P EST
INT LT JAN AND INGE BOUMAN
MATHENESSERSTRAAT 101A ALGEME BANK
3027 PD ROTTERDAM (HOLLAND)
LOOKING FORWARD TO YOUR VISIT 26-28 APRIL YOU ARE WELCOME TO STAY
WITH STAFF ADVISE OF FLIGHT ARRIVAL NICK REINDL HAS REPLACED BRAD ON
HORSE COMMITTEE AND HOPES TO ACCOMPANY YOU TO NEW MEXICO. GRUENWALD
MAY PROVIDE TRAVEL
EDWARD KOHN

COL 101A 3027 26-28

13:29 EST

MGMCOMP MGM

TO REPLY BY MAILGRAM, PHONE WESTERN UNION ANY TIME, DAY OR NIGHT:

FOR YOUR LOCAL NUMBER, SEE THE WHITE PAGES

OF YOUR TELEPHONE DIRECTORY

OR

DIAL (TOLL FREE) 800-257-2241

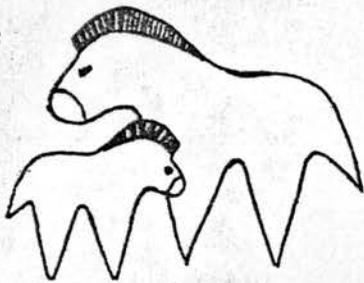
(EXCEPT IN NEW JERSEY 800-632-2271)

OR DIAL WESTERN UNION'S INFOMASTER SYSTEM DIRECTLY:

FROM TELEX 6161

FROM TWX 910 420 1212

Foundation on
preservation and protection
of the



Przewalski horse

Mr. E. Kohn
Dr. B. House
Direction Minnesota Zoo
12101 Johnny Caka Ridge Road
Apple Valley
Mn 55124
USA

flag 3/2
NR asked to
best response
for EIC
sign

Rotterdam, 11 February 1981

Dear Ed and Brad,

Although it is only a few months more than a year ago, it seems ages since we met for the first time at Ed's house and visited your marvellous park! Much happened and especially regarding the semi-reserves for the Przewalski horse.

The Dutch Government offered 3 areas. One very large one of 400 acres with a poor vegetation, sand dunes and trees, another smaller area of 90 acres in cooperation with the Amsterdam Zoo and an area for the surplus stallions, which will be used for exchange with zoos and other breeding groups in future in other semi-reserves. The preparations for the horses are under construction and will be ready at the end of August this year. Fundraising started successfully by the Dutch WWF and money is available now for acquiring horses and the costs for transportation. The Dutch sister Foundation of the future international Foundation was founded as you know. The Board is formed by members of the Board of the Dutch WWF, our Foundation for the preservation and protection of the Przewalski horse, biologists of the Amsterdam Zoo and the Arnhem Zoo, Nature Protection organisations, University people and people who are well known in 'horse-circles'. A scientific supervision group is formed to supervise and advice about feeding, vegetation, veterinary problems, breeding etc.

As you will understand and know the aim is to establish something like this in the US. Bill Gruenerwald is still very interested and waiting for more concrete plans. Chris Wemmer is also interested as you know. We want to visit the US at the end of April and May. We should be very happy if we could visit you again to discuss with you the whole idea once again, the establishment of the Foundation US "Reserves for the Przewalski horse", the Board and the whole organisation and fundraising. We learned that Lovejoy [WWF-US] was not interested, other funds have to be raised therefore. The money for New Mexico don't seem to become a problem. It will be a problem for Front Royal. A friend of ours Dr. Arden Huff of the Virginia Polytechnic University is an extension specialist, animal science, very known with all studbooks of the horse-breeds in the US. He will organise a 'benefit meeting or evening' in Northern Virginia on 21, 22 or 23 April. He also has some ideas about people for the Board. After Front Royal we want to visit Lexington. A horse farm offered us an office and help. We have become curious and therefore want to visit these people.

