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**Oji-Cree Men's and Women's  
Traditional Practices Project:  
Restoring the Balance  
Volume 2**

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John Paul Jacasum (series editor), Vicki  
Angees, and Christina Keesic (translators)

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Ojibway and Cree Cultural Centre





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**Oji-Cree Men's and Women's Traditional Practices  
 Project: Restoring the Balance Volume 2**



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**This volume is dedicated to the late Fred Meekis of  
 Sandy Lake, Ontario.**





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## Introduction

The Oji-Cree Mens' and Women's Traditional Practices Project was organized through funds obtained from the Aboriginal Healing Foundation under the program theme Restoring the Balance. "This theme looks at ways to heal the community in the present and keep it healthy in the future"(Aboriginal Healing Foundation Program Handbook, 2<sup>ND</sup> Edition, p. 13).

The goals of this project were as follows: (a) to gather information on traditional men's and women's practices from the Oji-Cree elders, specifically individual, family, community and environmental practices that enabled the Oji-Cree people to be strong in the past; (b) to hold a conference on traditional men's and women's practices bringing elders, frontline workers and interested community members together; and (c) to publish resource materials on Oji-Cree men's and women's traditional practices for frontline workers and the public. The information contained in this document is the result of these efforts.

Each of the elders were interviewed in Oji-Cree by Virginia Beardy in their home community. All of these elders were asked the same four open-ended questions:

- (1) What practices made you strong in the past?
- (2) What practices made your family life strong?
- (3) What practices made your community strong in the past?

and (4) What practices were important when you were living off the land?

Responses to these questions were recorded on cassette tape, transcribed into syllabics, and later translated into English.

In keeping with the goals of the Aboriginal Healing Foundation, I hope that the information presented in the Oji-Cree Men's and Women's Traditional Practices Project will "encourage and support **Aboriginal people** [frontline workers and the public] in building and reinforcing sustainable healing processes that address the **Legacy of Physical and Sexual Abuse in the Residential School System**, including **Intergenerational Impacts**" (Aboriginal Healing Foundation Program Handbook, 2<sup>ND</sup> Edition, p. 4).



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## Minda Anishinabie



### Biographical Information

Date of Birth: July 9, 1931

Place of Birth: Sandy Lake, Ontario

Present Address: Sandy Lake,  
Ontario

Name of Spouse: Geordie  
Anishinabie

Number of Children: 11

Grandchildren: 35

Great-grandchildren: 36 +

Number of Years Married: 36

Date of Interview: April 28, 2003

## Minda Anishinabie (Fiddler)

The first thing I will be talking about is my spiritual life. I am working on changing my life around, as I don't want to keep following the old ways. I know now about certain things I did in the past were not good. I did not have God in my life while I was young and I didn't care about the spiritual life.

Today I am an elder and I don't have thoughts of a young person anymore. I use my experiences and knowledge to teach my grandchildren, my sons, and daughters ... to live a good life. This is what I like to do today.

I thank God for giving me the ability to use my voice, my physical well being, and still being able to breathe. Before I start, I will say a prayer:

Dear Lord we give thanks for giving us another day and for looking after us while we were sleeping. We also give thanks

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for giving us health and we ask that you bless us today in the name of Jesus Christ. Amen.

I was asked to share some of my stories about how life was in the past. The reserve we live on today wasn't like that at all, as far as I can remember everybody was very poor. I was born in 1931. I wasn't born yet when my family came to this reserve. My older sister was one of the children that was born here. All they had at that time was a makeshift shelter made out of trees and branches. That's how poor we were. I remember as a child there were no houses yet on this reserve.

Our parents were very protective of us. We were not allowed to do our own thing. They would tell us when we should go to bed at night and we always did as we were expected. Whenever they told us to go to bed and when to get up in the morning, we would do it. We always had to sit with our parents before bedtime while they were having their evening prayers. And it would be the same way in the morning. We all get up at the same time, wash our faces, and then sit down for a morning prayer. Our parents really enjoyed teaching us about God and we as children enjoyed it too. We always showed our respect towards our parents. They taught us about many things that are important especially in terms of respecting other people. We were taught to treat our grandparents with respect, to lend them a hand, and never expect any kind of payment for helping them. We were told that if we do this God would reward us for helping the old people someday. This is what a child learned at an early age. It was taught to them in such a way that will make them learn about values in life. We also learned not to steal anything that doesn't belong to us and not to bother someone else's things. The other important thing that was valued was we had to honour the one day each week that is Sunday. We always attended prayer services on that day. We didn't have a church yet. So, what they did was find a good spot in an open field for people to gather for service. It didn't matter how far they had to travel to attend the service, even if they

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had to go by their canoe and paddle quite a way. They always went and everyone in the family was expected to go. We were always warned not to break even the smallest branch on Sunday or to pull berries off. We were told if we do this, it meant we were following Satan's ways. We had to wait until the next day to pick berries. It was very important for children to learn this. So when they had Sunday service it would go on all day and they would take a break in the middle of the day to have something to eat. I don't see people doing this anymore. The other thing that I see today is that there is no respect towards the elders and their teachings are no longer valued.

I can't communicate with my grandchildren because we don't use the same language and they don't seem to be interested in trying to learn their Native ways. We as Native people were given gifts to use our language and our cultural ways. Sometimes I would ask my grandchild to do something for me and he goes and does what he thought ... I said. I don't speak English to him, because I can't speak English. I can't keep up with young people today. I really enjoy teaching those who are keen on learning about life's lessons. I have so much to tell these young ones but as I said, I can't keep up with their ways, as I don't have the ability to use the English language. All I can do is just look at my grandchildren. They would rather learn non-native ways. It makes me feel [sad when] I try to teach them about our ways and they don't even want to acknowledge them. But I will continue to use my teachings as long as I live.

As far as I can remember it was our parents that worked very hard to care for us and feed us during the time they depended on surviving off the land. We never had any store bought food in those days. My memories of living on the land are still very clear as if it was yesterday and how difficult it was especially in the winter

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months. I remember how much I used to wish I could have a piece of bannock to eat but we didn't always have the luxury of even a little bit of flour.

The clothes we use today were not even near anything like that. We used rabbit fur for clothes. Women today don't wear clothes that were meant for them to wear.

My father's health was always poor. Occasionally he used to work with other men when they would leave to haul freight with store supplies. When he returned he brought with him some treats for us and some other things like flour. Flour was packed in cloth sacks and that sack used to have two layers of cloth. The outer part was very strong just like a canvas. This is what my mother used to make a dress for me. She would just cut a hole for the neck and armholes. That's how poor we were back then.

My mother was always the one that worked hard caring for us because my father's health wasn't always good. During the winter months, my mother would set a net to catch fish, but she didn't always get any. So, she would chop a hole in ice and use a hook to try and catch fish. She used to go far away from where we lived. We would stay home and look after our father when he was too sick to do anything. One day we were waiting for my mother to return from her fishing trip. We kept looking out for her to appear around the bay and sure enough we saw her from a distance. We could see her carrying a great big jackfish across her back. We were so happy that she was coming back with a fish so we could eat. She cleaned and cooked it right away. She also cooked fish eggs and liver. We were so anxious for it to cook so we could get eating. Jackfish liver is very big and I remember crying because I wanted to have some too. My older sister says that she wants to eat cheese too. I don't know where she got that idea to call that liver cheese because there was no such thing as cheese back then!

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I don't recall any of us kids getting sick easily in spite of being so poor. We hardly had any kind of illness, like high fevers. I only recall how my knees used to ache so badly. My grandmother told me what to do how to get rid of what ailed me. She told me to go out on the snow with no shoes or socks on and to walk through the snow until it's up to my knees. I didn't have any more pain after I did what my grandmother told me to do. We never had any painkillers like aspirin. They had all kinds of natural medicine to use but they didn't need to use them because they hardly ever got sick. It wasn't like the way it is today, we see children get sick very easily.

The only health problems they had were diarrhea and earaches. All they did to treat diarrhea was administer an enema. My grandmother was our nurse. I think why we didn't get sick easily was because we didn't eat anything that wasn't good for us.

We eventually had a log house as we got a bit older but not every family had a house yet.

The other thing is when a woman is ready to deliver her baby there was no doctor to assist with delivery. I used to watch when a baby was born. They never worried about anything bad happening to a baby and a mother. It was a natural part of our lives whenever a baby was born. There were never any complications. That's how strong people were back then.

I will talk about what my father used to do after each of his children were born—there were ten of us. He wrote down when we were born on a piece of paper. He gave each and every one of us that piece of paper where he wrote our date of birth and he told us to always keep it. Today that piece of paper is getting yellow with age. Nobody else did this except him. So, when I was eligible to apply for old age pension I used that paper as proof of my birth date. The name that I go by, Minda, is not what my father wrote down. He named me

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Melinda and I was born in the morning on the 9th of July, year 1931. That's what it shows on that paper. He did that for all his children. My older sister showed it to someone and she never got it back. I think my father was smart to do this when he wrote everything down such as births, deaths, and things like weather. He left his book at the church for safekeeping but it was destroyed when the church burnt down. Two churches have burnt down since we've been living on this reserve. That was such a big loss for us when my father's recordings got lost in the fire. He used to help at the church but he wasn't an ordained priest. He was considered one of the church workers.

I remember when my grandfather's daughter passed away. My father wrote it on his book when she died. I don't remember how old she was when she died. I also recalled seeing my grandmother weeping. I was getting upset about seeing her crying like that because I didn't understand at that time why an adult was crying. I began to understand why she was crying. She was grieving for her child. These persons I refer to as my grandmother and grandfather, they adopted my father when he was just a small boy. My grandfather used to feel very sorry for us when we didn't have any food to eat, and when he saw us crying from being hungry. One day he said to my father, I'm going to head out to the bush to hunt for moose. My father was very sick that day. Whenever he tried to work, he would start coughing up blood.

So, my grandfather left and after a short while later, we could hear gun shots not very far, because we were all inside our log house. He came back to let everyone know that he killed two moose! So, everybody went running over to where he killed a moose except one of my sisters and me. Soon after, my mother came back to the house carrying some meat and started cooking it right away. She told my sister to keep an eye on the meat while it was cooking and she went back to help cutting up this moose. We had a wigwam just outside our house where my mother did her cooking. My sister started

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cutting at the cooked part of the meat so we can eat as it was cooking. That's how hungry we were. We didn't have a decent meal in many days. We didn't have flour to go with moose meat at that time.

Sometimes we would have visitors passing through where we lived looking for pelts in exchange for flour, oats, salt, tea, baking powder, and some other items. But they never had any sugar with them. Sometimes they would bring some candies for us. But we didn't know what they were called. All we knew was that it was sweet.

We didn't know what a lot of new things were called. We had a different way of describing money too. The way one \$1.00 was referred to was one pelt. That's how much was paid for one pelt. I was amazed how my father had that knowledge to write about events, months, and years. I don't know how or where he learned to do this.

Sometimes my father would leave to get supplies when we ran out of things. He would go to Manitoba where his sister was living. They already had a store there where she was. I remember one night after we all went to sleep, he arrived, and my mother was so happy she woke us all up. She was telling us our father brought some bread and we should try it. We all got wide-awake after my mother said bread. This was such a rare treat for us, not often did we get to eat bread at that time. My mother made me another dress from a flour bag that my father brought back.

The other time [when] men arrived with supplies, it started raining hard, of course they didn't have any tarps to cover up these supplies, and all the flour that they brought in got all wet. My mother took this wet flour and went to a muskeg area, dug a hole, and buried a

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sack of flour there. She kept this flour there and would only take it a little bit at a time. There was nothing wrong with it while she kept it there.

Before Christmas, everyone in our family would travel to a place where people gathered for that special occasion. People would travel quite a long way to participate in that gathering. They used to put away food to use for the feast. They were able to keep it for that purpose, and even if we ran out of food to eat, they still wouldn't touch food that they were saving.

During one of these gatherings, a woman gave birth on Christmas Day. Soon after that, she got up and started helping with the preparation of the feast. That's how strong a woman was back then, even right after she gave birth she started doing her work. How I got to see these things was because I was always curious about everything. That child who was born on that Christmas day is still alive and has grey hair. I watched my mother, my grandmother, and my aunt give birth when I was young. Men never went to where a woman was giving birth. I started helping out when a baby was born. I had the privilege of cutting the umbilical cord on four babies. My mother acted as a midwife and I used to assist her. She did just about everything because my father was always incapacitated. It was up to her to make sure that she took care of everybody.

Long time ago, TB was a deadly disease. If anyone became sick with it, they eventually died. It was just as deadly as cancer that people die of today. Two of my siblings died of TB. One of them was just a baby when she passed away.

I had eleven children of my own. I used moss for diapers. I never used cloth diapers or disposable ones, as they didn't exist at that time. I breast fed all of my babies. I was married to my husband for 36 years when he passed away. All the years that I was with him, he

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got physically abusive towards me once and once he threw me out of our house. I never told anyone about what happened and I had a reason why I choose not to tell my parents and siblings. It would have created more problems within our family. The only person I went running to was my father-in-law after I got thrown out. I went to tell him that his son kicked me out of the house. His response was maybe I was the one who instigated everything [and that is] why it came to this. He said that sometimes all couples go through some kinds of problems or when one person doesn't respect the other. I did some things I shouldn't have done while I was with my husband but he tried his best to be patient with me. The other reason why some couples have problems is because the in laws tend to take sides with their children if they have a problem. It is their duty to be there for their children if things don't go right with their partner so they can guide them through hard times and to help them solve their situation.

I was sixteen years old when I got married and prior to my marriage, I used to be so afraid of men. I wasn't even interested about boys either. A man who wanted to marry me asked my father if he would give his daughter to him and he agreed to it. He didn't even ask me if it was okay with me. I went along with what my father agreed because I didn't want to disobey him. We were taught at an early age to do what was expected of us. So I said yes anyway even though I didn't know this man I was going to marry. Two other couples got married at the same time we did. This other girl that got married with us, her husband died too, but while her husband was alive, he had another woman. The other couple is still together in the community. Our parents were the ones that decided who we should marry. We were not allowed to make any decisions on anything. Even when I first got married, I didn't understand what marriage was all about.

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The day arrived when I was supposed to get married and I was so scared I went somewhere to hide. This other girl who was getting married came with me so we could hide together, but we couldn't get out of it.

I began to understand that as a married couple we needed to help each other out in whatever kind of work we were doing. For example when I was busy feeding the baby, he would start a fire to make tea. Both of us worked very hard but helping each other made a big difference and made it easier on us.

When we had problems, we knew we couldn't run to our parents to help us and solve [these problems] for us. That only makes everything worse. The parent's role in this matter was to be there for their children and their spouses, to guide them, and to make them understand that there are always ways to solve problems. The in laws knew that they had to treat them the same way as they treat their child. We had to work on issues that were affecting our marriage and if we didn't do anything about it, things would only get worse. And if parents don't show their love and kindness to their married children, they can't have any relationship in a meaningful way. I also know this is very true. I always try to be careful how I treat my children's spouses. Two of my sons' wives ended up with other men. And I never took my son's side and blame those people what they did to my sons. I only told my sons not to do anything to try to hurt them in any way because it will cause them more pain. One of my daughters in law that left my son for another man was killed in a car accident. Their child and one of my son's children were also killed in an accident. That was why I warned my son's not to give in to their anger towards their wives after they left them because we don't know what's going to happen next. It was very heartbreaking when this tragedy happened. My son had three children with his wife who died in an accident so I started looking after one of them and my son has one. Two of my daughters also left their husbands for other men. I feel responsible for the way

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my children made such wrong choices because I may have influenced them to leave their spouses.

It wasn't until one day I decided to change my life around and invited God into my life that I began to see that He is always there to help us and forgive us for all the wrong things we had done. Today, I have a special relationship with him. When I was still doing that, it wasn't right. It's as if wearing these clothes made me do whatever I wanted to do. This is exactly what my daughter is doing. I don't blame anyone else for all the things that happened to me and my family. I always ask God to forgive me every day. We are always facing hardships in this life because there is a being that goes around trying to destroy us.

One time I received a letter from one of the elders. In his letter he talked about the problems that we are starting to see that didn't happen long ago. He only knew of two people that didn't stay with their wives at that time. He also told me to use my past experiences to teach young people. And this is what I am doing today. I never saw my parents physically abuse each other but occasionally they would argue about something. It never became violent.

We didn't come to this community as often because we had a home on the land. We only came back during summer time. Today, there are many new houses on this reserve and yet people still get sick easily, but long time ago, people were tough no matter how cold it was. It didn't bother them. I don't remember ever being cold at night while we were sleeping.

It is my turn to pass on the elders' teachings to young people, but it is very difficult to do this because they are not interested in learning about the old teachings. The elders are no longer regarded as the most important people anymore. I find that when I talk to them they don't pay attention to what I say.

## Minda Anishinabie

Every young person needs their parents' teachings so they can use them as tools to go through their journey in this life and to guide them along the way. But this doesn't happen now. Still I keep on talking to them. I don't give up. I tell them about my life experiences and how I lived my life as well as the lessons I learned from my elders. I talk to my grandchildren about the things we did in the past and what people did when they hunted for moose.

They also had hunting dogs to help them to run after a moose. Dogs were trained to run after a moose and to circle around it so it will be cornered. That's when a hunter would shoot it. I also tell them about how they prepared food in order to last a long time. I used to help my mother prepare food to store away. She would cut up meat in very thin strips and then I lay them on a rack over a fire to smoke them. She left it there until it was all dry. She also used to pound dried meat until it's all in small pieces. After that, she would put this meat in a potato sack. She then put them away until we needed it. When meat was prepared this way, it lasted a long time. We did the same with fish. [We would] smoke it and make pemmican out of it. She did the same thing with rabbits, muskrats, and beavers. She used to cut all the bones out, cut it until it's very thin, and smoke it. They used to make a storage [place] high off the ground where they kept their food so animals won't reach it. Even ravens never bothered it.

They also gathered plants they needed to keep for medicine. My father left me some of his knowledge about medicine when he passed away. I still don't have the ability to make medicine out of the plants that he showed me. He used to tell me what kinds of plants to use for certain types of illness. The one I remember is for someone who has heart problems. He would use bark off a poplar tree, but I don't remember how much to use. I still can't heal anybody with these plants. My father would look for a young poplar tree: just after its leaves came out in early summer. He peeled the outer bark and then cut the soft fibre that is right next to wooden

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part. He would boil it until the water was yellow. Then you could drink it. The other plant that was used was Labrador Tea and they used it for heart problems. The other plant is called the Mother's Wort and that plant has a strong pleasant smell to it. Its flowers are purple. If someone got a chill, they would boil it and drink it and that helped restore body heat. Women drank it if they were bleeding too much during their time. It was also used for colds but bark was added and they were boiled together. For bloody diarrhea, they added a root called *we-kay* to boiling water and sprinkled a bit of flour into it. If those plants are boiled with nothing else added, they taste awful but if you add another plant to it then the taste is not too bitter. You have to drink a cup of it at least three or four times a day for four days, then your symptoms should be gone. If you are coughing and have a sore throat they used the white part of fir bark. You boil that and drink it. When a baby had sores in his/her mouth, they used a cranberry bush root, dried and crumbled into a fine powder, and then mixed with a rose hip root. Cranberry root is very bitter, but a rosehip root is mild. If they are mixed together, the taste is not very bad. If you have trouble swallowing because of sore throat, you can use spruce cones (green ones). You boil them and drink the water that was boiled in them. There are all kinds of plants, [found] all over our land, that have healing properties. They were put there for us to use for medicine. All we have to do is walk around the bush to look for them. Even non-natives use these plants when they make medicine like painkillers. But if we use too much of their medicine, it only gives us side effects. And it's the same way if we consume too much of their cattle meat. It makes us sick because they are given chemicals to make them fat.

But the food that we used was all natural like moose and caribou. We ate every part of an animal. I used to see the elders when I was small eating a caribou's intestines along with its cud. They used to tie intestines at both ends with the cud still inside. Then they would hang it over a fire and smoke it. I don't recall ever eating that stuff. They did the same with moose intestines but if they wanted to

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be creative, they would add blood clots from a moose and let it hang there and smoke dry. Once it was all dry, they would take it down and boil it until it had the consistency of soup. I saw elderly women make this kind of soup. One time an old woman used to live close by us and I went over to see her. She was sitting over a fire stirring something in her pot. I looked in the pot to see what she was cooking and all I saw in the pot was some black liquid boiling away. I kept running back to watch her cook whatever it was because I was curious about it. I finally asked her what it was and she told me it was lichens pulled off rocks. She also said she only used black ones not other kinds that are different coloured because they can make you sick. I sure didn't like the way it looked as I watched it boiling in her pot! After she finished boiling it, she threw a moose intestine that was smoke dried into a pot, and stirred it very slowly. It stared to look very appetizing after she put that stuff in there. I was amazed about the way she was cooking her meal, but she didn't offer it to me. That was one of the delicacies that they enjoyed eating back then, but I never got to have a taste of it!

Today a few people are using bear fat to medicate themselves. I was given some to try as I had pain in my joints, so I was advised to rub it on where I had pain. I know these people that always make this medicine. They cook fat but they don't fry it so I don't really know how they cook it. Not too long ago I was given a bear carcass. I gave that person bear fat because I didn't know how to cook it. He asked me if there was a gall bladder but that person who gave me the carcass had gutted it before he brought it home. He said that's what they included with bear fat when they were cooking it to use for arthritis or sores on skin. I know many people use this for medicine. That's what I used when I had sore joints in my legs and today it doesn't bother me now.

The other thing I will talk about is when women have babies today. I breast fed all the babies I had them so they were always healthy and strong. Today I see women that have babies. They don't even

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breast feed them. There are lots of babies born and not one of these mothers even uses a cradle board for their baby. They just use those baby car seats. God created woman to bear children. She was given breasts to feed her baby from there and when a baby starts learning to eat solid food then the mother's milk dries up. Breast milk is best for a baby. Today a baby is fed with cows' milk in a bottle, even though a mother is healthy enough to breast feed her baby, she chooses not to. It really bothers me when I see young mothers do this to their babies. It would also help them spend less money on formula if they were breast feeding. They should try using a cradle board instead of a car seat. A baby can get cold easily and can have aching joints because it is small not like us adults. We can tolerate cold weather. That's how a baby can get sick if he gets cold, but he would stay snug and warm if he was in a cradle board.

When I try to tell young people about these things they always have an answer to everything. They tell me, those things you talk about are over, and we don't have to do that anymore. I think they just don't want to make an effort to do them. So, I'm asking and encouraging all of you young mothers to breast feed your babies. Tell your doctor after he or she delivers your baby that you want to breast feed your baby. That this is what God intended for us to do. This is the only right way to feed a baby. Please do this when you have a baby. This is the most important teaching I want all of you to follow. Also, take good care of yourself once you find out you are pregnant. It is very crucial to do this as soon as you know. Even 21 to 23 days before you miss your period, a life inside you has already begun. It is very important that you don't use or take anything that will harm your baby as it's developing. If a woman doesn't take care of herself during her pregnancy, she will face the consequences of either losing it or risk having an abnormal baby. Whoever will be listening to my stories, I'm asking that you try to understand what I talked about. I know I speak a little different, but that's the language I was given to use. We were given different languages to use.

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There is a story why there are so many languages and it was all because of ignorance. Yet they believed they were very intelligent, and that's the same way some people are today. The story says some people came up with an idea to make a building so it can reach to the top in heaven and to go up there whenever they wanted to. They started working on this building and one day God looked down and saw what they were doing so He made everyone speak a different language and they all became confused and couldn't communicate with each other. That's why we can't understand each other because of what happened a long time ago. And that's why I don't understand a person who speaks English.

That will be all. I'm sending my greetings to everyone.









Γ'C <σ'αV

ςC'·Δ' L' ρd' <λ'ρ' < Δ"Δ·∇ ρ'· b·Δ' σPΔ'ρ  
 Pρ'C'ρ' ρ'Δσ <λ' ρd' ρ' ρ'Δρ'bU'· b·Δ' C' σPΔ'ρ  
 Pρ'C'ρ' ρ'Δd'ρ'λ' Δ"Δ·∇ bPΔ'Λ'ρ' b·bC'P'λ'· b·Δ'  
 σb'ρ' ρ' Δ' ΔC·Δ' ρ'ρ' ρ'ρ'·Δ'Λ'σ'α·Δ'· V'·b  
 ∇C σPρ'ρ'C' ∇P σC CU·Δb'σ'λ'· ρ'd' C' σPΔσ'  
 ρ'ρ'σ'σ'bU·Δ' ρ'Δ'C·Δ' <<Ld'α'ρ'λ' Δ'·Δ'σ'Γ σP'Πd'  
 ρ'Δ'·b'd'σ'λ' Δ'Γ Δ"Δ·∇σ'σ ∇PΔσ'σ' ∇α'C·Δ"Δ'σ'·  
 Δ'Γ C' Δd <λ' bΔ'·b CU·Δb'σ'λ' Δ"Δ·∇ bΔ'·b  
 ΔC'λ'· b·Δσ' Δ'ρ' C·b'ρ' b'Γ·∇<σ'ρ'b'σ'Δ' L'ρ'ρ'·  
 PΔ'λ' ς·Δσ'd Δ'C·Δ"Δ·∇·Δ' b·Δ' ςC' ·b'C  
 Δ"Δ'ρ'·Δ' Δ'ρ' <λ'ρ' ρ'd' ·Δ' bΔ'Λ'ρ' ·Δ'ρ·Δ  
 Δ'd'ρ'·Δ' Δ'Λ'ρ'ρ'· ς"Δ ρ'σC Δ'α'Λ'α'σ'Δ'  
 ∇P'ρ'·Δ'·bU' ∇L'Γ'ρ' α'C ∇U·ΔC·Δ'ρ'· ∇P Λ'C'<·∇'  
 Δd <·Δ'λ' PΔ'σ' α'C·Δ"Δ'·b'σ'·Δ'· ρ'd' C' Δ"Δ·∇  
 b'ρ'σC α'C·Δ"Δ'σ' bΔ'd'ρ'·Δ'· Δ"Δ·∇ C' ∇b bPΔ'ρ  
 σC Δ'd'ρ'α'σ'Δ' ∇b ∇PΔ'ρ d'ρ'<σ'ρ'bU' ·b'C ρd'·  
 ∇·b ∇b ρd'σ'σ ∇Δ'ρ' L'ρ'Λ'C'· bΔ'd UΛ'ρ'ρ'CL'  
 ·Δσ'd· L'L'ρ' Δd σb'ρ' ∇P Δ'·Δ'b"Δb'σ'λ'· ∇b ΔC  
 Γ'ρ' ∇PΔ'ρ' Δ'σ'Δ'·Δ' ·Δ'b"Δb'α' ·∇'·b' bΔ'dUΛ  
 Pρ'ρ'CL' ΔC·Δ' Γ·b' bPΛ Δ'Λ'ρ'ρ'·Δ'λ'· b·Δσ' PΔ'ρ  
 ·∇'σ'Π'ρ'α'σ'Δ'ρ' Δ"Δ·∇ ·Δ' bΔ'σ'ΔC'λ'· ς"Δ b'λ  
 bC'd'ΛC·Δ'ρ'α'σ'Δ' b·Δσ' Δ'·Δ'λ' PΔ'ρ' Δ'λ'ρ'  
 ρ'ΔC'Λ'α'·Δ'ρ'· ρ'd' Δd ∇C·σ'ρ' b'α'·Δ' Δ"Δ·∇  
 bΔC'λ' ∇·b b'λ b·Δ' ·Δ'b PΔ'ρ' Δ'P'Δ'α'σ'Δ'ρ'ρ'  
 Cb·Δ'ρ'λ' Δ"Δ·∇ bσC·Δ'ρ'α'·Δ'ρ'· ∇·b Γ'α b·Δ' PΔ'ρ  
 α'σ'U'ρ'bU'ρ'ρ' VΛ ρ'b·Δ'ρ'λ'· b·Δ' Δ'·Δ'λ' PΔ'ρ  
 ·Δ'ρ·Δ'ρ'ρ' ·∇'·b'· b·Δ' σPρ'ρ'C'ρ' Δ'α'Λ L'λ' Δ"Δ·∇  
 bΔ'σ'ΔC'λ'· ∇·b C' ·Δ' σCC L·Δ' P'ρ'ρ'·∇C' ∇·b  
 ∇P'ΓC'ρ'λ'· b'ρ'α ∇P'ρ'α·∇'C' b'ρ'α bPΔ'σ' σC·Δ'ρ'λ'·  
 b'ρ'α C' σP'Γ'σ'd'Γ' Δ"Δ·∇σ'σ bP'L'ρ'α'Δ'· σ'σ'C'  
 ρ'ρ'α·∇'C'λ' Δ"Δ·∇ ∇·b b·Δ' b'α'ρ' Δ'ρ' ρ'·Δ'Λ'·ρ'b'

Γ'C ΔσδαV

Δ"Δ·∇ V<ₓ b·Δ' dC' Δ·ΔL Δ'∇' ΔC'∇  
 Δ"Δ·∇σσₓ Δ<' C' bPΔ'∇' Δ'∇'∇'∇'  
 σPΔα<Γ'∇' Δ"Δ·∇ₓ Δ'∇' Δ"Δ·∇ Γ'C  
 bΔ'σbσd' Δ"ΔL bPΔα'Δ'Δ'∇' Γ'∇' 1931  
 Δ'∇' ∇'∇' bPΔ'σC·ΔP'ₓ Δ'∇'∇'∇' bPα  
 bPσC·ΔP'ₓ ∇'P'∇'Δ'∇' ∇'Δ'∇'∇'σσ' b₄  
 ∇'∇'∇'∇'σσ'ₓ bPα C' σPΓ'σd' Δ'Δ·∇ b₄  
 σPΓ'∇'·Δ' ∇'PΔ'∇' Γ'·∇' Δ"Δ·∇σσ V<σσ Δ'∇'  
 C' ∇'P'∇'∇'·Δ'ₓ L·Δ' ∇'P bP'·Δ' Δ"Δ·∇σσ  
 bP'∇'ₓ Δ·Δ' b₄ b>σ∇'∇'∇' ∇'P'∇'Δ'∇'ₓ ∇'∇'  
 ∇'σσ Δ'P'∇'Δ'∇' Δ'∇' Δ'σ' ∇'Δ'∇'∇' Δ'∇'  
 ∇'∇'∇'·∇' Δ'σ' ∇'Δ'∇'∇' bΔ'σ'·b'ₓ Δ<' C'  
 P'∇'∇'·Δ' Δ·∇'·Δ' bP'∇'Δ'∇' Δ'∇'∇'·Δ'∇'  
 ∇'P'∇'∇'∇'ₓ Δ'σ' σ'∇' ∇'P'∇'∇'·Δ'∇' Δ'∇'∇'ₓ Δ'∇'  
 Δ"ΔL bPΔ'∇' Δ'σ'∇'∇'ₓ Δ<' bP'∇'∇'∇'  
 bP'∇'Δ'∇'∇'ₓ P'∇'∇'∇'·Δ' Δ'∇' Δ'Δ·∇ σC  
 b·Δ'σ' Δd ∇'∇'∇' Δ'∇'∇'·Δ'∇' Δ'∇'∇'·Δ'σσ  
 ∇'∇' PΔα·Δ' Δ·∇'·Δ' Δ"Δ·∇σσ bPΔα'∇'·Δ'ₓ

