

カバ Hippopotamus

創作 Created 2001/10 改良 Revised 2008/2

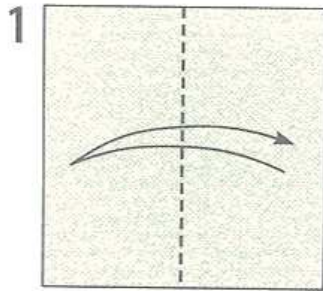
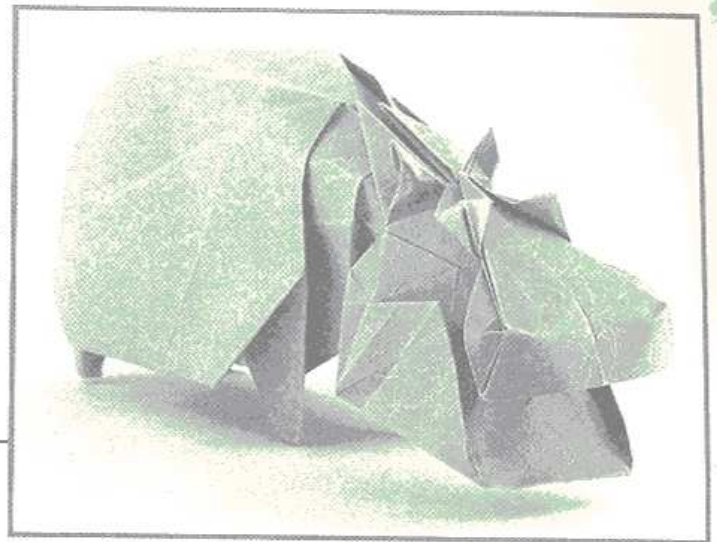
難易度 Difficulty ★★★★★

使用紙サイズ Paper Size 24×24cm

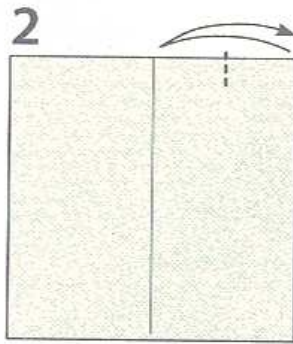
折り図初出 First Published

『折紙探偵団』71号(2002, 日本折紙学会)

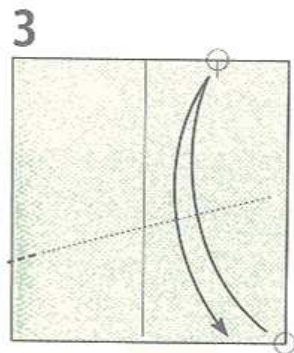
"Origami Tanteidan Magazine" No.71 (2002, JOAS)



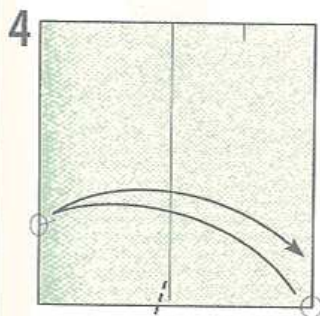
フチとフチを合わせて
折り筋をつける
Fold and unfold.



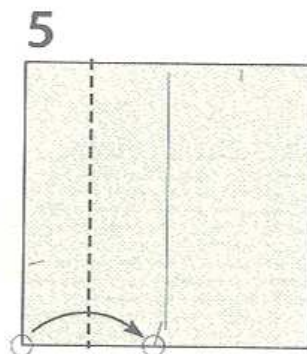
カドと折り筋を合わせて
フチに印をつける
Mark the top edge by
folding the corner to
the center.



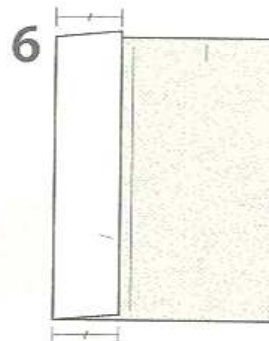
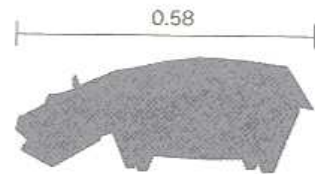
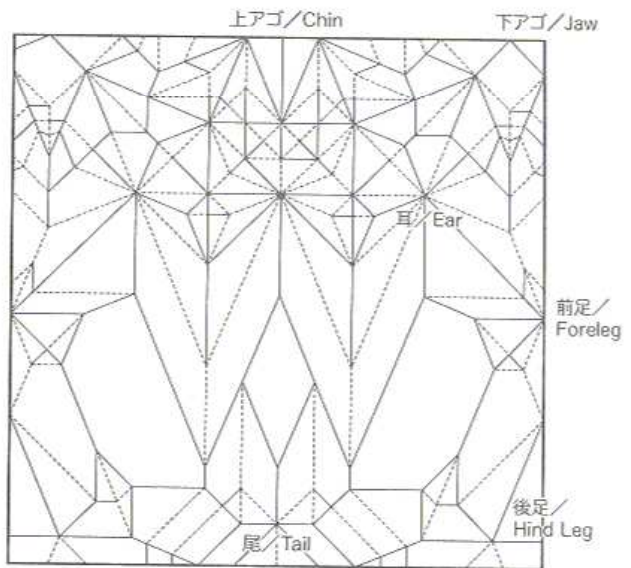
右下のカドを印に合わせて
左側のフチに印をつける
Mark the left edge by
folding up the right
bottom corner to the
mark made in 2.



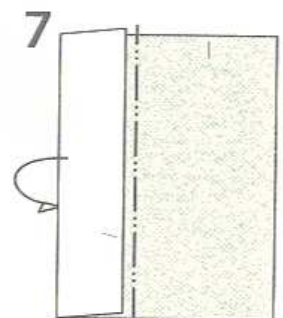
右下のカドを左の印に合わせて
下のフチに印をつける
Mark the bottom edge
by folding up the right
bottom corner to the
mark made in 3.



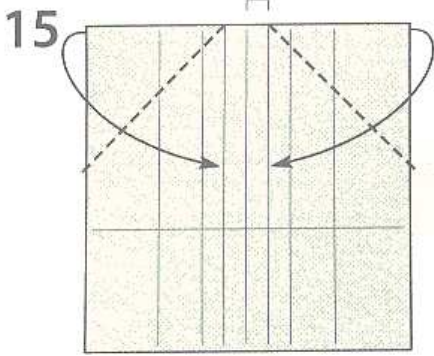
カドを印に合わせて折る
Fold the left bottom
corner to the mark.
Fold the layer through.



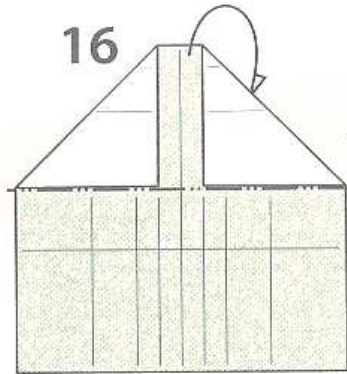
工程5はこの長さが
同じかどうか確かめ
つつ折ること
Make certain that
the widths of the
layer on the top and
on the bottom are
the same.



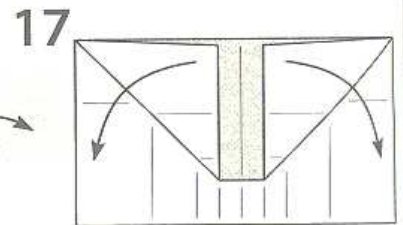
ついている折り筋で
後ろに折る
Mountain fold along
the center line.



15 折り筋ひとつ分をあけてカドを折る
Fold down the corners
so that the top edge aligns
with the crease lines
next to the center line.

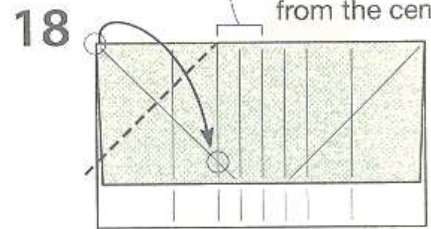


16 フチのところを後ろに折る
Mountain fold along the
edge.



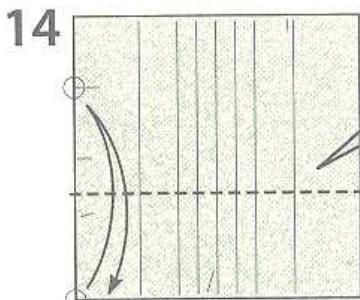
ひらく
Unfold.

折り筋2つ分
The third
crease line counting
from the center.



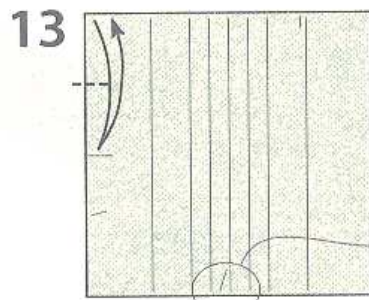
18 上のフチを折り筋に合わせて折る
Fold the top left corner
from and to the second vertical
crease line.

以降の図は2~13でつけた
印の折り筋を省略する
From now on, marks are
not shown in the diagrams.



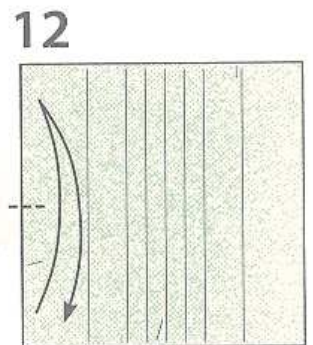
14 カドを印に合わせて
折り筋をつける
Fold up the left bottom
corner to the mark.
Fold the layer through.
Unfold.

大きい紙の場合わずかに
上の位置で折ると良い
If you are using a large
sheet, fold at a slightly
upper position.

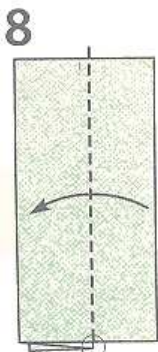


13 紙の上下を間違えないように
注意して印をつける
Mark making sure of the
orientation of the sheet.

この印の
ある方が下
This mark
should be
located on
the bottom.