37 04 47

Mathenesserstraat 101^a 3027 PD Rotterdam tel. 010 - ~~02 07 33~~ / 37 65 13

Algemene Bank Nederland acc. nr. 50 23 26 131

Foundation on
preservation and protection
of the



Przewalski horse

Does it suit you both if we will visit you on Monday 27th April. We will arrive on Sunday 26th and want to leave on Tuesday for Denver and Bill Gruenerwald in Colorado Springs. If it does not suit you we hope to hear from you soon to change the scheme.

We asked Jim Dolan, if he could come and see the big farm in New Mexico of Bill Gruenerwald. We also asked him the same as you both to help us to develop the idea and the organisation and Board. After visiting Bill Gruenerwald and hopefully have seen Jim, we want to discuss everything once again with Dr. Conway if he is present and hope to have a good meeting with lawyers in New York. Bill Gruenerwald asked his lawyers to prepare articles and the Dutch IUCN lawyer is studying them. If you are interested we are happy to send the papers soon, when they are hopefully ready. If you have some more suggestions for our journey, please write us.

As you will understand we look forward to see the horses and foals. We are very happy with Nic's letter telling about another new exhibit for the extra stallions. Will you please give him our best regards.

We hope to hear from you soon,

With best wishes
Yours sincerely

Inge Bouman

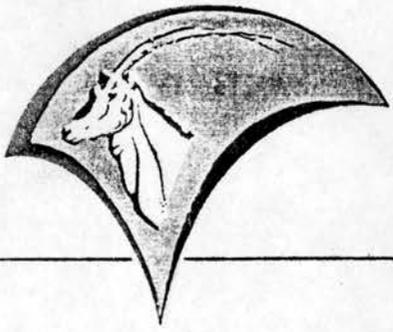
7/9

Brad: Do you wish to see us represented?

\$12000 approx
EF

Marwell Zoological Park

Colden Common, Nr. Winchester,
Hampshire, SO21 1JH.
Telephone Owslebury (096 274) 206.



Cables: The Ark, Winchester

30 May 1979

The Director,
Minnesota Zoological Garden,
12101 Johnny Cake Ridge Road,
Apple Valley,
MN 55124, USA.

Dear Colleague,

I am writing to give you early notice of the 4th International Symposium on the Preservation of the Przewalski Horse which will be held at Marwell Zoological Park on 23rd, 24th and 25th of June, 1980, in accordance with the resolution made at the end of the 3rd International Symposium held in Munich, 26-28 April 1976.

In the intervening years there has been further growth in the numbers of Przewalski Horses in captivity, but there still remain many problems for discussion.

Of further interest is the prospect for the re-introduction of Przewalski Horses to either their native habitat or to ecologically similar areas.

Information regarding the Symposium is attached.

My colleague, Mr. Colin Rawlins, Director of Zoos, Zoological Society of London, and his staff, are assisting us in the development of the Programme.

I very much hope that you will be able to attend this Symposium on what is undoubtedly one of the most important Endangered Species in our care.

As Winchester is a city of some considerable historic interest, hotel accommodation is limited during the Summer season; therefore an early indication of your intention to attend the Symposium would be appreciated, at the latest by the end of September 1979.

Yours sincerely,

J.M. KNOWLES, Director

Enc.

cc: Brad H.

1980
M.W. Horae

Drs. Inge Bouman
Secretary of the Przewalski
Horse Captive Breeding Group
of the SSC
Mathenesserstraat 101a
3027 PD Rotterdam
Netherlands.

a Bred, Δ
desperance
EK

Mr. Edward Kohn
Dir. of Minnesota Zoological
Garden
12101 Johnny Cake Ridge Road
Apple Valley
Mn 55124 Minnesota U.S.A.

Rotterdam, 10 March 1980

Dear Mr. Kohn,

We are very happy to have received from Sir Peter Scott your acceptance to serve as a consultant to the Survival Service Commission of IUCN, as a member of the Przewalski Horse Captive Breeding Group for the 1978/ 1981 triennium.

The 4th International Symposium on the Preservation of the Przewalski Horse will be held on June 23-25 1980 at Marwell Zoological Park, near Winchester in England. We want to suggest to you to have the first meeting of the Group on Sunday June 22nd at Marwell Zoological Park starting during the morning.