Δ'∇' σ'∇' ∇'·b ∇'∇' ∇'∇'∇' ∇'PΔ'·b∇'∇'∇'  
 ∇'∇'∇'∇'·∇'·Δ'σ' ∇'P Δ'·b∇'∇'∇'ₓ Δ'∇' Δ"Δ·∇σσ  
 ∇'∇' σC bP'∇'Δ'∇'ₓ Δ·Δ' bP Δ'·b∇'∇'∇'ₓ  
 b·Δ' σb∇'∇' Δ'σ' ∇'∇'∇'∇'·Δ'∇'∇' Δ"Δ·∇ Γ'·b'ₓ  
 ∇'∇'∇'∇'ₓ Δ'∇' ∇'∇'∇' ∇'L·Δ' ∇'·b ∇'∇' ∇'∇'∇'∇' Δ'σ'  
 Δ"Δ ∇'∇'∇' Δ'∇' P'∇'·Δ' ∇'∇'∇'∇'·Δ' Δ'∇'∇'ₓ Δ'∇'  
 C' <'∇' σP∇'∇' Δ'σ' Δ"Δ bP∇'∇' Δ'∇' P'∇'·Δ'ₓ  
 ∇'∇'∇'·∇'·Δ' C' <'∇' Δ"Δ·∇σσ σP∇'∇' Δ'σ' bP∇'∇'  
 L·Δ' ∇'∇' ∇'∇'∇' ∇'·b ∇'∇'∇' ∇'PΔ'·b ∇'∇'∇'∇'  
 Δ'Δ·∇ ∇'∇'ₓ Δ·∇'·Δ' bΔ'σ'∇'·b b·Δ' σL ∇'·b  
 σC Δ'σP'∇'·Δ' Δ'∇' Δ·∇'·Δ' σC bPσC·ΔP'∇'∇'  
 Γ'·b' ∇'∇'∇'∇'·Δ'ₓ ∇'∇' α'∇' σP∇'∇'∇'∇' σ'∇'

Γ'C Δσ'αV

▽P J·b·bN'z'' ▽<·Δσ'z''x VJ·b σbmq σJ'ε'c  
 ▽bmq σCCL' ▽N ·▽N σbΔs mΛΓ'' J'  
 ▽·Δ'Δ'·C·Δ <'P·h'x σCC C' bPσC'Δd' ▽PσC  
 ΛP<σ·C' Γ'·Pσ <'P α'C ▽Δαmq' ▽·b C' αΛ'  
 Δd ·Δ< LU LL·U·▽J'9 Λ'P' ·Δb"Δb' Δd CσC·b'  
 ▽LU <<'P·h' J'z''x ▽Γ C' σJ' ▽Pσh' ▽·b C'  
 bPa <<' ▽Δs·Δ' σ'C' ·Δ' ▽b ▽PLLU' ▽h'  
 ▽Δb'P'z'' ▽b bPDP' Δs'z'' Γh·Δ' ▽V'α·b'x  
 σbmq σLL ▽D'P' Cd<·C' <'P J'·Δ'z'σ ▽Λ  
 P<·q<J' qΓ'z''x ▽"Δ·▽ C' dC' σΓh'  
 ▽Δmqbmq·Δ' Pba·Δ<C' Δ"Δ·▽σσ P<·bσσ JL'  
 P·Δ'z'z''x Δ"Δ·▽ C' ▽"d ▽ΔJ'α·bP<' bCJ'  
 P'J'U>ασ·Δ' ▽ΔJ'CPU' ΓNd·Δb"Δbσ' Δ·bP'x  
 ▽"ΓC' <<'P ▽D'P' <<·qJ'bU' bΔmq'P'P'J'U' Δ"Δ·▽  
 ·Δ'z' ▽z'ΛP' <·Δσ'z'' Δs ·▽'b' ▽P·Δ'z'z'' ▽·b  
 ▽b baq <·qJ'b' ▽Δz' P<·qJ'ba>bmq·Δ'x Δ"Δ·▽  
 J·b' mΛΓ'' bbVJ'z'P<' ▽·b ▽'b' Δ·Δz' PΛCdJ'  
 ▽Λ αα'C·Δ ΔC·▽·Δ' qdσσ Γ'b' <·qJ'b' Δmq'  
 J·ΔC' N ▽ΛP'P'b' ▽·b dCPz' qda' b·Δ' ·Δb z'b  
 PΔz' Δ"Δ·▽ J·b'x z'"Δ ▽C ▽'b' J·ΔP'  
 ▽PΛmqbmq·Δ' ▽·b ▽b baq ▽PqσL' ▽ΔJ'σbC'  
 ▽"Δ·▽ J·ΔP' ▽σLdJ' ΓNd'x

b·Δσ' PDP' Pq'CL' ▽z'ΔJ'σbU' qd' ·▽'b'x ΔN'b  
 z'z'z' b·Δ' Δ"Δ·▽ PDP' ΔJ'σbaqmz'x σbmq VJ'  
 ·Δ"Γ ▽Δmqbmq' ▽"Δ·▽ VJ'·bΛ'x Δ"Δ·▽ C' bPDP'P  
 Δmqbmq' VJ' ·ΔC' ▽"Γ bΔαP'z'x ▽"Γ C' bPDP'P  
 ΔJ'σbaqmz'x ▽ΓC' Δ"Δ·▽ bPDP'P LLbUσL' σCC  
 bPa qdσσ bPσC L'z'α"Δ'z' J'b' ▽"P bΔαP'z' Γα  
 Λ'z' Δσ' ▽ΔJ' Λ'J·Δ'x Δσ' Δ"Δ ·Δ' ▽C  
 ▽PDP'P Pq'C' Δ"Δ·▽σ P'b'P'J' P'J'C'x

Γ'C ΔσΨαV

∇<sup>υ</sup>β<sup>ε</sup> σCC ΡΔ'Ρ σC LLβ <Δ' <Δd β<·Δσλ<sup>υ</sup> ΔΓ  
 C<sup>υ</sup> LσC< ∇Δςd<τ' ΔC·∇L' ∇Δ'C·Δ ·Δ<L<sup>-</sup> Δς  
 ·Δα·Δ ·∇ΓΠdJ·Δ ΓΡΓσ ∇Δλ·Δ<sup>-</sup> σβμ9 VJ·β  
 ∇ΠΛβ<sup>-</sup> ∇Cdj<sup>-</sup> σCC ∇·β ∇βP·Δσ<sup>υ</sup>β·∇Λ'σdλ<sup>υ</sup>  
 Ρ·Δ·Lλ<sup>υ</sup> βΛαβμ·Δ<sup>-</sup> Δ"Δ·∇ <·9Jβ<sup>υ</sup>  
 βΛ'CAβ·Δβμ·Δ<sup>-</sup> β·Δ' ςCJ<sup>υ</sup> Δ·Δλ <α·ΔΡ9μ<sup>υ</sup>  
 Ρ·Δσ<sup>υ</sup>β<σ"Δ<sup>-</sup> <·9Jβ<sup>υ</sup> ∇Δαβμ·Δ<sup>-</sup> L·Δ<sup>-</sup> Δd  
 ∇Γ·τ'CL<sup>υ</sup> <·9Jβ<sup>υ</sup> Ρ·Δ·L<sup>-</sup> ΔΓ C<sup>υ</sup> Δ"Δ·∇ <<sup>υ</sup>·9·Δ<sup>υ</sup>  
 β<C<sup>-</sup> ∇ΔLdCλ<sup>υ</sup> <·9Jβ<sup>υ</sup> βPΔJ ΔΡ·ΔΡ<sup>-</sup> VJ·β Γα  
 ∇Cdj"ΔCΡαμ·ΔP<<sup>υ</sup> <Δ' C<sup>υ</sup> ∇P ΡΡ ΡΓ·Δσ<sup>υ</sup>β<sup>-</sup> ∇·β  
 ∇β ∇Δ'Ρ Δ·βα"ΔβUP<sup>υ</sup> ΓΡL<sup>υ</sup> <·9Jβ<sup>υ</sup> <Δ'  
 ∇Pς·Δ<·∇<sup>-</sup> ΔΓ σLL Δ"Δ·∇σσ Ρ·αβ<sup>υ</sup> ∇P  
 βα·∇'C<sup>-</sup> ∇PσC σ·ββΓΡα<sup>-</sup> L<sup>υ</sup>Pd<sup>-</sup> ∇β ΡLΡJ<sup>υ</sup> Δ"Δ·∇  
 <·9Jβ<sup>υ</sup> <<P C<sup>υ</sup> ∇ΔΡ LLσ·∇<·Δβμ·Δ<sup>-</sup> <·9Jβ<sup>υ</sup>  
 β·Δ ·ΔΡσασ·Δ<sup>-</sup> <Δ'β<sup>υ</sup> ΔC ∇ΔJ Δ<sup>υ</sup>βμ·Δ<sup>-</sup> ΔΓ  
 L·Δ<sup>-</sup> βLdββJβ<sup>-</sup> <β<sup>υ</sup> ∇Δςλ<sup>υ</sup> 9σα·Δ' <Δ<sup>υ</sup> Λd β4  
 Δ·Δλ ββVJ·Δ<sup>-</sup> PLL·Δ<sup>υ</sup>β·Δ<sup>-</sup> VJ·β4<sup>-</sup> ∇Δd<sup>υ</sup>βμ·Δ<sup>-</sup>  
 ΔΓ βΡα Δ·Δλ <<P ∇PΔ'Ρ LαΡC<sup>-</sup> ΓΡΓσ Δ"ΔL  
 9ΔJ<sup>υ</sup>ΔC<sup>-</sup> Δ"ΔL βΔJ LL·Δ<sup>υ</sup>βμ·Δ<sup>-</sup> 7·β<sup>-</sup> ∇LdββJβ<sup>-</sup>  
 Γ<sup>υ</sup>·Δ<sup>-</sup> Δd ∇<·Δσλ<sup>υ</sup> ΔΓΛd βΔJ βα·∇'ΡβU<sup>-</sup>  
 Δ"Δ·∇ ΓΡ<sup>ε</sup> β·Δ ΔJ·ΔΡβU<sup>-</sup> ·∇Π ·Δ<sup>υ</sup>

σβμ9 Γα VJ·β ∇CdjΛC·ΔΡ<sup>-</sup> Δ·9 7·β<sup>-</sup> ∇LdββJβ<sup>-</sup>  
 7·β<sup>-</sup> ∇LL·Δ<sup>υ</sup>βμ·Δ<sup>-</sup> Δ"ΔL<sup>υ</sup> ∇ΔΛΡ L<sup>υ</sup>β·ΔΠΡ<sup>-</sup> C<sup>υ</sup>  
 Δ"Δ·∇ Δ·9 βΔ<sup>υ</sup>βΔλ·Δ<sup>-</sup> ΔΓ Λd βΔσJ LLCμP<sup>-</sup>  
 9·Δ' ∇·ΔΡ"Δ·∇<sup>-</sup> βLdςμ·Δσσ<sup>-</sup> Δ"·∇ C<sup>υ</sup> βPΔ'Ρ  
 ·Δ·Δ<P9λ<sup>υ</sup> ∇P σC ατβΓΡλ<sup>υ</sup> 9σ<sup>υ</sup> βP9'CL<sup>υ</sup> 9d<sup>υ</sup>  
 ∇ΔJ·∇<<sup>-</sup> Δς C<sup>υ</sup> <ΔΛ'Π·βτ Δ"Δ·∇ βPσC·ΔP<<sup>υ</sup>  
 Δ"Δ·∇σσ 7·β<sup>-</sup> σLL ∇·β VJ<sup>-</sup> μ"d<sup>ε</sup> ∇·β VJ<sup>-</sup>  
 σCΡ<sup>υ</sup> βPCdjΛC·ΔΡ<sup>-</sup> Δ"Δ·∇σσ 7·β<sup>-</sup> ∇P  
 βα·Δ<P9λ<sup>υ</sup> 9σ<sup>υ</sup> β·Δσ<sup>υ</sup> β4 αV ΔςΡ<sup>υ</sup> 7·β<sup>-</sup>

Γ'C <σ'αV

Δ"Δ·∇σσ bΔρ'σ'x PaLCA εC° Δd 7·b' <"Δ·∇  
 bCdΛC·<ρ'x 9σ' C° Λσ' σP·ΔP"Δ·∇  
 ∇CdΛC·<ρ'αμ·<'x α'C σ·Δ' σP<P·ε' <ΛμP'ε'  
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 ∇PΓbσP' ∇·b Γα VJ'·b ∇P'P'·∇ΛσP'x b·Δ' C°  
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 σLL Γα σ·ΔP σC·ΔPLb' P'Λ' ·Δ'CL·<·b Δ"Δ·∇  
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 α'C ∇b bΓμ<L'Γ"Δ' Δ·9σ·<' >P'εN'ε' <Γ Δ"ΔL  
 bε ∇>P'ε' L'P'ε·Δ'x









Γ'C <σ'αV

VJ·b' ∇Δα<C' <·Δ> bLPU"∇'x >"Δ CJ' Δ·9·Δ'∞  
 ∇·b L·Δ' Γ·L·b' Δ"Δ·∇ ∇·b α·Δ' ∇Δ<·Δ'∞dΓ'·b'  
 7·b' b·ΔΛ·bσ·Δ'x <·Δ> bD>Γ CbP' Δ"Γ  
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 bD>P'C' <·Δ> L·Δ' b·ΔhP·b'C'·9' α<b'C'  
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 Γσ·bU'x >"Δ CJ' b<ΔdP'd·∞' <Λ·∞P' J'P' D'P'Λ'  
 ∇Λ'∞dU·ΔσbU' ∇·b b4 D·b·ΔΓαP'J'D'P'Λ' ∇ΔJ' LL·Δ  
 Pσ·b·ΔσbUP'x J'P' D'P'Λ' L·Δ' ·ΔhP<·b' >"Δ CJ'  
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 PΔP'J P<P'J>x <Γ Λd VJ·b' ·∇ΓΠdJ' <"P'  
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Γ'C <σ'αV

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 ·∇α ∇Δ<Δz' <σ' αΛ' σρααβΓ' ∇·Δ·Δ<C'·Δ'  
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 ·Δdα' βLβU·Δρσ'x b·Δσ' βρρ LLPCC·βρρ·Δ'  
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 ∇Γ'β·Δα'·Δ'x ΓC' Vb' ∇<σρρα' <ΔΓ'  
 ∇·Δσ·α'·Δ' Δ·∇σ Δρ<·β' ΔLβU·Δ>β' ΓC' Δ·∇σ  
 βρσβσ' <αδ ·ΔUβ' ∇·b Γ'·ρσ ∇ρΔJ <ΔΓα'  
 UCd ∇Γ·αβΓσ' ∇ρρΛ'β'ρ·Δ'β' <ρσ·Δdα'x L·Δ'  
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 βL'ρρβC'·Δ' 9σ' <ε σ'ρ <ρC·Δ"Δ·Δ'9x <Δz'  
 βρρ·Δ'β9'C' βΔβαΛα'x LδΛΓUσ Γα  
 ρΔ'ρC·Δ"Δ·Δ'9·Δ' ∇Jαα'·Δ' σρ9σL' Δ·∇σ ∇ρσC



Γ°C ΔσΨαV

•Δ•Δ'CL•Δ•b Δσ' •Δ' •∇'b' bPΛΔσ'Pb•Δ' b•Δ'  
 •Δ' Δ•∇ PΔσ'Pb•Δ'x ∇Δα•∇'CJ•Δ' C' Δd Δ•∇  
 PΔσ'P9•Δ' ∇b ∇•ΔCJ•Δ'x

P<d4σΓα•Δ Pαα•Δr4' bDVΛPΓ4' P•Δ'CL•Δ4'  
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 ασ"Δ' PVΛP'x L'J σPΓσ' Δ'Π 9D'P ΔσΓL'x  
 ΔΓ Δ•∇ L•Δ' b•ΔΔσ •Δ'CL•Δαd' αα•Δr'x •b'z'  
 b4 bα•∇σΓ' b•ΔΔσ PP'b•Δ4' ΔΛαP'x L•Δ'  
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 βα•∇σΓΠr'z' b•ΔΔσ DCLαPσΓz'x Δσ' Δσ •∇Π  
 ∇ΔσLb' bV<P9Lb' 21 α'C 23 C'P' Δσ ∇ΔU'x  
 ΓC' Δσ Pβα•∇σΓΠr'z' Γα ∇b PΔCLαL'  
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 <<b\* bD'P ΔΔσP•z'z' DL Δσσσσ•Δ' D'z'  
 ∇bPC•∇'CJ•Δ' CΛ'd' α'Δ' 9Pα•Δ bD'z'Γ  
 bPC•∇'CJ'x ∇Pb•9 Δσ Γβα9•Δ' •∇Π P'Pσd' P'P  
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 P'P Δσσ•Δ' Δ•Δz' P'Pσd' •ΔΔσ'x ΓC' U•V ΔΛ'  
 •Δz' ∇PΔσDσJ•Δ'x Vσ•b Λd ∇Pσbσ' L'J  
 D'Pβα•Δ<C' Δ•∇σx ΓC' Δ<' ∇b Vσ' ∇P  
 D'PσP'JcΠ•Δ' <b' ∇PΔσP•z'z'x ΓC' Δ•∇ ∇b  
 bD'P σP'JcΠz' bβPz'x ΔΓ σ' ∇b bD'P σP'Jc•Δ'  
 Δ•Δz' bΔβασJ'x

ΔΓ•∇ >σ PΠσα•Δx

## Priscilla Kakekashpan



### Biographical Information

Date of Birth: January 16, 1941

Place of Birth: Fort Severn, Ontario

Present Address: Fort Severn,  
Ontario

Name of Spouse: Norman  
Kakekaspan

Number of Children: 4

Grandchildren: 13

Great-grandchildren: 1

Number of Years Married: 30 +

Date of Interview: May 2, 2003

## Priscilla Kakekaspan (Matthews)

As a child I didn't know my mother, she had died and my grandparents raised me. I didn't know my father even when he was around. When my granny told me he was my dad, I didn't believe them.

My grandparents taught me everything about medicine, survival, and hunting. They taught the right things. Grandpa talked to me on how to do things while I was growing up, like going out to get wood for fuel, snaring rabbits, and hunting grouse. Also, I learned how to trap for muskrats, mink, and beavers. I called my grandmother "Mother" and did all the things she taught me. I never talked back to them. I was always obedient and learned spiritual teachings from my grandparents.

## Priscilla Kakekashpan

I learned what they were teaching me so I wouldn't have a child before I married my future husband. I obeyed them after they talked and warned me to guard against getting pregnant because it was not right to have a child before wedlock. The custom of having my husband to-be chosen for me has been passed down for generations. A day came when a husband was chosen for me. He is still my husband today. I was to take care of him and our children. We raised our children and did not hire a babysitter. My husband went hunting for weeks at a time and being a young wife, I began to feel sorry for myself. Meanwhile, I did all the work to look after our children. Today, it seems young [people] have no desire to raise their own children. My way of thinking was wrong while my husband was away and when he came back bringing so many furs, I began to understand why he had to leave me and my attitude changed for the better.

I would make trips to get wood on my own. What I learned was to use snow for water to wash and to get fish from the river for food. I learned to tan moose and caribou hide and from that, I made moccasins and mittens for my family. When my family life began, I wasn't that good at sewing but did the best I could and soon I became an expert. I didn't really know much about how my grandparents lived before I was born. They just taught me all that I needed to know.

Today, children speak English and are not able to speak our Native language. My own grandchildren are not speaking the language. When I talk about not refusing any food I serve, in my language, they don't understand what I am saying. People have changed so much.

## Priscilla Kakekashpan

We ate traditional food and most time it was fresh. Bannock was made in the morning — no eggs. Fish were cooked over an open fire. I remember my grandfather drying ducks, moose meat, and geese. This dried meat was stored to be eaten later when food was scarce. Almost everything was dried to keep for later.

Every morning prayers were said before the day began and evening prayers were said before bedtime. Children were taught to settle down for the night and I learned not to run around after dark. Today, children want to be by themselves. It was not like that before. Everybody was expected to rise early in the morning and work during the day for sustenance. Also, things were hand made like rawhide for snowshoes. I learned how to make them.

One of the teachings was not to be disrespectful especially toward the elders and to not talk back to anyone who offends you by saying bad words. I followed that teaching. I helped the elders by bringing in fire wood and getting water.

People were not sick much because they moved around physically and got their exercise with daily work. I don't really know how they lived in the past in order to survive. It wasn't until I got older that I understood by doing those things myself. When I married, they told me how to take care of my family in the traditional way.

I remember we used to move around a lot and people always came together to help each other by sharing their food. I remember when grandpa killed geese. He was able to feed a big family. That's what I saw him doing especially when he killed moose, it was shared with all the family and others, too.

## Priscilla Kakekashpan

I am trying to tell as much as I can so people will know about raising children. I want to share with you about a time long ago when we had one fish net that was handmade. I watched how they did it and I helped to finish the net. Another kind of net was made to use in the river. My grandma, her daughter, and I would do that kind of fishing. We just pulled the net to shore and it had all kinds of fish in it. Sometimes there were five of us pulling all together. We would fish that way often.

Other things I would like to mention are medicines that were used but I didn't do any gathering. Acorns and berries were used for any kind of wound from a cut by an axe or other cuts. For bleeding, they used bannock by applying it with a cloth on an open cut to stop it bleeding. There were no medical supplies at all then.

On our trips, we went down rapids. I never tried that, only experienced boaters did it. My grandfather was good at shooting rapids and we always travelled by canoe.

A *tikinagan* was used to keep a baby safe. Moss was used for diapering. In fall, people went to a swamp on a nice day and hung clumps of moss on tree branches to dry. A wigwam was made and dried moss was packed in it to keep right there in the bush. Wigwams were made one or two at a time and we made sure no snow could get in. My husband and I went together to make one for our baby. When I needed moss I went to get some and warmed it up, then broke up moss and took out any twigs or bugs. I made it very soft for a baby. A cloth was used on a *tikinagan* to keep it together as you tied up a baby. You seldom see a *tikinagan* anymore or hear about moss being used as diapers. Nowadays, mothers use Pampers for their babies. Today, young people have no parenting skills to look after their babies.

## Priscilla Kakekashpan

The way people lived their lives was to love [those] in their family and love others, too. A wigwam was built big enough for five or more people and it was very warm inside. I lived in those wigwams as a child. It was at Christmas time that many people came back to the community by dog team as well as by toboggan. I walked along pulling one, too. Today, we don't see that happening and people are not using dog teams anymore. All summer long people would be camping somewhere doing the things they always did.

Whenever someone had an accident, sprained an ankle, or broke an arm, grandfather was able to make a splint from a stick and wrap it with a cloth. I always saw him helping someone in need when they hurt themselves. Other people did the same thing, too. All the people would try to help if someone became sick or had an accident that needed medical attention. Grandfather was sure to be there to help.

There was help for people who needed counselling when they weren't able to take care of themselves. During that time, my grandfather was chief. He would bring them into a council house and talk to them individually about their daily problems and pray with them. Then that person would be fine.

When I was young, my sister and I went to get wood and some other young males came along to help us. We came back and were taken into a council house. We were told not to be with boys at all. We tried to tell them these boys were only helping us with wood but they would not believe us. Instead, we were told never to do that again. I remember so well being told that what we did was a very bad thing. I wish this were still enforced for young [people]. The way

## Priscilla Kakekashpan

they did their counselling was very good. Our elders' way of discipline was fine and leaders were paid money for their services because it was a very important job.

An Indian agent would visit our community for treaty day every summer and pay people \$4.00 each. Everybody went to get his or her money. A dentist and a mounted police officer also came our community. Treaty day was an important event and immunization was done for children and people. Everybody respected the Indian Agent when he came. People would be cleaning their dwellings and spruce themselves up to look their best for the Indian agent's visit. I remember that when I was young.

I went to a gathering of people and they would visit with each other. Everyone kept in touch with each other, too. My grandfather would tell legends and I loved that. So, I would ask grandfather to tell us a legend and he would say, "Later, there's work to be done first." We would all sit down to listen when grandfather began telling a legend. I loved listening to him as he told about animals and Wisakejack. I can't tell a legend at all. This is all I have to talk about the traditional ways.















## Ina Mamakwa



### Biographical Information

Date of Birth: January 1, 1917

Place of Birth: Weagamow Lake  
Ontario

Present Address: Kingfisher Lake,  
Ontario

Name of Spouse: Albert Mamakwa

Number of Children: 10

Grandchildren: 0

Great-grandchildren: 0

Number of Years Married: 53

Date of Interview: April 25, 2003

## Ina Mamakwa (Kamenawatum)

Life was difficult when I was thirteen years old. I was already able to help and get what I needed for myself. Difficulties were hardest in winter. All we had to eat was fish. The only thing from the store was tea but I didn't drink it. Tea was a popular beverage among older people. Today everything is readily available and easy to get but in the wilderness, we were very poor. We had to go out and get food for the day if we wanted to eat. Early morning we would grab a drink then go check a fish net and rabbit snares, too. By the time we were done, it would be noon and we had our lunch. Then we would have rabbit for supper. Our wigwam was cozy and that was our home. We didn't mind it at all. Our clothes were not much but we had what God provided for us from the land.

As winter approached, food was hard to find. When a moose was killed, people made pemmican and then stored it indefinitely for later. There was only one fish net and not everyone could use it. So, a fish trap was made in a river where lots of suckers got caught and we had food to eat. We didn't mind having fish and they were plentiful. We made dried fish to keep. When we had no more food left, times became hard and difficult.

## Ina Mamakwa

Rabbits and grouse were abundant. We used spring type snares and checked them by pulling a toboggan. As for wood, we only had an axe to cut with. No one had a saw and we had very little food our home. I can't imagine how today's generation would feel if they had lived like we did. I'm sure they would find it strange.

The store was far away from where we lived but today you can just run to the store. Also, we didn't stay in one place, we moved to where there were a lot of rabbits. We hardly had anything to eat during our travels. It was our way of life when I was a child, and we got used to it, that's why we didn't mind it. There is so much to tell of the hardships our people went through: children, mothers, fathers, and grandparents. I helped my parents by snaring rabbits and fishing. In spring, we would spend a night by a river and make a fire to eat some of our catch because we would get so hungry before heading back.

When I married and had children, I didn't experience much difficulty. My husband and I knew how to work for our survival even before we had any children. We did trapping, hunting, and fishing. So, when we started our family, I still went out hunting, and as the children got older, they would help by staying home with the young ones. We had no trouble with our children. They did a good job of looking after themselves when we lived in the wilderness. Food from the store was already available and we bought sugar, tea, and other foods, too.

We had ten children all together. Three are gone, but seven of our children survived. My husband and I worked very hard to keep them alive and well. There were a couple of elders we lived with and they looked after our children, too. We had no hard times. We made sure we had lots of food.

There was a community church that all people attended every Sunday. People lived quietly and there was nothing to disturb the stability of the community. Church services were good and nothing was around to prevent us from going to church. We had a store to get groceries and it helped us provide for our needs whenever necessary.

## Ina Mamakwa

Today, children and youth appear to have many disturbing problems. We didn't see that in our young people before. They were quiet and I knew this because there was not much to distract them and we had only one church.

I often think back to the way it was a long time ago. How peaceful it was. People in the community were very physically and spiritually strong. They used the resources that God had put there for our use. I think about how they cared and loved each other. When someone was in distress, they would go and help that family with whatever they were able to give. They always took time to visit each other.

They were always happy to attend church. All the people in our community, children, too, were glad to go to church. No one missed a service at all.

Medicines that were handed down from our ancestors were gathered from the bush. People couldn't name all of them because there were too many. We used roots of trees and other means for treatment. Like, for instance, if you had a bad cough, acorns from a certain tree were boiled in water and then cooled to drink. Also, bark was scraped off a Pin cherry tree and boiled to soothe a sore chest and [prevent] coughing. A person would not know what kind of medicine was used unless they went to see for themselves and knew what plant or vegetation to pick. Some plants along the shore were picked for medicine and boiled to drink for treatment. If that didn't help much, wild ginger roots were used. Ginger roots were regarded as a strong medicine and it helped with skin sores, too. We still use our medicines in the home and keep some of them for God had given them to our people. That is all I have for now.











## Fred Meekis



### Biographical Information

Date of Birth: August 5, 1940

Place of Birth: Sandy Lake, Ontario

Present Address: Sandy Lake,  
Ontario

Name of Spouse: Rhoda Fiddler  
(deceased)

Number of Children: 5

Grandchildren: 9

Great-grandchildren: 3

Number of Years Married: 37

Date of Interview: April 29, 2003

note: Fred Meekis passed away on  
November 13, 2003

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I am originally from Sandy Lake and I've never lived in an other community. My father did not raise me, but there was one elder that raised me, his name was Johnny Anishinabe, ever since I was just a small child he took care of me. When the children my age at that time were being sent out to go to boarding school, I asked him if I could have his permission to go out to school too. He said no. The following summer just before school started, I asked him again. Again, he said no, you are not going anywhere. I don't want you to leave your family. You have to realize that the Creator put you on this land to live. If He had wanted you to live in a different world meaning a white man's world, then he would have put you there to live. "You will do your work here," he said, "and I will take care of you and I will teach you how to live off the land." Because the Creator decided for you to live and work in this land, you will not be deprived. The Creator will also take care of you because this is where he wanted you to live. You won't find wealth while you are

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here, but you will never go hungry. So, that's when I gave up on the idea that I should go to school. This elder was a very gifted hunter and trapper, he travelled all over the land, and he lived off the land, living the traditional lifestyle. They were times when I was still a young boy that I used to get so tired of travelling and being away for so long, sometimes for as long as a month. He took me all over the place on his trap line. Sometimes I used to get very homesick and lost because of not seeing other people. All those times I was with him he also told me many things. But I am starting to forget many things that he told me, and I don't really think about the things we did in the past any more. My everyday problems also make me forget. I am thinking too much about myself nowadays.

So, going back to my story, the elder that brought me up taught me many things while we were travelling—the things that I need to be careful of. I was rather a very curious boy and I didn't really pay much attention to his warnings and teachings.