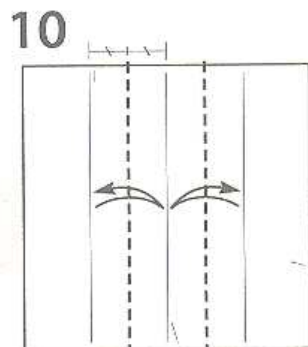
12 フチの真ん中に印をつける
Mark the middle point
of the side edge.



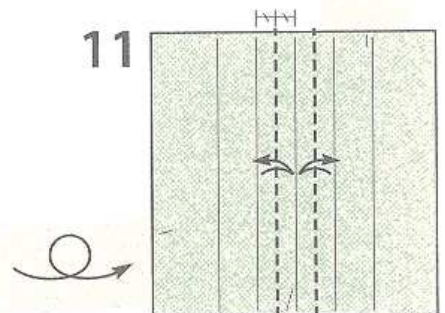
8 後ろのフチに
沿って折る
Fold the layer
along the edge.



9 折り筋をついたら
すべてひらく
Unfold everything.



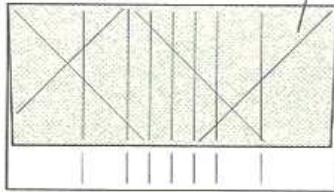
10 半分の幅の折り筋をつける
Fold the layer where
the two crease lines meet.
Unfold.



11 さらに半分の幅の
折り筋をつける
Fold the layer where the
two crease lines meet.
Unfold.

21

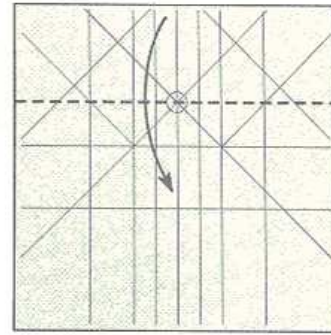
右側も18~19と同様に折る
Repeat 18-19 on the right.



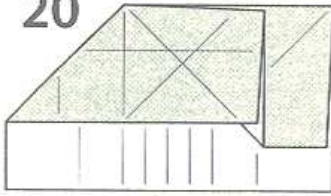
全部ひろげる
Unfold everything.

22

○を通る線で折る
Fold the edge down along the line going through the first intersection at the center.

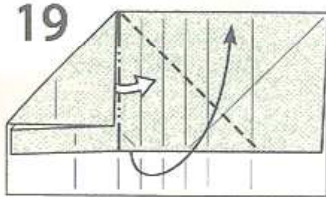


20



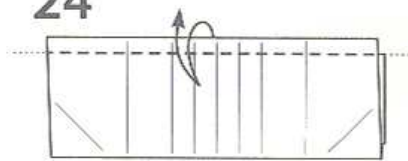
折り筋をついたら18の形まで戻す
Unfold to 18.

19



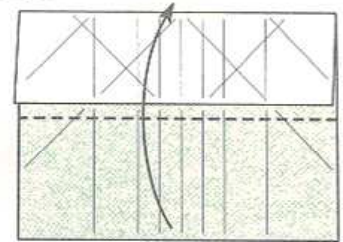
紙を引き出して上のフチにそろえるように折る
Pull out the layer and align it with the top edge.

24



後ろのフチのところで折り筋をつける
Fold and unfold along the edge behind.

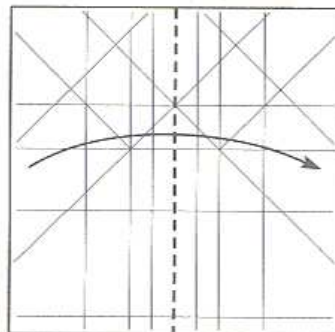
23



ついている折り筋で折る
Fold along the crease line.

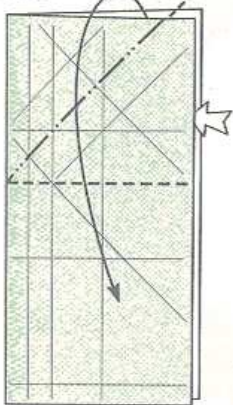
全部ひろげる
Unfold everything.

25



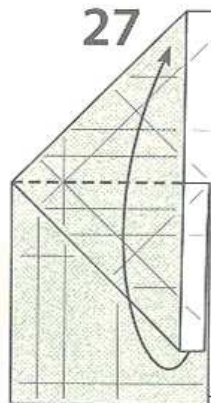
半分に折る
Fold in half.

26



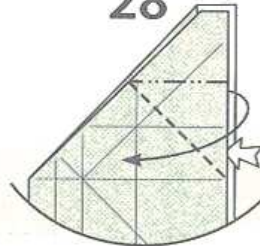
ついている折り筋でひらいてつぶすように折る
Open and squash along the crease lines.

27



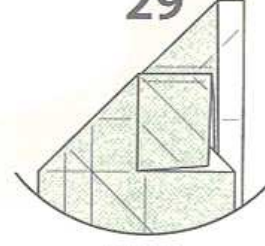
閉じる
Fold up and close the layer.

28



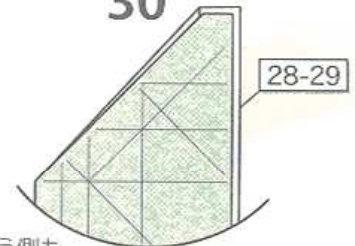
ついている折り筋でひらいてつぶすように折る
Open and squash along the crease lines.

29

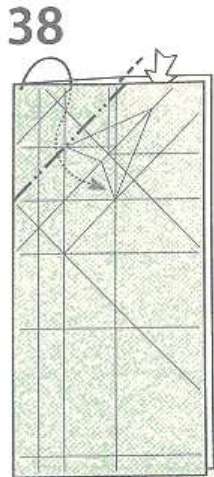


折り筋をついたら戻す
Unfold.

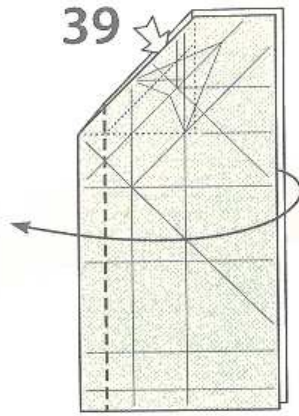
30



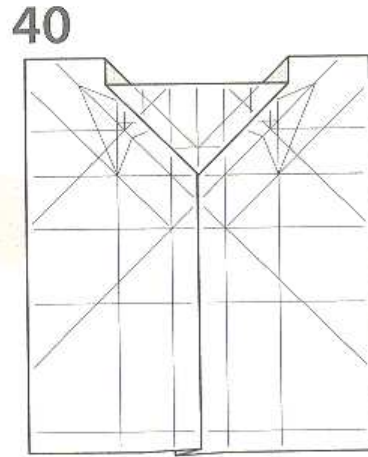
向こう側も28~29と同様に折る
Repeat 28-29 behind.



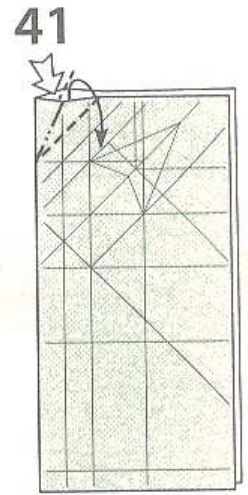
38
ついている折り筋で
内側に折る
Inside reverse fold
using the crease lines.



39
ひらいて内側を
つぶすように折る
Open the layer
and squash the
hidden layer.

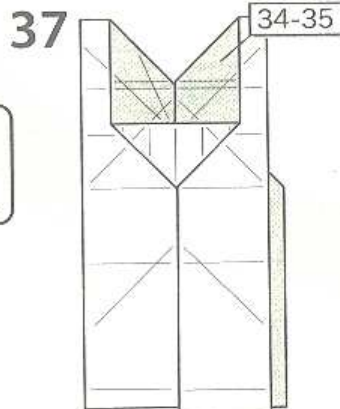


40
折り筋をつけたら
38の形まで戻す
Unfold to 38.

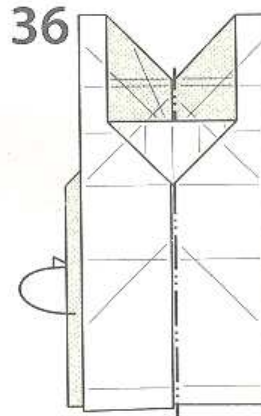


41
ついている折り筋の
ところで内側をひらいて
つぶす
Open and squash
along the crease lines.

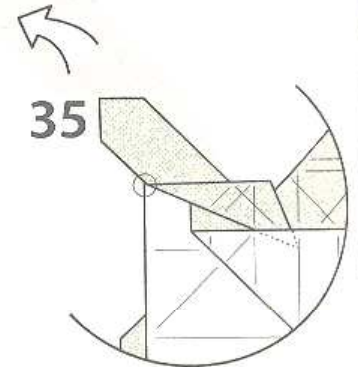
26の形
まで戻す
Unfold to 26.



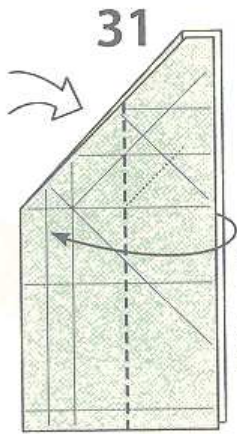
37
34~35と同様に折る
Repeat 34-35.



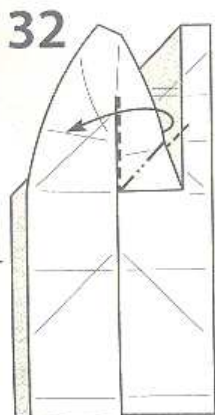
36
フチを反対側に
折り返す
Fold the layer
behind to the
other side.



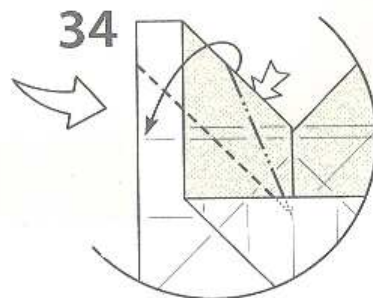
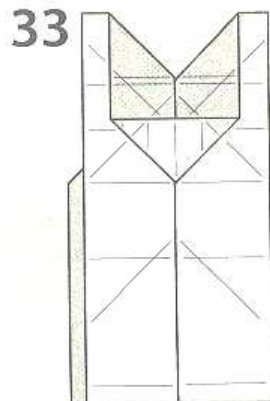
35
○のところが合う。
よく折り筋をつけたら戻す
Note that the edge
aligns with the corner.
Crease and unfold.



