Woosh Yáx Yaa Datúwch
Tlingit Math Book

Gaawt'akaan Hi Sgoon
Sgóonwaanch Kawshixit
Yakwxwaan Tláach Koo Wlítúw

by the students of Hoonah High School
under the direction of Katherine Mills
Instructor of Tlingit
Acknowledgments

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Biography of Katherine Mills

Katherine Brown Mills / Yakwxwaan Tláa
Raven, T’akdeintaan
Kaa Shaayi Hit
(Head House, an extension of Ta’x Hít, Snail House)
Kaagwaantaan yádi (Child of Kaagwaantaan)
Kookhittaan yádi (Child of the Box House)
June 5, 1915 – August 16, 1993

Katherine Mills was born to Paul Brown and Mary Sarabia on June 5, 1915, at PAF Cannery at the end of Excursion Inlet, in what is now Glacier Bay National Park, up the bay from the present day location of Excursion Inlet Packing. Her Tlingit name was Yakwxwaan Tláa. She was born into the Raven moiety, the T’akdeintaan clan, and the Kaa Shaayi Hit (Head House, an extension of Ta’x Hít, Snail House). Through her father’s line she was Kaagwaantaan yádi (Child of Kaagwaantaan) and Kookhittaan yádi (Child of the Box House). Her siblings include Irene Lampe of Juneau, Robert Sarabia of Seward, the late Edward Sarabia of Juneau, and the late Susan Belarde of Anchorage.

All her life Katherine and her family lived off the land. From early childhood she gathered nagoon berries, straw-berries, and soapberries at Dundas Bay, and seagull eggs at Glacier Bay. She attended what was then the Hoonah Territorial School, and later went to Sheldon Jackson High School in Sitka.

On April, 11, 1936, Katherine married Gilbert Mills Sr. in Hoonah. The couple raised a large family. Katherine was a cannery worker for sixty-two years before retiring. In her spare time she enjoyed berry picking, fishing, and smoking fish with her grandchildren.

Katherine was involved in the Tlingit Language movement from the very beginning. She taught Tlingit language and culture in the Hoonah public schools for many years. During the course of her teaching, she composed many materials for classroom use. Of these, the best known is her Tlingit Math Book, published in 1973 by Tlingit Readers, Inc., and which has remained popular over the years. She participated in the first Tlingit Language Workshop at Sheldon Jackson College in 1971, as well as in subsequent workshops. Her Tlingit Math Book was published during the third such workshop. Along with Andrew Hope III, and Nora and Richard Dauenhauer, and the late Henry Davis, Katherine was a founder of Tlingit Readers, Inc., and served as a charter member of the Board of Directors.

In the 1980s she collaborated with Wally and Marie Olson on a bilingual pamphlet called “Tlingit Thinking / Lingit Tundaatoollee,” published by Southeast Alaska Regional Health Corporation. In addition, she made many contributions to the Sealaska Heritage Foundation. She was active in one of
the Foundation’s very first transcription and translation projects and she also served as a charter member of the Elders Advisory Council. Among her still unpublished works are a short play in Tlingit and English based on the Eagle Boy legend, and a Tlingit translation of Cannery Kid, a book written by her grandson Gus.

Katherine was a gifted story teller, and several of her Raven stories are forthcoming in a volume by Sealaska Heritage Foundation edited by Nora and Richard Dauenhauer. Her stories were also among the inspirations for the plays written by Nora Marks Dauenhauer and performed internationally by the Naa Kahidi Theater. Her style for Raven stories was characterized by a classic “dead pan” tone of voice contrasting with the outrageous antics of Raven underway in the stories. Her English versions were characterized by unexpected choice of vocabulary. She was one of the funniest Raven story tellers among the Tlingit tradition bearers.

In contrast to her record of achievement, Katherine was a very quiet person, so low-key and low-profile as to be easily overlooked by outsiders. This is a traditional Native virtue, and causes one to reflect on the proverbs about “not beating your own drum” and “the empty barrel rattles the most.”

In 1971, Katherine and several other women formed the Mount Fairweather Dance group and Katherine was named president. The group went on many tours, and was famous for its performances of the countless Hoonah “love songs.”

Katherine Mills and Nora Marks Dauenhauer, June 1974, on Sheldon Jackson College campus, Sitka, for Tlingit Language Workshop. The *Tlingit Math Book* was printed during the 1973 Tlingit Language Workshop. Photo by R. Dauenhauer.
Katherine was a lifetime member of Hoonah Alaska Native Sisterhood Camp No. 12, serving as president for many years and as a convention delegate. She was also a Tlingit and Haida convention delegate and served on the Hoonah city council. She was a lifelong member of the Russian Orthodox Church.