We would always leave for his trap line in the fall and stay there all winter trapping because this was his only way of survival. I don't ever recall running out of food while we were out there. He was a skilled hunter. He did everything in terms of survival skills and he still had strength to do these things. He told me everything while we went about doing our work like how to set traps. He showed me how to do them. His teachings were about survival on the land as well as other related things but I didn't always follow some of his teachings. Eventually as I got older, I would remember them. Even today, someone would come to ask me about certain things. I try to remember things that this elder taught me and they would come back to me.

I remember just about every night as we were all settled in our bed to sleep, that's when he would start talking to me. Many times I always ended up falling asleep on him and I won't hear him talking away as I'm drifting off to sleep. He always had many things to talk

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about especially the things he knew were important in life that I should keep in mind all the time.

I began to enjoy the teachings he showed me, especially about trapping. He taught me the importance of how sacred things are that were given to us from the land and that I should treat everything with respect. This is what he regarded very highly and I came to understand how important it is to do the same thing. He stressed how important it also is to respect the animals. When I began to understand, that's when I started looking forward to travelling with him so he can show me more about the ways of trapping and his passing his knowledge on to me. He showed me many things if I need something, where to get it, and how to use it.

I've never known to see him use the white man's medicine or even to take it with him when we set out to his trap line. Even back then, there was hardly any of that available. So, he took whatever he needed from the land for medicine. He knew what kind of plant to use to treat his ailment or if I wasn't feeling well, he would go out to find a certain plant to cure me.

He told me that the Creator put everything on this land for us to use. He put us here as First Nation peoples for a purpose and he gave us things to use to survive and live. I remember one time I accidentally cut myself on my arm with a hatchet but it wasn't a major cut. So, what he did right away is he went and broke off a branch from a willow and he scraped off the bark, put it in his mouth, chewed it up, and then applied it to the cut. It stopped bleeding almost right away. I began to understand and appreciate more of his teachings by showing me the things as we went along with our lives. I also began to understand when he said everything you see all around is there for you to take. These are gifts from the Creator. I also started to think about how important it is to have knowledge and understanding of these gifts that were given to us to use. I was very fortunate to have a teacher that shared his

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knowledge no matter how small it seemed, like for example, he chewed up the bark as well as using his spit to use for medicine. Today we think of spit as a very dirty thing. But long time ago, this is what the people used to heal themselves.

The other important factor ... was all the things that I learned from him while we were out there came from hands-on teaching about survival skills. As I gradually picked up the skills by doing them, this is where I got my strength from. I also learned if I did the things he did then I would have the same capability just like him.

When I first started travelling with him, he never allowed me to wander away by myself. I always had to accompany him. I was about seven or eight years old when he started taking me out to his trap line. I was with him the whole time until I was 12 to 14. So, he always kept an eye on me not to sneak away on him especially during early summer or even when he was just resting from our travelling. I had to be around him and he would tell me that this is one of his ways of taking care of me. Sometimes I used to get him upset. One time during spring, he told me I could carry the canoe for him on one of our travels. So I started walking carrying the canoe on my shoulders. He was ahead of me. We had to cross the creek. He goes jumping across the creek and he has our stuff on his back. I watch him jump across and I do the same thing he did, but the canoe got caught in one of the branches. I lost my balance and fell right into the water and ended up floating away out to the river. I wasn't really paying attention to what I was supposed to do. After that incident we headed out again. He was walking ahead of me chopping off branches that were on the trail. I was carrying the canoe at that time and once again the canoe got caught in the branches. I am tugging away at it trying to pull it away, but I didn't realize that I was also pushing him along from the front of the canoe. I looked up just as he went tumbling down to the ground. That's how much I didn't know about these things when he first started teaching me.

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This is how the young children are, they don't pay attention to the teachings from their elders, but it comes back to them when they find themselves in some sort of predicament. They eventually realize the purpose of the teachings. That's why it is so important to keep talking to them even when we think that they are not listening, as long as they understand what you are telling them, they won't forget. We tend to think as adults, kids are too busy being mischievous to listen.

I was this way too when I was growing up. I can only say from my own upbringing that this elder was always talking to me about everything and these things were very useful as I got older. That's the way it was with me, I did not always understand what I was being taught but I know today it was a very important part of growing up, to have adults guide you through your childhood, and to prepare you for the future. I never questioned his teachings, because I learned at an early age that I have to listen to them. It is true every child does not have any understanding at all, unless if he or she is being taught to become strong and have the skills as they get older. The child also knows to sit still while an adult talks to him. Today, we don't do that anymore, we are too busy sitting around watching TV. And what the children believe is what they see on TV. Even though we know that we really should be paying more attention to our small children, but we don't make an effort, we would rather watch TV. We don't even talk to them anymore, yet it is most important as adults that we do this. Talking to children is very useful; I know this because this is the way I was brought up. This was their method of teaching. Even my wife had the same kind of teaching. There was nothing, no outside influences at that time to distract us away from the teachings we learned every day. We did not have a radio either, so it was just my elder who did all the talking. Even my wife had these same teachings as she was growing up.

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I am just touching on a bit about the way it was when I grew up plus a little bit about my goof ups because I didn't know any better yet!

He used to have a canoe, the one that is pointy on each end. It was a very small canoe, He used to always tell me to sit very still when we were paddling on the lake because that canoe was very tippy and very narrow. Many times, we couldn't travel when it was windy. He always had to wait until it was safe enough to cross the lake. One time we were across this big lake. We were waiting for the wind to die down because it was just too windy to paddle across. There were white caps on the waves. We ended up sitting around all day and towards the evening he took out his tobacco and pipe to smoke. He used to enjoy smoking his pipe in the evenings. He found out that he was out of tobacco, so the only way was to go back to the community to get more tobacco. He then said we have to go through the bush so we can cross the lake from the other side, but that lake was just as big as the one where we were waiting. It looked very dangerous to go on the lake as it was so windy and besides his little canoe looked too flimsy to take us across. He was getting desperate for a smoke so he started putting our gear on the canoe. Nothing was going to stop him from getting tobacco. He said I rarely make an attempt to cross the lake when the weather is like this, but we will go ahead and try it out. And I never want you to do what I'm about to do, he says. So we headed out and stayed close to the shoreline. The wind was kind of sideways towards our destination, so we kept on going along the shoreline where it's not too windy. As we were crossing the big lake, the waves were so high, and we were just bobbing around in our little canoe, I became so afraid we were going to tip over and drown. He knew which direction to go and how to manoeuvre his little canoe so the water wouldn't splash too much inside. He also kept a dipper to bail out the water. I've never been so afraid for my life as we were being tossed around on the lake that night. He said I'm not trying to put your life at risk. I'm just trying to show you if you ever get caught in the weather like this, how you can avoid the dangers of the weather

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and what you need to do if you are in a situation when it is windy. But I knew the only reason why he was so determined to cross the big lake on a windy night was because he was getting a nicotine fit! But he was still trying to explain as to why he did that!

The other thing back in those days was when we were travelling around he never had a tent. All he had was a rabbit fur blanket and one store bought wool blanket that we called a poor man's blanket. This is all we had to keep warm at night and we used to sleep together. All he had was some kind of canvas that he used to hang over where we made a bed for a shelter. When we travelled during the cold months like in fall or spring and when we made camp somewhere, he used lots of boughs for a bed so we won't get cold while we are sleeping. Then he would put that poor man's blanket on top of the boughs. We would also keep each other warm sleeping together. This is the other thing that he told me to do to keep warm at night.

The other thing that he always did was he only kill animals that he needed. He only took the animals that he could sell. And he took only what he could eat. He always made sure he had enough to last a few days so the meat wouldn't spoil. Then he would go out again to look for an animal to eat as soon as he ran out of what he had previously killed. I never saw him put away [food] for later. He was always careful not to take too much, but just enough to get him through for a few days at a time. There were days when we used to run out of food due to bad weather, but this was a part of life and we expected that. He never treated animals out of disrespect. He always said all living things are sacred and that animals should be treated with great respect. He really liked trapping otter and he enjoyed eating it. If he didn't see it for a while he would go out and hunt for it. He was always so happy when he caught it and as soon as he brings it home, right away he would skin it, clean it, and cook it so he can enjoy his meal! He also expected me to eat whatever he had for a meal. He was always eating an otter. I was never too fond of

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eating it, but if he offered me some, I would eat it anyway. That was the favourite food of the elder Johnny Anishinabe who took care of me when I was small.

He did the same thing with fowl. He didn't shoot them just for the sake of shooting them. He only shot what we needed to eat that day during our trip. So, he used to tell me to do the same thing. The only times that he shot lots of fowl was when we headed back to our village, to take home some for the family. During the time we were out there trapping, we took just what we needed that day. He used to say why try to keep for later when it's going to spoil anyway. But if he had extra he would bury it so it won't spoil right away. He always found a way to preserve the food to last a few days.

During spring when the weather starts to get warm or even in the fall, it didn't take long for food to spoil. When it starts to get cold this was the ideal season to trap the animals. He still took only what he needed. He would say if I killed something I have to use it or use it for food, not to just throw it away be it an animal or bird.

Today, we don't even feed the children the things that we survived on long time ago. They don't want to eat anything—even ducks. The only things they like to eat are non-native foods. I don't think they even try to get used to eating wild food, I'm saying this because I see my grandchildren turn up their nose at it. All they eat is junk food. A long time ago, the food that we used kept us strong. Today, the kind of food we use is slowly destroying us. Our health is so fragile that we get sick so easily. The children are so fragile too. Their bones are getting brittle and break easily, but if we were to feed them the food that made us strong, our young ones would be strong too. Just like before we never had anybody break their bones. Nowadays if someone trips over something and falls down they break something in their body. We are weak all over and our bodies are very fragile. So as I said before, the food we ate made our bodies very strong because everything was natural.

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People are saying we are no longer interested in using our means of livelihood. We are being influenced by non-native ways and we are trying to live that way too. We Native people were given the things to use from the land and non-natives were given different ways to live. All the different nations were each given a different way in terms of cultural and traditional ways. But we see the white man trying to get everybody to believe that his way is better.

We see what they are doing to our way of life as if they are trying to tell us how to run our lives. They even tell us how to use our skills to survive. We can no longer trap animals like we used to, and we are slowly being cut off from using the things we used in the past.

From the elder's teaching, he always said when you look around for something on the land you will find it. The Creator put these gifts there for us. When you get hungry, you will find something to take care of your hunger, anything that grows like the plants. [We] peeled bark off a birch and inside there was a sweet tasting fibre. That's what we ate. We found just about anything that is edible. The other things that we used to eat are reeds that are in the water. At the end of the root is a white tender fibre that has a texture like a banana. We used to love eating those. Children today wouldn't even know about these things that can be eaten if they get hungry while they are out in the bush. They also give you nourishment.

I regret to say that all of the things that we used in the past I don't remember what half of the plants are used for or what they are called.

I didn't prepare myself ahead of time when I was asked for an interview so I'm kind of at a loss for things to talk about. But I do remember some of the things when I was asked some questions about life in the past, and I'm glad that I didn't forget them for good.

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There are also plants that are not edible and ones that can make sick and as well as ones that will nourish you. Even animals can get sick from eating the things from plants. If we eat that animal it will make us sick, so we always made sure the animal is healthy enough for consumption. This is what he taught me. This elder that had a little canoe, he used that canoe for a long time, I began to get quite good at using that canoe. At first, I didn't bother with it because it always wanted to tip over, but eventually I overcame my fear, so from there I got used to travelling with it. What this elder did was he would repeatedly remind me of the teachings that he already told me before. I think the purpose of that was so I would remember them and carry them almost like he was giving me tools to use in order to survive. It sure did get lonely at times as it was just the two of us most of the time. We wouldn't see another person for a long time.

When I became a young man I still travelled with him and he kept on taking care of me. By the time I was about 20 or 21, he still treated me like a child, always taking care of me, even though I was already a man!

Then one day he told me I should have a wife and of course, he didn't allow me to decide who I should marry. He took it upon himself to do that for me, to find a wife for me! So, I went along with his idea and I didn't want to refuse him probably because he has done so much for me since I was just a small boy. So, he did find a wife for me and I got married shortly after that.

After I got married he came to talk to me and he said, you're on your own now. I will no longer take care of you and I won't be around you to tell you what you should do. I'm done teaching you all I know. So, it was up to me now to fend for myself and my new wife. I had to find my own things to use. He never offered me his canoe! I had to find a way get my own canoe! He was very skilled at making snowshoes, but this was the one thing he never taught me.

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He made everything that he needed to use. And he always made things for me, so I never had to worry about making it myself. I think this is one thing he forgot to teach me before he told me I was on my own now! So, I never learned how to make snowshoes at all, but other than that he taught me every other important thing about survival skills. It really helped me once I became on my own. When we started having children I was able to take good care of them and they never got hungry. I began to teach them the way the elder taught me.

He was still there guiding me about how to care for my children. He used to say remember the things I showed you when you were small. This is what you need to do with your little ones so they can learn, too. You have that responsibility to teach them and care for their needs. But I didn't follow all of his teachings when it came to my children. I couldn't do all that I was taught to try and pass them on to my children mainly because outside influences were already making their way to our community.

Today, it is totally different from what it was when I was young. All the traditional teachings are practically nonexistent today, so young people have no clue at all about any of this. I did my best. I knew how to care for my children and to make sure that they had enough to eat. That's when things started changing at that time. I also had more responsibilities when my father could no longer do things I started taking care of him. This was one of the teachings I was taught as well. When the time comes and any of one of my elders becomes too old to look after themselves, then it is my turn to care for them. So that's what I did.

Children were required to attend school in the community, so we couldn't just up and leave for our trap line anytime we wanted like we did when I was young. This is where we began to abandon our way of life. We slowly stopped teaching our children about traditional ways.

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Today we don't teach our children anymore because of too many distractions that come from non-native ways. If we had kept on following our own lifestyle, then children would still be a part of it too. I know it is easy to teach a child while they are small even if they are playful. If we keep talking to them, then they will understand the things that you explain to them. But we don't do this because we are too busy with our own distractions. We no longer spend quality time with them. I believe the most important thing we can do for little ones is to talk to them all the time and to explain things to them. Sometimes a young person comes to me to ask me about certain things that he doesn't understand, so I try to spend that time with a young person who wants to talk. A lot of them don't understand me when I try to talk to them. They don't have any idea what it was like back then. But some of them are very curious about it so they come and ask me. Sometimes they can't even comprehend when I explain about life in the past. The other problem I see is that the language is not the same anymore. We seem to always talk in a negative way. But it was not like that when people talked to you. They were always right to the point and you knew what they were saying. We don't use terms that were used while we were out on the land. Now [the language] doesn't make sense to this younger generation that we use when we try to talk to them. Besides, they would rather use English language. I also learned while I was with the elder what things are called that are on the land — everything from plants, animals, lakes, and rivers. Now it is foreign to them, even when we tell them where we are going they just get confused. We had a name for everything and a way that things were described. This is because we don't explain these things to them and they are not interested either even our language. They don't want to learn it. And the way things were described, sometimes only one word was used and we knew what that meant. So, if I tell my wife where I went she understands where the place is.

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I think we should make an effort to teach the young people these things so they can understand their identity as Native people. There are many things that we could teach them. We would like to take them out on a trip. This would be a good place to show them things that are around and what kind of plants are used for medicine. I think it is still very important for them to learn what we already know. I feel confident that they will want to learn more if we take time to be with them. They could even start having cultural teachings at the school.

People in the past were very intelligent about their way of life just as non-natives were intelligent about their way of life. You knew how to talk to other people. The understanding was there and learning came naturally. They didn't use books to teach their children, so they were expected to remember everything. If Native people were to put their stories on paper, there would be so much to write about and many things to teach them just like what they do in school. Many things are taught for children to learn.

But this is what Native people did in the past. [They] used oral teachings to their children. They had to memorize everything in their heads. They didn't have tools like pencils, so this is what they had to do, to communicate.

I think that is why it was so easy to forget our methods because you don't actually see them. But this was not their way, as they didn't have tools.

It was decided that our community would become a reserve. The only time we used to go back was during summer months. We would leave for our camp in fall with our family members. We always had food while we were out there, and there was no welfare yet. So, we travelled to a place where we knew animals were. We moved from one camp to another and sometimes we went back to the community during winter. We did this for many years. Some

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families started staying in the community so their children could go to school. A lot of them were sent out to residential schools.

A school was eventually built in the community. This is where our children were slowly taken away from us and our way of life started disappearing.

It became impossible to keep it as non-native ways became more dominant in our lives. It is our children who are suffering from this loss of their heritage.

I've had lots of young people come to me with so many questions: What can be done to recover some of our losses? and How do we get it back?

When it came time for us to live in the community permanently, we settled in one area where our immediate family could be close to us, so that way we can still help each other out. We kept on doing what we used to do while we were out on our trap line, looking after each other and doing things together. We kept our connection to each other that way.

Today it is not like that anymore.

There was no electricity even when the school was first built in the community. The only thing that we had was an outboard motor and they were so loud.

And the other thing that is different today is that people don't look out for each other anymore, probably because everything is so convenient, so they don't bother with doing things anymore. Kids are not taught about things either. When we were young, if we needed anything we had to go look for it and it required walking and doing it by hand. When we went to get wood, we used an axe and

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bucksaw to cut wood. We always fetched wood for our extended family and provided food for those that can't do it for themselves.

We always made sure that they were all right. We used to visit each other every day but today it is not like that. Today, we use a phone to visit each other and I don't think this is good because you don't get to see whom you are talking to. But when we visited each other, you see a person, how they are, if they are sick, and that was one way of looking out for each other. We rely on a phone but even though it is very convenient, we don't always know when someone gets sick at his or her home. It is easy to say that you are fine over the phone, but most times things can happen in a short time. It also makes us isolated.

We depended on plants for medicine back then, and they helped us get better. We don't use them today. Instead we use the white man's medicine. I don't like taking their medicine but I use it anyway. When we used plants for medicine, it did not give you any side effects. Medication that we are given today, just numbs your pain and just burns away at your body if we use them too often. This is how their medicine works. Sometimes they don't even tell us what it will do to us while we are taking it. Or even if a person has a skin rash or sores or any other type of ailments, a doctor uses a scalpel to cut away where it is infected. Or if a person has another kind of infection, they just keep cutting away them until there's hardly a person left. ... Our traditional medicine does not work right away, but it gradually does help if you keep using it, and it won't damage our system. This is how our medicine works because it comes from a natural healing plant. We don't want to use our traditional medicines anymore because it doesn't give us instant results. I'm saying this because I see what it does to people. Long time ago we didn't have any doctors perform surgeries on us. Our medicine helped us heal, now we don't even want to use them and we don't realize that medicine we use today is doing more damage than good. It would benefit us if we were to start using what we used in the past

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so that our people don't forget, and reintroduce them to young people. [These are] things that our ancestors used and depended on.

The other teaching that was passed on to us was to treat animals we killed with respect. People used to say that whatever we killed they are not dead, they are very sacred. If we killed an otter or a mink, we were told to always remember to cut off skin around its eyes and hang it on a tree. This is our way of showing our respect to an animal that you had killed. And when we killed a beaver we were told to cut skin off its mouth. We did the same thing — hanging it up on a tree. A beaver was considered a very important animal. It is more important than us human beings, because a beaver is capable of doing more work than a person can. That's why they thought of a beaver in this way. It can do more than us. It has the ability to use its strength to do its work, yet it has such small hands. It can cut a huge tree down and it can make a dam on a river. But us humans, we weren't given that ability like a beaver. When I killed my first beaver, I was told to ... show my respect for this animal. We did the same with moose. If we killed it, we saved leg bones and moose hairs. We tied them into a bundle and hung them on a tree. We were taught at an early age to follow this and it became a part of us as Anishinabe. We were told that when we do this we show our respect and gratitude for animals who are providing us for food and other things. We are also saying that we are just leaving it there for now and that we will be back to collect them. That was the purpose of that. We never ran out of things that we needed. Even if we killed all the beavers in one lodge, other ones would come along to take their place. We always made sure we didn't kill all the moose so we never had to go without them because we followed the teachings and showed our respect to animals. Non-natives might say that animals are slowly disappearing because of over kill, but that was not our way. We believed that if we continue to follow the teachings we would never run out of things.

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The other thing that we enjoyed eating was rabbit. Sometimes we would get tired of eating the same thing like moose, but we never got that way with rabbit. It was the same with fish. We were always setting snares for rabbits. Other animals like beavers or ducks, we could only eat it for a short time, and then we would get tired of them. But rabbits and fish were our favourite choice of food. We also tried to get as many rabbits and fish and store them for later, but we always made sure we ate everything that we had. We used to look forward to eating food that we only get during the seasons. We used to wait for the groundhog to come out of its hole. That used to be a rare treat in early spring. When the waterfowl arrived, that was another thing we would look forward to, and when they migrated back south. We would try to get as much [as we could] so we can store them for later. Of course, we never had a fridge to put away our food. So, what they did was smoke meat, fish and ducks, in that way they lasted longer. Fish was smoked and made into pemmican. This was also the kind of food we enjoyed back then. Everybody was very strong and healthy because of the natural foods that we ate.





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 bPP<sub>σ</sub>◁L·ΔJ<sup>-</sup> ◁σ<sup>3</sup> Δ·▽σ ·◁σΔ<sup>9</sup>·Δσ, 9dσ Δ·▽σ  
 bΔJ<sup>3</sup> bαUC<sup>-</sup>, P<sub>L</sub>αP<sub>C</sub>·◁<sup>-</sup> b<sub>4</sub> ◁σ<sup>3</sup> 9ΔJ<sup>3</sup> ▷J<sub>C</sub>·◁<sup>-</sup> ◁Γ  
 ▷·▽σ L·◁<sup>-</sup> bPPσ<sup>3</sup>◁C·◁<sup>-</sup> bP ΛJ<sup>3</sup>◁C·◁<sup>-</sup> ◁σ<sup>3</sup> 9J<sub>C</sub>J·◁<sup>-</sup><sub>x</sub>  
 ◁Πb Δ·▽ L·◁<sup>-</sup> P<sub>L</sub>αP<sup>3</sup>ΔL<sup>-</sup> ◁·ΔJ<sup>3</sup>σ<sup>3</sup>, ·b<sup>-</sup> P<sub>J</sub>C·ΔL<sup>-</sup>  
 ◁Γ Δ·▽ bPΔJσ<sup>9-</sup><sub>x</sub> L·◁<sup>-</sup> σPΓ·σL ▽·◁·ΔJ<sup>3</sup>·◁<sup>-</sup>, b<sub>4</sub>  
 ▽·◁·Δ<sup>3</sup>CL·ΔJ<sup>-</sup> 9da<sup>3</sup> Δσ·▽σ·◁<sup>3</sup> b<sub>4</sub> ◁σ<sup>3</sup> 9ΔJ<sup>3</sup>  
 ◁◁P<sub>C</sub>·◁<sup>-</sup> ◁Γ Δ·▽ bPΔJ<sup>3</sup> ·◁·Δ<sup>3</sup>CL·ΔJ<sup>-</sup><sub>x</sub> ◁Πb b<sub>4</sub>  
 b·Δ<sup>3</sup> σP▷P P<sub>9</sub>σL<sup>3</sup> ·Δb P<sub>L</sub>P·ΔJ<sup>-</sup> L<sup>3</sup>PPσ, ·▽ΓΠdJ<sup>3</sup>·Δ  
 L<sup>3</sup>PPσ<sub>x</sub> b·Δ<sup>3</sup> αΛ<sup>-</sup> P▷P ◁L<sup>3</sup>σ<sup>3</sup> J<sup>3</sup>·b<sup>-</sup> Δ·▽<sub>x</sub> b·Δ<sup>3</sup> ·Δb  
 P▷P<sub>L</sub>P·ΔJ<sup>-</sup> L<sup>3</sup>PPσ P<sup>3</sup>◁<sup>3</sup>C·Δ<sup>3</sup>▷·◁<sup>9-</sup><sub>x</sub> ΓC<sup>3</sup> Δ·▽  
 bPΔJσ<sup>9-</sup> α<sup>3</sup>C ▽ΔαL<sup>3</sup>P<sup>3</sup>▷<sup>-</sup> ◁<sup>3</sup>Pb<sup>-</sup> 9dσ ▽P▷P  
 ▷CΛα<sup>-</sup><sub>x</sub> ▷PP<sub>9</sub>C<sup>3</sup> 9dσ<sup>3</sup> Δ·▽σ 9PΔJ<sup>3</sup>◁◁P<sub>J</sub><sup>-</sup>  
 P<sup>3</sup>◁<sup>3</sup>C·Δ<sup>3</sup>b<sup>-</sup> 9dσ<sub>x</sub> ▽·b Γα α<sup>3</sup>C ▽ΔJ<sup>3</sup>·◁<sup>-</sup>  
 ▽◁<sup>3</sup>C·Δ<sup>3</sup>ΔJ<sup>-</sup> ◁<sup>3</sup>Pb<sup>-</sup> bP▷P▷CΛα<sup>-</sup><sub>x</sub> ◁Γ b<sub>4</sub> bΔσJ<sup>-</sup>  
 bPα 9dσ L<sup>3</sup>J ▷P·b<sup>3</sup>◁J<sup>3</sup> CΛ<sup>3</sup>d<sup>-</sup> Pα·Δ<sup>3</sup> P◁◁P<sub>J</sub>·  
 ▷L bP◁PΠσd<sup>-</sup> ◁Γ bPΔP<sub>J</sub><sup>-</sup> bPα 9d<sup>3</sup> ▽·b<sup>3</sup>◁J<sup>3</sup>  
 P◁◁P<sub>J</sub>·<sup>-</sup> bPα 9d<sup>3</sup><sub>x</sub> ΓC<sup>3</sup> Δd U·V bJ<sub>C</sub><sup>-</sup> Δ·▽σ  
 bP◁J<sup>-</sup><sub>x</sub> ◁Πb VJ<sup>3</sup>·b ▽PΛPb<sup>3</sup>▷ΠJ<sup>3</sup>·<sup>-</sup> σσP<sup>-</sup> ΔL ◁<sup>3</sup>P<sub>x</sub>  
 b·Δσ<sup>3</sup> Δd ▷J<sup>3</sup> Γ<sup>3</sup>CΔ σP▷P ΛPb▷ΠJ<sup>3</sup>·<sup>-</sup> ·◁b·bJ<sup>3</sup>  
 ▽CdaL<sup>3</sup>, ◁Γ J<sup>3</sup>L<sup>-</sup> ΓΠdσ ▽>·bΠα<sup>-</sup> ·ΔJ<sup>3</sup>dΛL·bΠdσ  
 ▽b<sup>3</sup>·b<sup>3</sup>◁<sup>-</sup> ▽<sub>3</sub>bJ<sup>3</sup>◁σ▷<sup>-</sup> ▽J<sup>3</sup>·b<sup>3</sup>C<sup>-</sup> ▽·b ◁Λ<sup>3</sup> bPΔJ<sup>3</sup>◁J<sup>-</sup>  
 ΔL bPΔJ<sup>3</sup> ΛPb<sup>3</sup>▷ΠJ<sup>3</sup>·◁<sup>-</sup>, ΓC<sup>3</sup> Δd ◁Λ<sup>3</sup> b·Δ<sup>3</sup> ▷<sup>3</sup>P  
 Γ<sup>3</sup>P·◁J<sup>3</sup>σ<sup>3</sup><sub>x</sub> ΓC<sup>3</sup> ΔL bP▷P bP<sub>9</sub>CL<sup>3</sup> Δ·▽σ  
 b·◁·Δ<sup>3</sup>CL·ΔJ<sup>-</sup> U·V P<sub>P</sub>LΓJ<sup>3</sup>◁CL<sup><</sup> ▷·▽ bPΔJ<sup>3</sup>  
 P<sub>P</sub>◁L·ΔJ<sup>-</sup> bPα 9d<sup>3</sup> ·b<sup>3</sup>◁J<sup>3</sup>CU CΛ<sup>3</sup>d<sup>-</sup> ·◁·▽ L<sup>3</sup>J  
 bΔJ<sup>3</sup>Γσ<sup>-</sup> ▷L ◁<sup>3</sup>P<sup>-</sup> P◁◁J<sup>3</sup>·<sup>-</sup> bPΔP<sub>J</sub><sup>-</sup><sub>x</sub> ◁<sup>3</sup>P σP▷<sup>3</sup>P

'U' ΓP

LΓDTC' U·V PPDCL<' Δ·∇σ Δα9"Δ bΔJb'PCT  
 bPΔJ·Δ'CL·ΔJ' ∇DCT' D'P·Δ' ∇D<PCT' CL'Yd'  
 bJ·b'CT' Δ·∇σx Pα·Δ' ·Δ' d' ∇JσbCL' Δ·∇  
 P·Δ' L·D' ∇L'PσbCL'x ΓC' ·Δ' Δ·∇σ ·∇'b'  
 bPΛD<PCT·D' D'P·Δσ·D' ∇PPD'P' D'CT·Δ"D·D'x DΓ  
 Δ·∇σ bP<PCT', ∇·b C' Δ·∇ bPPD'P' L'Yb·ΔY'  
 bααC·∇P9Y' 9dα' bDCL' ∇P ·Δ'CL·ΔJ' Dσ'  
 Δ"Δ·∇ 9ΔJ'P9·D' <<Γ DΔY·D' DΓ ΔL bP DσP  
 L'Yb·ΔP'Y' CL'Yd' Δ·∇σ ∇P·ΔCL·ΔJ' Dσ' 9DCT·D'  
 Δσ·∇σ·D' Dσ' 9DCT·D' bPPCTP<' DΓ D·∇σ  
 CL'Yd' bPPCT·ΔJ'x σ'CT' bL'P·ΔP·D' b·Δ' bα9 ·Δb  
 σPPD'P' <PΠσdP' ·D'Y α·D' PΔY·D' DΓ Λd JY'  
 P·ΔP·D' DΓ Δ·∇ bPPCT·ΔJ'x αD' Δd σP<ΛσP'°  
 α'CT Λd 8 σCT'P·Δσ DΛ σ'CT' bL'P·ΔP·D' α'CT  
 7 Λσ' 12 Γα 14 bDσ CT'P·Δσ·D'x DΓ  
 bDCT·ΔJ' ∇b ·Δb JY' Δd P·ΔP·D' DΠb Δ·∇  
 bD'YΛ' bD·σJ' α'CT b4 7·b' bΓσbΓ' Δ·∇ α'CT  
 PDP' Lb·D' b·Δ' bα9 ·Δb σPPD'P'<PΠσdP', DΓ Λd  
 P'U<CL' σPPCT' ∇·D·Δ'CL·ΔJ' Dσ' Δ"Δ  
 bDPDCT·ΔJ' ·bY' ∇bα·∇σΓJ' ∇PPσ"DL·ΔJ' Dσ'  
 9DCT·D'x ∇'b' Y·Δσd σPbPJ'·D'D'x DΠb Δ·∇  
 VJ'·b bP·b' DΓ Δ·∇ σ'CT' ∇ΓσJ'<' PΛΓσ9·D',  
 ∇L'P·ΔP·D' ΛΓσ9' ΔPJ'x DΓ DΛ' ∇L'Pσ9·D' ·∇Π  
 JΛ' ∇Dσ DY·ΔΠ·9Y' Dσ Dσ·b'Ydσ ∇ΛΓ·Dσ' DΓ  
 Λd ·∇Π 9σ' σCTσDσ·b'Yd', DΓ DΛ' Δd ·∇Π  
 ∇αbYdY' σα° Δd DΛ' ∇J'<dΛY', DΓ Δ·∇  
 bPΔP'Y'x DΓY Δ·∇ bP<ΛP'P'<ΠP'Y' 9σ' Δ·∇ ∇b  
 bα9 ∇bα·D<CL' 9DCL', DΓ Δ·∇ bPΔJ' <dΛY'Y'  
 ∇L'P"DDdY'x ΓC' Γα·D' ∇Dσ <ΛJY'Y' ∇Dσ  
 CC·Δb"Δ9' C' Δ·∇ VP' <P ΓΠd' bDσ bP<·bJ·D'  
 DΓ Δ·∇ Γα ∇D'P' αbYdY' α·∇YdJ' ΓΠ' DΓ P'b