31
ついている折り筋で
1枚を折り返す
Open one layer using
the crease line.

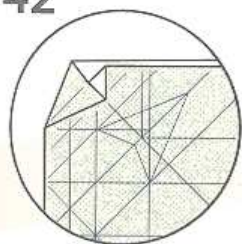


32
(途中の図)
内側をひろげて
つぶす
Open the layer
and squash.



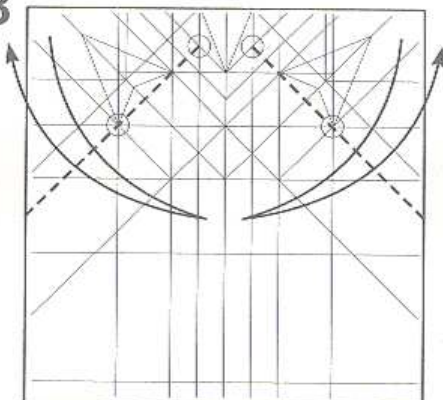
34
ついている折り筋で
折り返してつぶす
ように折る
Swivel the layers
using the crease
lines.

42



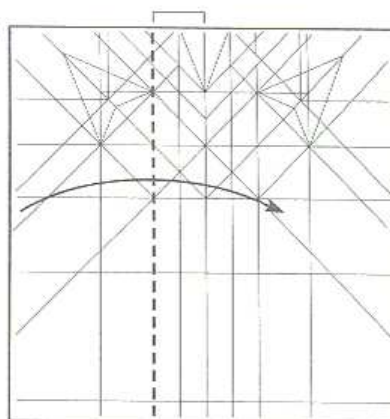
全部ひろげる
Unfold everything.

43



○を通る線で折り筋をつける。
上の方はつけない
Fold and unfold along the lines
connecting the circled points.

44



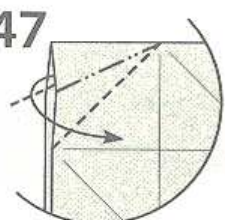
中心線から2つ目の折り筋で折る
Fold along the second crease
line from the left.

48



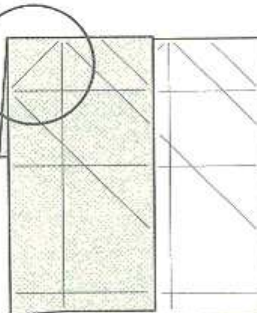
フチに合わせて折り込む
Fold the edges inside
along the center edges.

47

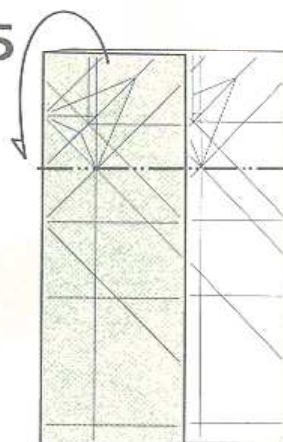


内側をひろげてつぶす
Open the layer and
squash.

46

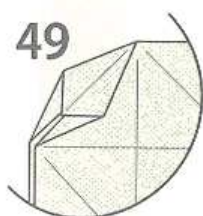


45



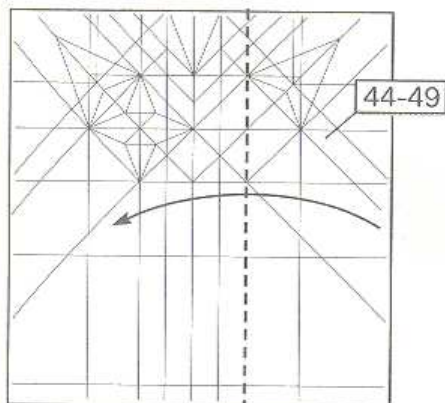
ついている折り筋で
後ろに折る
Mountain fold using
the crease lines.

49



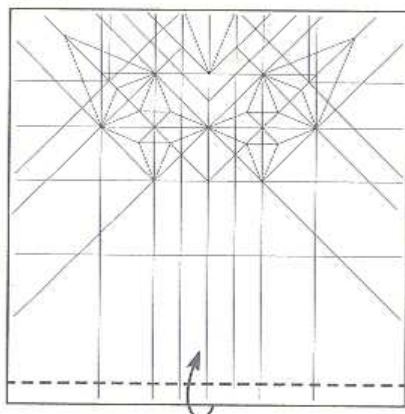
しっかりと
折り筋をついたら
すべてひらく
Crease and
unfold everything.

50



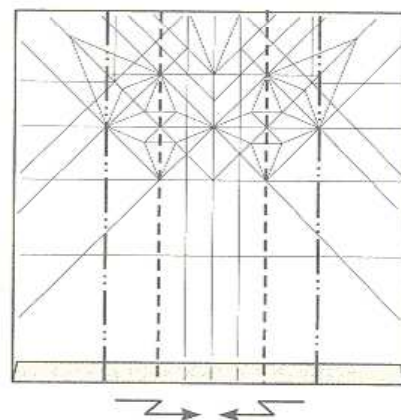
右側も44~49と同様に折り筋をつける
Repeat 44-49 on the right side.

51



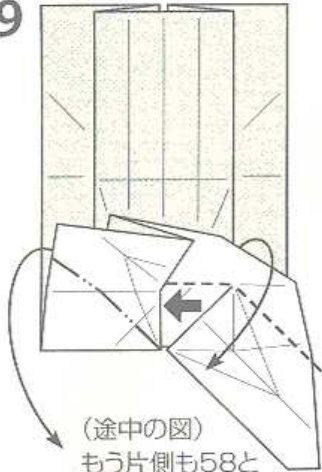
ついている折り筋で折る
Fold up the layer along
the crease line.

52



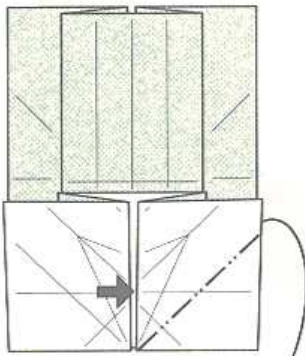
ついている折り筋で段折り
Pleat fold along the crease
lines.

59



(途中の図)
もう片側も58と
同じように折って折りたたむ
Repeat 58 on the left
and flatten the model.

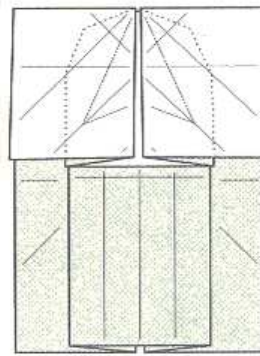
58



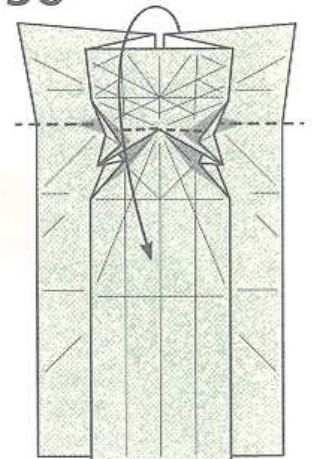
ついている折り筋で
黒矢印のフチを
押しひろげて折る
Swivel the arrowed layer
using the crease line.

180°

57

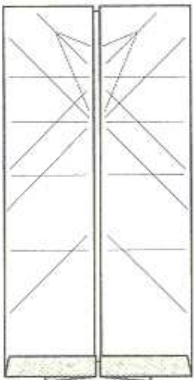


56

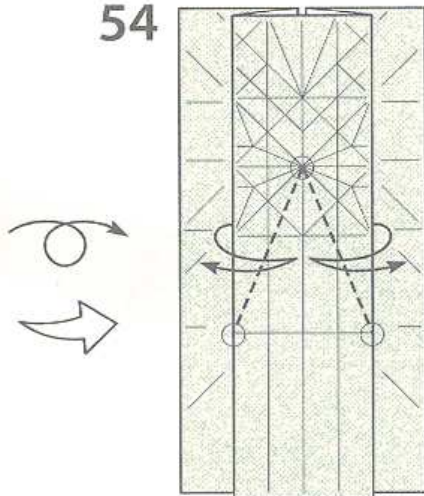


(途中の図)
Closing and
assembling
in progress.

53

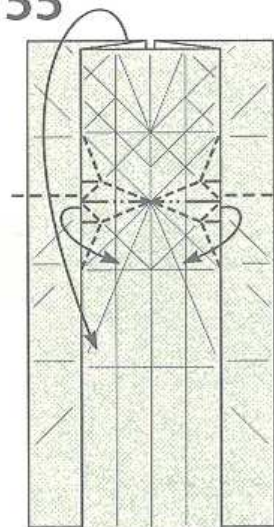


54



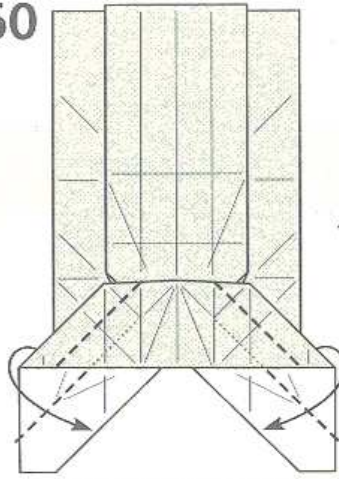
○を結ぶ線で折り筋をつける
Fold and unfold along the
lines connecting the circled
points.

55



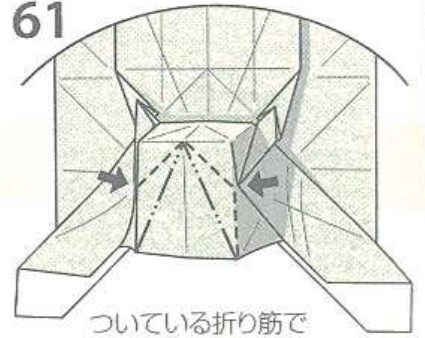
47~48でつけた
折り筋でまとめながら
下に閉じるように折る
Assemble along the
crease lines
you made in 47-
48 and close the
model down.