In later life, she developed increased difficulty in walking, and her children got her an electric wheelchair. Despite her difficulties, she remained active and traveled widely, and served as an elder and consultant to museum projects in Seattle and Portland. In July 1991, she was one of the Southeast Alaska performers at the Festival of American Folklife on the National Mall in Washington, D.C. where she sang from her wheelchair and told traditional stories.

Katherine died on August 16, 1993, and after requiem services in Hoonah, she was escorted by a convoy of the largest seineboats of the Hoonah fishing fleet to the traditional burial site at the end of Excursion Inlet. Her daughter Phyllis Mills Bean and her son Gilbert “Butch” Mills Jr. preceded her in death, but she was survived by daughters Eleanor Moritz, Judith Brown, and Kathy Marvin, all of Hoonah, and Rosemary Jimboy of Lawrence, Kansas; sons Anthony, George, Thomas, Patrick, Christopher, Stuart, and Jeffrey, all of Hoonah, and Michael of Juneau. At the time of her death, she had forty-two grandchildren and twelve great-grandchildren. Her husband, Gilbert, passed away in December 1996. Pat Mills expressed the family’s grief at their father’s passing, but took comfort in his faith that, “They’ll be together for Christmas.”
Two eagles and three ravens were flying.
How many were there all together?

one 1
Déix ch'áak' ka nás'k yéil át kawdliyeech.

X'oon sáwé tle wóoshteen?

____________  +  ____________  =  ____________

tléix'
Three brown bears were walking along.
A man shot one.
How many were left?
two 2
Nás'k xóots át woo.aat.
Tléix' yú káach aa oowa.ún.
X'oón sá áa wooneex?

____________  –  ____________  =  ____________

déix
Five birds are sitting.
Four flew away.
How many are left?

three 3
Keijín ts'ítskw át kéen.
Daax'oón aax kawdliyeech.
Wáa yakugei sá áwu?

____________ – ____________ = ____________

nás'k
A man shot two seals
and two deer.
How many animals did he shoot?
four 4
Déix tsaa aawa.ún
ká déix guwakaan.
X'oon yateeyi át sá aawa.ún?

____________ + ____________ = ____________
daax'oona
A person caught five king salmon.
He kept one.
How many did he sell?
Keijín t'á kei awdzit'éx.
Tléix' awsineex.
X'oon t'á sá aawahooon?

___________  -  ____________  =  ___________
A person has eight spoons in hand.
Ten people need them.
How many spoons are lacking?
six 6
Nas'gadooshú shál áwé du jeewóo.
Jinkaadínáx ku.oo jiyís.
X'oón shál sá oosyéx?

____________ – ____________ = ____________
Six beaver were trapped.
One sells for twenty dollars.
How much did he get?

seven 7
Tleidooshú s'igeidée awdzigát.

Tleikáa dáanaa tléix' yéi aawahoon.

Wáa yáx sá ayaawadlaak?

____________ × _____________ = ____________

dax.adooshú
People shot thirteen seals.
One shirt takes three seals.
How many shirts did she sew? And how many were left over?
Jinkaat ka nás'k tsaa has aawa.ún.
Nás'k tsaa, tléix' k'oodás'x sateex.
X'oon k'oodás' sá aawakáa? Ka x'oon sá áa wooneex?

____________ ÷ ______________ = ______________

nas'gadooshú
Three killerwhales chased two whales.
One got away.
How many did they kill?
nine 9
Nás'k kéetch yaawa.aat déix yáay.
Tléix' sh wudzineex.
X'oon sá has aawaják?

___________  –  _____________  =  ____________

gooshúk
Thirteen children are sewing beads.
They have one hundred and three bundles of beads.
How many bundles of beads does each one get?
Jinkaat ka nás'k at yátx'ee kawóot has akéis'.

Tléix' hándid ka nás'k jinkaat kawóot shakatl'éen has du jeewóo.

X'oont kawóot shakatl'éen sá tléix' at k'átsk'u jee yéi kgwatéé?

___________ ÷ ____________ = ____________
People are drying twenty salmon.
A raven ate two.
How many salmon did they dry?

eleven 11
Tleikáa xáat has asxook.
Déix yéilch wusixáa.
X'oón xáat sá awsixúk?

__________  –  ____________  =  ____________
She has four bundles of beads.
She bought six more.
How many bundles does she have altogether?

twelve  12
Daax'o'on kawóot shakatl'éen du jeewóo.
Tleidooshú tsú aa woo.oo.
X'oon shakatl'éen sá du jeewóo tle wóoshteen?

____________ + ____________ = ____________

\[ \text{jinkaat} \]
\[ \text{ka déix} \]
Ten eagles are sitting in a tree.
Three flew in.
How many eagles are there all together?

thirteen 13
Jinkaat ch'áak' aas yíkt kéen.
Nás'k át kawdniyeech.
X'oon ch'áak' sá áwoo tle wóoshteen?