בא·ד<<CL', ב·ד' בא9 א2CJ·Δ' PDR <לר', ·Δσd  
 ·Δ"Δ·∇ ראוCdr', ·Δ"Δ·∇ P2Δσσ באΓ·Δר·Δ'P'x  
 9·Δ' ·Δ·∇ P5C DPLP'C' ·Δ·∇ באLCA  
 ∇P·Δ·Δ'CLd' 9·Δ' Δσ' Δ"Δ·∇ 9ΔJΛLR"Δ', Δσ'  
 Δ·∇σ 9P2CP<'x ΔΓ Δ·∇ Δר <Λσרס' ב4  
 בPΛ<Δר4' בD'P' ·Δ·Δ'CL' סבP<N·Δ' ב4 VPU  
 בD'P·Δ·ΔCL'x ΔNב Δ·∇σ ΔרL' ΔΓ Δ·∇ בP<ΔרJ',  
 L·Δ' Δd PΔbr'abσ ΔרL' ·Δ·∇ בP<<Γ ·Δ·Δר·Δ'x  
 ΓJσ Λd ∇'b' ר4בLCA' ΔΓ בPΔJ'σ' ΔרL', L·Δ'  
 ב4 ∇P C<r'abσ' ΔרL' Δ·∇σ בP<<Γ<ΔרJ'x ΓJσ  
 Λd J'ס' ∇ב א'C ר·Δ·Δב·Δ' ΔΓ Δ·∇ בPΔר4' רL'  
 Δ·∇ בP<ΔרJ'x L·Δ' Λd בΔב' Δ·∇ רL' בP  
 <ΔרJ'x ΔNב Δ·∇ ב·Δ' J'ס' PDR Δר4'P'  
 רΛL·בJ'∇' בLL'ב'ב' ΔN'x ב·Δ' J'ס' PDR Δר4'P'  
 רPΔJ'ΛL·בJ'∇'x בLL'ב'ב' ΔΓ Λd רCaΛ' P9 Δ·∇  
 PΔJ'א·בσ ΔרL'x VJ'·ב ·∇N רר4בΔב' ∇Δ'∇'  
 ∇CaΛ'x Δ∇N, ΓC' Δ·∇ <PC·∇·Δσ' ·∇N C'  
 Δσ9"Δ ∇·Δ·בבL' ·∇N רΔσ·בJ'∇' ∇LL'ב'ב'  
 ∇CC'Δ'x ΔΓ ΔΛ' בΔσNΛבσ' ∇P4ב·4'  
 ΔJ·<בσ<' Δס Δ·<בא' ∇Δ<ר"Δ' Δ·∇ בΔσNΛבσ'  
 ΔΛ' ∇P6P4' Δא4LL', רב·9P·∇' Δd ΔΓ Δ·∇σ  
 בΔר4σ'x ΔΓ ΔΛ' Δd ∇LCA'x ∇P6P·∇'x ΓC'  
 ΔL רר4בΔב' ∇Δ'∇' רΔσ·בJ'∇'x ב·Δ' אΛ'  
 PΔר4'P' רPΔσ·בJ'∇'x ΔΓ Λd UCd ∇·Δ4ב·4'  
 ΔJ·<בא'x ΔΓ Λd ΔΛ' ∇Δσ <>P'P9'  
 ∇·ΔL'P·בJ'∇'x ב·Δ' ·Δב אΛ' σJCR' Δ·∇ בJCL'  
 ΔPJ'x ΔΓ Λd ∇σ·∇' 9ΔJ LR'·בJ'∇' ΔPJ'x Δ·∇  
 ·Δ' ב·ΔL'P·בJ'∇' ∇ב ·Δ' P' Δ·∇ רJCL' CA'd'  
 Δ·∇ ב·Δ Δא·בJ'∇' ΔPJ'x Δ·∇ C' בΛLב7' 9ב'  
 Δd J'ס' אσ·∇' CA'd' Δd ∇ב רΔσ·בJ'∇' Δ·∇N  
 C' Δא9 Δ'P'σ·∇ ב·Δσ' Δd L'c' Δ·∇ Δא'ב'P'σ'x

י"ו רפ"

]ס' Δd אט"ו"Δ PΔσס ΔΓ Δσס bPΔר b"PΔ-  
 Lז' .∇N ∇JCA.∇' ∇.b C' אט"ו רΔσ Δא.בJ.∇ז'  
 ]ס' Δd ∇b רΔσ.בJ.∇ז' ∇b רא.Δא.ב'x ΔΓ 49'  
 ∇Δז.מC"דז' ∇"b' .∇N <PC.Δבσ' dP' Δט9  
 רΔΔא.בJ.∇ז'x ΓC' ∇P.Δ'CL.ΔJ' Δ.∇ ∇.ΔJC'  
 UΛא' ∇b רΔJ Δσ.בJ.∇' PCb' ∇b רΔJΔσ"b'x  
 אט"ו Δd ∇Δא.בJ.∇'x ∇"b' Δd ר44Pז' Δ.∇  
 Γσd' PLL'ב"ב ΔP9'C' C' b4 9Δא.ב'PΔ' Δσ'  
 9ΔJ.∇<"Δ' ΔCא' ∇אLCA' ∇b Δ4' Γ"CA σΛσ  
 רΔזσ' Δ.∇ b4 ΔJC' ∇PΔJ' ΔL 9.∇.∇<"Δב9'  
 Δ4' ΔσΓבבΓσ' σΛσ רΔר Δ"b"Δ>מ'x ΔΓ ΔL  
 σPΔP.C.Δ 44P' Δd bΔσ.בJ.∇ז'x ΓC' ∇PΔ' b.Δσ'  
 Δd Pב.9 σJ.ΔאP"ΔJ' Pב.9.Δ'CL.Δ' Δσ' Δ"Δ.∇  
 9d' Δσ' 9PΔJ ΛL"Δז<', ΔΓ bΔר JC.Δא'x Δ.∇  
 C' Δd bΔ'ר ΔJ'P9' ∇ΛP.Δ4ב.4' 4Λd'x ΔΓ C' ΔL  
 b4 ∇Δר בב.מσJ' Δ.∇σ bΔ'PJC'x ΔNב Δ.∇  
 b<<Γזז' b.Δσ' <.בטבΓdσ ΔP ΔPΔזז'x ΔNב C'  
 b4 Δ.∇ b<<Γז' א'C bσL.בσז' ∇.ΔC.בσL'  
 .Δ>.4זא' ∇L'P.Δא' ∇.b Γא VJ' PNL'P.Δ .Δ>ז'x  
 ΔΓ Δ.∇ Γσd' ∇L'P.ΔP9ז' Δ.∇ ΔC.Δσd bΔ.בσז'  
 ∇J'P'P'בJ'P9' C' ΔΓ Γσd' bΔdL'P.ΔP9'x ΓC' ∇JC'  
 Δ.∇σ בבVJז' Δ.∇ Δס ΔJ4 Δ.∇ bσ<σ.Δ'  
 bCPז' א'C bΔσC.בP' א'C b4 bΓ.מבΓ' bCPז'  
 CΛ'd' Jd' ΔΛ' Γ"C"Δ ∇PΔ<N' bΔΛJ'Jאσ.Δ'  
 ∇.b C' ΔL PNL'P.Δ .Δ>ז' ∇P ΔΛJ'Jאσ.Δ' Δ'P  
 P'דC'Nאσ.Δ' b4 bσ'J'אσ.Δ' bΔdאבσ.Δ' ΔΓ  
 Δ.∇ bPJC' L.Δ' Γ"C"Δ JdΛ' ∇PΔ4' bΔJ'ΛΓJσז'  
 ∇b 9Pא' רΔר CbN'.bΓז' ΔΓ Δ.∇σ L.Δ'  
 bP.Δ'CL.ΔJ' רJCL'x Δ.∇ .Δσd bPσ<ז' bPJC'x  
 ∇.b C' Δ.∇σ bPLאPΔ' 9dא' CΛ'd' bσ<J' 9dσ,  
 bΔ'C.∇'C' Δ4 Λd 9dσ ΔΓ Δ.∇σ ∇C bPσ<J',

'U' GP

bPaC·vσL<sup>-</sup> ∇C <C·<bα<sup>3</sup> ΓC<sup>υ</sup> Δ·∇σ 9ΓΓ<sup>-</sup> ∇C<sub>x</sub>  
 b·Δσ<sup>3</sup> ·b<sup>3</sup>C Γ·∇Λ<sup>α</sup> Γ<σ σΓ·<αCσ<sup>-</sup> ΔΓC<sup>3</sup> Γ<σ  
 <dΓΓ<sup>-</sup> Δ<sup>4</sup> Λd Δ·∇σ <Γ Δ·∇ bC<sup>3</sup> bP<σ σ<C<sup>-</sup>  
 ∇PPΓ<sup>3</sup>C<sup>-</sup> ∇b 9dσ ΓσΓ·<αΓ<sup>-</sup> Γ<σ <<ΓC<sup>-</sup> Δd  
 Δσ·∇σ·<<sup>3</sup> Π<sub>σ</sub>bα<sup>3</sup> bσ<C<sup>-</sup> 9dσ<sub>x</sub> bPΔΓσ<sup>-</sup>  
 ΓΔΓ<<ΓC<sup>-</sup> <Γ Δ·∇ bPΔΓΓ<sup>9</sup><sub>x</sub> ∇<sup>υ</sup>b<sup>c</sup> ·Δσd  
 σPα<sub>σ</sub>U<sup>4</sup>Γ<sup>3</sup> ∇b ΔC<sup>d</sup> ∇ΔΓ ασ<C<sup>3</sup> bLΓΔΓ·∇<<sup>-</sup>  
 <Γ ·Δσd bPΔ<sup>3</sup>γ<sup>-</sup> b·Δσ<sup>3</sup> Δd 9dσ ΔPΔ<sup>3</sup>ΓL<sup>3</sup>C<sup>3</sup>  
 ΔP bαU<sup>3</sup>Cα<sup>3</sup> ΔPbαUσL<sup>3</sup> <·Δ<sup>3</sup>Γ<sup>3</sup> Δ·∇σ  
 Γ<<Γ<sup>3</sup>Δ<sup>-</sup> γ<sup>3</sup>Δ<sup>3</sup> C<sup>υ</sup> L·<<sup>-</sup> ΔPPΓ<sup>3</sup>σL<sup>3</sup> σ<sup>3</sup>P·b<sup>3</sup>, L·<<sup>-</sup>  
 ∇PPΓ<sup>3</sup>σL<sup>-</sup> ∇<·L<sup>-</sup> P<sup>υ</sup>Λ<sup>3</sup> ∇b b·<<L<sup>-</sup> <Γ γΛd  
 ∇b·9σ<sup>4</sup>, ΓC<sup>υ</sup> Δd ∇<dα<sup>-</sup> ∇<·L<sup>-</sup> ΓC<sup>υ</sup> bPΔσΓ<sup>-</sup>  
 bΔα<sup>3</sup>Γ<sup>9</sup> Δd 9σ<sup>3</sup> Δd ΓΔα<sup>3</sup>Γ<sup>9</sup>·<<sup>-</sup> <Γ Δ·∇ Γ<sup>3</sup>  
 bPΔσΓ<sup>-</sup> σ<sup>3</sup>P·b<sup>3</sup> <d ∇<·L<sup>-</sup>, b·Δ<sup>3</sup> αΛ<sup>-</sup>  
 σPΔΓ<sup>4</sup>VσL<sup>3</sup> Γ<·L<sup>-</sup> σ<sup>3</sup>P<sup>3</sup> ∇<γΓd<sup>3</sup> C<sup>υ</sup> ·Δσd  
 Γb·9C<sup>3</sup>L<sup>3</sup> C<sup>υ</sup> Δd ∇ΛΓ PP<sup>3</sup>ΔL·ΔΓ<sup>-</sup> ΔC ·Δσd Γ·b<sup>-</sup>  
 <·∇ bPP<sup>3</sup>ΔL·ΔΓ<sup>-</sup> L·<<sup>-</sup> ΔP·ΔP·<<sup>3</sup> σ<sup>3</sup>P·b<sup>3</sup> ∇<·L<sup>-</sup>,  
 <Γ Δσ·∇σ·<<sup>3</sup> L·<<sup>-</sup> bP<sup>4</sup>Γ<sup>3</sup>Δ<sup>-</sup> σ<sup>3</sup>P·b<sup>3</sup> <·∇ σΓ<sup>3</sup>Γ<sup>υ</sup>  
 ·bσ \*ΔσΓαV bPΔΓσbΓ<sup>-</sup> <Πb b<sup>4</sup> ΓΓ<<sup>3</sup> b·Δσ<sup>3</sup>  
 ·b<sup>3</sup>C ΔP ΔΓ <<sup>3</sup>P·γ<sup>3</sup> <Γ Λd bC<sup>3</sup> bP<<Γ<sup>3</sup>Γ<sup>3</sup> Γ·b<sup>-</sup>  
 <Γ Δ·∇σ bPσ<C<sup>-</sup>, ΓC<sup>υ</sup> 9σ<sup>3</sup> bC<sup>3</sup>·ΔΓ<sup>-</sup> ∇b ·b<sup>3</sup>C  
 9dσ Γ<<sup>3</sup>P<sup>4</sup>Γ·<<sup>-</sup> <Γ bPΔΓΓ<sup>9</sup><sub>x</sub> ∇·b <Λ b<σP·∇<sup>3</sup>  
 <Γ ΔL bPΔΓ b·9σ<C<sup>-</sup> ∇·ΔP·∇·ΔC<sup>-</sup> 9dσ<sub>x</sub> <Γ  
 bσCΔΓΓ<sup>9</sup><<sup>3</sup> <d<sub>x</sub> Δ·∇ C<sup>υ</sup> ·Δσd b·<σ<sup>3</sup>Δ<sup>9</sup>Γ<sup>3</sup> Λd  
 <αΛ Δ<sup>3</sup> ·Δσd Δσ<C<sup>3</sup> L·<<sup>-</sup> Δd ·b<sup>3</sup> ∇bα·∇<sup>3</sup>C<sup>-</sup>  
 ∇b ·Δσd ·b<sup>3</sup>C, ∇αα<sup>3</sup>ΔC<sup>-</sup> CΛ<sup>υ</sup>d<sup>-</sup> Δ·∇σ α<sup>3</sup>C  
 ∇Γσ<sup>3</sup>·bα<sup>3</sup> ∇Γσ<sup>3</sup>·bbΓPα<sup>-</sup> ∇b ΓσΓ·<αCσ<sup>-</sup> L·<<sup>-</sup> Δd  
 ΔPPΓ<sup>3</sup>σC<sup>3</sup> Δ·∇σ<sub>x</sub> ΔPP<sup>9</sup>C<sup>3</sup> <σ<sup>3</sup> 9C<sup>3</sup> LαΓ<sup>-</sup> Γσd<sup>-</sup>  
 bP<<Γ<sup>3</sup>Γ<sup>3</sup> Δ·∇ C<sup>υ</sup> ·Δσd b<σ<sup>3</sup>γPbΓ·<<sup>-</sup> L·<<sup>-</sup> 9d<sup>3</sup>  
 P·<9·Δ σΓ·<αC<sup>3</sup> bC·bP<sup>-</sup> Γ·b<sup>-</sup> bbP<sup>3</sup>U<sup>-</sup> ∇·b C<sup>υ</sup> ·Δ<sup>3</sup>  
 α·<<sup>-</sup> b<σC<sup>3</sup>b<sup>3</sup> b·Δ<sup>3</sup> Δ<sup>3</sup>Γ Δ<sup>3</sup>γ<sup>3</sup>Δ<sup>3</sup> L·<<sup>-</sup> Δd

Γ·σC·b' V4<sup>υ</sup> ∇Δσ JC' ·bL' ∇σ<J' bΔσ·Δ<C'  
 9dσ, bΔσC·bPσ' bΔσCbLσ'x J5' bP<<Γ·ΔP·Δ'  
 b·Δ' D'P' Δσ'CL' ·b'C 9dσ Pσ<C·Δ'x L·Δ' Δd  
 PbaU'CL' bPa 9d', P<<P'JL' Δd ∇C 9d' bσ<JL'x  
 P'Λ' 9d' bσ<JL' ΔΓ DσΛd PΓP'J' ΔΓ Δ·∇  
 bPJC·ΔJ', ∇LσP'J' 9da', Δ·ΔLJ'σ' b4 ΔΓ Δ·∇σ  
 bP·Δ·Δ'CL·ΔJ'x ∇·b C' σd' CΛ'yd' bJC·Δ·C  
 ΔΛσP'σ' ∇b ba9 bb·9 ΔσΓ'·C Δσ·∇σ·Δ'  
 bPΔσΓ'·C CΛ'yd' ·∇'b' Dd·∇σ·Δ', b·Δ' ba9,  
 ΔσPΔJ' ·ΔP>dP' J'J', b·Δ' ba9 DC·L'J' ΔΛσP'x  
 ·∇ΓΠdJ' bD'J'J' ΓP'L' ∇C bb·9ΓP'x b·Δ' ba9  
 ΔσJ'σσ·Δ ΓP'Γσ D·b·9ΓP'J', ΔΓ ∇J'P'9'CL'  
 ∇J'·Δ<L·b DC Λd σP'x L·Δ' b·Δ' 9d'  
 D·ΔΓP'J'σ·Δ'x L·Δ' Δd ·b'C 9d' ∇σ'P'9·Δ'x ΓC'  
 Δ·∇ ·∇'b' bPΔσ'P'9·Δ' L·Δ' PL'·b·ΔΠP'·Δ'x ∇·b C'  
 σd' bΔσ'P'9L' Pa·Δ' ΔΓ Dσ Δ·∇ bΔσ  
 σJ'·ΔσP'ΔdL' σΛ' b4 bD'P' ·Δ9·Δ ΔdP'L', Δ·∇ b4  
 bΔσP' ΔJ'L·Δ' ΔΛσP'σ' CΛ'yd' b·Δ9·Δ >·bP'J'σ·Δ'  
 b4 ∇ΔσP' ·Δ9·ΔP'·Δ' D·bσ·Δ' ∇b Δ·∇σ  
 bPΔJ'Γσ·C CΛ'yd' P'PΔσσΓ·C<' ΔΓ Δ·∇ bD'P'  
 ΔP'x Δd ∇σ'CL'x <'P Λd ∇<PUS', <'P Λd  
 ∇ΔσdP'x, b·Δσ' ·Δb P'D'P' >·bP'J'J'x ∇·b C' σd'  
 <'P σ'C ∇b·Δ·bD'P'x ΔΓ Λd ΔΛ' ∇>·bP'x  
 ∇ΛP'·Δ9·ΔP'L'x ΔΛP'd ΓP'∇ P·Δ9·ΔP'Γ' σd'x σΛ'  
 ∇·Δ9·Δ' PJC·ΔL'J'σ'x ·∇'b' C' ·Δ' bPΔσ'P'9·Δ'  
 L·Δ' PL'·b·ΔΠP', PL'·b·Δσ b4 D·ΔL'P'·Δ', ΔΓ Δ·∇  
 bPΔP'x U·V Dσ bΔσdL' ∇b ∇σ<<Γ'CL' D'x  
 Γ'CD ∇C ·∇ΓΠdJ' P·b·9σJC·ΔΓ', P·b·9 ·∇ΓΠdJ'·ΔΓ',  
 ∇b <'P bPΔJ'ΓσdL' b·Δσ' P'P'D'P' ΓσdP'Γ' CΛ'yd'  
 P·∇ΓΠdJ'·ΔL'x <b' 9·Δ' ·∇ΓΠdJ' PΔJ'Γσ ΔΠb D·∇  
 bC'·∇PσdP'·Δ' D·∇ Δ'Pb' <<b' PΔJ'Γσ·Δ' 9dσx

Δσ' 9ΔJ ΛΛΓ"Δ·Δ', ΓC' Δ·∇σ ·∇ΓΠδJ bΔσ  
 LL·Δα' CΛ'δ' ·Δσd ∇C U·V·Δσ bΔJ' ΔΓ Δd  
 ∇τCL'x ΔΠb δc ·∇ΓΠδJ <<b' 9d', 9da' Δd ΔP  
 ΔΓ Λd Δ·∇σ bb·9JC' ·∇ΓΠδJ CΛ'δ' ·Δσd UCd  
 ∇b·9ΠVσΓdJ' Δσ' Δ"Δ 9PΔJ ΛΛΓ"ΔJ'P<' b4  
 Δσ·∇σ·Δ' b4 δc CΛ'δ' Δ·∇ bPΔ'P ΛΛΓ"Δ·Δ',  
 CΛ'δ' Δ'C·∇'P9·Δα' ∇σJα·b' ∇σP'PaLdJ',  
 PCσP'PaLdΓ' bPΛΔ<P'J' ΔΓ ∇J·Δ<'CL' Δ·∇  
 ∇ΔσJ Δ<P'P9J' ∇JCdJ' ΔΓ ∇J'P9'CL'x

Δ·∇ bΔCL' CΛ'δ' bPΔJ PPδΔLdJ' 9da' Δ·∇σ  
 Λd 9d' ΔJ ΔL PΓσd·Δ? bPΔP'J' Δ·∇ bP<<Γ  
 PPδΔL·ΔJ' bPa 9d' PΔJ ΔΠb C' Δ·∇ b4 P'J'PbU  
 Λd Δ'Π Λd bδUΔ·bΠr' 9dσ ∇ΔP'LLΓr' Γs'δJ"Δσ  
 b4 ΔP'JCα·Δ ∇·ΔΛ'bdΛαPΠ<' ΓΠ' ΔJΠ·ΔΠ'  
 ∇b'bdLP<' ΓC' ΔL ∇ΔP' ΓrJ' ∇·Δ'P<·bP<'  
 ΔJΠ·ΔΠ' ΔαΓ' bσΛ·ΔΔJ' ∇Δ'P'J·Δ<·b' ΔΓ Δ·∇  
 bPΓrJ'x ∇·b C' Λd 9d' σPCJCΓ' ΔΠb b4 ·∇Π  
 σΛb' PΔ'ΠσbU Δ'Π 9PΔP'LLΓrJ'P<'x ·∇Π VJ·b  
 ∇Δ·bJ'P<' VJ' ∇rΛ·Δ' Δσ·∇σ·Δ' C' Γs'δ' b  
 ·b·b·αbPUP' ΔΓ Δσ·∇σ·Δ' ∇LLσΛJ'J', ·∇Π C'  
 ·ΔΛJ bΔP'P9J' CΛ'δ' Δd <αα"Δr' ΔJα·b'x <P  
 Λd Δd9 bΔdJ'bd9' PΔJ·ΔΛJ P·Δ'P<·b' C' Δ·∇  
 bΓrJ'x, L·Δ' Δd P·Δ'P<d' Δ·∇x ΔΓ Δ·∇ b·Δ'  
 bα9 ΔP'9'C'Jα·Δ δc ΔΛδP's' P'LLσΛJ·Δ'  
 δUΔ·bΠr·Δ'x Δ'P'ΓrΓ'γb9Lb' b4 Δ·∇ bΔCL' CΛ'δ'  
 Δd Γr' PΔJ' Δ·∇ Γs'δJ"Δx ΔΓ Δ·∇ bΓrJ'x  
 ·∇'b', b·Δ' σPΔP'P9C' bPa 9dτ' Δσ·∇σ·Δ',  
 σ·Δσ9 Δσ' Γσd' 9da' bP·ΔΔCΛαL' Δσ'  
 Δσ·∇σ·Δ' bP'LLΓrJ'<' Δ"Pb' Δ'P· b·Δ' UCd δc  
 σbσ9r', ∇b bα9 ∇ΔP' P9'CL' 9dτ' Δ"Δ·∇, Δσ'

'U' GP

9ΔP3L' ▽b ▽P▷P LΓJ◊CL' 9d◊ Δ◊▽  
bPΛΔJb•9PΓdL' ▽b ΛaL 9d' ▽▷P aac•ΔP9CL'x  
▷◊ C' •Δσd σCσbbσ9 ◊σ' 9d' bΔJ b•9PΓdL'  
9P ΔJσbCL<'x

◊L◊◊' C' b4 9da' 9LaPΓP'L' ◊"Pb', ▷◊ ▷N  
9Lr'bdL' ▽b C' •Δ' Δσ◊▽σ◊◊' 9Γm'bdL' ◊L◊◊'  
b4 Δσ◊▽σ◊◊'x •b'c b4 Lr9da' ◊L◊◊' m'  
9Lr'bdL'x ΓC' Δd bΔr'4' Δ◊▽N◊9 bP◊L'L'  
bP◊ΛmP'J•ΔL', 9d' ΔL ◊"P' bD'PΓP'bU' ◊L◊◊'  
Δd ◊Nb ◊◊ΔL'J'5' ▷'Pc Λd 9◊Δa◊◊ Lr'L◊◊'  
CL'yd' b◊d'◊◊◊', 9dσ b4 bD'P ◊ΔJ'L◊◊◊' Δ◊▽ P▷P  
Lr'bdL'x b•Δ' C' •Δ' Δ◊▽ σP▷PΓP'P', ◊Γ bΔr'4',  
bPa Λd ▷Paac•ΔP9'c' ◊◊◊ bP◊◊◊Δr◊◊◊' ◊σ'  
Δ◊▽ 9PΓ•a◊r◊L'<'x ΓC' ◊◊◊ bΔa' bP◊b'σ'  
▷P'L' bP◊◊r◊L', aΛ' Δd P◊◊' ▷P◊L' J'5' Δd  
▷P◊◊r◊L'x σP◊σ P9C' ◊σ' 9ΔJ ◊◊r◊L' Δ◊▽  
P'L'x σ'c' C' b•Δ' aΛ' σP▷P ◊◊◊'9' 9P' Δd  
▽◊Δ'baΛ'ybL'x ◊Γ bPΔr'4'L', Λσ' C' b•Δ'  
σP◊mP'dC'x b•Δ' b4 a'c P▷P Δr'4'P' ◊5  
•Δσd ▽Pabr◊L'x ▽b C' bP◊◊r◊L' ΓP'L' L◊◊'  
▷PbaUCa' P◊σ bP◊◊r◊L'x b•Δσ' •b'c  
P◊σ◊Λa' ▷P▷P◊C'x L◊◊' Δd ▷PΓ◊c' ▽◊σ  
b•9Pc' Δσ◊▽σ◊◊' bΛΓ ΓP'L', ◊Γ bPΔJ'P9' ▽'b'  
b4 σP◊◊◊'c' ▽b'9'CL' ◊σJσσ Λd P◊◊L',  
J'5' ▽P◊◊Γ ◊◊◊Δr◊◊' ◊◊◊ P'Δσσ, σΓ'7'x ▽b  
C' Δ◊▽ bP◊ΛmP'J•ΔL' bΔCL', σP◊σaV° ◊Γ Λd  
J'5' bΔJ ◊◊◊◊◊Δr◊◊' ◊◊◊ P'Δσσ ◊Γ Λd bΔJ  
ba◊▽σΓJ'x Λσ' a'c 20 a'c 21  
▽◊σC'◊◊"P•Δ◊◊◊', ◊Γ Λd UCd ▽P'N'VσΓJ' P'Λ'  
Δ◊▽ bP◊◊◊Δr◊◊'x CL'yd' Δd ◊ΛmP' bΔJ