60

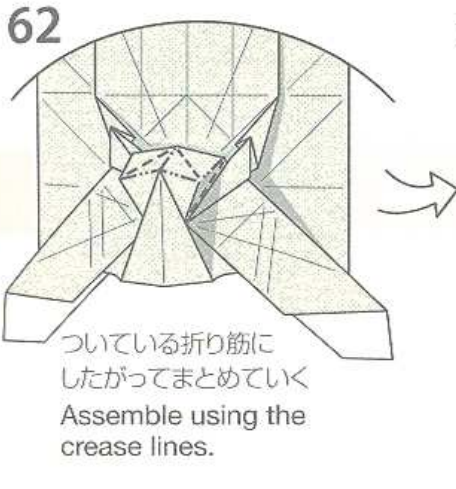


ついている折り筋で折ると
次の図のように中央部分が
箱状に立体化する
Crease along the crease lines
so that the center of the layer
will become three-dimensional.

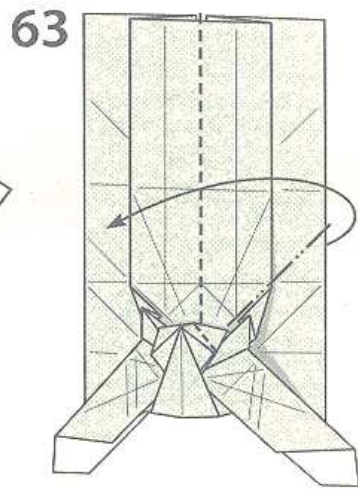
61



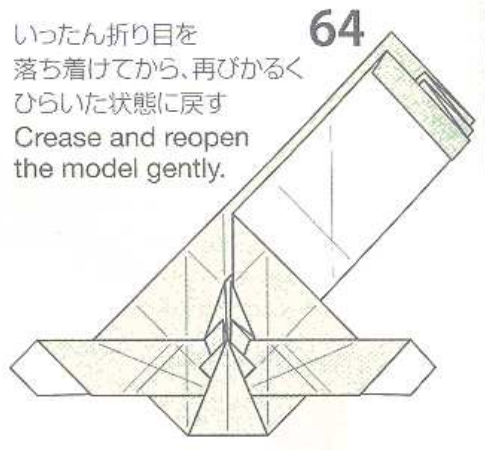
ついている折り筋で
矢印のところを
くぼませる
Crimp and sink
the arrowed points.



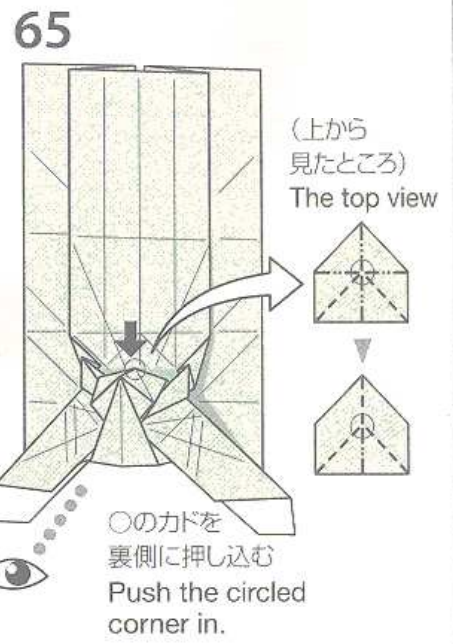
62
ついている折り筋にしたがってまとめていく
Assemble using the crease lines.



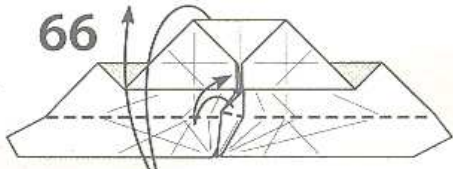
63
上の方を半分に折って平らに折りたたむ
Fold the top layer in half and flatten the model.



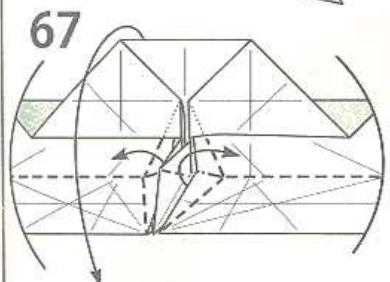
64
いったん折り目を落ち着けてから、再びかるくひらいた状態に戻す
Crease and reopen the model gently.



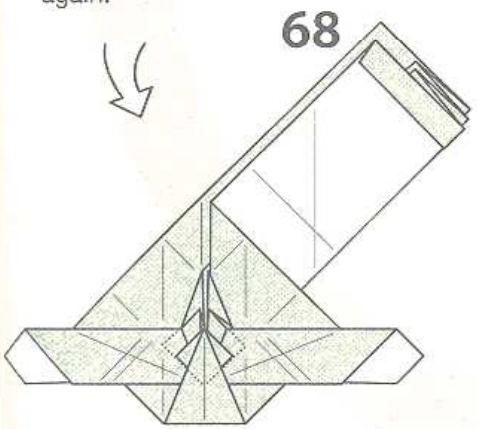
65
（上から見たところ）
The top view
○のカドを裏側に押し込む
Push the circled corner in.



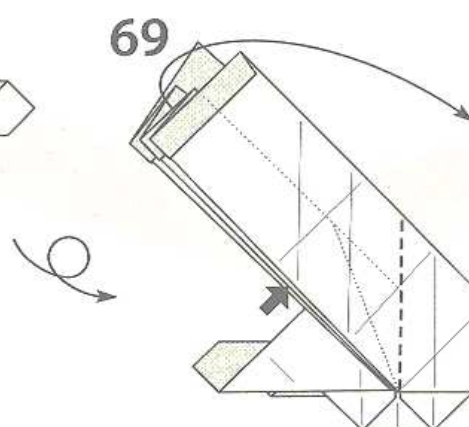
66
65で押し出した部分を一方に倒すようにいったん閉じて折りぐせをつける
Lay down the corner pushed inside in 65 on one side and close the model.
Crease and unfold.



67
ついている折り筋でフチを外側に折り返し、再び閉じる
Fold the layers outside and close the model again.

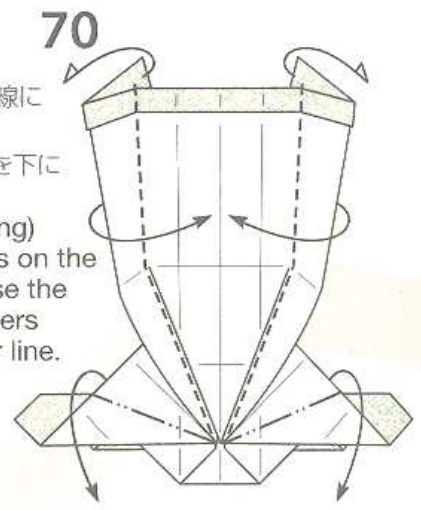


68
点線が67で折り返したところ
The dotted line shows the layers created in 67.



69
ついている折り筋で真ん中でひらいて折る
Open the layers symmetrically.

（途中の図）
左右のフチを中心線に合わせて折り、同時にあまった紙を下に引き出してたたむ
(Open and closing)
Swivel the layers on the bottom and close the left and right layers along the center line.



79 左側も72~78と同様に折る
Repeat 72-78 on the left.

80

81 黒矢印のところを押しひろげるように折る
Fold the right layer to the left and open the arrowed layer.

78 折り返す
Fold the corner to the right.

77 カドを折り返す
Fold down the corner.

76 ついている折り筋で中割り折りのようにして平らに折りたたむ
Inside reverse fold and flatten the model.

75 くぼんでいる部分を手前に押し出す
Push out the corner.

ついている折り筋
The necessary crease line is here.

74 引き寄せるように折る
Swivel the layers.

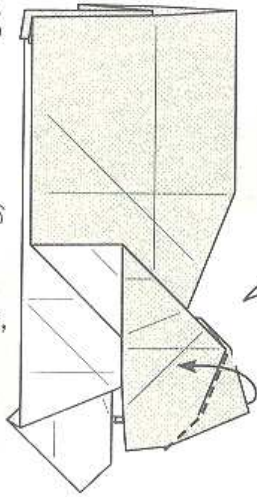
73 (76まで立体図)
左の方だけフチとフチを合わせるように折り返す
(Three-dimensional until 76)
Fold edge to edge only on the left side.

72 カドをめくって内側を見る
Open and look inside of the layers.

71

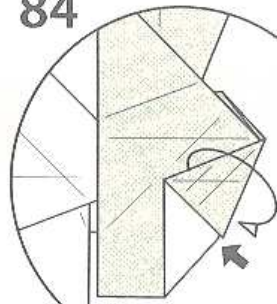
83

下の方も
平らにたたむ
Fold and
flatten on
the bottom,
too.



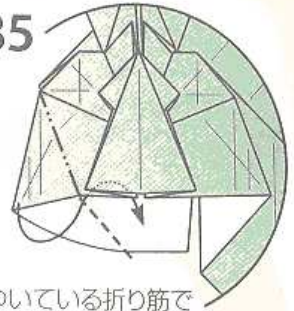
84

カドを裏側にかぶせるようにする
Reverse fold
the layer.



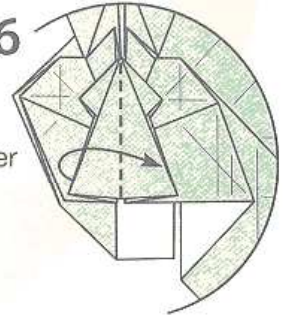
85

ついている折り筋で
中割り折りのように折る
Inside reverse fold.



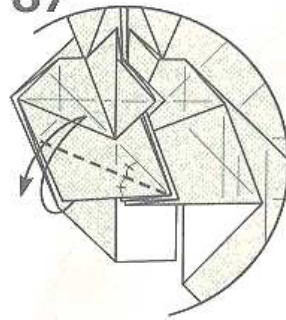
86

カドをめくる
Fold the layer
to the right.