____________  +  ____________  =  ____________
People have ten trout.
They cooked four.
How many were left?

fourteen  14
Jinkaat x'wáat' has du jeewóo.
Daax'oong has aawsi.ée.
Wáa sá áa wooneex?

_________  –  ____________  =  ____________
Someone bought twenty flowers.
She needs eighteen for people.
How many flowers were not necessary?

fifteen  15
Tleikáa k’eikaxwéin aawa.oo.
Jinkaat ka nas'gadooshú ku.oo jiyís.
X'oon k’eikaxwéin sávé du jeewóo ch'al kukanáax'?

___________  –  ______________  =  ____________

jinkaat ka keijín
Counting in Tlingit

<table>
<thead>
<tr>
<th>Number</th>
<th>Tlingit Number System Old Way (Base 20)</th>
<th>Tlingit Number System New Way (Decimal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>tléix'</td>
<td>11 jinkaat ka tléix'</td>
</tr>
<tr>
<td>2</td>
<td>déix</td>
<td>12 jinkaat ka déix</td>
</tr>
<tr>
<td>3</td>
<td>nás'k</td>
<td>13 jinkaat ka nás'k</td>
</tr>
<tr>
<td>4</td>
<td>daax'o'on</td>
<td>14 jinkaat ka daax'o'on</td>
</tr>
<tr>
<td>5</td>
<td>keijín</td>
<td>15 jinkaat ka keijín</td>
</tr>
<tr>
<td>6</td>
<td>tleidooshú</td>
<td>16 jinkaat ka tleidooshú</td>
</tr>
<tr>
<td>7</td>
<td>dax.adooshú</td>
<td>17 jinkaat ka dax.adooshú</td>
</tr>
<tr>
<td>8</td>
<td>nas'gadooshú</td>
<td>18 jinkaat ka nas'gadooshú</td>
</tr>
<tr>
<td>9</td>
<td>gooshúk</td>
<td>19 jinkaat ka gooshúk</td>
</tr>
<tr>
<td>10</td>
<td>jinkaat</td>
<td>20 tlei káa</td>
</tr>
<tr>
<td>20</td>
<td>tlei káa (one person)</td>
<td>20 tlei káa</td>
</tr>
<tr>
<td>30</td>
<td>tlei káa ka jinkaat</td>
<td>30 nás'k jinkaat (three tens)</td>
</tr>
<tr>
<td>40</td>
<td>dax káa (two persons)</td>
<td>40 daax'oon jinkaat (four tens)</td>
</tr>
<tr>
<td>50</td>
<td>dax káa ka jinkaat</td>
<td>50 keijín jinkaat (five tens)</td>
</tr>
<tr>
<td>60</td>
<td>nás'k káa (three persons)</td>
<td>60 tleidooshú jinkaat (six tens)</td>
</tr>
<tr>
<td>70</td>
<td>nás'k káa ka jinkaat</td>
<td>70 dax.adooshú jinkaat (seven tens)</td>
</tr>
<tr>
<td>80</td>
<td>daax'oon káa (four persons)</td>
<td>80 nas'gadooshú jinkaat (eight tens)</td>
</tr>
<tr>
<td>90</td>
<td>daax'oon káa ka jinkaat</td>
<td>90 gooshúk jinkaat (nine tens)</td>
</tr>
<tr>
<td>100</td>
<td>keijín káa (five persons)</td>
<td>100 tléix' händid</td>
</tr>
<tr>
<td>200</td>
<td>jinkaat káa (ten persons)</td>
<td>200 déix händid (two hundred)</td>
</tr>
</tbody>
</table>
Tlingit Number System

5  
keijín  
five fingers up

9  
gooshúk  
before the thumb

10  
jinkaat  
ten fingers up like a basket

20  
tleikáa  
one person (ten fingers, ten toes)
**Human Counting System**

tleináx káa – one man
daxnáx káa – two men
nas'gináx káa – three men
daax'oonínáx káa – four men
keijínínáx káa – five men
tleidooshúnináx káa – six men
dax.adooshunínáx káa – seven men
nas'gidooshunínáx káa – eight men
gooshugunáx káa – nine men
jinkaadínáx káa – ten men

**Ceremonial Numbers**

The Tlingit ceremonial number is four (daax'oon). Four mourning songs are sung for the removal of grief, shouts to cleanse sorrow are repeated four times, when names are given they are repeated four times, multiples of four may be used for days of fasting before important work or events: 4, 8, 12, 16, etc.