'U' ΓP°

ba·∇σΓσ<sup>-</sup> σPJC·Δ<sup>1</sup>, ∇σ C<sup>υ</sup> ·Δσd ∇PPaV·Δ·Δ<sup>1</sup>·  
 ΓC<sup>υ</sup> Δ·∇ bPΔσσ<sup>-</sup> ∇Γ Dσ ∇σ P·Δ·Δ<sup>1</sup>·Δ<sup>1</sup>·  
 ∇Δσσ<sup>-</sup>, ∇Γ bΔσσ<sup>-</sup> P·Δ·Δ·Δ<sup>1</sup>, b·Δ<sup>1</sup> ba9  
 σP▷P▷σC<sup>1</sup> ∇·∇σ<sup>1</sup> qΔ<sup>1</sup>·Δ<sup>1</sup> Δ·9<sup>x</sup> ·Δσd ▷P▷σC<sup>1</sup>  
 ∇σ<sup>1</sup> Δσ·∇σ·Δ<sup>1</sup> qΔ<sup>1</sup>·ΔL<sup>1</sup> Δ·9·Δ<sup>1</sup>, ∇Γ bPJC·Δσ<sup>-</sup>·  
 ΓC<sup>υ</sup> Δd bPJCJ·Δ<sup>1</sup> Δ·∇σ qΔσ LΓ·σCJ·Δ<sup>1</sup> CΛab  
 ·Δσd σP PP<sup>1</sup>·ΔL·Δ<sup>1</sup>· ΓC<sup>υ</sup> U·V ∇PΔ<sup>1</sup>·ΔL<sup>1</sup>  
 ▷σ·∇σ·Δ<sup>1</sup>, bPΔσσ<sup>-</sup> qΔ<sup>1</sup>·ΔL<sup>1</sup>· ΓC<sup>υ</sup> ∇PJC<sup>-</sup> bΔ<sup>υ</sup>·b  
 ·ΔPJC·Δ<sup>1</sup> ∇Γ ∇·b P<sup>1</sup> PNVσΓPσ<sup>1</sup> ∇Γ ∇·b  
 ∇<Pσσ<sup>1</sup> PNVσΓPσ<sup>1</sup> P<sup>1</sup> PNVσΓPσ<sup>1</sup> Pσd  
 ▷<sup>1</sup>·∇ PΔΔ<sup>1</sup>·ΔL<sup>1</sup>· σP9<sup>1</sup>·C<sup>1</sup> ∇σ<sup>1</sup> bPΔσ<sup>-</sup> PP<sup>1</sup>·ΔL·Δ<sup>1</sup>·  
 ∇Γ Δ·∇ bPΔσσ<sup>-</sup>· ∇Γ ∇·b P<ΛL<sup>1</sup>·Δ<sup>1</sup>· ΓC<sup>υ</sup> Δd  
 ∇P<Pσσ<sup>-</sup> ∇Λ<sup>1</sup> Δd, σσd qΔΔ<sup>1</sup>·ΔL<sup>1</sup>· ∇·b Λd  
 PaaJaaL<sup>1</sup> qdσ<sup>1</sup> qΔ<Pσ<sup>1</sup>·, b·Δσ<sup>1</sup> σP▷P Γσd<sup>1</sup>  
 Δ·∇σ Pσ qΔ<Pσ·Δ<sup>1</sup>· ∇Γ hΛd σσd P·b·qΔ<sup>1</sup>·  
 qdσd qΔ<Pσ<sup>1</sup>·, ∇Γ bPJC<sup>-</sup>· ∇Γ Λd P·b·9b<sup>1</sup>·Pσ<sup>1</sup>·,  
 L·Δ<sup>1</sup> b4 PσCΔPΓ9, b·Δ<sup>1</sup> C<sup>υ</sup> ·Δ<sup>1</sup> ba9 σP▷P  
 <Pσσ<sup>1</sup> PΔPΓ9·Δ<sup>1</sup>· bPa Λd ▷PσCΔσ<sup>1</sup>· ∇σσσ  
 b▷σ<sup>1</sup>· qda<sup>1</sup>· ∇Γ Δ·∇ qb<sup>1</sup> ∇▷P·∇σ<sup>1</sup>· P·Δ<sup>1</sup>·ΔL<sup>1</sup>·,  
 bPa qda<sup>1</sup> ∇Pa bPσ<sup>-</sup> Δσ·∇σ·Δ<sup>1</sup> qΔσ ∇<Pσ·Δ<sup>1</sup>· Jσ<sup>1</sup>  
 ∇P·b<sup>1</sup>·Paa<sup>1</sup>· ∇Pσ C<sup>υ</sup> ∇Λ ΔL bP<Pσσ<sup>-</sup> ∇Γ ba  
 Δ·∇σ bP·∇σ<sup>1</sup>· PPP<sup>1</sup>·ΔL·Δσ<sup>-</sup>· PΔPΓ9·Δ<sup>1</sup>· ∇b ∇Λ<sup>1</sup>  
 ∇▷P PP<sup>1</sup>·ΔL·Δσ<sup>-</sup>· ΓC<sup>υ</sup> ∇b ∇▷P σCΔPΓ9<sup>1</sup>· ∇b  
 ·Δσd ∇▷P PP<sup>1</sup>·ΔL·Δσ<sup>-</sup>· Δ·∇σ C<sup>υ</sup> ·Δ<sup>1</sup> bPΔσ  
 PP<sup>1</sup>·ΔL·Δσ<sup>-</sup> ∇σ<sup>1</sup> qΔσ<sup>1</sup>·Δσ<sup>1</sup>·, L·Δ<sup>1</sup> ∇Λ<sup>1</sup>  
 σPΓ<sup>1</sup>·Δ<Pσ<sup>1</sup>· ΔL<sup>1</sup>· ΓC<sup>υ</sup> Δσ·∇σ·Δ<sup>1</sup> bPJC<sup>-</sup>· ∇·b b4  
 ∇P PP<sup>1</sup>·ΔL·Δσ<sup>-</sup> ∇σ<sup>1</sup> qΔσ<sup>1</sup> ΛL<sup>1</sup>·ΔL<sup>1</sup> ∇σ<sup>1</sup>·ΔL<sup>1</sup>· bPΔσ  
 P9CL<sup>1</sup>· Δ·∇ ∇Λσ<sup>1</sup>· qΔσ<sup>1</sup> ba·∇σL·b<sup>x</sup> ∇Γ Δ·∇  
 bPΔσ<sup>-</sup> ·Δ<sup>1</sup>·ΔL·Δσ<sup>-</sup>· ΓC<sup>υ</sup> bPΔσ ∇<sup>1</sup>·ΔL<sup>1</sup> ∇Λσ<sup>1</sup>·,  
 P<sup>1</sup>·Λ<sup>1</sup> σPΔσ<sup>-</sup> bbσ<sup>-</sup> ∇σ<sup>1</sup> qΔσ<sup>1</sup> ΛL<sup>1</sup>·ΔL<sup>1</sup>·  
 bσC·ΔP<sup>1</sup>·ΔL<sup>1</sup>· ▷·∇ σPΔσ<sup>-</sup> ∇<sup>1</sup>·∇ b·Δ<L<sup>1</sup>· ∇Λσ<sup>1</sup>·

ΡΡ9'C' Δ·∇ βΔJ ΡΡ\_μ"ΔL·Δα' ΡΡΡ\_μ"ΔL·ΔΓ βΡΔJ  
 ΡΡ\_μ"ΔL·Δα' ΓC' Δ·∇ βD'P' αC·∇σΓα' ΡJCL'  
 ∇ΡΔσJ', ΓC' Δ·∇ 9JCL·ΔΓ ΡCΛ\_μP'J'x L·ΔΓ ·βL'  
 Ρβα·∇σL'x β·Δ' C' ·Δσd J'σ' σPDP' ΔJ'P'9'P' 9σ'  
 J'σ' ·βL' Ρβα·∇σL·β, βΡΔJ βα·∇σΓJ' β·Δ' UCd  
 σPDP'JCL', ΔΠβ Δ·∇ βD'P' ΔP'JL' D·∇ βΡΔJ  
 βα·∇σΓJ' ·Δ·∇, β·Δ' UCd ΔP'P' βΔCL' ΔΓ Δσ  
 ΔL ∇PΔ\_μP' ·Δα"ΔdL' μd' ·∇ΓΠdJ' βΛJ' Δ·∇  
 Π\_μβ'x Δ·ΔJ'Γ C' μd' ΔσP'P', β·Δ' βα9 <'P  
 DP'9'CP' ΔσJ'σσ·Δ 9da' ΔσJ'σσ·Δ ΡΡ\_μ"ΔL9·Δα',  
 β·Δ' 9d' μd' ΔL'P' D·∇, ∇·β C' ΔΓ βPΔσ  
 JCL' Δ·∇ Δ·∇ ΔΛ\_μP' CΛ'Δ' βPΔL·ΔΓ βΡα 9dσ,  
 ∇β 9dσ P'μ'U' βΡΔJ ΡΡ\_μ"ΔLdL' ΔΓ βJCL'x ∇·β  
 C' β4 Δ·∇ βP ΡΡ\_μ"ΔL·ΔJ' βP·Δ·Δ'CL·ΔJ' CΛ'Δ'  
 β4 D"Δ·∇ ∇PΔσΔJ'P'P' σCC ∇PΔσ βα·∇σL·β  
 PΔσ·ΔP"Δ·β ΔΓ βPΔσΔP'P' CΛ'Δ' ∇β α'C  
 βPΔσ ·ΔPΔΠP'·ΔΓ, L·ΔΓ Δd σPΔσ βα·∇σL'x ΔΓ  
 Δ·∇ βPΓ·αJ' U·V βΡΔJ ΡΡ\_μ"ΔLdL', ΔΓ Δ·∇  
 βΡΔJ' αC·∇σΓdL' ΡJCL' ·Δ"Δ·∇ βP ΡΡ\_μ"ΔL·ΔJ',  
 σCΛ\_μP'J'L' Ρβ·9 ΡΡ\_μ"ΔL·Δ·βx ΔΓ D·∇σ βP  
 ΡΡ\_μ"ΔL·ΔJ' P'βΔσσx 9β' C' Δd β·Δ' UCd  
 σPDP'JCL' Δ·∇ DCLΔ βΛΓΔ'Δ\_μ·Δ·ΔΓ ΔΛ\_μP'P'x  
 ∇β ·Δσd σ' βPJCL·ΔJ' P'βΔσσx ∇·β C' μd' ∇β  
 <P ∇ΡΡ\_μ"ΔL·ΔP' ΡCΛ\_μP'J'Γα', ·∇ΓΠdJ' Λd  
 βJCLdL', ΔΓ βD'P' ΔP'P' ∇β ΔΛ' <P βΔσ  
 ΡΡ\_μ"ΔL·ΔL' βΔσ ·Δ'CL·ΔL', ΔΓ ∇\_μCL' βΡΔJ  
 ·ΔCLdL' ∇Δσ ββσ9L'x

ΔΓ C' 9PΔJL·ΔC' ΔΛ\_μP'P' ∇P'P'·ΔΓ DC Λd  
 ΔΛ\_μP'P'x σΠ\_μσL' ΔΛ\_μP'P' ∇β ∇βP<ΠP'·ΔΓ,  
 ΔαPΔJ'βP<ΠP'·ΔΓ βΔ\_μσLP·C D'P'C 4 Ρββ\_μαP·C

'U' ΓΡ°

Ρλ° β4 ▽β βσρϳϳ·Δ- βΔσλ·Δ- Δ'Ρϳ ρββ.μα·β,  
 Γϳ° ϳΛ°δ- ▽β ▽ββ.μα·β ▽Δ'ϳΓ Λρ'ϳΛ'  
 ·▽ΓΠδσ·Δ ρδα' ΠΛ ▽ΔϳΓβα·Δ<ϳΛ' αϳϳ·Δ'  
 ▽ΔϳΓ Λρ'ϳΛ'x Γϳ° ▽β ▽σ <Λρ'ρσλ·β ΔΛ.μρς'  
 ▽ρλ'x λ·Δ- Γ.ασ.μ<' ρρ ββ.μα·β<' ΔΛ.μρς'  
 βΡΔσ ·Δ'ϳΛδλ' ρδα', ρρ ·Δ·Δ'ϳΛ·Δ·β<' ΔΓ Δ·▽  
 ▽τ'ϳΛ'x σϳαλΓϳτϳ' Δδ Δ"Δ·▽ ρρϳϳΛ<' Δ"Δ·▽  
 ρρ Δ'ρ ββ.μα·β<' ΔΛ- σΓ·τϳ' Δδ ▽°β° Δ·Δλ  
 ΔΛ.μρς' ▽ΛΔρ Λββ.μσσσ' ρδσ βΛβ·ρρΓσ'  
 ρ·Δ'ϳΛ·Δ' σ·Δ·Δ'ϳΛ·Δ σβ·ρσρϳϳα ρδσ, α'ϳ ϳ°  
 β·Δ' βα9 ▽σρϳϳ·Δσ·Δ- β ββ.μα·β Δ'ρλ"Δ'x  
 Δρ·▽σ·Δ' ρρΔ'ρσρ·Δ' β·Δ' βα9 ΔΡρ'ϳρ·Δ ▽°β°  
 ρδσx Γϳ° ▽°β° ▽Λσβ·ρρΓσ'·Δ'x Γϳ° ▽β βα9  
 ▽σρϳϳ·Δσ·Δ' ▽°β° βΛΔσβ·ρρΓσ'·Δ' ▽β βα9  
 ▽σρϳϳ·Δ', ΔΛ- β4 <β' ϳϳσσρ·λΓ' αΛ- β4  
 ϳϳσ λρΔσρ·λΓ' μδ°x ·▽°β- ϳ° ·Δ' γ·β- βρ  
 ρρ.μ"Δλ·Δσ' Δ·▽ ρλΔσσ ΔΛ- λλ° ϳΔΔρλσ  
 βΔσσ'x μδ° ϳ° β·Δ' λρ·Δ' ρΠσρρρΓ' Δ·▽ μδ°  
 βΔσρ·λασ·Δ'x β·Δ' βα9 U·V σρϳϳδρμ', ▽Λρσϳ  
 λς' Δβασλ·Δ- βΔρΔρλ', β4 Δσ·▽σ·Δ' βΡΔσ  
 ·Δ'ϳΛ·Δσ' Δ·▽ β<<Γλλ' Δ"ρβ' ▽·Δ'ϳΛ·Δσ' Δλ  
 ▽σσβUP'x βρα ▽ρΔσσβϳ·Δ- Δσσσσ·Δ' Δλ  
 Δ"ρ' βϳρτλσ·Δσσ' ρδα' Δρ Δσσβϳα·Δ'x μδ° ϳ°  
 β·Δ' βα9 ΔΡρ'ϳρ·Δ ΔΛ.μρς' βρα Δσσβϳ·Δ-  
 ρU Δσσσσ·Δ', ΔρΔσσβϳα·Δ βρα ρδ', Γα  
 λβΔβσ' ΔΓ Δ·▽ βΡΔσ ϳρ'ϳΛ', μδ° ϳ° β·Δ'  
 ϳσρϳϳδρμ' Δ'Π βΔςλ'x β·Δσ' ΔΛ.μρς' ΔΡρϳϳ,  
 Δσ° ▽β ▽·Δ'ϳΛ·Δ·β ρδσ ▽β ϳ° β4 ▽Λρ'ϳϳ·Δ',  
 ▽Λρβρ<Πρ·Δ- ▽β ▽β·ρ σρϳϳ·Δ-  
 Δσσσσ·Δρ·λ·Δσx ΔΓ ▽σρρσλ·β Δ·▽ βΔσρρΔ'x  
 λ·Δ- ▽σ·β ▽ρϳ' Δσσσσ λλ° Δδ ΔΛ' ΔΡρ'ϳ'



PPQC' Δ·∇σ b·Δ'CL·Δ<sup>-</sup> qd', <σσσσ b·Δ<sup>2</sup>  
 ▷Lρa"Δ<sup>2</sup>, b·Δ<sup>2</sup> LρaΔbaΠdσ ▷C<P>ρ<sup>2</sup>  
 ∇Jρ·Δ'CL9<sup>-</sup>, ΓC<sup>ν</sup> ΔΛ<sup>2</sup> Δ·∇ ∇b ∇Δσρ P9'C·b<sup>2</sup> ∇b  
 bΔσρ<sup>2</sup>∇'CJ·Δ<sup>-</sup> CΛ<sup>2</sup>d<sup>-</sup> Δ·Δ<sup>2</sup> ρb·9 P9'CJ·Δ<sup>-</sup>, ∇b  
 b▷ρ<sup>2</sup>Λ<sup>2</sup> Δ·∇ Δσ CPΔρ<sup>2</sup>< P<sup>2</sup>Λ<sup>2</sup> PΔJΓa·Δ'Π<σ<sup>2</sup>  
 Δσσσσ ρLρa"Δ<sup>-</sup> ▷·Δ'CL9·Δ<sup>2</sup>.

Δ·∇ C<sup>ν</sup> ▷L bP▷σ<sup>2</sup>ρbU<sup>2</sup> ρΔ<sup>2</sup>dσbσ·Δ<sup>-</sup> ▷L  
 ρCJΔ<sup>2</sup>∇<sup>2</sup>, ΔΓ ▷L bPΔJ<sup>2</sup> Δ▷d<sup>2</sup>b<sup>2</sup>∇<sup>2</sup> bσΛ<sup>2</sup> Δ·∇  
 bPΔJ<sup>2</sup> Δ'CLd<sup>2</sup>∇<sup>2</sup> bPΔJ<sup>2</sup> PPσ"ΔLd<sup>2</sup>∇<sup>2</sup> ρCCL<sup>2</sup> ρρρσCCL<sup>2</sup>  
 Δσ·∇σ·Δ<sup>2</sup> bPPσ"ΔLd<sup>2</sup>∇<sup>2</sup> ΔΓ Δ·∇ bPΔJ<sup>2</sup>ρ9<sup>2</sup>∇<sup>2</sup> L·Δ<sup>-</sup>  
 ∇ρρσCCL<sup>2</sup> ▷L bΔ<sup>2</sup>∇<sup>2</sup>∇<sup>2</sup> bσΛ<sup>2</sup> a<sup>2</sup>C b< bΛ<sup>2</sup>><sup>2</sup> ∇·b C<sup>ν</sup>  
 σPΔJ<sup>2</sup>ρ9<sup>2</sup> ∇·∇ b·Δ▷d<sup>2</sup> b∇J<sup>2</sup>∇<sup>2</sup> a<sup>2</sup>C bC·bP<sup>2</sup>  
 ∇JLρd<sup>2</sup>∇<sup>2</sup> ∇Π ∇Δ<sup>2</sup>C·Δ CJ·Δρσ<sup>2</sup>∇<sup>2</sup> ∇b Δσd  
 ∇P▷ρ<sup>2</sup> ΔσΓ<sup>2</sup>, ΔΓ Λd ∇Π ρLρ<sup>2</sup>∇<sup>2</sup> Δd, Δ'Π Λd  
 9ΔJ ρρΓb<sup>2</sup> ∇Π bΔJ<sup>2</sup>d<sup>2</sup>∇<sup>2</sup> bP>CCL<sup>2</sup>∇<sup>2</sup> ΓC<sup>ν</sup> Γa·Δ  
 bΔσΛ<sup>2</sup>> ∇ΛJ<sup>2</sup> ΛP·∇d<sup>2</sup>∇<sup>2</sup> Λσ<sup>2</sup> C<sup>ν</sup> ∇b bPΔσρ  
 <PΠσd<sup>2</sup>∇<sup>2</sup> bΔCL<sup>2</sup> Γa ρaC·Δ Δ<sup>2</sup>dσ·Δ<sup>2</sup>∇<sup>2</sup> bPΔσ  
 LLρ·Δ<sup>2</sup>σ·C ΔΛσρ<sup>2</sup>∇<sup>2</sup> ∇Π ∇aC·Δ Δ<sup>2</sup>dσ·Δ·Δ<sup>-</sup>∇<sup>2</sup> Λσ<sup>2</sup>  
 PΔσρ<sup>2</sup>∇<sup>2</sup> ▷L bCσΛ<sup>2</sup>∇<sup>2</sup> Δ<sup>2</sup>dσ·ΔbΓ<sup>2</sup> ρΔσΔ<sup>2</sup>∇<sup>2</sup>, ρCJ  
 Δ<sup>2</sup>dσ·Δ·Δ<sup>-</sup> ΔΛσρ<sup>2</sup>∇<sup>2</sup> ΔΓ bPΔσρ<sup>2</sup>∇<sup>2</sup>∇<sup>2</sup> ΓC<sup>ν</sup> bPΔσρ<sup>2</sup>∇<sup>2</sup>  
 ∇b ρΔσ LLρd<sup>2</sup>∇<sup>2</sup>∇<sup>2</sup> Δσ<sup>2</sup> ∇σLρΔ<sup>2</sup>dσ·Δ·Δ<sup>-</sup>∇<sup>2</sup> ΔΓ ΔΛ<sup>2</sup>  
 bPΔσJ<sup>2</sup> Pσρ"▷<sup>2</sup>∇<sup>2</sup>∇<sup>2</sup> ΔΓ ΔL b< bPΔσρΔρ<sup>2</sup>∇<sup>2</sup>∇<sup>2</sup> ∇b  
 ∇PΔσρ<sup>2</sup> PPσ"ΔL·ΔP·C ΔΓ ΔΛ<sup>2</sup> ΔL bP Δσρ  
 LbΓd<sup>2</sup>∇<sup>2</sup>P·C CΛ<sup>2</sup>d<sup>-</sup>, bPΔσρ<sup>2</sup> LbΓ<sup>2</sup>·C ΔσJσV<sup>2</sup>  
 bPΛΔJ<sup>2</sup>ρ9·Δ<sup>-</sup>, ΔΓ ΔL bP▷ρΔρ<sup>2</sup>∇<sup>2</sup>∇<sup>2</sup> L·Δ<sup>-</sup> C<sup>ν</sup> ∇P  
 PρσC·b<sup>2</sup> Δ·∇Πσ9 bPΔJ<sup>2</sup> PPσdΔLd<sup>2</sup>∇<sup>2</sup>∇<sup>2</sup> ΔΓ Λd  
 ∇ΔσJ<sup>2</sup> ▷dσd<sup>2</sup>∇<sup>2</sup>∇<sup>2</sup>∇<sup>2</sup>∇<sup>2</sup>∇<sup>2</sup>∇<sup>2</sup> bΔJ<sup>2</sup>·Δ'CL9<sup>-</sup> ΔΓ  
 b▷ρ Δρ<sup>2</sup>∇<sup>2</sup> ∇b Δσσσσ·Δ 9dσ bΔσρ<sup>2</sup> P9'CJ·Δ<sup>-</sup>  
 ΔΛσρ<sup>2</sup>∇<sup>2</sup>∇<sup>2</sup> ΓC<sup>ν</sup> ▷·∇σ ΔσΔJ<sup>2</sup> b·9·ΔCL·Δ·b  
 σσCd>9a<sup>2</sup> Δσd a<sup>2</sup>C bb·9ρΓJ<sup>2</sup>·Δ<sup>-</sup> ρP▷<sup>2</sup>ρσρ·Δ<sup>-</sup>, ΔΓ

'U' GP

Ad Ad Vsb.9rfs.4- 4s' Vsa.b' D.V, 4s'  
 Vp4' D"D.V; 4G Ad Vsf.4'x .4.V C'  
 bP.4.Δ'CL.ΔJ' 4G Ad b4sf DdbVJz'' sa.Δ'  
 Dd.Vs.4' sf.4L' V.b b4 sCC Ga bP ba.VsfJ'  
 Ga <b' 4.Δz' 4G bΔJ DdbVJz''x GC' bPJCL'  
 DL vb.ΔhbΔbs' bDdbVJz'' VP .4.Δr"Δnlz''  
 V4sfnz'' VDr ba.Vsfnlz'' bPJCL'' Vba.VCL'  
 Vb D4' r4s m'U4z'', a'c 9d' bJCL' VP LL°  
 JCL'' VP.Δr"Δnlz''x md' C' .Δ' b.Δ' ba9 4s  
 D.V Δp4p, b.Δ' 9d' PDr AFAPp' 7.b'  
 Δ'dm.Δbf' b4s4z', b.Δ' 9d' bAFU' PDr 4zp,  
 Δ.V Ad VC sAb' b4cC' r.4rba' bP4cCP'  
 bPPR Δ.s.VAP' VC bP4zP'x md' b.Δ' ba9  
 .4.ΔrΔna.s.4' VAr.V'c' bPa 9d' bJRbU' md'  
 CL'd' VJR C.4APs9' bPa 4.Δz'x b.Δ' ba9 9ds  
 D.b.9JCP'x b.Δ' ba9 D<<7'c' 4Lp' md', Ga  
 b.Δ' ba9 9d' .Δ'CL.4r' sa.Δ' bPJCL' VJRJCL''  
 VPRa4bL'' 9d', Vb ba9 9d' VDr 4z''  
 VJrDCLz'' VJR P'P>r9z'' bJR a.s.VAsbU'  
 P'P>r6' VPr4cJz''x P'Λ' a'c ΔJz' 4.Δz'  
 sb.9.Δr"4G' Vb rJRb.4r' a'c VPr4cG"Δ'  
 V4sfn' Vb bP4cG"Δnr' 4G bJCL'x

L.4' sfDr ba.Vsfnlz'' Vb a'c rΔJLr4' 4.Δz'  
 b.Δs' JR.4' md' bΔp4' Δp4p' .V'b' bPA  
 Δp4' bPa 9d' 4'r4, As' <b' Vsfz' 9d'x 4nb  
 b4 Δ.V bΔCL' aL' .4.9.Δr.4' V.b Ga b4s  
 4'r4P' ΔJp.9.Δa', L.4' Δd G'c"Δ 4'r4.4m'x  
 b.Δ' ba9 JR.4' bDr Δp4p' Dr ΔJp.9a.s.4'x  
 4G b4 bPJCL' sb.s.Vsfnlz'' bΔCL' VbPDbfnz''  
 VDr ba.Vsfnlz'' 4G bΔp4'x 9d' Δd V4'c.Δ

<Δ'נל', ∇·ב C' מד' ב·Δ' בא9 סרדבגנרר',  
 רז·Δ' Δd ∇C ∇DCLσbU', <Γ ΔL ∇Dר  
 רדבגנל', ב·Δ' C' ג·אסרמ' רזרררר' <ר'ד'  
 <·Δ'ל ברר' בא·∇σג' ברר' אבר"Δ' <·Δ'ל, Δ·∇  
 בבדבגנל' בΔCL' <ר'ד' בבא·∇σגנל'. Δ·∇  
 ג·ב' ∇ב רז·Δ' ב<לרר', רררσL <·Δ'ל א'C לd  
 ב<Δ'ל', U·V לd רררררר' <ר'ד' ררר' בא·∇σג'  
 <·Δ'ל <Γ בררר'.

מד' ב·Δ' Δררר', ב·Δ' <·Δ'ל רדבלבמ·Δ'ר' <Γ  
 לd ∇C רז·Δ'σ' ∇Dר ברררר', ΓC' <ר' <·Δ'ל  
 ב<ר' <D'לל' ∇ב בא·∇σג' <·Δ'ל D·∇ ·Δσd  
 בררר' ב·Δ' א' א'C סנרלר', Δ' C' ·Δσd ·∇נ  
 ·∇'ב' <·Δ'ל ∇Dר'בא·<<Γ' ∇·ב C' ב4 ב·Δ'  
 ל'רר·ΔבΓ' דר<לרר' דL, <Γ לd ·Δσd <"<·∇  
 <σ'σσ·Δ ל'רר ∇ר<<רז', L·<' ר<ררר' Δ·∇  
 <σ'σσ·Δ ל'רר ר<'C·Δ'ב9Lב' ב4 Δ·∇ בר<<רר'U'  
 ∇·ב מד' ברר'CL' ·∇Γנד' ל'רר, σ' ε·Δ' ב·Δ'  
 סרר'C' <d סנ'C' ·∇Γנד' ל'רר, ΓC' ·Δσd  
 ∇'<<רז', D·∇ ברררר', <σ'σσ ל'רר בר<CL'  
 ב·Δ' ל·ברר·∇Lב'ר', U·V ר<'C·Δ'ב9Lב' ∇ב ·Δ'  
 ·∇Γנד' ל'רר רר'σ'ר'·∇Lב' <ר'ד' א'C ב4 <ר'  
 D'σ'רר'ר' ר'ל' ד'ε' Γ'C"Δ בר<<רז', ΓC' D·∇  
 ∇'Γר·∇' ·∇Γנד' ב·Δ' בא9 א·<' <ר  
 D'ב·9Δ'σ'σ'C' Δ·∇σ בר'σ'ב9Lב'σ', <Γ D·∇ ב4  
 <'ר ל'רר ∇C'σ'CL' ב4 א'C בר'σ'<·9'ב' א'C בררר'  
 א'C ב4 בר'ל', D'ר'Lσ'ε' ·∇Γנד' <Γ Δ·∇ ∇ב·9  
 <'C·Δ"Δ' א'C Γא <ב' בר'σ'ל'σ' <Γ Γא·<  
 ∇<σ'σ'σ'ε' א'C Γא D'Cσ ל·ב·בר'ε' א'C Γא  
 D'Cσ'ר'σ'ε' <' ΓC' ∇ב·9 <'C·Δ"Δ' בר<ר'σ', Δ·∇  
 בר'σ'·Δ'CL' D·∇ <ר' ·Δ<' ∇'Δ'ב'ε' ·∇Γנד'

'U' ΓΡ'

▷CC·ΔΔ·∇·Δ' ∇·b C' <σσσσ ▷αC·ΔΔ·∇·Δ' b·Δ'  
 ηL' C<αPLbρσ ▷αC·ΔΔ·∇·Δ' <Π' ·ΔbC ▷Cσ  
 J'Δ'bd' bΔJ' <C·ΔΔ·∇·x b·Δ' C' ·Δ' C▷Γ  
 ΓCρρρ' bΔJ' <C·ΔΔ·∇· <σσσσx ΓC' b▷Γ  
 <α·∇'CL' ∇b ηL' b▷P'bd'x, <Γ ∇J'P'CL' ▷·∇x  
 σC>α' Δσ·∇σ·<' Π>ba' <σ' bΔJ' b9LbP',  
 σ·<<Cα' C' b4x ·∇'b' ·Δ' b·Δ' ▷P'P'·ρ', L·<'  
 ▷P <C·Δ'bd' Δ·∇σ 7·b' bΔCL' <σσσσ·Δ L'P'P'x  
 ΓC' <Λ' ▷·∇ UCd b<α·∇'CL' b<PΠαL'x b·Δ'  
 PC<U' CρΓ' CΛ' d' ∇b bP'9'CL'  
 ∇<σbPσJ'·<αP"Δd'x α·<' Γ·αJ'σ<' Δ·∇ P'P  
 <<P>P<' P>Λ' P'P b·9 P'9'CLP<' Γα P'PJ'PαLP<'  
 Δσ·∇σ·<' bP <<P>P<' bP<<P>·<' PCCα' Γα  
 PΓρΓα' P'PααC·Δ P'9'CLP<' <Γ ▷·∇ ∇·CL'  
 <αΔJ' b·9b>9'x ▷Πx ∇·b Γα Δ·∇ bP'P'·CL'  
 bPΔJ' P'P>"<L·<P·C P>CL' ▷·∇ PΔJ'σbU bσ'P·C  
 <·Δ>' P'βαP'C9'x PΔJ'σbU P'LaP'"<P·C CΛ' d' Δ·∇  
 bσ'P·C ∇b U·V P'σ>·<' Π>b' P'▷P' LαP'<P·Cx <Γ  
 Δ·∇ bPΔJ' ·ΔCLd'x P'βαP'C9'x ·<·∇ σ'P' Γα  
 ρ·9J' ▷'P'J' bLbU·Δ>' P'<d>J'x ΓΠdb' <Γ Δ·∇  
 CΛ' d' σ'βαP'C9·Δ'x ∇·b C' <Γ bσ'P', σ'P·ΔCLd  
 b4 Δ"Δ·∇ bΔJ' LbU·Δ'P'J' P'LσρL' ·∇Π ∇<d>J'x  
 ∇·b C' b4 Λd <P'Π ▷P' βαP'C9 <·Δ> <P'Π Λd'x  
 <Πb C' ·<·∇ <Γ' bΔα' bP'P'·C'dρ' P'P'·C'dρ'  
 L·<' Γσd' Pα·Δ' CΛ' d' b>CL' <αP·Δ', ·Δ' L·<'  
 Γ' C"Δ ▷>C' 9dσ <Γ'x <Γ Δσ·∇σ·<'  
 bP'P'·C'L·<' <σσσσ·<' Δ·∇σ b>CΓσ' Γ' C"Δ  
 αΛ' 9dσ ∇b'P>J'σ' L·<' ∇P'ρ'P'σ' L·<'  
 ∇P'<bρσP' P'ρ' b4 P'PΓΠd' ▷b·<·b"Δ', ρ'Λσ b4  
 ▷b'P>J' ∇P'<"<' bPα 9dσ ▷>C' ·Δ'x b·Δ'  
 <σσσσ Γσd' Δ·∇ Γαρ' P'b'P>J' ·Δ' Γσd' bb'P>J'