Till now we received three suggestions for discussion in this meeting.

- Mrs. Jane Thornback from the Species Conservation Monitoring Unit asked to revise the data sheet of Przewalski's Horse in the next revision of the Red Data Book.
 - The Foundation for the Preservation and Protection of the Przewalski Horse prepared a project on " the introduction of selected breeding groups in semi-reserves to benefit the genetic variation of existing Przewalski horses, as an intermediary step before introducing Przewalski horses in wildreserves."
 - Dr.P.J.H. van Bree will introduce for the WWF a way to co-ordinate fundraising and the formation of Foundations to realize the semi-reserves and wildreserves for the Przewalski horse.
- Dr.P.J.H.van Bree is curator of the Amsterdam Zoological Museum and secretary of the Netherlands Commission for International Nature Conservation [the van Tienhoven Stichting] and member of the Survival Service Commission of IUCN.

I expect to hear from you when you have other points for the agenda. We look forward to meet you all and we hope for a fruitful discussion for the future of the Przewalski Horse. More details of the meeting will be sent later.

Yours sincerely

Inge
Inge Bouman, secretary.

LUCHTPOST
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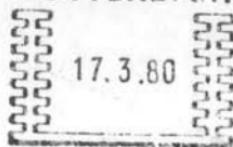
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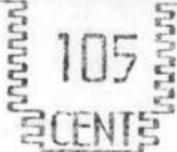
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ROTTERDAM



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NEDERLAND

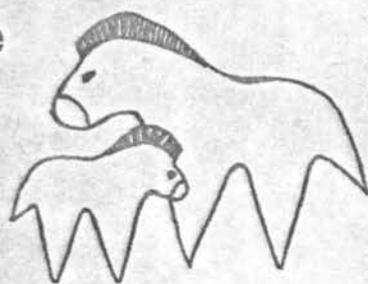


FR 5395

Mr. Edward Kohn
Dir. of Minnesota Zoological
Garden
12101 Johnny Cake Ridge Road
Apple Valley
Mn 55124 Minnesota
U.S.A.

Secretary of the Przewalski Horse Captive
Breeding Group of the SSC
Mathenesserstraat 101a
3027 PD Rotterdam
Netherlands

Foundation on
preservation and protection
of the



Przewalski horse

cc Sandy / Nick
Jed X

Mr J.M.Knowles
Director Marwell Zoological Park
Colden Common, Nr.Winchester
Hampshire SO 21 1JH
England

Rotterdam, 28 December 1980

Dear John,

Thank you for sending us the conclusions and recommendations of the 4th International Symposium on the Preservation of the Przewalski Horse at Winchester, last summer. We were very astonished, however, to read that the propositions made by Mr. D. van Dam, director of the Rotterdam Zoo, were carried unanimously (then follow these propositions). We only remember a glacial silence after the lecture of Mr van Dam. We talked to several other persons present at the meeting and they all have the same memories. We take it that the person who wrote the minutes for you made a mistake.

You mentioned that the proposals were in accord with the IUDZG recommendations on studbooks. As you know, we also participated in the symposium on studbooks for endangered animals in captivity. It really is a pity that a discussion of the Copenhagen resolutions has not been a point on the agenda of the Winchester meeting and it also is a great pity that they also have not been discussed at the end of the meeting at " other business ". To state that a proposition of Mr. van Dam was carried unanimously is bending the truth and this certainly cannot be your intention. We believe it, however, most useful (if not absolutely necessary) that the Copenhagen recommendations have to be worked out for Przewalski horses and that the results have to be discussed (and accepted) at the next Przewalski Horse Symposium (Rotterdam).

Przewalski horses are too valuable and too endangered to give misunderstandings the slightest chance to obstruct international cooperation in preserving them. We are convinced that this is also your opinion. The ship is more important than the crew or a single crew member. With this saying in mind we will go on with our work, this in close cooperation with Dr. Jiri Volf as in the past and with the directors of zoos or private collections where Przewalski horses are kept, also as in the past.