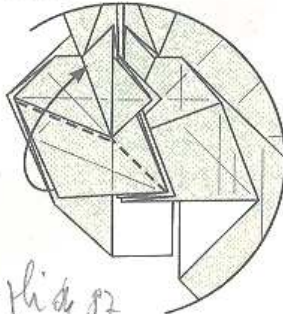
87

フチを
折り筋に合わせて
折り筋をつける
Fold the edge
to the crease line
and unfold.



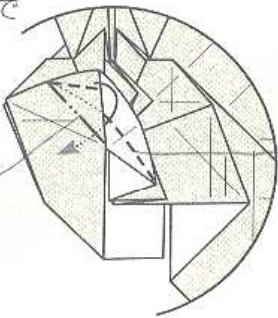
88

ひらくところで
立体的に折り返す
Open the layer
as far as it goes.
The model will be
three-dimensional.



89

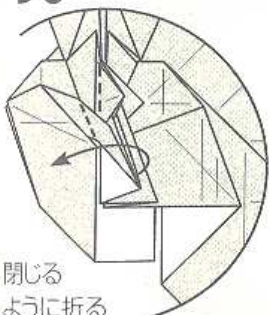
ついている折り筋で
内側に折り込む
Inside reverse
fold using the
crease lines.



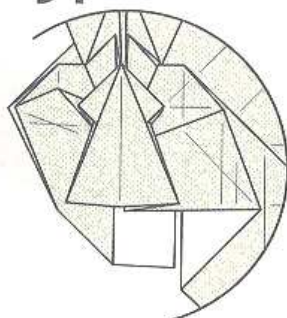
hide 87

90

閉じる
ように折る
Close the layer.

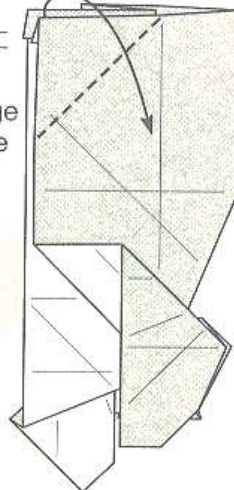


91



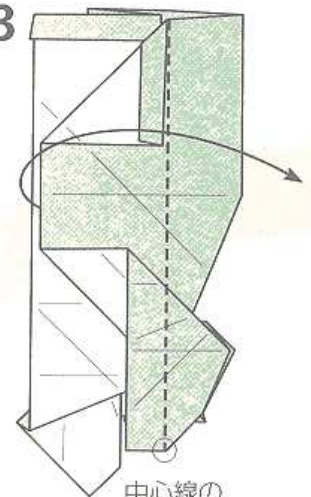
92

フチを折り筋に
合わせて折る
Fold the edge
to the crease
line.

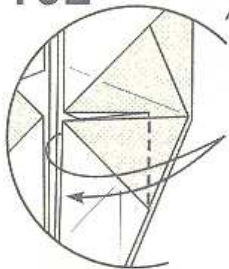


93

中心線の
ところで折り返す
Fold the layers
to the right.

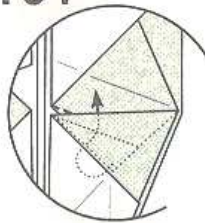


102



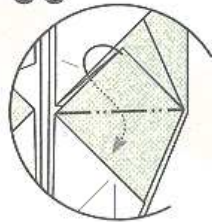
ひらくところで折って
折り筋をつける
Fold and unfold
where the layers open.

101



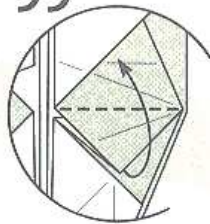
フチとフチを
合わせるように
中割り折り
Inside reverse fold
the hidden corner.

100



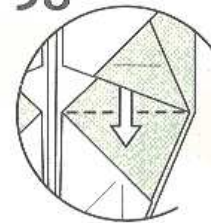
カドを内側に折る
Fold the corner
inside.

99



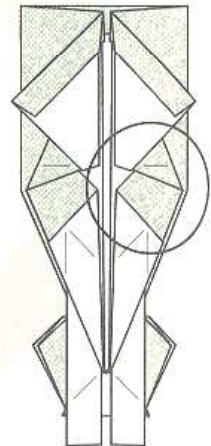
折り返す
Fold it up.

98



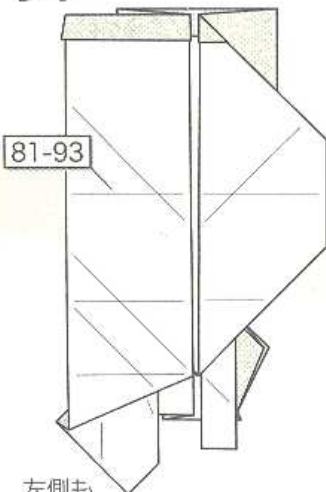
紙を引き出して折る
Pull out the layer.

97



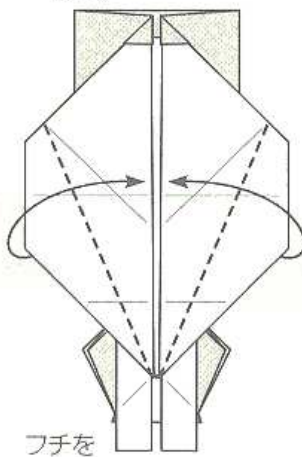
後ろのカドを
引き出しながら折る
Fold down the
layers and swivel
the hidden ones.

94



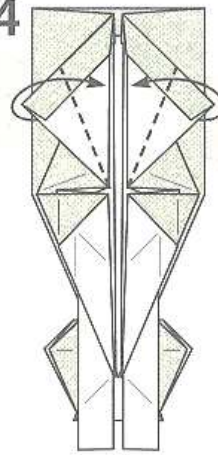
左側も
81~93と同様に折る
Repeat 81-93 on the left.

95



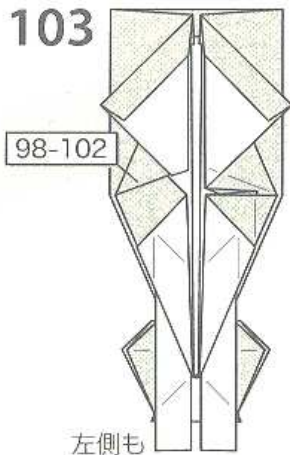
フチを
中心線に合わせて折る
Fold edges to the
center line.

104



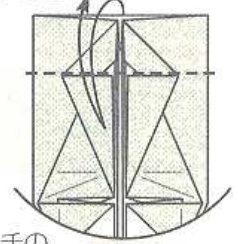
フチを中心線に
合わせて折る
Fold the edges
to the center line.

103



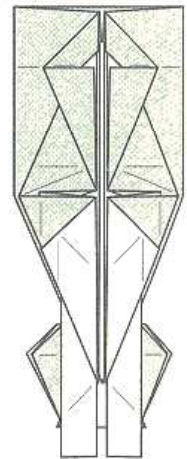
左側も
98~102と同様に折る
Repeat 98-102 on the
left.

105

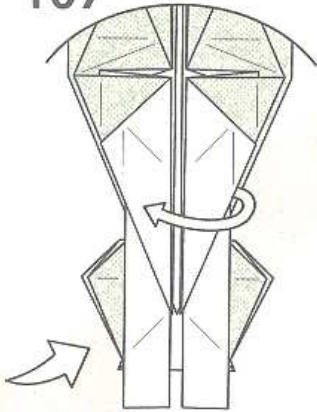


フチの
ところで折り筋をつける
Fold and unfold along
the edge.

106

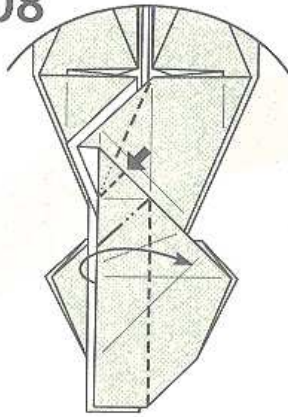


107



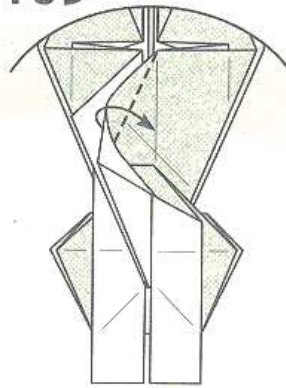
重なっている紙を
はがしてめくる
Pull out and flatten
the hidden layers.

108



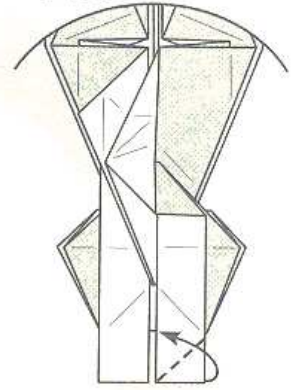
下の方から順に折りたたむ
Fold starting from
the bottom crease line.

109



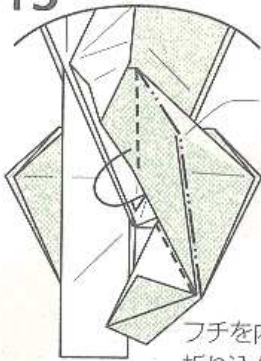
(途中の図)
In progress.

110



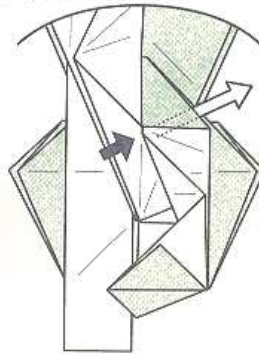
カドを折る
Fold the corner
up.

113



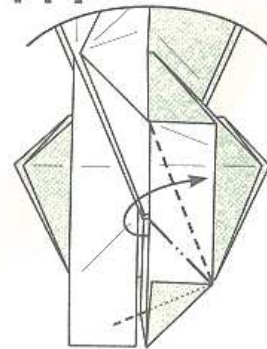
押し出した
カド
The corner
pushed out.

112



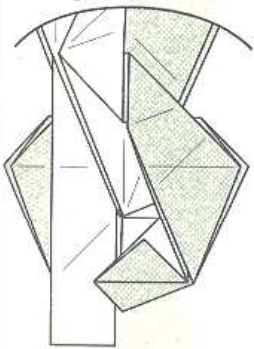
黒矢印のカドを
押し出す
Push out
the arrowed corner.