'U' GP

GC Δ·∇ bD'P baUσΓ- <Γx <∩b C' Δ·∇  
bbafC9L' <Γ bPDRΓσdL' Dσ' rLaFJL'x <∩b b4  
J' b<ΛrΓ'∩J- qbaF9L' ∇P·Δ'CLdL' ∇PΓσdL'  
CL'd-, Dbc' rLaFJL' r<dJL' a'c b4 D·<L'  
rΛ·b·bCdax

GC bPΔJ·ΔCLdL' Δ·∇ bbaF9L'x bD'P ΔPJL'  
rbaCL' Δ·∇ bbaF9L'x <Γ bPΔJ·Δ'CLdL'  
bPΔ·bJL' Db', <Γ qΔPJL' σabC' σC'Y'P' Γa·<  
σbΛa'rb' <Γ Δ·∇ qΔPJL', <Γ Δ·∇ bPΔσJ'x GC  
D·∇σ·<' bPa bLaFrbUP' CL'd- Γa·<  
rΛa'rbUP' Δ·∇ ∩ab' <Γ Δ·∇ bPDR JrbU'x b·Δ'  
C' ·Δ' ·Δb qd' D'rΓrY'p' <∩b b4 bLP"Δ'·C  
<Γ·b' Γa·< Λd <Λ- <L·<' ΔL bPΔJσC·ΔP·<  
∇·b C' b4 J' ·Δa·< ·∇Γ∩dJ·<' DcσΓ∩a·<  
∇·b C' ·Δ' <σJσσ bΔJΓσ- <Γ Λd J's' ∇J ΛΓ  
ΓJ·<'x b·Δ' <Λ' <σ<L'·<' bΔPJ·<  
·∇Γ∩dJ·<'x <σJσσ·<' C' ·Δ' Δ·∇ bPΛΔrY' <Γ  
Λd bΔJ ΛΓL' Δ·∇, <∩b b4 <Γ·b' bPΔJLP"Δ'·C  
<Γ Λd ∇J·b' ∇JCr·<', b·Δ' D'rΓrY'p' Δ·∇x  
GC Δ·∇ bPDR bafC9aσ·<' ∩ab' ∇b ∇DRΓrY'  
CL'd- bafrbU' Δ·∇ ΓΔ·∇∩b9"Δ ·Δ' b·Δ'CL'  
bafC9·Δ' bΔrbU' ∇LaFrbU' qd'x

<∩b b4 ·<>' L·<' P'c'dr ·ΔL' aΛ- ∇·<9·Δ  
UΛΓrbU' ∇·b C' ·Δ' ·<>' b·Δ' ·Δb PDR  
UΛ<·L'p', Δσ·∇σ·<' bP<L'p' ΓrL', <Γ b·Δ'  
PDRUΛΓrbU'p'x ∇·b b4 P'p' b·Δ' ΔJ' ·Δb aΛ-  
UΛ<·L'J', <Γ Λd J's' bPDRrbU', J's' ·<>'  
∇b·q<J'p' ∇·b Γa P'p' <Γ Δ·∇ bΔrY'x <∩b C'  
·Δ' ·ΔL' b<L'rbU' aΛ- ·<9·Δ UΛΓrbU' ∇·b b4

י'ו' גר'

י'ו' ר'א' ר'ט' ב'ד'ס'ר'ב'ט' א'ל' .ד'ג'ד' ו'א'ר'ב'ט'  
 .ד'ג'ד' ו'א'ד'ל' י'ו' ד'נ'ב' ב'ג' ד'ג' א'ל' .ד'ג'ד'  
 ו'א'ד'ל' ב'ג' ד'ר'ל'x ג'ט' ד'ד'ג'ס'ד' ס'י' ג'ר'ג'ט'ל' ג'ב'  
 א'ל' ג'ד'ג'ד' ו'א'ד'ג' .ד'ג' ג'א' ר'ט'x ב'ד' .ד'ב'ס'  
 ס'ר'ד'ר'ו'א'ד'ל'ר' ר'ט'x ד'ג' ג'ר'ג'ט'ל', ג'ט' ד'ד'  
 ד'ס'ג'ס'ד' ב'ר'ב'ג' ל'א'ר'ג'ל' .ד'ג', ג'ט'ד' ג'ב'ג'  
 ד'ל'ד'ר'פ' ט'א'ד' ג'ב' .ד'ב' .ד'ס'ד' ג'ו'א'ד'ג' .ד'ג' ד'ג'  
 ד'ד' ג'ג'ט'ל'ר'פ', ג'ג'ט'ל' ד'ד'x ד'ר'ט'ט'א'ד' ב'ר'ס'ט'ג'ל'  
 ר'ד'ס'ר'ל' .ד'ס'ג'ס'ד' ב'ג' ב'ד'ס'ר'ל' ט'א'ד' ב'ד'ס'  
 ט'ו'ר'ל' .ב'ד'ס'ר'א'ב' ד'ר' ד'ג' ב'ד'ס'ר'ט'ט'ד'ר' ג'ד'  
 ב'ד'ס'ר'ל'x ד'נ'ב' ב'ג' .ד'א'x ג'ב' ב'ה'ב'ד' ל'ד'  
 ג'ר'ר'ט'ט'ג' ג'ד'ג' א'ל' ב'ג' ג'ר'ט'ט'ד'ג'ג' ב'ג'  
 ד'ס'ג'ס'ד' ג'ר'ל' ד'נ'ב' ב'ג' י'ו' ב'ט'ד'ל' א'ל'  
 ג'ר'ט'ט'ד'ג'ג', ד'ג' ד'ג' ב'ר'ד'ר'ל'x ג'ב' ט' ג'א'  
 ב'ד'ס'ל'ג' ג'ר'ד'ס' ל'א'ר'ד'ג' ט'ל'ג' ר'ד'ג' ד'ג' ב'ג'  
 ב'ר'ג'ט'ג'ד' ד'ד', ג'ד' ד'ד' ד'ר'ט' ג'ר'ד'ר' ל'א'ר'ב'ט'x  
 ב'ד' ב'ג' ט'ר'ר'ב' ר'ד'ר'ד'ג'g'x ד'ג' א'ד' ר'ט'g'  
 ב'ד'ל'א'ר'ג' ר'ט'ב'ד'g' ב'ג', ט'ב'd'ב'א' ר'ט' ג'ר'ד'ג'ד'  
 ט'א'ד' ב'ג' ב'ר'ד'ג' ל'א'ר'd'g' ר'ט' ב'ט'b'd'ב'ס'ד'x ב'ד'  
 ט' .ד' ב'א'ג' ד'ד'ג' ד'ד'ד'ל'g' ב'ג' ד'א'ט'r', ל'ד' ט'  
 ג'ר'ט'ד'g'g' ט'b'd'ב'g' ב'ד'ס'g' ב'ר'א' א'ד' ג'ר'ט'r'ט'ט'g'  
 ג'ר'ט'g'g'd' ג'ט' ד'ג'ס' ל'ד' ב'ר'ד'r' r'ט'ב'ג'g' ד'ס'r'ט'ט'  
 .ג'ט'g', ד'ג' ד'ג'ג'ס'ד' ב'ר'ד'ר' ל'ט'ב'ד'נ'g' ב'r'ד'g'g'g'x

## Thadius Wabasse



### Biographical Information

Date of Birth: November 15, 1931

Place of Birth: Attawapiskat,  
Ontario

Present Address: Nibinamik,  
Ontario

Name of Spouse: Martha  
Roundhead

Number of Children: 7

Grandchildren: 16

Great-grandchildren: 0

Number of Years Married: 43

Date of Interview: April 24, 2003

## Thadius Wabasse

I'd like to start with traditional food that our people had. This is what my parents showed and fed me to live off the land. They provided daily ducks, rabbits, grouse and moose whenever it was hunted and many other traditional foods. I still eat the food we had when we were growing up. We hardly had anything from the store and now I am seventy-two. I eat very little store food. My parents cooked their food to keep it longer and I make smoked fish for myself. Fish is cleaned and prepared for the smoke rack and hung over a fire and fish eggs were prepared to dry. Bannock made with fish eggs and fresh food was boiled to eat and all kinds of fish and game, sometimes otters, mink, lynx, and muskrats. ... That is what I ate.

Fish was the main meal mostly and it was hard fishing in winter. You didn't just go get anything right away. Due to weather and windy days, hunting wasn't easy and that is why they would keep

## Thadius Wabasse

food on hand. There was something to eat if nothing was brought in for the day. I saw them making pemmican and dried fish and oil kept in a sack. Dried fish skin was used as a container. We always ate our traditional food the way my parents would prepare it. As I was growing up it's all we had. Now I long to eat some foods I had years ago.

Medicine was handed down from our ancestors and these were gathered to use for colds and sores. Medicines had different names and some were mixed together to apply on wounds or for colds. Roots, leaves, and berries either boiled or pounded, even bark was scraped off and used for treatment. Our environment was peaceful before gradual change arrived in our community.

Like I said, it was hard to get food. I remember seeing a fish trap made out of wooden sticks. Fish would get caught inside and this was one way of getting food. Mother made a fish trap and I watched how it was made. The other way is with a fish net. We only had one [net] that always had to be mended. [It was] too precious to throw away and that is what they did with clothing, too. Everything was either mended or patched, nothing ready-made or new from a store. Shotgun shells came empty and had to be filled, stuffed, and sealed before use. Guns were different, too, and what we have today are not the same.

I would be asked to go along with others to get food and I remember this way of fishing. I don't see this happening anymore. We went out to the lake and I saw all kinds of fish floating around, some were hardly alive and some were dead. What they did was scoop up fish and take a load home. [They] had fish for supper. Many people used to do that.

An elder made a birch bark canoe. I watched him work on the canoe until he finished it. They are quite sturdy, like a strong boat. Not only did they use birch bark for canoes, it was used for many

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other things. Birch wood and bark were used to make dishes, baskets, and a roof. Bark was woven together to cover a wigwam and rolled to carry with them from camp to camp. A shovel was made out of birch tree wood, which was very useful everywhere like lifting a fish net in winter. We had many wooden spoons and, of course, handmade snowshoes. I remember when they had only an axe to chop a tree down. Axes were hard to come by. It was very hard work to provide wood to keep warm in winter.

I was content as a child and didn't mind if we didn't have much food to eat. I never heard anything like a machine. All I heard was the wind blowing and roaring rapids, too. My parents never had much and were quite healthy and strong from eating traditional food.

Dog teams were a way of travelling around. A toboggan was loaded up just enough for a dog team to manage and they would carry other things on their backs. My dad taught me how to trap and I watched him go about his work. He told me as soon as you learn and can look after yourself, then you can be on your own in the bush. Soon I had a wife and found out how hard it was to provide for a family. But not for long. [Soon] I was able to become more confident in what I was doing out there. We had six children to raise and lost one. Things are different now. Children went to school and became more educated and did everything differently for themselves. My sons and daughters are so changed. [They] have accepted modern day living and will no longer eat traditional food—only store bought food. ... They are slowly losing their language. One son of mine will not speak the language. My children have become different and are not like the they were while we were raising them. [It is] so different now.

Once a family is affected like that, it is impossible to try and redo what once was a tradition, [it is] too late to get it back and it is because of changes. Family needs and teachings were good before all

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this distraction happened and disrupted our lives. These distractions have such a strong pull on our young people. ... They will not listen to the way we lived before and they don't believe any of it, even when you try to tell youth today. It is because of school that they will not have anything to do with it. They will not work and do things how we did. They only care about going by ski-doo and car. Many home appliances are what they want to use; so easy, available, and still they don't work to take care of their home.

This is what I see happening among young people. They don't want to do anything you tell them to do. They do only what they learned in school and that's what they want to follow in their lives. They will not do daily chores, let alone chop wood in the bush. All they do is depend on their parents to do all the work and sponge off them. Their ways are learned from school and so, when you try to feed them traditional food they frown on it. All they want is pop and chips. I believe that not all of them are like that and not all are living that way.

Nobody wants to walk anymore. All you see are ski-doo tracks on the snow. This is what is carrying them around. I never walk along the track of a ski-doo because you never know where it leads and I don't trust that machine. You can't see where it looks bad on the trail and where there is thin ice. A machine doesn't tell you that and you ride over it. It wasn't like that before. People were very cautious and carried a stick to check for thin ice and could tell where it was bad because they knew the lake. That machine doesn't care what happens to you. It can kill you. Some people know how to look after things and it serves them well. There are so many things in the bush that can give you problems.

In my own life and experience, some things didn't work for me. ... In my own way of thinking, if it doesn't work for me, then I will just let it go. If I started to think it's not a good thing for me to use, then why bother having anything like that in my life. I thought the

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same about my children and what the future held for them; things will not always be fine. I used a few modern day things, decided to let them go, and found out I live better. Life has more meaning for me since I gave them up. Things don't bother me much anymore.

I visit other reserves when I hear about something going on. I want to find what I am looking for and to see for myself. I hope that my advice and teachings are seen as a good thing to work hard and have it accepted on its own merits. That doesn't happen anymore because when an elder speaks. People don't seem to understand and therefore it becomes a meaningless issue. If a person accepts what is told to them, then it will work if they follow the teachings.

I always went with my parents and brought something. My mother was blind and I would take her to church when she wanted to go. I began to understand what the Bible meant when you honor and respect your father and mother. You will have a long life and this is what I followed and have done in my life. I don't mind helping my neighbor at all.















## William Winter



### Biographical Information

Date of Birth: June 4, 1921  
Place of Birth: Kaneshooshig  
between Kingfisher Lake and  
Kitchenuhmaykoosib, Ontario  
Present Address: Kingfisher Lake,  
Ontario  
Name of Spouse: Rhoda Sakakeep  
Number of Children: 5  
Grandchildren: 18  
Great-grandchildren: 20  
Number of Years Married: 61  
Date of Interview: April 26, 2003

## William Winter

I was asked to talk about some of the old ways that I saw as I was growing up. I was born somewhere in the bush on June 4 in 1921, and I was told at that time there were no modern day things that we see today. There was not even a store either. The nearest store was in Big Trout Lake and that was quite a long distance when you think about if you were to travel by foot. My parents used to tell me I was born in one of the places where they always stayed — on one of the trap lines. There was nothing like milk and baby bottles that children use today. Those things didn't exist when I was born. They didn't even have basic things like candles. So, they didn't have anything like that when I was a child. They used birch bark for candles and they would roll it up and light it, it burned for a long time. This is what we had for light at night. At that time, people mostly did trapping for survival as well as fishing. They spent all their time looking for food while living on their land. The nets they used weren't very strong and they were very small. Today, it is very

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easy to catch fish. It wasn't like that [then]. Women made their own nets when they needed them to catch fish. That was my main source of diet. My mother told me she used to dip a cloth in fish broth so I can suck on it. My father was away at his trap line when I was born. It must be about 30 miles away from this community where I was born, nearby that big river where my father did most of his trapping. When I about a week old, my parents moved to that trap line. Meanwhile he was checking his traps as they were travelling. My mother didn't have anything to use to carry me around. So, they made a little sled and that's where she strapped me in while they were portaging. I was taken quite a distance just a few days after I was born. I went to this place where they camped overnight when they were travelling. I saw these old birch bark candles laying on the ground that they used for light that night.

My father always trapped for otters.

I still remember some of the ways that they did a long time ago, mainly to sustain themselves and to feed me. I watched people catching fish especially in summer time. There were lots of fish during that time and they were very tasty. I also watched them making pemmican from the fish that they caught. First, they would smoke them over a smouldering fire. Then they would break them up in pieces to make pemmican. [Later] fish guts were fried until they were all crisp and fat was drained to use with pemmican. After they finished with that, they put pemmican in birch bark baskets. They made these containers air tight. They did this all summer and early fall preparing fish this way, so they can put them away for winter time. This is all we had for our food. There was nothing fancy; not like the way we store our food in the freezer. This was one way of processing food to store away. By late summer, they started getting ready to set up their dwelling place for winter. And I remember they used to look for a spot where there were lots of trees so they can use them for putting up their tipis. They also picked a

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place where there was a lot of moss. Moss was used to insulate the tipi where they were planning to stay all winter. They also had to make sure there were lots of dead trees to use for fire wood.

For fire wood, they would just carry it on their shoulder to their tipis. All they had was an axe to chop their wood. They didn't have saws yet. Only axe heads were available that time, so they had to make a handle for it. They used birch to make a handle. They choose birch because it didn't break easily. This is what I saw when they made their dwelling place. They worked very hard getting all the things they needed to make tipis and everything was done by hand. They had to use the certain kind of moss for the tipi. This moss was really good for insulating.

I began to start helping carry moss as I got bigger and stronger ... . Everything that they did I learned to jump right in and help maybe when I was about seven years old. By the time I was ten, I was already capable of doing all kinds of work. I was not even ten years old yet when I started going hunting and staying out all night by myself. People were very amazed how quickly I learned to do these things.

We stayed at that place until ice on the lake was thick enough to walk on. There was a river where we had our camp and this is where we always preferred to stay. There were other families that were close by where we lived. They used to make fish traps by a river in the fall. They caught many fish when they used a fish trap. They just left it there until a river froze up and that's when fish stopped migrating. After they pulled them out of a trap, fish were hung to dry. They also made a cache up in the trees and put their fish there for winter. That's where they went to get fish every morning for breakfast. When they did this, fish were there all winter for food. They depended on fish when the weather was too harsh to go hunting for other animals. They also had pemmican that came in handy during that time. But that didn't stop them from trapping

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and hunting. Before men headed out to their trap line, they used to prepare everything for their wife and children who would be staying home by setting a fish net and setting as many as fifty rabbit snares. A wife would go out to check the snares and take all the children with her. Everybody had to walk and if she has a baby, she would carry it in a cradle board on her back. Children would pull a toboggan and put rabbits there. Sometimes there would be lots of rabbits and when they got scarce, it made life harder. So, they had to depend on fish and other animals. Not everybody had the luxury of owning a gun back then. They had those other kind of guns, but not the ones we call 22s. Those weren't available yet. I remember the things that we didn't have long time ago. I used to make a bow and arrows for hunting. I would hunt for partridges with my bow and arrows. Spruce hens don't get frightened away as they are approached. What we did was get a long stick, put a rabbit snare at one end of a stick, and try to snare it. We knew what to do in spite of not having a gun. Women used to be very good at this. It was really easy to snare grouse. It was just like helping yourself to fresh birds with no effort. But sometimes you couldn't even go near these birds due to the changing environment or when the weather is cold and windy. Sometimes they would just be sitting there as you went near them. This is when you practically picked them up to kill them.

Children learned very quickly how to hunt for these small game animals. They eventually headed out to learn more about hunting bigger game. As long as people worked hard to go hunting, they never got hungry. Children also learned to start working around their place cutting wood for fire. I did this kind of work too, and we had no saw. When they first came out, there was just a saw blade. People were so happy to get something like this. But they first had to make a handle out of wood for a blade. It wasn't very sturdy how we made a handle but it did the job.

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Sometimes there were hardly any moose around while I was growing up. My father used to kill them during rutting season. Whenever we had moose, it lasted us for a long time. Today when people kill moose, they just take a little bit of meat from it. They don't even take the rest of the moose parts. I used to see people use everything from a moose. The only things that were thrown out were bones, but that was after they were boiled and picked clean. Only a cow was rich with fat. That's why they used to boil bones to get marrow. That was a delicacy. The hide was also used and it involved much work when it was being worked on. But they were very skilled at it and it didn't take them long to soften and tan it. I used to be so proud to get a new pair of moccasins from a hide that they just finished working on. Three main things were easy to hunt for food: fishing, fishing using a fish trap, and hunting for partridges. There were other kinds of partridges, [but] you couldn't use a stick to catch them. You needed a gun to kill them.

When they sold their pelts, they didn't make much money. Not the way it is today. I think the price is very good. When I first learned to start trapping, I remember the highest price for an otter was about \$10.00 and mink was about \$5.00. That was the highest [price] for a good pelt. Muskrat had a good price. It was \$1.00 each, [with] the highest [price being a] \$1.50. That was really good back then. Before that, I don't know how many muskrats you needed to sell for one dollar.

Muskrats were also used for food when we were trapping them. There were lots of them by early summer. Fish would start to go near the shoreline. Food was very plentiful during that time and on top of that, waterfowl were migrating back in spring.

Not everybody had a gun when I was young, but we did eventually buy them. However, bullets were not available. We had to make them. You had to do so many things before you could shoot with that gun. It was quite amazing how people became quite skilled at

## William Winter

preparing their gun to shoot a moose and kill it. Sometimes there would be three moose standing around and they had no problem killing all of them. That's how fast they were at putting the gun powder after each time they pulled the trigger. I used to listen to men talking about how they always managed to kill moose with that gun. Sometimes they would go very far away from their camp when they went moose hunting. So, if they killed a moose that far away they didn't have very much to use for transporting it back to their place. All they had were dogs to pull a sled for them. These dogs were very strong when they were pulling a sled along with meat. I used to have a dog team too. And I started going with my dogs to get a moose by myself. When the season started changing from winter to spring and if a moose was killed far away, everybody moved to where it was killed and stayed there for a while. They moved to another spot where another one was killed. I remember how much I used to enjoy living this way, especially when we moved to one place to another during spring time.

Sometimes, we used to see other people from Wunnumin Lake while we were travelling around and they were doing the same thing we were doing.

While we were out on the land, nobody ever had any kind of illness that I remember. Everybody was very strong. We were used to cold weather too, even if it went to 40 below. It never stopped me from going where I wanted to go. I used to hear trees crackling from the freezing cold and I didn't have layers of clothes either. That's how tough we were back then. We even used to go check fish nets in the middle of winter. We would pull fish out of the water and take them off a net with [our] bare hands. It didn't bother me.

We never had any medicine back then. Nobody was hardly ever sick. People died from natural causes or when it was their time to pass on. We never suffered from any diseases. The only thing that we had were common colds. I never saw any medicine. Sometimes if

## William Winter

we got in an accident like if we got a cut from an axe, we used *wigoop* to stop bleeding. I always saw people using this for cuts. I used this many times while I was travelling, or if a child got cut too, this was used.

I watched my mother making medicine. If a child couldn't have a bowel movement and if she thought that it was beginning to make him sick, she would go look for a cedar tree and cut the inside bark and put it in water. The water would turn really oily and that's what she used to give an enema for a child. She would put the solution in a fish skin bag to administer an enema. A child would soon have a movement after that. There are all kinds of plants used for medicine for many kinds of ailments. I saw them doing this too. People were very strong because all they had were animals for food. They never used stuff that came from the store like sugar. The only kind of sweetener I saw was saccharin. They were very tiny tablets. Children were not allowed to use this. Instead, they were given a cooked jackfish gut to suck on, like a soother.

As I said before during fall just before freeze up wherever we were at, fish were always plentiful. Fish go to another lake during that season. That's where they stayed to gather as much fish [as they could] for winter. I will tell you as an example, in Wunnumin Lake there is a lake where fish travel to another lake at a certain time of the season. That's where people used to go to catch them. They probably are still doing that today. You don't find many places like that where fish are plentiful while they are migrating to another lake. They knew when to go there to catch them and they stayed there until fish no longer migrated.

I listen to people talking today about how non-natives could one day claim our land in the future and we will no longer be able to use it for our livelihood. I am always hoping the communities will hold on to their traditional territories for the benefit of their future generations. There aren't very many lakes where fish are plentiful in

## William Winter

this area. That's why I'm saying if only people still followed this tradition while the opportunity is still there for them to use today.

We were very strong long time ago and we never had any problems with anything. No matter how far they had to walk to get to where they wanted to go, even if it is sixty miles away, it didn't take them long to get to their destination. I walked long distances when I was young and if I wanted to go where the store was, I went. It wasn't just a short walk. Today, I can't even walk to the store in my community.

When it was time to be on my own, it wasn't long before I got married. We only stayed on a trap line for a short time. Only my oldest daughter got to experience the traditional way of life. She still follows some of these old ways today. She was very good at setting a fish net at any time of the season. She did everything I did when I used to hunt. Our second oldest, our son got to see some of the old ways while we were still surviving off the land. It wasn't too long after that when we moved to the community that was called Big Beaver House. I became a church leader and I'm still working as a church leader today. So, I gradually stopped going to my trap line after I was ordained many years ago. But I still kept on trapping while I was still able. I got a chance to kill a moose once in awhile. I started seeing commercial fishing. They were selling sturgeon mostly. So we started staying at a place all summer where we were commercial fishing.

This is what made families strong back then when we were living off the land. We never had to worry about anything else. There were no outside influences yet so our children were our students and they learned what we taught them. But today, it is very different and because our way of life is almost nonexistent. People are no longer strong.

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The other thing I was asked to talk about is what made your community strong. I really can't say too much about this. But I will try my best to explain what it takes for our community to stay strong. I'm starting to see our young people getting educated and doing all kinds of work in the community. They are running businesses on their own. We have our own community owned store, hotel, band office, laundromat, and mechanic workshop. Local people started these things. They didn't get any assistance from outside. They even have local education authority. I think it is important to work as a team in the community in order to gain self reliance. Things are changing and this is one important way for people to have an income from the community itself and to provide them employment rather than looking for help from outside. They can no longer rely on the old way as we had long time ago. The other thing is the community can't get strong if people don't agree with each other on certain issues. If one person wants to start something, it won't happen if others have different ideas. They need to stand together to be able to get things off the ground.

All those things that I already talked about are ones that were important in our lives in the past. Things that we used for food like fish and other kinds of animals were the most important items in the lives of many people long ago. The other thing that they valued was that their children to learn skills that made them strong so they could use them in their lives.

There was much work that needed to be done every day: hunting for food, getting things for the place like wood, and keeping the place clean. All we had was a tipi and that's where we all stayed all the time. We used boughs for mattresses. We never had beds back then. I see all kinds of beds shipped to the community today. We only had rabbit fur blankets and it kept us warm. We also used them for hats and pants.

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The other thing I am going to talk a bit about are my parents. They were devoted Christians. They were very strong in their beliefs. And they never did their work on Sundays. By Saturday, they did everything like getting fire wood that would be used on that day. They just stayed in their tipi all day Sunday and they didn't hunt or travel. All they did was keep their fire going and eat whatever they had. They did their prayer service three times on Sunday morning, afternoon and evening. They did this even while they were out on their trap line. So, we were expected to do the same that they were doing. I used to have bow and arrows when I was a child. My parents used to put them away [on that day]. I wasn't to touch it until Monday. This was one of the important parts of their lives, but today people don't follow that anymore.

I was very honoured when I was asked to talk about some of the old ways. It is kind of difficult to remember everything that was done in the past. But I thought I would at least share some of the experiences that I still remember. I still have many stories that I could talk about but it would take very long. But these are some of the highlights of what I saw since I could remember some of the important things that I learned and followed in order to have a strong life. I'm sure there are still a few of us elders who saw these things while they were growing up.

Wacheyea to everyone that listened to my story.