With best regards,

Yours sincerely,

Jan G. Bouman

Jan G. Bouman

Inge Bouman

Inge Bouman

Annette Groenewald

Annette Groenewald

37 04 47

Mathenesserstraat 101^a 3027 PD Rotterdam tel. 010 - ~~02 06 47~~ / 37 65 13

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*Prz. HORSE
IWN*

MINNESOTA ZOOLOGICAL GARDEN GD
12101 JOHNNY CAKE RIDGE RD
APPLE VALLEY MN 55124

THIS MAILGRAM IS A CONFIRMATION COPY OF THE FOLLOWING MESSAGE:

TDBN APPLE VALLEY MN 06-20 1239P EST
INT THE ARK, WINCHESTER ATTN DOCTORS BEFFELOVSKY AND BOUMAN CHAIRMEN
AND SECRETARY
OF PRZEWALSKI HORSE CAPTIVE BREEDING GROUP
WINCHESTER (ENGLAND)
NEW CONDITIONS DICTATE THAT BRAD HOUSE AND I REMAIN IN MINNESOTA.
NICK REINDL WILL SERVE AS OUR COMMUNICATOR. WE WISH THE ASSEMBLY
EVERY SUCCESS IN STRENGTHENING THE GROUND WORK FOR PROGRESS IN OUR
CHERRISHED COMMON AIM OR PRZEWALSKI PRESERVATION.
EDWARD KOHN GENERAL DIRECTOR MINNESOTA ZOOLOGICAL GARDEN

12:39 EST

MGMCOMP MGM

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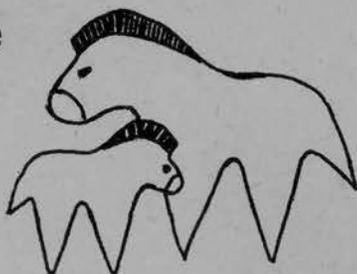
Drs. Vesselovsky and Bouman
Chairman and Secretary
Przewalski Horse Captive Breeding Group
c/o The Ark, Winchester

New conditions dictate that Brad House and I remain in Minnesota - stop-
Nick Reindl will serve as our communicator - stop -
We wish the assembly every success in strengthening the groundwork for progress in our
cherished common aim of Przewalski preservation. - stop-

Edward Kohn
General Director
Minnesota Zoological Garden

Western Union
339-9840

Foundation on
preservation and protection
of the



Przewalski horse

PZ horse
Ed Bradhouse, IUCN
jd

Mr. E. Kohn
Director of the Minnesota Zoo
12101 Johnny Cake Ridge Road
Apple Valley
Mn 55124
U.S.A.

Rotterdam, February 14th 1980

Dear Ed,

We enclose a letter from Mr. Conway, a reply on our letter, which we have sent him privately.

As you know we wanted to inform Mr. Conway about the offer of Mr. Bill Gruenerwald to construct a semi-reserve for the Przewalski's in New Mexico, the discussions with Front Royal and the offer of the Dutch government for the same purpose. We have been very happy with your involvement in the case of the Przewalski horse and we therefore want to keep you up to date.

We have suggested as secretary of the Captive Breeding Group of the Przewalski horse of the SSC of the IUCN/WWF to have the first meeting on Sunday 22th June at Marwell Zoological Park. John Knowles will organize a meetingroom and we only wait for the commend of Dr. Veselovsky to invite all members of the group for this meeting. Our Foundation hopes to discuss the semi-reserves plan. Dr. P. van Bree will propose the IUCN/WWF and SSC viewpoint and the last developments in fundraising in Holland.

We recently founded a Foundation for Reserves for the Przewalski Horse. It is a combined initiative of our Foundation and the WWF-Holland. The Dutch WWF starts fundraising in March for the semi-reserves [according our semi-reserves plan] and the wildlife reserves in future. The translation of the Statutes will be finished soon we hope and we will send you a copy. We hope to found the same type of Foundation in the U.S.A with the same aim but with American Board members to make it possible for

320442
Mathenesserstraat 101^a 3027 PD Rotterdam tel. 010 - 12-77-67 / 37 65 13

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Przewalski horse

the Americans to give taxdeductable gifts.