**Concept of Quantity**

yángaa – a little
shayadihéin – many
yéi yagu.áats’ – not too much/many
wooch yaayí – a pair

**Counting Animals and Things**

tléix' jánwu – one goat
déix guwakaan – two deer
nás'k xáat – three salmon
daax'oon gáaxw – four ducks
keijín cháatl – five halibut
tleidooshú ts'ítskw – six birds
dax.adooshú aas – seven trees
nas'gidooshú shál – eight spoons
gooshúk yaakw – nine boats
jinkaat s'íx' – ten bowls

**Concepts of Time**

satgawsaan – twelve noon
tléix' gaaw – one o'clock
déix gaaw – two o'clock

**Days of the week**

tléix' yagiyée – Monday
déix yagiyée – Tuesday
nás'k yagiyée – Wednesday
daax'oon yagiyée – Thursday
keijín yagiyée – Friday
tleidooshú yagiyée – Saturday
dax.adooshú yagiyée – Sunday
Traditional Measurements Using the Human Body

one inch
first thumb nail joint
tléix' kaa tl'ekx'áak

seven inches
spread between little finger and thumb
twelve inches
elbow to end of fist
one foot
tléix' kaa x'oos

thirty-six inches or one yard
spread between one open arm and middle of the chest
tléix' káas'

one fathom
spread between open arms
tléix' waat

thirty horsepower
nás'k jinkaat gawdaan latseení
### Liquid Measurements

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>tléix' shál k'átsk'u</td>
<td>one teaspoon</td>
</tr>
<tr>
<td>tléix' shál k'átsk'u ka a shoowú</td>
<td>one teaspoon and a half</td>
</tr>
<tr>
<td>tléix' shál tlein</td>
<td>one tablespoon</td>
</tr>
<tr>
<td>tléix' gúx'aa</td>
<td>one cup</td>
</tr>
<tr>
<td>tléix' k'atéil</td>
<td>one gallon</td>
</tr>
<tr>
<td>tléix' gayéis' lákt</td>
<td>five gallon can</td>
</tr>
</tbody>
</table>

### Linear Measurement

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>tléix' kaa tl'ekx'áak</td>
<td>one inch</td>
</tr>
<tr>
<td>tléix' kaa x'oos</td>
<td>one foot</td>
</tr>
<tr>
<td>déix kaa x'ois</td>
<td>two feet</td>
</tr>
<tr>
<td>tléix' káas'</td>
<td>one yard</td>
</tr>
<tr>
<td>tléix' waat</td>
<td>one fathom</td>
</tr>
<tr>
<td>tléix' kaay</td>
<td>one mile</td>
</tr>
</tbody>
</table>
Title Page
woosh yáx yaa datúwch – math
Gaawt'ák.aan – Hoonah
sgoon – school
sgóonwaanch – by the students
kawshixít – wrote
Yakwxwaan Tláach – by Katherine Mills
koo wlitúw – taught

One
ch'áak' – eagle
ka – and
yéil – raven
át – around there
kawdliyeech – were flying
x'oon sáwé – how many are there
tle wóoshteen – all together

Two
xóots – brown bear
woo.aat – went on foot
yú – that
káach – by a man
aa – one
ooowa.ún – shot
x'oon sá – how many
áa – there
wooneex – were left (survived)

Three
ts'ítskw – small bird
át – there
kéen – are sitting
aax – from there
wáa yakugei sá áwu – how many are there

Four
tsaan – seal
aawa.ún – he shot it
guwakaan – deer
x'oon yateyi át sá – how many things

Five
t'á – king salmon
kei awdzitéx – he hooked it
awsineex – he saved, kept
aawahoon – did he sell

Six
shál – spoons
áwé – there are
du jeewóó – she or he has
ku.oo jiyís – for the people
oosyéx – does she or he need, lack
Seven
s'igeidée – beaver
awdzigát – were trapped
daánaa – dollar
yéi aawahoon – he sold it for
wáa yáx – how much
ayaawadlaaḵ – did he gain

Eight
has – they
k’oodás’x – coat (predicate nominative)
sateeḵ – it becomes
aawakáa – did she sew

Nine
kéetch – killer whales (subject)
yaawa.aat – chased
yáay – whales
sh wudzineex – saved himself
aawaják – did they kill

Ten
at yátx'ee – children
kawóot – beads
akéis’ – is/are sewing
shakatl'éen – bundle of beads
at k'atsk'u – child
jee – in hand
yéi kgwatée – will be, will each get

Eleven
xáat – fish, salmon
asxook – is/are drying
yéilch – raven (subject)
wusixáa – ate
awsixúk – did he/she dry

Twelve
aa woo.oo – she brought (some)

Thirteen
aas – tree
yíkt – in
kéen – are sitting

Fourteen
x’wáat’ – trout
aawsi.ée – cooked

Fifteen
k’eikaxwéin – flower
ch'al – just
kukanáax’ – wasted; in vain