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 ΔhΛ<sup>c</sup> •Δσd ρΔhΛ9 b•Δ<sup>c</sup> C<sup>c</sup> b4 ρΔρ ρ.m<sup>c</sup> Δ•∇  
 Δh<sup>c</sup> b•Δ<sup>c</sup> C<sup>c</sup> •Δ<sup>c</sup> b4 ρΔρ Δρa.dρ<sup>c</sup> m<sup>c</sup> Δb<sup>c</sup> bΔρ  
 a"ΔbρΠσ9•Δ<sup>c</sup> bΔρΔλ<sup>c</sup> b•Δ<sup>c</sup> ρΔρ Δρa.dρ<sup>c</sup> ΓC<sup>c</sup>  
 ΔL ρΔCρ"Δdλ<sup>c</sup> bσC•Δρλ<sup>c</sup> a<sup>c</sup>C Λd Δb<sup>c</sup> Λ<•bσb.m<<sup>c</sup>  
 bdC•ΔσbU<sup>c</sup> σΛ a<sup>c</sup>C Λd Δ>Λ•Δ> ΔΓ Δ•∇  
 m.aρ9"Δdλ<sup>c</sup> ∇∇Λ•Δλ<sup>c</sup> ∇•b Γa Γ•b<sup>c</sup> bσC•Δρλ<sup>c</sup>  
 9σ<sup>c</sup> Γ•b<sup>c</sup> Δd Δρλ ∇aρ•Δσ"Δ9<<sup>c</sup> ΔaΔCCΓλ<<sup>c</sup>  
 ρΔρ •Δ•Δσ"Δ9•Δ<sup>c</sup> bΛΛΛρ"Δ•Δ<sup>c</sup> ΔL C<sup>c</sup> bΔCL<sup>c</sup>  
 ΔL Δρ Lλρ<sup>c</sup> Δd σρΓCa Π<"ΔbσλΔ<sup>c</sup> •bλ<sup>c</sup> ΔC  
 •∇Π ∇•b •Δ<sup>c</sup> •∇Π ρρρΛ ∇•Δ•ΔρΠ•9λ<sup>c</sup>  
 ∇ρ•Δσ"Δ9<<sup>c</sup> Δd ∇ΔCCΓλ<<sup>c</sup> Vρ<sup>c</sup> Δd ΔL 9b<sup>c</sup>  
 Δd UΛa•b<sup>c</sup> ΔL bΛΔρ ρ•∇<sup>c</sup>b<<sup>c</sup> ΓC<sup>c</sup> ΔΛ<sup>c</sup> Δ•∇  
 ∇ρdC•ΔU bΔρλ<sup>c</sup> ∇ΛΛΠρλ<sup>c</sup> ΔΛ<sup>c</sup> ∇ρΛρ•Δσd•Δ<σ<sup>c</sup>  
 ΔΛ<sup>c</sup> Δ•∇ •Δσ"Δ9•Δσ<sup>c</sup> ∇Λρ<sup>c</sup> ∇Λaρ•Δσ"Δbσ<sup>c</sup>  
 b•Δ<sup>c</sup> b4 9d<sup>c</sup> ρΔρ Γ•aρ<sup>c</sup> bΔρ ΛΓ•Δσdλ<sup>c</sup> ΔΓ  
 ∇ρΔ<<sup>c</sup> Δd<sup>c</sup> ρΔρΔρ"Δb.m<<sup>c</sup> b4 ΔC<a<sup>c</sup> ΔC<a.d<sup>c</sup>

•Δσλ° •Δ'C≥

бДС<9•< P J P Д J " < б м • Δ x Γ C ° Δ • ∇ ∇ Γ м б Γ °  
∇ Δ ρ γ ° б Δ C L ° Δ L б Δ J ° < б • б Λ σ J ° d < ° ° Д σ б Γ °  
б б < ° ° б Δ J ° σ б U ° x C Λ а • Δ ° а V ° < ° Δ J °  
P J L П а б σ • Δ x Δ • ∇ • Δ < ° ° < ° γ σ P Δ J ° Δ σ d  
σ P • < < C а < ° Δ L σ ° C ° ∇ P Δ J ° σ < d < ° °  
∇ γ б б Γ P ρ • б < ° ° < ° Δ ° ° • Δ • б ρ П П Λ σ б а ° б Δ ° • б P U P °  
< ° Γ ° Δ • ∇ б P Δ J ° • < ° U а L d ° ° ∇ П Λ б ° x Γ C ° Δ d  
Δ ° Δ • ∇ б Δ а P J ° ° б Δ P J ° ° ° < ° ° б P • < ° σ ° < ° L • < ° < °  
σ ° P • б ° ° < ° γ • ∇ П x

∇ • б C ° Δ • ∇ б б • 9 P Γ d ° ° 9 σ ° σ C а P 9 C ° P U Λ б м 9 ° °  
б P < Δ J P 9 • < ° ° Д П ∇ б • 9 Λ L P ° ° Δ • < ° ° Д П 9 σ ° x  
Δ σ • ∇ σ • < ° ° σ P • < < C ° ∇ J P б U ° Γ Λ d ° Δ ∇ б • 9 σ γ • < ° °  
P м ° ° б σ Λ σ ° x б σ Λ σ ° ° Д П б б • 9 σ γ • < ° ° P м ° ° ∇ • б  
C ° γ б ° б ° б Γ J м • < ° ° P м ° ° б < C ° а Λ ° L Γ м J ° ° < ° °  
P м ° ° б σ Λ σ σ ° x < ° ° Γ б V Λ d ∇ J C J • < ° ° ∇ м б ° Δ 9 • < ° °  
б Δ P б U ° x Λ а L б P J U б • γ • < ° ° P м ° ° б J C J • < ° °  
б J ° d Λ а • < ° ° б м б ° Δ 9 • < ° ° C d б < Δ ° Δ • ∇ σ  
P м ° ° Δ Λ Γ U σ б Δ J ° ° < ° ° x Γ C ° ∇ J ° Δ J ° ° < ° ° Δ • ∇  
б σ Λ σ ° x Γ C ° < ° ° Δ ° ° б Δ ° • б P J ° ° < ° ° Δ σ • ∇ σ • < ° ° Γ P L °  
б Δ J ° ° < ° ° б < ° γ J • < ° ° Γ C ° < ° ° Δ ° ° • Δ • б ° а а J σ б U x  
• Δ • б γ П d ° б Д П σ б U ° б < d а б м • Δ ° ° • Δ • б γ П ° ° Д J P б U  
• Δ • 9 J ° Δ P б U C Λ ° d ° Δ d Γ П d • < ° ° Δ ° C • б ° x • Δ • 9 J °  
σ П J ° σ б C Γ ° ° σ а • Δ ° ° x Γ C ° Δ L ∇ J ° Λ а • < ° ° < ° °  
Δ σ • ∇ σ • < ° ° ° Д м б ° Δ б σ Γ • < ° ° < ° ° ° б <  
Д P м ° ° Δ Λ Γ U Γ • < ° ° < ° ° ∇ J C J • < ° ° Δ • ∇ б L γ • б σ Λ σ °  
б < а • < ° ° б Λ C • б P σ ° x < ° ° Γ Δ • ∇ L • < ° ° P P 9 • Δ ° ° б • Δ ° ° L Γ ρ  
9 d ° ° P Д P ° ° < ° ° x м d ° ° Д C • Δ ° ° б < ° б P P б б м • < ° ° C P ρ P б ° x  
< ° ° Γ Δ • ∇ V J ° ° Д L • < ° ° P P 9 • Δ σ • < ° ° x ∇ • б C ° < ° ° Δ ° °  
б < ° σ C • б P ° P γ Λ ° Δ d ∇ Δ ° ° < ° ° σ Λ ° ° < ° ° Γ < ° ° Δ ° ° ∇ Д J ° ° < ° °  
б • Δ Δ J ° б V J ° ° < ° ° x Δ • ∇ C ° σ П J ° P 9 ° ° C ° ∇ P J C J • < ° °

•Δσλ' •Δ'C>

▽P ααC•◁◁CJ•◁<sup>-</sup> L•◁<sup>-</sup> Δd bΔJΓ•αJσ' b•▽\_mC'  
 ΓΠd' b▷P ▷JΓbUP' LJbaΠd' ▽•b Γα ◁"P  
 9▷'ΠσbU'x ◁"P P•◁◁•bb\_•◁' Δ•▽ ▽▷JΓbU'  
 b•ΔCJ' Λ>σJασ•◁'x ▽•b Γα P•▽\_mCP' Γ"γ' Γ"γ'  
 Δd P•▽\_mCP' ▽•b C' Γα PΔJα•b' PJP  
 ◁λ•◁Pσb\_•◁' α•◁<sup>-</sup> •Δσd V\_ b◁λLbP'x  
 JΓ◁λ•◁Pσb\_•◁' ◁σ' b•Δ' 9d' P▷P ◁λ' P'P>Pb'  
 bΔPbU'x ◁Γ Λd ▽C •◁b•b' σΠJσbCG' σα•Δ'  
 ▽•b Γα Pb"Δb' b4 σΠJσbCG'x b•Δ' C' •Δ' •bλ'  
 \_md' bLΓ•αJσ' P▷P ◁ΔJα•bP' Δσ•▽σ•◁' b•bλP  
 α<dP'x b•Δ' P▷P ΔJα•b'x •Δσd ◁σJσσ  
 ▷P▷J' Δ•▽σ ▷•◁b•b•CΠ' •Δσd ▷P▷J'x  
 •Δ•bλΠdσ ▷P◁◁P' ◁Γ Δ•▽ ΓΠ' bL'•b•◁'x ΓC'  
 Δ•▽ bPΔJ' •◁◁CCL<' Δ•▽ ▽JΓbU' b▷JΓbU'  
 bΔJbVJασ•◁'x ▽◁\_mPασ•◁' Δd ▽LαΠ•b\_•◁'  
 ▽•b Γα ◁"P ▽◁λ•◁P•ΔPbUP'x b•Δσ' Δd •b'C  
 ◁"Pσ ◁λ•◁' Δd Δσ•▽σ•◁' bΔα<CP'x Λσ'  
 σP•ΔP"Δ•▽ 9σ' ▽◁λ•◁P•◁αUP' Δσ•▽σ•◁' ◁"P'  
 ▽•b Γα 9dα' b◁σLJ' PΛΓ•ΔJλ' 9σ'  
 σPΛΓ•ΔJα'x ΓP•▽ Λd 9d' b◁σJΓbU' Λσ'  
 σP◁σ •ΔP"Δ•▽ α'C Λd b◁σ σ•bλ◁"P•Δ\_λ'x  
 ◁\_s •Δ' bΓCλ◁"P•Δ\_λ' ΓJσ σP P9'C' bCλJΓbU'  
 b4 Λσ' b•Δ' LJ PΓCλ◁"P•Δ\_λ' bb'PJλ' bVJd  
 b•bΠ•bσλ'x

▽•b C' <σL b◁σ◁•bΠ' σα•Δ' •Δ' bPCJ  
 Λ>σJλ' P◁λLb' PΓPΛ ΔL 9σα•Δ'  
 ▽PΓ\_σCαΛλ' Δd\_x ◁Λ Λd bΔPλ•◁<sup>-</sup> dCPλ' ◁•Δλ'  
 ▽•b C' ΔL PΛ ▷J"◁b\_•Δ ΓPb' bΔJσbλ'x  
 PP9σL•◁ bα ΓPb'x b◁σC•bPσ' ▷J"◁b\_•Δ\_x ΓC'  
 ▽J•▽\_mΠP•◁<sup>-</sup> P\_mλ' bΛ'C"◁•▽•◁<sup>-</sup> bC•bP'

•Δσλ' •Δ'C>

b<σ<•bΠσ' Λσ' <Λ' b<σ Λ>σ' b'•bΠ•Δσλ'x  
 <σL Λd bP>'•bΠ' Δ•∇ λΛx <Γ <σL ∇>σ  
 Λ'C"Δ•∇•Δ'x ΓC' •∇Π bΔσ' <dabσ•Δ•Δ' P•λ'  
 ∇P<ΓCdaebσ•Δ•Δ' ∇σ<λ'•Δ' ∇•b Γa UλΛCλ'  
 ΔσσbUσ ∇σ<dλ'•Δ' P•λ'x ΓC' ΔL ∇σ•Δ'  
 b•Δ •Δλ'•Δ' ∇Cλ'qλ'<λ' ∇Δ'C•Δ <λ'•b•λΛσ•C  
 ΔP•∇σ•Δ' b•λ'x <Γ Δ•∇ Vλ' bPΔΓ ΛLΠλ'•Δ'  
 Δ•Δλ' ∇Cλ'•Δ'x Γλ' b' ΔσσbU Δ•∇ ΓC' Δd qb'  
 bVΛ>' ∇Δλ'•Δ' Δσ•∇σ•Δ' P•λ' ΔL ∇ΔΓ  
 •Δλ'σaσ•Δ' bλ bPΓ LLλPλ' 7•b' bΛ>' bPΔσ  
 L•ΔΓ"Δ•C P•λ'x a<' •Δ' bPL•ΔΓλ'bUP' dCPλ'  
 qda'x ∇•b C' <Λ' bΛ>' bΛΓΛ>' bλ  
 P•Δσ"Δbσ•Δ' VP' ∇aC•∇Γbσ•Δ'x Δ•∇ C' •Δσd  
 Cλ'<σ' b•Δσ"Δq•Δ' ΛaL ∇Δσλ'•Δ' bPa qd'x  
 <λ' bλ •bλ' ∇ΔaΛ' ∇•b Γa a•bba' bΔσΓbUP'x  
 b•Δ' C' •Δ' σd' bΔσLΓaσ•Δ' qΓa' Δd σ•λ'λ'  
 bλ ΓΓσaΠP' a•bba' a'C σλ'σΓCa a•bba'x <∇  
 C' Δ•q b<Λ' •Δ' <Λ' ∇σaaC•q' <Γ Λd  
 ∇σLΓ•Δa' Δσbσλ' bΛλ'λaσ•Δ' ∇•b bλ a'C  
 ∇PPΠPaεσσ' ΔCdaC•Δλ'a'x <Γ Λd  
 ∇σ<<λ'•ΔaL' Δ•∇ b<<ΓaaC•q'x ∇•b C' bλ  
 Δ•Δσλ' ∇ΛΓC<a•Δ' •Δ>λ' •∇Π a•bbσba'x <Γ  
 Δ•∇ bCΓbU'x <σ' C' •Δσd PΓσ•Δ' •Δ>  
 bΔaεσ•Δ' •∇'b' ∇•b C' P'Λ' ∇b <Λ' b•Δ>λ'b'  
 σdΠ' bΔλ'λ' aΛ' P<σL'x <Γ ∇C P•λ' Δλ'  
 ∇Δ<Πλ'x ∇•b Γa dCPλ' qda'x b•Δσ' Δd  
 ΔΓC•bλ'σ' Δ•∇ <'Pλ'b' ΔC•Δ' P•∇σC' aλ'  
 ΔC•Δ' P•∇σC'x dCPλ' Δλ' •Δ' ΔP<λ'a•Δ'x Δ•∇  
 C' •Δ' Λσ•Δ <'Pλ'b' bΔΓbU' b•Δ' ΔΓ<λ'λ'σ'x  
 σPq'C' Δd bPΔσ' •Δ<<CL' σPλ'C' Δd qσ'x <λ'  
 ∇PΔσ"Δ' Λ•bd' ∇Δσλ'λ' ∇<Λ•L•b Λσ•Δ' ∇σλ'•b

•Δσλ<sup>c</sup> •Δ'C>

▽·b Γ<sub>a</sub> ·◁·▽ Γ<sub>1</sub>d<sup>y</sup> bΔ<sub>a</sub>b<sub>σ</sub>·Δ<sup>-</sup> aJΛ<sub>σ</sub> b·Δ<sup>3</sup> aΛ<sup>-</sup>  
 ρ◁·bJ<sup>-</sup> ·◁·▽ Λ<sub>σ</sub> ◁Γ ·Δσd ▽P<sub>a</sub>·bσ<sup>-</sup> Γ<sub>1</sub>dσ  
 a·bbσ>Λσ ▽◁·bΛ<sub>1</sub>bUσ<sup>-</sup> ◁Γ ·Δσd ▽▷<sub>1</sub>  
 a<·b"▷<sub>a</sub>b<sub>σ</sub>·Δ<sup>-</sup> ◁Γ b<sub>4</sub> bJCCJ·◁<sup>-</sup> ▽b  
 b▷<<sup>o</sup>ρ<sub>1</sub>bσ·◁<sup>-</sup> Δ·9·◁<sup>-</sup> ▽b ·Δ<sup>3</sup> ▽▷<<sup>o</sup>ρ<sub>1</sub>bσ<sub>a</sub>σ·◁<sup>-</sup>  
 P<sub>1</sub>Γ<sup>o</sup> ·◁▷CΛ<sub>a</sub>bσ·Δ·◁<sup>-</sup> Δd Δ<sub>σ</sub>C·b<sup>3</sup> ΔP·▽σ·◁<sup>-</sup>  
 Λ<sub>σ</sub>·◁<sup>-</sup> ▽·b C<sup>y</sup> ·Δ<sup>3</sup> J<sub>5</sub><sup>-</sup> ρ◁<sub>1</sub><sup>-</sup> ρPV<sub>σ</sub>a<sub>d</sub>ρ<sup>-</sup>  
 b◁ΔJ<sup>o</sup>·▽<<sup>-</sup> bbP<sub>1</sub>b<sup>-</sup> a<sup>3</sup>C bP<sub>1</sub>σ<sub>1</sub><sup>-</sup> bCb<sub>1</sub><sup>-</sup> b·Δ<sup>3</sup>  
 ρPV·<Lb<sub>σ</sub>·Δ<sup>-</sup> d<sub>1</sub><sup>o</sup> C<sup>y</sup> Δd bΔJ<sub>1</sub>σ<sup>-</sup> P<sub>1</sub>bσ  
 ▷JCCd<sup>3</sup> ·◁·▽ Λ<sub>σ</sub> ▽b ·Δσd ρP▷J<sup>-</sup> 9b<sub>1</sub> ΓC<sup>y</sup> ▽J  
 Γ<sub>σ</sub>σ<sub>1</sub>b<sub>σ</sub>·Δ<sup>-</sup> ◁Γ bΔ<sub>1</sub>Δ<sup>-</sup> Δσ·▽σ·◁<sup>-</sup> ΛL<sub>1</sub>ρ<sup>o</sup>·Δ<sub>a</sub><sup>3</sup>  
 ΓC<sup>y</sup> L·◁<sup>-</sup> ◁Λ<sup>3</sup> b◁σ P<sub>1</sub>9<sup>o</sup>CJ·◁<sup>-</sup> ◁·◁J<sub>5</sub><sup>-</sup>  
 bΔ<sup>y</sup>d<sub>σ</sub>·Δ·◁<sup>-</sup> ρ<sub>a</sub><·9·◁<sup>-</sup> ◁Γ Λd ▽J ρP▷ΛP·◁<sup>-</sup>  
 ▽PσC a<·9·◁<sup>-</sup> ·◁><sub>1</sub><sup>3</sup> ▽σ<sub>1</sub>·◁<sup>-</sup> Λσ<sup>y</sup> ◁Λ<sup>3</sup> ·◁<sub>1</sub>  
 b◁σ ◁Δ<sub>5</sub>·◁<sup>-</sup> ▽·b C<sup>y</sup> ·Δσd ▽σC·◁<sub>σ</sub>P·◁<sup>-</sup> bP<sub>a</sub>  
 ◁·◁J<sub>5</sub><sup>-</sup> b·Δσ<sup>3</sup> Δd ρ▷<sub>1</sub> ·Δb <<·◁σ·◁<sup>-</sup>  
 ▽σC·◁<sub>σ</sub>P·◁<sup>-</sup> ▽·b C<sup>y</sup> Δ·▽ b<sub>4</sub> Γ<sup>o</sup>C"Δ Λd Γ<sub>1</sub><sup>3</sup>  
 ▽◁J·◁<sup>-</sup> ▽J<sub>1</sub> ◁<sub>1</sub>·◁<sub>1</sub>ρσbCJ·◁<sup>-</sup> b<sub>4</sub> ▽J<sub>1</sub>  
 >db"◁J·◁<sup>-</sup> σP◁Δ<sup>3</sup>JC<sup>3</sup> ▷·▽ bΔPJ<sub>1</sub><sup>3</sup> 9σ<sup>3</sup> b·Δσ<sup>3</sup>  
 9d<sup>3</sup> P<sup>y</sup>P>ρb<sup>3</sup> ρP<sub>1</sub>9<sup>o</sup>C·b<sub>1</sub> ◁Λ<sup>-</sup> σd<sup>c</sup> ρΓ·σC·b<sup>3</sup>  
 b·◁<CCL<sup>3</sup> ·ΔΛ<sub>1</sub>▽<sup>1</sup> ▽C<sub>1</sub> b·Δσ<sup>3</sup> 9d<sup>3</sup> b<sub>4</sub> Λ·◁Λd<sup>-</sup>  
 b◁<sub>1</sub><sup>-</sup> P<sub>1</sub>ρ▷J<sub>1</sub>ρbU Γ<sub>1</sub><sup>-</sup> b·Δ<sup>3</sup> C<sup>y</sup> ·Δσd ρPLL<sup>y</sup>·b·Δ<sub>1</sub><sup>-</sup>  
 ▷<sub>1</sub>

▽·b C<sup>y</sup> Γ<sub>a</sub> ▽<sup>y</sup>b<sup>c</sup> PΔ<sub>1</sub>Δ<sub>1</sub> 7·b<sup>-</sup> ·Δσd bPΛ <ΛΓP<sub>1</sub><sup>3</sup>  
 b·Δσ<sup>3</sup> U·V ρ▷<sub>1</sub> Γ<sub>1</sub>σ<sup>-</sup> J<sup>o</sup> bΔ<sub>a</sub>bσ·Δ<sup>-</sup> ◁Γ ·Δσd  
 b◁σ Λ>σ<sup>-</sup> b◁σ Λ<sub>1</sub>ρΛ><sup>-</sup> Γ<sub>1</sub>σ<sub>a</sub> σP<sub>1</sub>9σL ▽Pσ<sub>1</sub><sup>-</sup>  
 9σ<sup>3</sup> b▷CCΓ<sub>1</sub><sup>3</sup> J<sub>1</sub><sup>3</sup> ΓC<sup>y</sup> ·Δσd aΛ<sup>-</sup> P·σ<sup>y</sup> P◁Δ<sub>1</sub>Δ<sub>1</sub>  
 ρ▷<sub>1</sub> ΛL<sub>1</sub>ρ<sub>a</sub>σ·◁<sup>-</sup> J<sup>o</sup> bσ<sub>1</sub>σ<sub>1</sub>bσ·Δ<sup>-</sup> ▽·b C<sup>y</sup> ·Δ<sup>3</sup> σd<sup>c</sup>  
 Γ<sub>a</sub> ▽J<sub>1</sub>·◁<CCL<sup>3</sup> J<sub>1</sub><sup>3</sup> bσ<sub>1</sub>·◁<sup>-</sup> <P<sub>1</sub><sup>-</sup> Δd ▽C  
 ▷JCCΛ<sub>a</sub>a·◁ ΔL ▽C bΔJ<sub>1</sub> ▷·Δ<sub>1</sub>ρ·Δσ<sup>-</sup>

•Δσλ° •Δ'C>

▷▷CΛα•Δ'x b•Δσ' 9d' ρ▷CΛαJ•Δ' bCρ  
 ΔJα•bP'x ΓC' bΔJ•Δ<9><' b•Δσ' α'C ρ▷ρ  
 •∇Λαbσ•Δ' J'x Δ•∇ Λd ∇C ▷b' ρ•∇ΛσbU<'x  
 <σL ▷Π bΔ'•b ρσbΓρbUσ' ρ'J' ▷C•Δ' ∇•b  
 Γα ΔαΓ' ▷ba' b<λ>P' bΔ'•b ▷CΛσbUP'x ∇•b  
 Γα J•λ' bΔαbσ•Δ' Γ'C"Δ ΔρP•Δσdρ αΛ' Δd  
 ▷ρ•∇'ρ"Δ•Δ' Δ•9•Δ' b▷J"Δ•Δ' b<PLΛ9•Δ' ∇•b  
 Γα bJ•λ'σ9•Δ' b▷λ•Δ<ρ9•Δ'x L•Δ' Δd  
 ∇LΓ•σCCL<' 9σ' ΔΛ' ∇▷'bPρ'σ' J•λ' ΔΓ  
 bΔJ•Δ<CL' ∇Δρλ'x ∇•b C' •Δσd ∇ρσ"ρρ'  
 ρρ'ΛLρ"▷•Δα' b<PC"Δρ•Δ' ∇•b Γα bΓρbaΛασ•Δ'  
 ∇•b Γα bρρ'Λσ•Δρ•Δ'x Δρ•∇σ•Δ' b< dCPλ'  
 Λσ•Δ' •ΔΛλ' b•Δσ' U•V Δρ•∇σ•Δ' ρρJρ  
 αC•b"▷'•C <'ρρ'b' •Δσd U•Vx ∇•b Γα bΛ>'  
 b•Δσ"Δbρ•Δ' σ' •Δσd b<dP9'CL'x b•Δσ' αΛ'  
 •Δσd ρ▷ρ ΓJαΠ' •Δσdx b•Δ' αΛ' ρ▷ρ  
 Π<"Δbr' LαC' ρd' ▷C•Δ' b<Λρ Γ'C"Δ Δαρρ'x  
 σPP9'C' Δλ' •Δσd ∇•Δσ"Δ9><' α'C ΓC•λΛ' Δd  
 ∇ΔdΔαρρ'<' σ'ρ' ρd' Δd ΔσC•b' ΔΓ L•Δ'  
 ∇Δρρ' ∇•b Lα ρ•9' ΔL Λd σλ•αΛ' ρΔαρρ'  
 L•Δ' ΔΛ' ∇Δρρ' σ'C'x ∇•b •Δ' •Δλ' σPP9'C'  
 Γα L•Δ' Γ'C"Δ ∇Δαρρ'<' α'C VJ•bΛ' ρΔαρρ'<  
 VJ•bΛ' ΔΛC'x L•Δ' C' Δ"Δ Γ'C"Δ ∇Δαρρ'<  
 Δ•∇x ∇•b •Δ' ΔJ ▷Cα' α9Λd Δ'Cρ' VJ•bΛ'  
 ∇ρλd<σ' •Δλ' bΔαbσ•Δ'x ∇•b C' •Δ' ▷•∇  
 J•b' b<σσΛ' ΓC' ΔL b< bΛ ▷'CΠρασ•Δ'  
 •Δλ'•b' ∇Δ•Lbσ•Δ•Δ' CΛαb ΓJ' σλbσ•Δρ•Δ'x  
 ΓJ'ρ<' Δ•∇ •Δλ' Δ•∇ J•b' b<σσΛ' ∇•b ΔΛ'  
 b< ρρ' ∇Δσ αCbΓ'•b•Δ' αΛ' ∇ρCρ<' Γρ' b<



•Δσλ<sup>c</sup> •Δ'C>

∇▷CΛ"◁•◁<sup>-</sup> ∇αPCC<9•◁<sup>-</sup> •∇Π bPΔJ σλ•◁<sup>-</sup> J<sup>ρ</sup><sub>x</sub>  
∇αPbJ•◁<sup>-</sup> Δσ•∇σ•◁<sup>-</sup> ▷J•ΔλPΓ•◁<sup>-</sup> 9σ' Δ•∇  
σP◁σ ◁ΔJCC' Λσ<sup>υ</sup> σP◁σ b<sup>υ</sup>PJ' P◁σ  
LLPσS"Δ9λ<sup>ρ</sup> Λσ<sup>υ</sup> Δd σP<VJ' ∇ααPbL' ◁'Π  
J<sup>ρ</sup> bΔJσλbσ•Δ<sup>-</sup> ∇•b α•◁<sup>-</sup> b◁σ bPρ•◁λ<sup>-</sup>  
b◁σP•b<sup>-</sup> b◁σ ◁ΛPρJb<sup>-</sup> P<sup>υ</sup>Λ' ∇σλbσ•Δ<sup>-</sup> J<sup>ρ</sup> σbU  
PΔJdP•◁d<' bC<sup>-</sup> Δd ◁Λ' ∇P◁'C•Δ Δ'CaΛ•◁<sup>-</sup>  
ΔL bΔJσλbσ•Δ<sup>-</sup> Γα•◁ C<sup>υ</sup> P<sup>υ</sup>Λ' dCPλ<sup>ρ</sup> ∇◁σ  
σλ•◁<sup>-</sup> σbU Γα•◁ Λd ◁σ◁'PdP•◁<sup>-</sup> ∇P<<ΓdP•◁<sup>-</sup>  
▷L Λd Λ•bCP' ∇<<ΓdP•◁<sup>-</sup> σP•◁<C' Δ•∇  
∇JρbU' Δ•∇<sub>x</sub> PΓ•C•b' Δ•∇ b◁ΔJρbU'  
∇<<ΓdPασ•◁<sup>-</sup><sub>x</sub>

σP9'C' ▷S •◁αL<sup>ρ</sup>λbΔbσ' •∇Π α•λ° Δd 9•Δα•◁  
∇<<ΓdP•◁<sup>-</sup> ◁Γ Δ•∇ Jb' bΔPλ<sup>-</sup> Γ•b<sup>-</sup>  
bΛD'ΛP"Δdλ<sup>ρ</sup> ◁Γ bΔPλ<sup>-</sup> Δ•∇ bΛΛLΠPασ•◁<sup>-</sup><sub>x</sub>  
∇•b C<sup>υ</sup> ◁Γ ▷•∇ bPJR ΓPΓ9•◁<sup>-</sup> ◁•Δλ<sup>-</sup> b•Δσ'  
P▷P ΔJλ<sup>-</sup> ◁σJσσ ▷C•Δ' bb•9α•Δ ◁ΔJλ<sup>-</sup> P▷P  
ΔJλ<sup>-</sup> ▷C•Δ'<sub>x</sub> PL<sup>υ</sup>b•◁ΠP b•Δ' C<sup>υ</sup> •Δ' P▷P  
σPJb•◁P<sup>-</sup> ◁Πb α'C Λd 40 b◁ΛPCCbλ<sup>-</sup> ◁Γ Λd  
◁d ∇Lρ<Jλ<' ∇Jρ <<<sup>υ</sup>b•bΠP' ΓΠd' b•Δσ' C<sup>υ</sup>  
•Δ' b4 P◁ΔCΛPλ<sup>ρ</sup> ◁Γ ▷S bΔJλ<sup>-</sup> b•Δ' P▷P  
σPJ b•◁P•◁<sup>-</sup> ◁•Δλ<sup>-</sup> ∇•b Γα bαCλΛασ•◁<sup>-</sup>  
∇◁•bCbΓ<sup>-</sup><sub>x</sub>

b•Δσ' P▷P •◁<CL' L<sup>υ</sup>PP bΔPbU' CΛα•Δ' ▷PCC•b<sup>ρ</sup><sub>x</sub>  
b•Δ' σJρ•◁<C<sup>ρ</sup><sub>x</sub> ∇•b b•Δ' αΛ<sup>-</sup> ◁•Δλ<sup>-</sup>  
▷P◁λdP<sup>ρ</sup> ▷C•Δ'<sub>x</sub> b•◁▷PρPλσ' •Δσd U•V P◁σ  
Δ<sup>υ</sup>•b ▷PρbΓ<sup>-</sup> ◁Γ •Δσd U•V PΔPλσ ◁•Δλ<sup>-</sup> b◁σ  
▷PρPλσ<sup>-</sup> ▷•∇ C<sup>υ</sup> •Δσd P▷P ασα•◁Λσ<sup>-</sup> b•Δσ'  
◁•Δλ<sup>-</sup> ▷PΔJλ<sup>ρ</sup><sub>x</sub> ∇•b Γα ∇C ∇<sup>υ</sup>b<sup>c</sup> bΔPλ<sup>-</sup>

•Δσλ' •Δ'C>

b▷CPdΓaσ•Δ'x ∇•b C' •Δ' b•Δ' 9d' σ▷Γ•Δ<<C'p'  
 L'PP ▷C•Δ' bΔΓbU'x ∇•b Λd a'c b<Δ'N' Δ•Δ'λ  
 a'c b<ΛΓb"▷N' bPPΛΓb"▷N' ΔΓ Λd ΓNδ'  
 ▷▷Γ ▷CΛa' a'c b4 •ΔdΛσx •ΔdΛσ J'x'  
 σP•Δ<L' ρ▷' ∇▷CΛaJ•Δ' ΔΛ' bPP▷Γb•Δ'x  
 Γ'dx ΓC' Δd ΔΛ' ∇PΛCΓb•Δ'x' 9σ' Δd Δ•∇  
 σP▷C' Δ•∇ b<<L'N'p' p'Λ' 9d' ∇Δ'x' ∇•b Γa  
 Δ•Δ'J'x σP•Δ<L' Δd σLL ∇▷CP' Δ•Δ'J' ∇b  
 bb'P▷' 9dσ ΔΛ' C' b<d'p' bΔσσL' σ•Δ<L'>  
 Δd a<b'c•bNδ' ∇Δ<Γ"Δ' •Δa9' ΔaΓ' bΔ'λ'  
 b•Δσ' •ΔP' bΔ'λ' ▷σΛb'c' C'x ΓC' ΔΛ'  
 ∇J▷xsbΓ'x Δ•∇ σΛx ΓC' ∇JΛ'c<•Δa'  
 P'σ'Δ'λa' Δd Λ'c<•ΔΓb9' ΔΓ C' ΔΛ' ∇b'P▷'  
 Δ•∇σ b<d'p'bd' Δ•Δ'J'x ΔΓ Γa ▷•∇σ  
 bΔJ'Δ<L•b Δ•∇ ∇▷CJ•Δ' ∇ΔΔ▷CJ•Δ' 9dσx ΔΓ  
 Λd a'c b<Δ'N'Δ' Δ'λLb'σ' Δd Δσ•∇σ•Δ' ΓNdb'  
 b<Δ'Γ▷•Δ' ∇Δ'c•Δ"ΔN'Δ' ∇▷Γ L'PPb9•Δ' ΔΓ  
 bΔJ'Δ<CL' ∇Δ'x' P'λΛ' σb'σ9 Δσ•∇σ•Δ'  
 bPΔ'σ' •Δ<L•b σσP"Δd' bPΔΔ▷CJ•Δ'x ΓC' •Δσd  
 bΔ'x' ∇P L'x•ΔN'Δ' Δ•Δ'λ'x ∇b •Δ' 9d' ∇▷Γ  
 LΓΓ•Δ' 9da' b•Δ' C' •Δ' •Δb •Δ•∇ •Δ' ρb  
 bΔabσ•Δ'x b•Δ' •Δb ▷ΓΔ'λ'x λ"Δ PΔ'λ ρb  
 ∇ΔdUΛP9'CL' bP<dΛ•Δb'σ•Δ' h'σ bΔJ'σb'p'  
 Δb'Γ'x N' ∇J<dΛ•Δ'Δ' ΔΓ Λd ∇C bΔJ'Δ<CL'>  
 ρb ∇Δ'λ' Δ•∇ •∇'b'x b•Δ' C' •Δ' Δ•Δ'J' Γ▷Γ  
 Δ<Γ"Δ' Δσ•∇σ•Δ' h'Λd Paa'Γb9 a'c Λd b4  
 Δ'•bΛJΓ'x bC•b'P9"Δb'σ•Δ' Δ•Δ'J'x ∇b ΓL•Δ'  
 bΔσσLb'σ•Δ' ΔΓ b▷CJ•Δ'x ∇•b Γa Δ•∇ Γ•b'  
 bΔσ Δ•bN' bΔP▷λ' Δ'λLb'σ' ∇ΔΔJ'∇<' ▷N Λd  
 Δ'N b<Δ'cσ•Δ' aΛ' ∇ΓJ'σ' P'σ' ΔL  
 bΔσΔ•bNσ' ▷b' a'c b'Pc•ΔC•9•Δ' bΔJ'a•b'x ΓC'