111



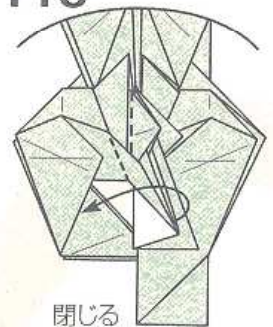
ついている折り筋(山線)を
使って引き寄せ折り
Swivel using the mountain
crease line.

114



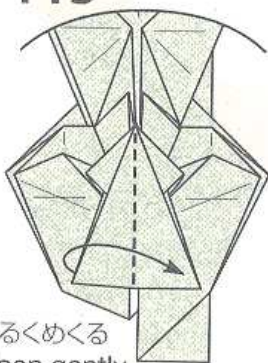
フチを内側に
折り込んでたたむ
Fold the excess
layer inside and
flatten.

118



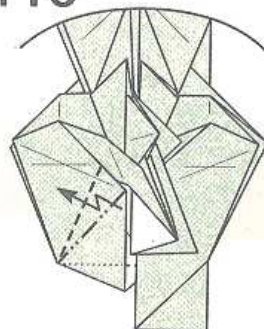
閉じる
Close the model.

115



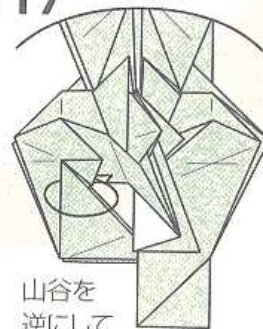
かるくめくる
Open gently.

116



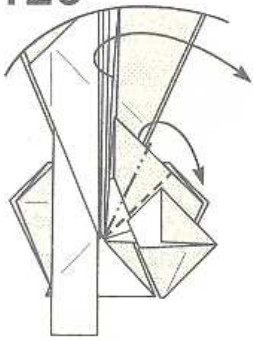
ずらすように折る
Swivel.

117



山谷を
逆にして
カドを隠すように折り変える
Fold and hide the layer
inside.

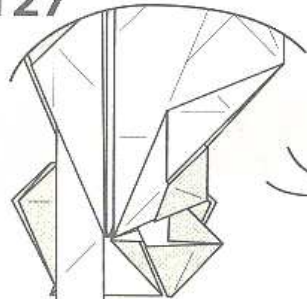
126



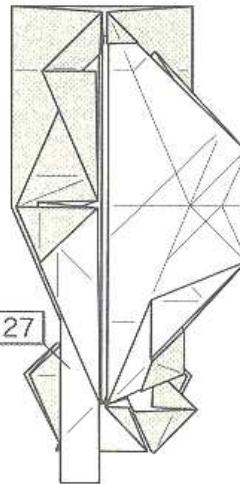
ついている折り筋で下の部分をひらきながら戻す
Swivel and open using the crease lines.



127

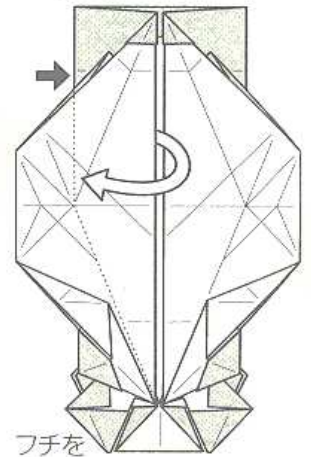


128



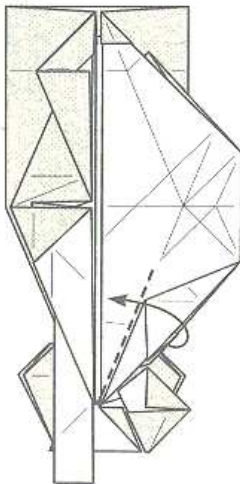
左側も107~127と同様に折る
Repeat 107-127 on the left.

129



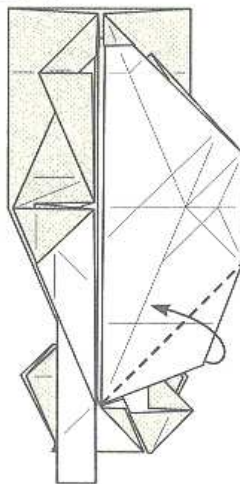
フチを裏側から押し出して手前に持ってくる
Push out the layer behind and lay it on the top.

125



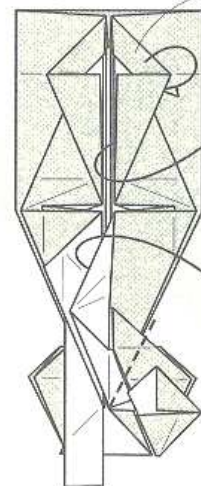
下の方だけ折り返す
Fold up the bottom portion along the edge.

124



ついている折り筋で折る
Fold along the crease line.

123

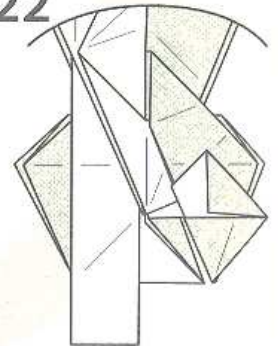


ここは後ろにしまう
This layer should remain behind.

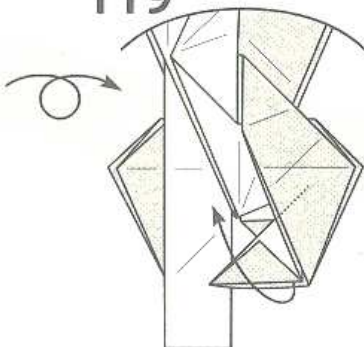
ひらくように折る
Open the model gently.



122

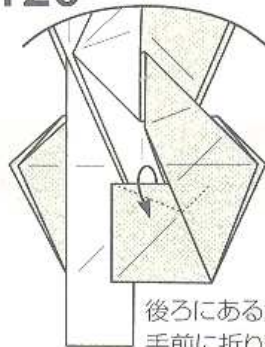


119



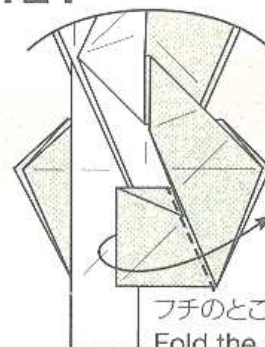
ヒダの下で折り返す
Fold up the layer inside.

120



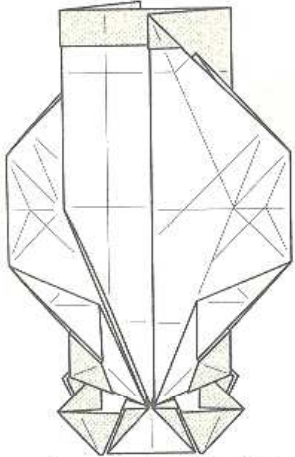
後ろにあるカドを手前に折り変える
Pull out and show the hidden corner.

121



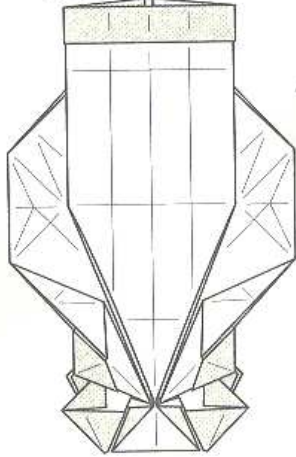
フチのところで折る
Fold the layer along the edge.

130

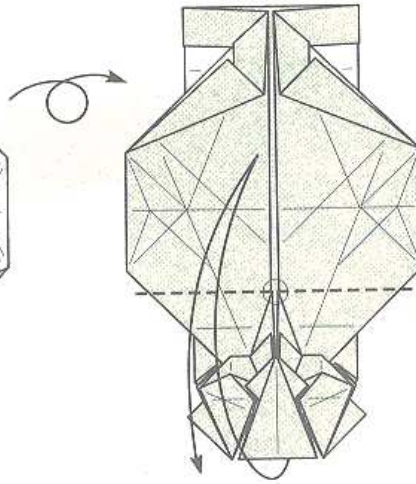


右側も129と同様に折る
Repeat 129 on the right.

131



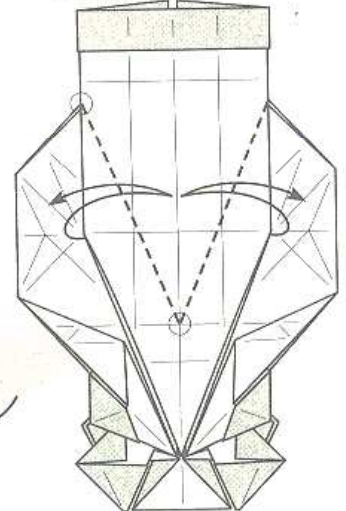
132



○を通る線でしっかりと
折り筋をつける
Fold and unfold tightly
along the line
that goes through
the circled point.

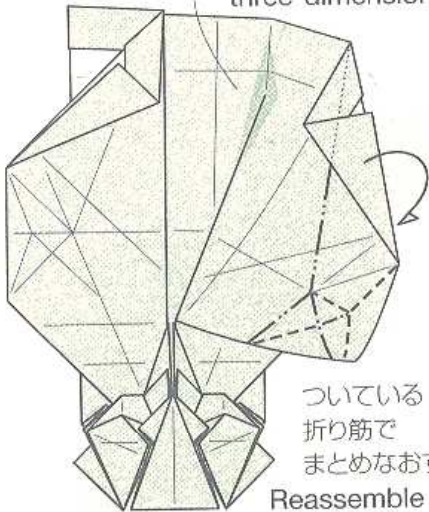


133



○を結ぶ線で
折り筋をつける
Fold and unfold
along the line going
through
the circled points.