Dr. van Bree is busy with the French-WWF with the same purpose.

Dr. van Bree is a member of the SSC. The idea is to form an international steering-group to guarentee the plans and the conditions for the horses and the breedingpolicy.

We really hope to see you at Marwell to discuss with you the developments and to learn from your commend.

With all good wishes also for your
wife.
Yours

Inge Bouman

NEW YORK ZOOLOGICAL SOCIETY

New York Zoological Park
New York Aquarium

Bronx Zoo
Bronx, New York 10460
Telephone: (212) 220-5100

Center for Field Biology and Conservation
Osborn Laboratories of Marine Science

Office of the General Director

January 7, 1980

Mr. and Mrs. Jan Bouman
Foundation on Preservation and
Protection of the Przewalski Horse
Mathenesserstraat 101a
3027 PD Rotterdam
Netherland

Dear Mr. and Mrs. Bouman:

I have read your letter of 29 December with great interest and regret that I was unable to be at the San Diego horse meetings. Like yourselves, I was disappointed in the report of the meeting.

In response to your several queries and items of news, I offer the following comments:

1. Semi-reserves. The semi-reserves plan sounds good but it is not without flaws. The enormous advantage of greater space is somewhat reduced by the likelihood of poorer care and management. The inability to observe untoward aggression, serious or incipient cases of illness or problems in parturition may offset, at least to some extent, the advantage of more ground to roam. It is difficult to imagine that any of the reserves will have staff capable of responding to serious medical problems or even seeing them. Moreover, the normal social structure of horses is not necessarily the most appropriate response to the problems of a highly inbred population. However, your reserve plan seems to have properly provided for many of these concerns and I support it.

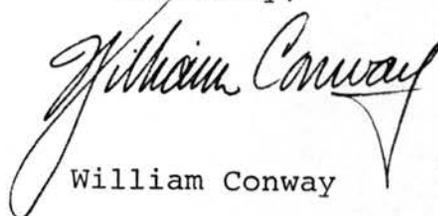
Mr. Gruenerwald's interest in the Foundation program I helped establish some years ago (before its time, alas) should be directed towards the establishment of a new non-profit foundation or alignment with an existing non-profit organization like the New York Zoological Society or some other organization closer to his home. Ask him

to write to me or telephone and I will be happy to discuss the matter.

2. IUCN/WWF and Foundations for Przewalski Reserves. It is true that the primary concern and responsibility of IUCN and WWF are for wild animals in natural habitats, and that is as it should be. We must recognize that conservation problems on a global scale are overwhelming; that as many as 600,000 species of plants and animals are expected to become extinct during the next twenty years; and that propagation in captivity is a last resort. I would not expect that IUCN/WWF could accord high priority to a Przewalski program at this time. This may not mean that new foundations (in each participating country, as you have been informed) will have to be set-up. Nevertheless, it would seem to me that the Przewalski horse project has a built-in attractiveness to horse lovers all over the world and it should prove reasonably easy to find private support for their propagation.
3. The Marwell meetings. I will be at Marwell and look forward to talking further with you there.

With all good wishes for the New Year.

Sincerely,

A handwritten signature in cursive script that reads "William Conway". The signature is written in dark ink and is positioned above the printed name.

William Conway

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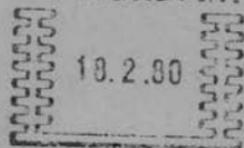
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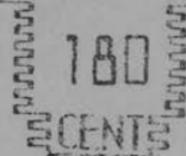
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Rivierahal
Europa's grootste
overdekte
dierentuin 'komplex'
Diergaarde Blijdorp.

ROTTERDAM

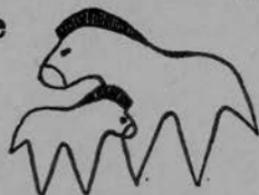


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Foundation on
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of the



Przewalski horse

Mr. E. Kohn
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