•Δσλ<sup>c</sup> •Δ<sup>3</sup>C≥

ΔL ∇CαΛ•Δ<sup>-</sup> bΛPΛ>σ<sup>x</sup> ΔΓ Δd ΔL ∇D<sup>3</sup>Πα•Δ<sup>-</sup>  
P<sub>2</sub>λ<sup>3</sup> Γα ∇σL•ΔP"Δ•Δ<sup>-</sup> D<sup>3</sup> L<sub>4</sub>λ<sup>3</sup> bD<sup>3</sup>Δ<sup>3</sup>CL•Δ<sup>3</sup>  
λ<sup>3</sup>Δ<sup>3</sup> •ΔαL<sup>3</sup> bPΔ<sup>3</sup>λ<sup>3</sup> σΛσ•b<sup>3</sup>•9Λασ<sup>3</sup> bΔP<sub>6</sub>U<sup>3</sup>  
bΔJ<PC•∇•Δ<sup>-</sup> Δd D<sup>3</sup> bΔJ•∇<<sup>3</sup> ΔΓ Λd P<sub>7</sub>Λ<sup>-</sup>  
∇ΔJ•∇<<sup>3</sup> α<sup>3</sup>9 DCLΛd P<sub>7</sub>Λ<sup>-</sup> DCLD<sup>3</sup>9α<sup>3</sup> Δ•∇  
∇P<sup>3</sup>9<sup>3</sup>CJ•Δ<sup>-</sup> bΔJ•∇<σ<sup>x</sup> b•Δ<sup>3</sup> C<sup>3</sup> •Δ<sup>3</sup> Γ<sub>2</sub>•∇  
Δ<sub>7</sub>Lb<sub>2</sub>λ<sup>3</sup> Δ•∇ D<sup>3</sup> P<sub>7</sub>ΔJ<sup>3</sup>λ<sup>3</sup> bΔJ<sup>3</sup>P<sup>3</sup>9<sup>3</sup>CL<sup>3</sup> C<sup>3</sup> Δd  
bΔJ<sup>3</sup> ΔJ•∇<<sup>3</sup> Δ•∇ P<sub>7</sub>D<sup>3</sup>ΠσbU<sup>3</sup> 9d<sup>3</sup> ΓC<sup>3</sup> ΔL  
bPΔJ<sup>3</sup> DCLαΛ•Δσ•Δ<sup>-</sup> Δ•Δλ<sup>3</sup> x

∇•b C<sup>3</sup> σαD<sup>3</sup>C•Δ<sup>-</sup> bΔ<sub>7</sub>Γ•Δ<sup>-</sup> Δ•Δλ<sup>3</sup> λ<sup>3</sup>d<sup>c</sup> bP<sub>7</sub>λ<sup>3</sup>b<sup>3</sup> α<sup>3</sup>C  
P<sub>7</sub>Δσ ΠV<sup>3</sup>C•b<sup>3</sup> σb<sup>3</sup> •∇ΓΠd<sub>7</sub>λ<sup>3</sup> P<sub>7</sub>Δσ<sup>3</sup> ΠVC•b<sup>3</sup> ∇b  
ΔΛ<sup>3</sup> P<sub>7</sub>Δ<P<sub>7</sub>D<sup>3</sup>λ<sup>3</sup> x ∇•b C<sup>3</sup> Δσ•∇σ•Δ<sup>3</sup> CαΛ•Δα<sup>3</sup>  
bΔCL<sup>3</sup> bP<sub>7</sub>D<sup>3</sup> ΛLΠ<sub>2</sub>•Δ<sup>-</sup> ΔσJ<sup>3</sup>σσ•Δ<sup>-</sup> x bσb  
P<sub>7</sub>P<sup>3</sup>ΔαJ•Δd<σ<sup>3</sup> σCΔΔσ<sup>3</sup>C<sup>3</sup> Δd βα<sub>7</sub>CL<sup>3</sup> D•∇<sup>3</sup> x  
b•Δσ<sup>3</sup> Γ<sub>2</sub>•∇ Δ<sub>7</sub>Lb<sub>2</sub>λ<sup>3</sup> CαΛ•Δ<sup>3</sup> bD<sup>3</sup> b<sup>3</sup>Παb<sub>7</sub>λ<sup>3</sup>Δ<sup>-</sup>  
P<sub>2</sub>λ<sup>3</sup> CΛ<sup>3</sup>d<sup>-</sup> C<sup>3</sup> Δd 9Pα•Δ<sup>3</sup> bΔ<sub>7</sub>λ<sup>3</sup> ΔΓ Λd ΔL  
P<sub>7</sub>Λ<sup>-</sup> ∇DΠαλ<sup>3</sup> P<sub>2</sub>λ<sup>3</sup> Δα•Δ<sup>3</sup> ∇Δα LbbΓ<sub>6</sub><sup>3</sup> b•Δσ<sup>3</sup>  
Γ<sub>2</sub>•∇<sup>3</sup> Δ<sub>7</sub>Lb<sub>2</sub>λ<sup>3</sup> x ΓC<sup>3</sup> Δ•∇ bΔCL<sup>3</sup> bσb  
P<sup>3</sup>9<sup>3</sup>CJ•Δd<σ<sup>3</sup> ΔσJ<sup>3</sup>σσ•Δ<sup>-</sup> P<sub>7</sub>D<sup>3</sup>CJ•Δ<sup>-</sup> b<sub>7</sub>Λ<sup>-</sup>  
∇C•Δ<sub>4</sub>σ<sup>3</sup> P<sub>7</sub>Δ<sub>7</sub>λ<sup>3</sup>Δ<<sup>3</sup> x ∇Δσ<sup>3</sup>CL<sup>3</sup> Δd λ<sup>3</sup>d<sup>c</sup> bP<sub>7</sub>λ<sup>3</sup>b<sup>3</sup> x

ΓC<sup>3</sup> •Δσd Δ•∇ bPΔJ<sup>3</sup>ΛLΠ<sub>2</sub>•Δ<sup>-</sup> bΔP<sub>7</sub>D<sup>3</sup>λ<sup>3</sup>  
P<sub>7</sub>L<sup>3</sup>b•ΔΠ<sub>2</sub>•Δ<sup>-</sup> Δ•Δλ<sup>3</sup> b•Δσ<sup>3</sup> 9d<sup>3</sup> D<sup>3</sup>P<sub>7</sub>J<sup>3</sup>λ<sup>3</sup> ΔΠb b<sub>4</sub>  
Δσ<sup>3</sup> Γσd<sup>3</sup> ∇ΔΔ<sub>5</sub><sup>-</sup> ∇J<sup>3</sup>P<sub>7</sub>Δ<sub>5</sub><sup>-</sup> P<sub>7</sub>λ<sup>3</sup> σd•C<sub>7</sub>ΓCα  
Π<"Δb<sup>3</sup> b•Δσ<sup>3</sup> •<C ∇C<sub>7</sub>d<sub>7</sub><sup>3</sup> x ΔΠb 9σ<sup>3</sup> ∇D<sup>3</sup>bΠ<sub>2</sub>λ<sup>3</sup>  
b•Δσ<sup>3</sup> •<C σP<sub>7</sub>C<sub>7</sub>d<sub>7</sub><sup>3</sup> ΔC•∇•ΔbΓd<sup>3</sup> bΔJ<sup>3</sup>Δ<sub>7</sub>λ<sup>3</sup> •Δ<sub>7</sub> x  
∇•b •Δ<sup>3</sup> λ<sup>3</sup>d<sup>c</sup> b•Δσ<sup>3</sup> Δ<sub>5</sub> ΔC•∇•ΔbΓd<sup>3</sup> σΠ<sub>5</sub>λ<sup>3</sup> x  
∇•b C<sup>3</sup> ΔΛ<sup>3</sup> 9σ<sup>3</sup> bΔσ >σβα•∇σΓ<sub>7</sub>•Δ<sup>-</sup> σσP"Δd<sup>3</sup>  
ΔPα ∇C PΔ<sub>7</sub>λ<sup>3</sup> bD•ΔP•Δbσλ<sup>3</sup> x ΔPα ∇C σPΔ<sub>7</sub>λ<sup>3</sup>  
Λ•bCP<sup>3</sup> x bP<sup>3</sup>9σL<sup>-</sup> Δ•∇ σCσ<sup>3</sup> bD<sub>7</sub>Γ<sub>4</sub>λ<sup>3</sup>L•Δ<sup>-</sup> ΔΓ ∇C

•Δσλ' •Δ'C>

Δ·∇∩ b·Δ<<C' P>Λ' Δ·∇ ∇PΔJ<Γ"Δ∩P>λ'  
 σC<PC·∇ C' •Δ·∇ bΓ>λ<' ΔC •Δ' bPΔJ>λ·Δ'  
 Δd ∇PΔJ>λ' ∇·b Γa dC' σdP>λ' <P  
 σP·Δ<Γda' Δ·∇ 7·b' bP <<Γ·ΔaP·C ΔC 9σa·Δ'  
 ∇Pa>λL' 9DΓ <ΛL∩P>λ' 7·b' b·Δσ"Δ9>λ' ∇·b  
 C' •Δ Δ·∇ b·Δσ' Δd σCP9>C' C'Δ"ΠP ΔC ΔΛ'  
 Δ·∇ ΔΛ' ΔL bPΛ Δ'P'>λP<' •∇∩ bPΔσJ  
 ΔJbVJ>λσ·Δ' •Δ>Γd·ΔJ' bΔPbU' <b' C' ΔΛ'  
 PΔσP' 9Δa>λP' P>Λ' Λd bΔa>λP' σ' •Δ'  
 ΔΛ' ∇P>σ <<Γ>λ' Λ·bCP' Δ·∇ ∇P'λ' >λP9  
 •Δσd σPΔΓ' ΔΔ>Γa<' •∇∩ bP ΔΔ'CJ  
 •Δσ"Δ9>λ' bD'>λP' >λP9 •Δσd PΔP'λ<' ∇·b  
 C' Δ·∇ bPΔσJ'PbU' bΔΔJCL' ΔC 9σa·Δ'  
 ∇P<<Γ"Δ∩P>λ' Δd b4 ∇'b' Δd ∇C ∇Pa>λ' J'  
 bΔa>λσ·Δ' ∇·b C' b4 σP<<Γ>λ' Δd PΔσ  
 ΔP'P'λ b4 P·Δ<<CL' bΔσ ΔC·Δb>λ·Δ' P>λ a7  
 bΔC·ΔP' σPΔΔ'JCF' bVσΛ' •∇∩ σC>Γa<'

ΔP Δ·∇ bΔΔ'∩λ' 9σa·Δ' <Γ Λd ∇C Δ·∇ 9σ'  
 σ∩VΓ9·Δ' bPΔΓ LL'>λ·ΔP'λb' σΛLΓ"Δ·Δσa' Δ∩  
 ∇Δ>λP' 9d' bPΔΓ L'>λ·ΔP'λb' <Γ Λd bPa ∇P'λ'  
 Δ·∇ ∇b·Δσ' 9d' ∇J'PbU' b·Δ' 9d' a'>C ΔPΔΓ  
 L'>λ·ΔP'λb'∩VΓ9·Δσ' ∇P'λ' Δ∩ ∇·b Γa Δ·∇  
 dC' bPb·9PΓd' 9ΔσJCL' b·Δσ' Δd L'>λ'  
 σCP·Δ·Δ'>C' Δ·∇ 9d' >λ' bDΓ L'>λ·ΔP'λb'  
 PCJ9·Δ' bΔP>λb' b·Δ' L'>λ' σCΔJσbC' 9σa·Δ'  
 C' •Δσd σC·Δ' bΔ>λ' σ·Δ·Δ<<C' bΔΔJCL'Δ'  
 ΔσJσσ·Δ' VJ'>λ' 9Pa·Δ bΔJ 9dσd bΔΔJCL'Δ'  
 ΔσJσσ·Δ' ΔJCa·Δ •Δa·Δ Λd 9d'  
 ∇<ΛΓ·ΔJ·Δ' bPa Λd 9da' ∇ΛΓ·ΔCL'Δ' bDΓ  
 <ΛL∩P>λσ·Δ' b4 Δ>λ·∇σ·Δ' >λ' ba·bP'

•Δσλ<sup>c</sup> •Δ<sup>3</sup>C>

<C·∇·ΔbΓd' bPa Λd ba·bP' <C·∇·ΔbΓd'x b4 Δ·∇  
 bVJ·ΔbΓ' b<λ' ∇·b Γa <'> <<° bΔrβU' Jba'  
 Γa PΛPσ9·ΔbΓ' Λ·<ΛdbΓ'x bΔrλ' Δd Δ·∇ Jb'  
 bΔCL'x bPa Λd ·Δa·< Λd DΛΓ·ΔJa·<Δ'x b·Δσ'  
 a<sup>3</sup>C <·Δλ <b' rD'r ΛΓ·ΔrβUP' b4 Δ<sup>3</sup>d<sup>c</sup>x ΓC<sup>υ</sup>  
 Δ·∇ ∇JrβU' ∇C L·< Δ·∇ C·Δ' bΔCL' rβ·9  
 L<sup>υ</sup>·b·ΔrβU' bΠΛa·∇·Δrβaσ·<' DΠx <Γ <Λ' bD'r  
 L<sup>υ</sup>·b·ΔrβU' Δ·∇ CJ9·Δ' ∇ΛΓ·ΔσΠrβ' Δ·∇  
 CJ9·Δ'x b·Δσ' CCb<sup>-</sup> ·Δ' σbU ∇D'r Jr<ΛLΠrλ'  
 ∇Δrλ' b4 Λd ∇D'r ΛΓ·ΔσΠrβ' <σP·Δa'  
 ∇D'r<λP' σd<sup>c</sup> ·Δ' bΔrλ' ΛLr<sup>3</sup>D·Δ'x b·Δ' CΛ<sup>υ</sup>d<sup>-</sup>  
 bλ<sup>υ</sup> bΔaΓλ'x ∇·b Γa VJ' 9d' D·∇ ·Δσd  
 CJ9·Δ' bD'r L<sup>υ</sup>·b·ΔrβU'x b·Δσ' rPL<sup>υ</sup>·b·ΔrβU' D·∇  
 ·Δσd b<ΛJλ<sup>3</sup>CJ·<' <·Δλ' 9d' b·Δ LLLrJ·<' b4  
 a<sup>3</sup>C Λd b4 rPLrβ9·Δ' bΔCL'x b·Δσ' rPL<sup>υ</sup>·b·ΔrβU'  
 P<sup>υ</sup>Λ' b<<σ<sup>3</sup>·9λ·<' b<<bσ<sup>3</sup>CJ·<'x ∇·b C<sup>υ</sup> Δd  
 Jb' ∇C Δ·∇ bVJd Δσ<sup>3</sup>CJ·<' <Λ' bLL·Δ  
 J CJ·<' 9dσx ∇LL·Δ DΠΠaJ·<' 9d' b·ΔJ CJ·<'  
 <Γ <Λ' bL<sup>υ</sup>·b·ΔrβU' Δ·∇ CJ9·Δ'x <Γ ∇rλ' DΛ  
 bCλ<sup>3</sup>'x LL° Λd ∇<λσ·<' <Γ Δ·∇ VJ' 9d'  
 PPσ<sup>3</sup><L9·Δ' CΛ<sup>υ</sup>d<sup>-</sup> baσr<sup>3</sup>ΔΠr·<' C<sup>υ</sup> ·Δ' 9d'  
 b·Δσ' rPL<sup>υ</sup>·b·ΔrβU' Δ·∇ CJ9·Δ'x ΓC<sup>υ</sup> Δ·∇  
 bΔPJLb' 9dσ<sup>3</sup> Jb' ΔJrβ9·Δ' bD'r L<sup>υ</sup>·b·ΔrβU'  
 CJ9·Δ'x VJ·b' Δσ<sup>3</sup>CJ·Δ' ∇C<sup>υ</sup> LL° J CJ·Δ' bP<λ<sup>-</sup>  
 CPD'r L<sup>υ</sup>·b·ΔrβU' CJ9·Δ' ∇rλ'x

∇·b C<sup>υ</sup> ·Δ' Δ<sup>υ</sup>·bλ<sup>-</sup> Dσ·∇σ·<' Jb' Δrλ·Δa'  
 bP'rσC·bP' 7·b<sup>-</sup> Λ·bCP' bPΛLr<sup>3</sup>D'x <Γ·<σσ  
 bP'rσC·bP' bP·Δ<sup>3</sup>CL' Pσλ bD'r bΠaβσ·Δ<sup>-</sup>  
 bC·λ4bP' Γa Γrβ' bΔabσ·Δ<sup>-</sup> <Γ ·<·∇ L·<  
 bP'rσ<sup>3</sup>C·b' ·∇<sup>υ</sup>b<sup>-</sup> Δ·∇x ∇·b Γa ·<>° bσλbσ·Δ<sup>-</sup>

•Δσλ<sup>c</sup> •Δ'C>

bα<•bμ•Δ'x ΓC<sup>υ</sup> Δ•∇ bPP<sup>τ</sup>•C•b<sup>λ</sup> ΛL<sup>π</sup>▷•Δ'  
bPΔ<C'x ∇•b C<sup>υ</sup> ΔΛ' Δ•ΔJ<sup>ς</sup> bΔσ•Δ<CJ•Δ'  
Δσ•∇σ•Δ' J CJ•Δα' 9•Δα•Δ Λd ∇P ΔσJ CJ•Δ'  
Λσ<sup>υ</sup> ΔΛ' •Δα•Δ Λd ∇PΔσJ CJ•Δ' b4 ΔΛ' bΔσ  
•Δ<L•Δ' ▷σP"Δd•Δ' bΔσ Δ<sup>υ</sup>•bΛLΠ<sup>ρ</sup>σ<sup>-</sup> ΔΛ'  
•Δα•Δ ΔΛ' Δ•∇σ ▷C<P Jα•Δ Δ•∇ J CJ•Δσ ΔΓ  
b4 bΔ<sup>ρ</sup>4'x

bΔ<sup>ρ</sup>4' •∇<sup>υ</sup>b<sup>-</sup> ΔΓ"Δ Γα μd<sup>c</sup> ∇<sup>ρ</sup>4' Λσ<sup>υ</sup> μd<sup>c</sup>  
bP<sup>ρ</sup>b<sup>-</sup>x

Δσ•∇σ•Δ' Jb' ΔJ<sup>ρ</sup>9•Δα' bPP<sup>τ</sup>•C•bP' 7•b<sup>-</sup> Λ•bCP'  
bΔ<sup>ρ</sup>σ•Δ' bPΛL<sup>π</sup>▷ασ•Δ'x ΔΓ Δ•∇ L•Δ' bPP<sup>τ</sup>•C•b<sup>λ</sup>  
bΛ>' ▷Πx b•Δσ' αΛ<sup>-</sup> ∇σΛ' b•b<sup>υ</sup>•9Λασ•Δ' ∇•b  
C<sup>υ</sup> Δ•∇ b•b<sup>υ</sup>•9Λασ•Δ' b•Δσ' P▷P ΔJα•b<sup>-</sup>  
•b<sup>υ</sup>•9ΛPb' μd<sup>c</sup> •Δ' bΔJα•b<sup>-</sup> bΔ<P J<sup>λ</sup>•x Δ•∇ Λd  
∇C bV<sup>ρ</sup>•bΛU<sup>λ</sup> •b<sup>υ</sup>•9ΛPb' ∇•b Γα P<sup>υ</sup>Λ' ∇b  
Δ<sup>ρ</sup>•Δ' •b<sup>υ</sup>•9ΛPbσ ▷P▷J Jα•Δ Λd<sub>x</sub> 9σ' Δd  
σJ J Jα<' Λ•ΔΛ'x L•Δ' P<sup>ρ</sup>•C•bμ<' •b<sup>υ</sup>•9Λτ•Δ'  
bΔ<sup>ρ</sup>bU'x Δ<sup>ρ</sup>Lbμ' ካb"Δbα' ∇C ΔL b▷P  
•b<sup>υ</sup>•9Λαbμ•Δ<sup>-</sup> Pμ<sup>λ</sup>x b•Δσ' Δd Γ<sup>ρ</sup>•∇x b•Δσ' Δd  
Γ<sup>ρ</sup>•∇ ΔJ•∇<<sup>ρ</sup>μ' Δ•∇x

α<sup>υ</sup>9 9ασ•Δ' ▷L bPΔJ•Δσ"Δ9<sup>λ</sup> ▷L Λd V<sup>ρ</sup>  
•b<sup>υ</sup>•9Λασ' ΔJσbUx ΔΓ Δd bΔσ ΛPΛ>' P<sup>υ</sup>Λ'  
∇b bΔσ ▷ΓPΓP<sup>λ</sup>P<' ΓC<sup>υ</sup> 20 Π<"Δb' ΔΛbJ'  
bΔCL' ΔΓ Δd ∇Λς<sup>λ</sup>P<' α<sup>ρ</sup>C ∇•ΔΛ  
•b<sup>υ</sup>•9Λτ<sup>λ</sup>P<' ΔL ካb"Δbσ'x ∇•b C<sup>υ</sup> ΔΛ' bΛCdJα'  
JL' bΔμαdJ' ∇•b<sup>υ</sup>•9Λτ<sup>λ</sup>P<' ΔΛ' ∇σ<sup>λ</sup>P•C  
ΔP•∇σ•Δ' Δ•bΛς'x ΔΓ C<sup>υ</sup> Δd JL' ∇•Δ<sup>ρ</sup>σ<sup>λ</sup>•x  
∇•b C<sup>υ</sup> Λσ<sup>υ</sup> ΔL Δd ∇ΛP<sup>ρ</sup>λ<sup>λ</sup>P<' bV Λd Λσ<sup>υ</sup>

•Δσλ' •Δ'C>

בדסר'ב' דג אד נג'ב'•9אד'•ד' פמנ'x גצ' ΔL  
נדר' אלר"דמס'•ד' Δ•נ' גב' בדל'x' הב"Δב' ד'נ  
דג אד אל'ד' לאל' הב"ב' בדל'x' גצ' Δ•נ' בדל'  
פ9'ר'ב' אד ד'ג' בדל' •ב'•9אס'•C פמנ'x דג אד  
•נ'ג' נ'מ'•ד' בדל' •ב'•9אמס'•ד'x' ל'ד' צ' Δ•נ'  
פ'9ד' •ב'•9א'ר'ב' בדל'ר'ב'x' ב'Δσ' בס'•' ב'Δ'C' ד'C'  
Δ•נ' ב'Δ>' ב'Δ'C'x' נ'ב' ג'א' ג'Δ•נ' נ'ב'•  
ב'Δ'C'ר'ר'ב'x' ב'Δσ' Δד' ר'ד'ר' Δ'ג'א'•ב' מ'ד'• ד'C'•Δ'  
ב'Δ'C'ר'ג'• ב'ג'ר'א'ג'א'x' ב'Δ' ד'ר' ד'ג'ר'x' ל'ל'ג' Δד'  
פ'Δ'Δ'ג'א'•ב'x' ד'P'•ד'ד'ג'ג' Δד' ב'Δ'C"Δ'9' ד'ג' בדל'x'  
ג'•ב' Δ•נ' ב'P'P'ג'ל'ב' ג'•ב'x'

דג Δ•נ' ב'P'ר'•C'•ב' ב'א'•ב'מ'•ד' ב'•ד'>ר'ב' נ'ב' ג'א'  
בס'א'σ' פ'מ'נ'•' בס'ה'ב'מ'•Δ' נ'ב' ג'א' ב'ג'ר'ר'ב'σ'ב'm'•ד' נ'ב'  
ג'א' ב'•ב'•9אמס'•ד' נ'ב' ג'א' ב'מ'ר'ג'•ה'm'•ד' נ'ב' ג'א'  
ב'מ'ר'א'•ד'm'•ד' ד'ג' ד'm'•נ'σ'•ד' •Δ' ב'ד'ג'σ'ב'U'P' בד'ר'  
•Δ'ר'σ'א'σ'•ד'x' נ'ב' צ' •Δ'σ'd' ד'm'P'•Δ'σ'•ד'm'x' ה'Δ'σ'd'x'  
P'P'Δ'•ד'ג' Δד' ד'ג' אד' ב'Δ'ג'א'ל'm'P'•ד' Δ•נ' ב'ב'•9'  
א'ל'r"Δ'ג'•ד' ד'•Δ'ג' C'd' צ' ב'4' ΔL' ב'Δ'ג'C'σ'•ד'x'  
ג'•C"Δ'• ד'm'P'•Δ' ג'r'b'U' נ'ב' •Δ'σ'd' •ד'ב"Δ'ב' נ'ד'ג'  
ב'Δ'ג'r'b'σ'•ד'x' P'r'Δ"p"ד'ב' Δד' נ'ד'ג'x' ב'Δ' צ' •Δ'  
א'•C' r'Δ'Δ'•r'b'U'P'<' ΔL' נ'ד'ג'm'•ד'x' ב'Δ' 9d'  
σ'V'•Δ'x' ב'C'C'd'g"ד'U'P' Δד' σ'V'•Δ'א' ב'Δ' 9d'x' ג'ד'  
Δד' נ'ד'Δ'ג'g'א'σ'•ד'x' ב'Δ' 9d' σ'<b'x' ב'4' •ד'>'  
ב'σ'ה'ב'σ'•Δ' ד'ג' אד' נ'•ד'ג'א'מס'•ד' נ'ד'ג'r'b'U' בד'r'  
ד'g'r'b'U' σ'<b'x' נ'ב' ג'א' •ד'>•ה'ג' ד'•ג'ג' נ'ד'g'r'b'U'  
נ'ב' ג'א' P'g'C'r'b'r' •ד'>•ה'ג'x' ד'ג' Δ•נ' L'g' נ'א'r'g'ג'  
Δ•נ'x' ב'P'Δ'g' •ד'<'C'L' ד'C' •Δ'σ'd'x'

נ'ב' ג'א' ב'Δ'Δ'א'r'g'ג' P'Δ'g'g"נ'•ד'ג'r'•ד' σ'P'r"Δ'g'א'א'  
ד"ד' ב'P'<<L'g'•ד' א'•b'C'P' ב'<<g' א'g'r"ד'•ד' ד'ג'ג'  
ד'C' אד' ב'P'Δ'Δ'g'•ד'x' ד'א' צ' ב'Δ' ד'g'g"נ'P'g'b'

•Δσλ° •Δ°C≥

6LΠα·∇ΡΨβ' ΔΠ Δ·∇ ΔΛ' βΔΨ>σ∩·Δ-  
 ΔC∞Ρ·Δσ·Δ Γα βΔαδΨσ'x ∇·b C' •Δ'  
 βΔλΓ"∇ΡΨβσ' β·Δ' ΔΛ' ΡΔΡ Δ∞Ρ·Δ-x β·Δ' 9d'  
 ΡΔΡ ΛΓ°CJ·Δ-x β4 Δ·Δσ"Δβσ·Δ β·Δ'x ΔΓ Λd  
 ΔL ∇Δλ·Δ- ΔβVΨ·Δσ·Δ' ∇·Δ·Δρσ·Δ- Δd ∇C  
 Δ·∇x ΔΓ β∩CJ·Δ- ΡΡ"Δ' ∇·b Γα ∇ΔλΓΡ9·Δ-  
 ·Δ·∇ 9σ' βΡ ΔCCΓλ' ∇ΔλΓ"∇ΡΨβσ' σ"·h  
 ΔλΓΡ9<' βΡλ<λσ' βΔΛCΡΨβσ' ∇·b Γα  
 βΔαδΨσ'x Γh·Δ- Δd Λ·βCΡ' βΡ<<LΠρλ'x ΔΓ  
 Δd 9σ' ∇·Δ°CLdλ<' σΡΔCβΛx β·Δ'  
 σ∩ΡαC·∇σΓdρ' ρ<ΛJΡ9λ'x ΔΓ Λd ∇Δ<"Δβ∞·Δ-  
 σCβ'x <σL Γα Δ°ΡΡΨβ' ρΔCΛα' ΔΓ βΔρh'x ΔΓ  
 Δ·∇ ΡΡ9d'x ∞d° C' ΔΛ' αβΡβU Γρ·∇ Δ·∇ ∩β'  
 βΡβαURβU' ∇ΔλΓ"∇ΡΨβ'x

L·Δ- σΡΡ∞C' Δ·∇ βΔ∞σdλ'x σΡ9°C' ∇ΔσL'x  
 ΔσL' •Δσd Lλ° ρΡΔΡ∩ασ·Δ' L'σ C' Δd βΡΔΨ  
 ·Δ<°CL' ΔΓ Λd ∇C βΔαρJλ'x ΔσC 9da' β·Δσ'  
 σCΡUA •Δ·Δ°Cρ' 9σ' βΡΛΔΨ •Δ<CLσ'  
 ∇ΔΔ∩ΡβU'x βΔΨ ΡΡΔΔρh' C' •Δσd 9d'  
 βΠ<∩CL' 9σ'x ΔΓ C' Δd 9·Δα·Δ dCΡλ'  
 ΔσΨσσ·Δ' ΔΠΨ •Δ<Cα·Δ∩' Δ·∇ βΡΛΔΔρh'  
 ·∇°β- ΔC·Δ' βΔ°CΠρ·Δ-x  
 ΔΓ ∇Ψ·ΔΡ4L' βΡα Δ·Δλ 9∞°C'