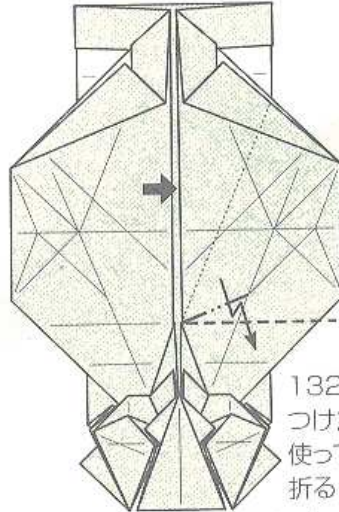
135



上の方は立体的になる
The top portion will be
three-dimensional.

ついている
折り筋で
まとめなおす
Reassemble using
the crease lines.

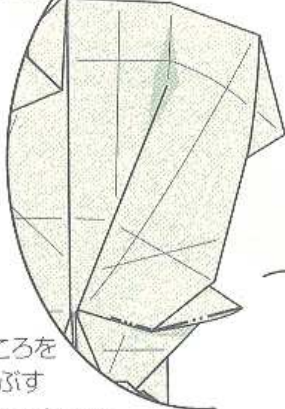
134



Swivel the layer using the
crease lines created 132-133.

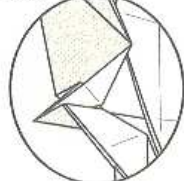
132、133で
つけた折り筋を
使ってすらすらと
折る

136



カドのところを
平らにつぶす
Flatten the layers.

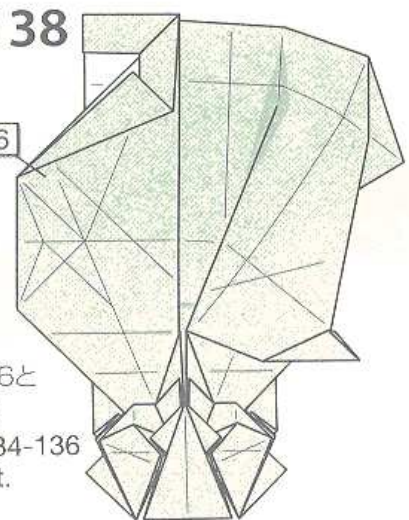
137



裏側のかたち
The backside view.

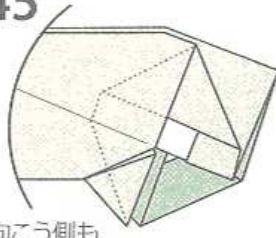
138

134-136



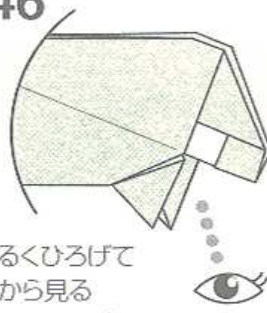
左側も
134~136と
同様に折る
Repeat 134-136
on the left.

145



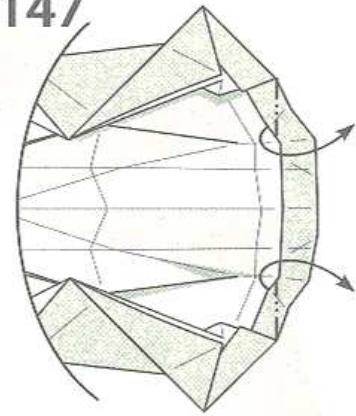
向こう側も
140~144と同様に折る
Repeat 140-144 on
the other side.

146



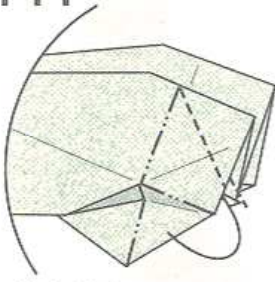
かるくひろげて
下から見る
Open gently
and look inside.

147



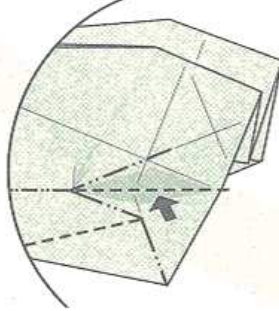
フチを
引き出しながら
ひらく
(破かないよう注意)
Pull out the layer
carefully.

144



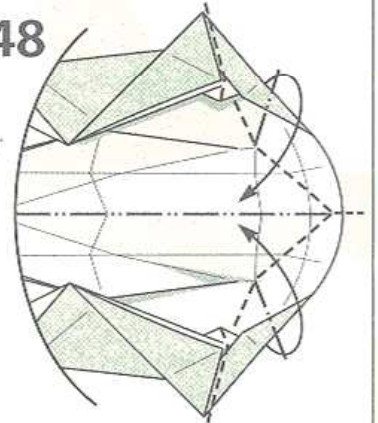
(途中の図)
ついている折り筋で
内側に折り込む
In progress.
Fold the edge inside
using the crease lines.

143



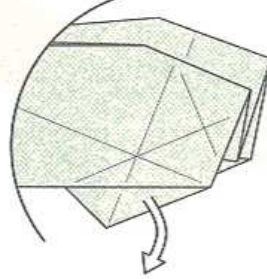
ついている折り筋で
くぼませるように折る
Push in the edge
using the crease lines.

148



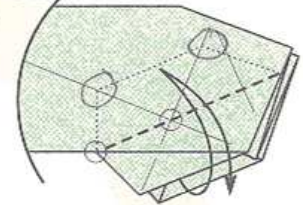
ついている折り筋に
したがってたたみなおす
Reassemble using
the crease lines.

142



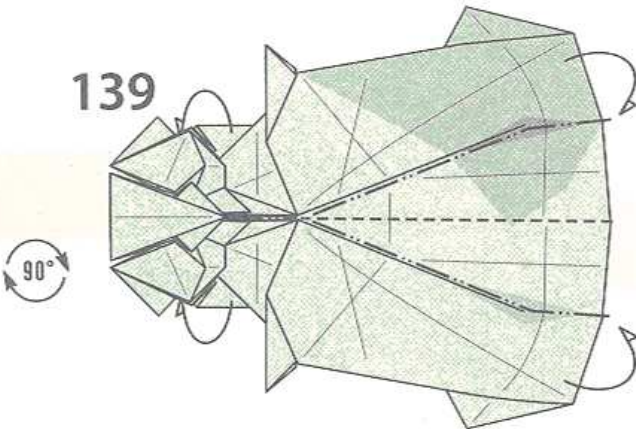
かるくひろく
Open gently.

141



しっかりと折り筋をつける
Fold tightly as shown
and unfold.

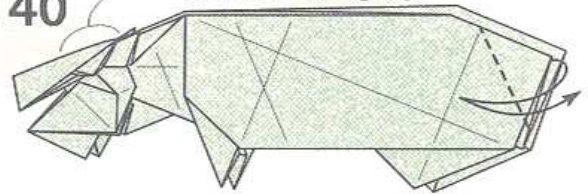
139



右側を後ろにかぶせるように折って
全体を折りまとめる
Assemble the model
using the crease line.

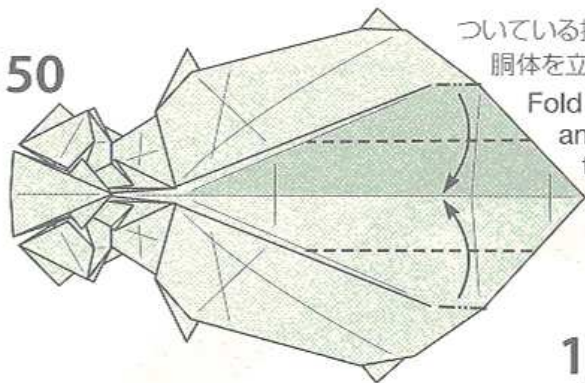
頭部の紙が厚い部分は
しっかりと折らなくていい
The head part are so thick
that crease lines need not
be made so tightly.

140



フチを折り筋に合わせて
折り筋をつける
Fold and unfold the edge
along the crease line.

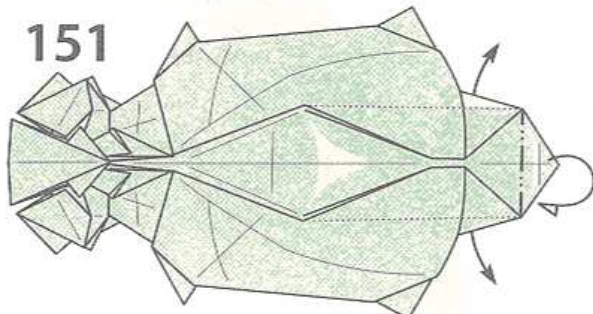
150



ついている折り筋で折り、
胴体を立体化する

Fold using the crease lines
and make the model
three-dimensional.

151

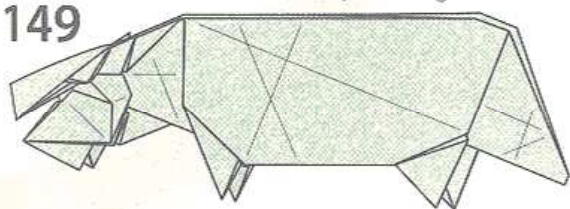


裏側の持ち上がった紙を
両側にひらいてたため
Open the swiveled
layers to the sides.

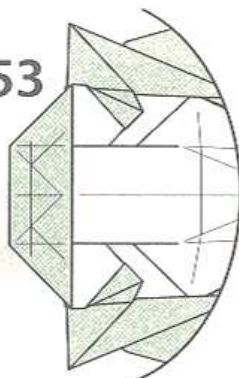
かるくひろげて上から見る
Open gently and look
inside from the top.



149

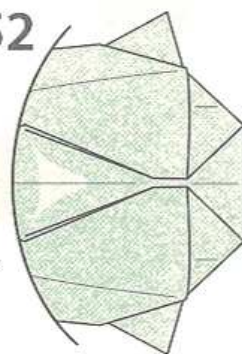


153

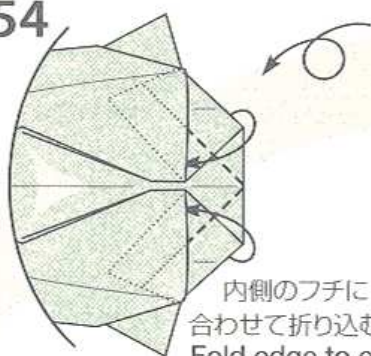


裏から見たかたち
The bottom view.

152

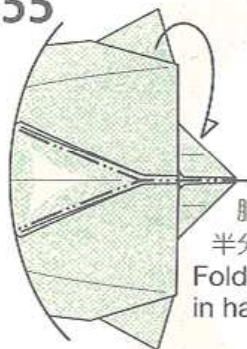


154



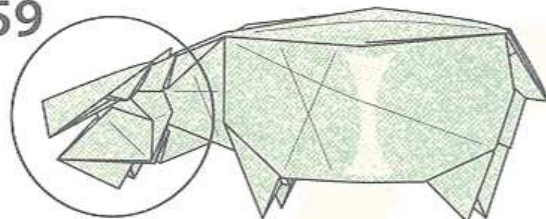
内側のフチに
合わせて折り込む
Fold edge to edge.

155

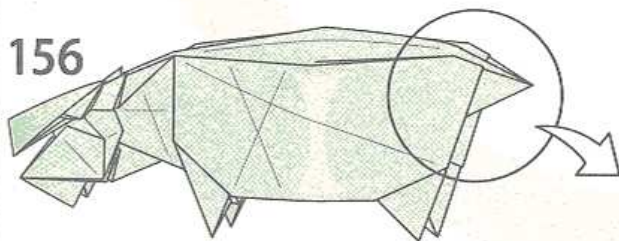


胴体を
半分に折る
Fold the body
in half.

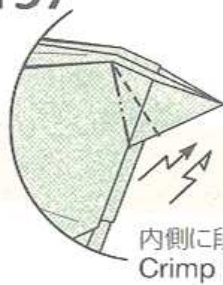
159



156

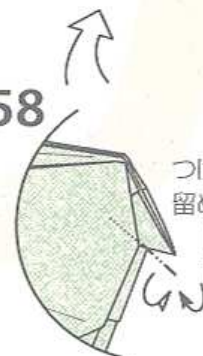


157



内側に段折り
Crimp inside.

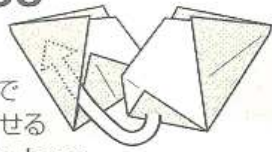
158



つけ根を折り込んで
留める
Lock by folding
the inner layer.

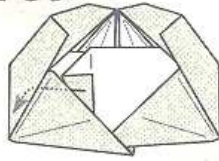
168

差し込んで
組み合わせる
Insert the layer
into the pocket.



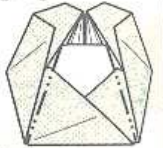
169

奥まで差し込む
The layer should
go inside as far
as it goes.



171

完全に差し込んだら
かるく山に折って
形を整える
Shape the lower
jaw by mountain folds.



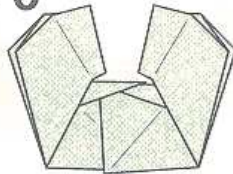
167

フチを
折り筋に合わせて折る
Fold up the edge
to the crease line.



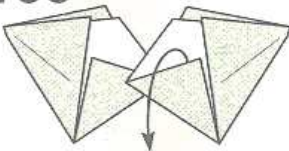
170

裏側もかみ合わせる
ようにする
Make sure that the
assembly is complete
on the back side.



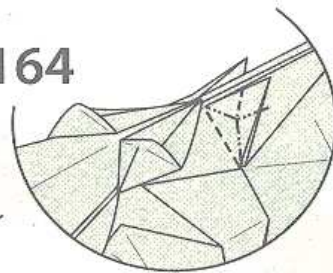
166

片側だけひらく
Open the right layer.



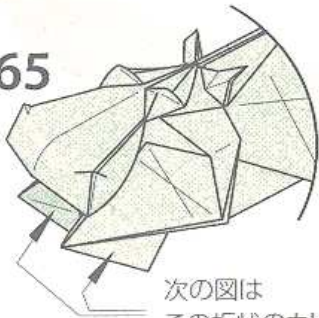
164

カドをつまむようにして
耳を作る。
反対側も同じ
Rabbit-ear fold the flap
and shape an ear.
Repeat on the other side.



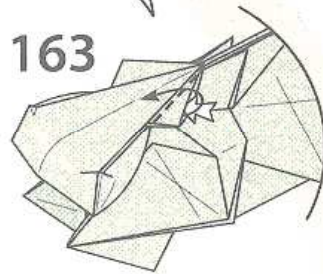
165

次の図は
この板状のカドだけ見る
The next series of
diagrams only show
these flaps.



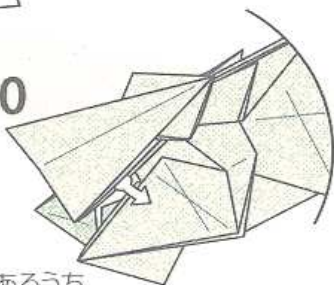
163

カドを立体的にひらいて
目を作る。
反対側も同じ
Open the layers
three-dimensionally
and make an eye.
Repeat on the other
side.



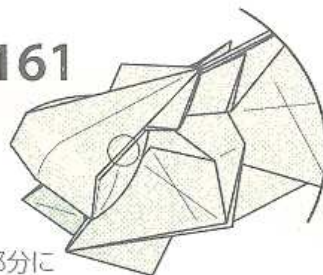
160

3層あるうち
一番下のヒダをずらして
上アゴを丸く仕上げる。
もう片方も同じ
Swivel the third layer
from the top and
round the upper jaw.
Repeat on the other side.



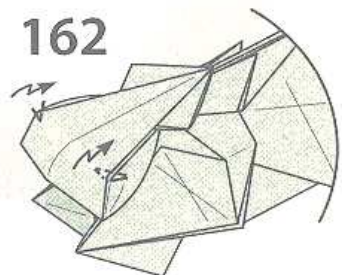
161

○部分に
すき間ができないように
下から押さえるようにすると良い
Do not leave any space at
the circled point.
You can do this by pushing
the upper jaw from inside.

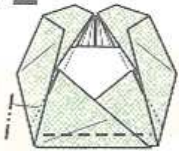


162

でっぱり部分をつまんで
鼻を表現する
Pinch the corners
and shape the nose.



172

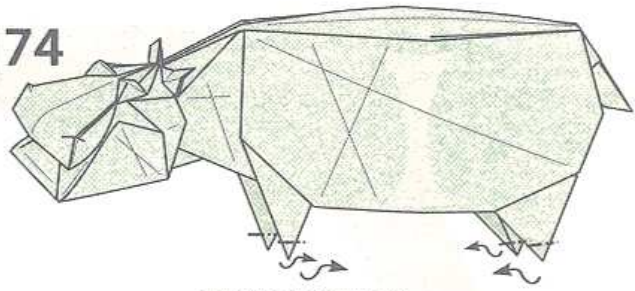


山の折り目を少しずらして
下アゴに丸みをつける
Slide the mountain
crease lines a little
and round the lower
jaw.

173

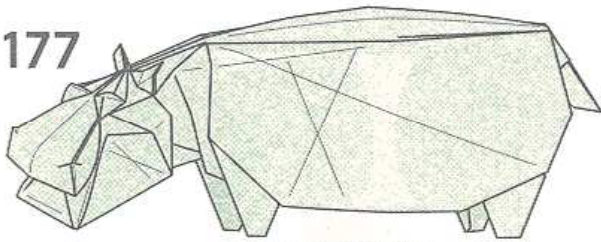


174



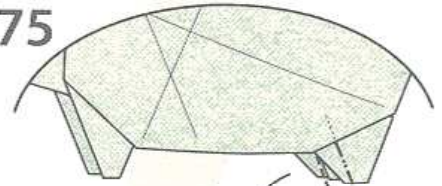
足の先を中割り折り
Inside reverse fold the feet.

177



できあがり
Model Completed.

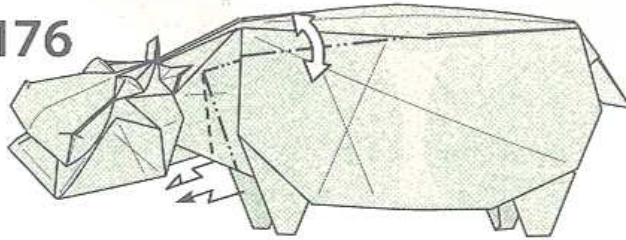
175



前足に合わせて
後ろ足を細くする。
内側の隠れているところは
平らに折れなくて良い

Fold the edges of the hind
legs inside so that they will
be of the same width as the
forelegs.
You do not need to fold
them through.

176



首を両側で段折りしながら
肩のところに丸みをつける
Crimp the neck and
round the shoulder.

収録作品中「道化面2」「オオカミ」そしてこの「カバ」の3作品は、折り線構成に特殊な比率が使われています。そのため、角度や辺を等分に折るだけでは折ることができません。

折り図の初出時は、「相似形分割方法」(川畑文昭さん考案)を用いて、正確な折り出し方を求めていたのですが、どうしても手間のかかる手順になることが避けられませんでした。その上、あらかじめつける折り筋も大量に必要で、出だしが「重たい」折り工程になってしまったことは反省点でした。

今回の折り図では、ロバート・ラングさんが開発したソフトウェア「リファレンス・ファインダ」を使い、近似値による折り出し方を採用しています。折り筋をつける工程も併せて整理しなおしたので、上記の欠点はだいぶ改善されたのではないかと思います。

「狐」もそうですが、「厳密な正確さ」と「折りやすさ」を秤にかけたときは、やはり後者を選ぶことが多くなります。しかし、折り線構造の純粋さが近似によって失われたような気もして、心境はちょっと複雑です。

In the crease patterns of Wolf, Clown Mask 2 and this Hippo, the ratio of division in the crease line structure is peculiar to them, so one cannot fold them with regular sectioning of edges and angles.

In the first diagrams, I used Kawahata's method of partitioning into similar polygons to seek for the precise way to fold it, but the steps were very cumbersome necessarily. With too many pre-creasing steps, the process of folding had become "heavy" at the start, which I needed to revise.

In diagrams here, I used ReferenceFinder by Robert Lang, and adopted the steps of folding based on approximation. I revised the steps of pre-creasing as well, so the difficulty above had been made better, I believe.

It also applies to Fox, but when I am to weigh between precision and ease to fold, I tend to choose the latter. However, the "pureness" of the crease pattern structure would necessarily be lost by approximation, which makes me still wonder.