

1944-ben még kiadja utolsó művét, de a háborús cselekmények rögtön utána eléri Szarvast. *Molnár* egyedül marad, még mostohább körülmények közé kerül. Alásott idegzete nem bírja tovább az izgalmakat. 1944. október 15-én elment kedves tartózkodási helyére, a Körös hídjára. Onnan hazatérve, méreggel vetett véget munkásságteli életének. Feljegyzései is mind elpusztultak.

*Molnár* munkásságának legfőbb jelentőségét tehát a következőkben kell látnunk: 1. Bebizonyította, hogy a magyar Alföld legfőbb, csaknem kizárólagos kakukgazdája a nádírigó. 2. Bebizonyította, milyen tömegben képes a kakuk egy területet megszállni. 3. Megfigyeléseivel, és az általa vezetett filmfelvételekkel rengeteg részletét tisztázta, hogy hogyan hordja ki a kakuk mostohatestvéreit, hány tojást rak a kakuk egy gazdamadár fészkebe, hogyan oszlanak el ezek százalékosan. 4. Adatokat szolgáltatott, miként viselkedik mesterséges áttelepítésekkel szemben. 5. Végül megtalálta azt a terepet, amelyet legtömegesebben keresnek fel hazánkban a kakukok. *Molnár* érdeme tehát, hogy olyan hézagot töltött be a magyar ornithologiai kutatás terén, mely már rég várt megoldásra és tisztázásra a nemzetközi tudományos élet is sürgette. Munkáit a magyar ornithologusok még annak idején megkapták, azonban nem akarjuk, hogy veszendőbe menjen az eredeti kutatás, ezért *Molnár* dolgozatainak maradandó értékű részeit a biológiai folyamatok lezajlásának sorrendjében iparkodtunk összeállítani, és angolnyelvű fordításra előkészíteni, melyre még *Molnár* életében ígéretet is tettünk.

## THE CUCKOO IN THE HUNGARIAN PLAIN.

By *Béla Molnár*.

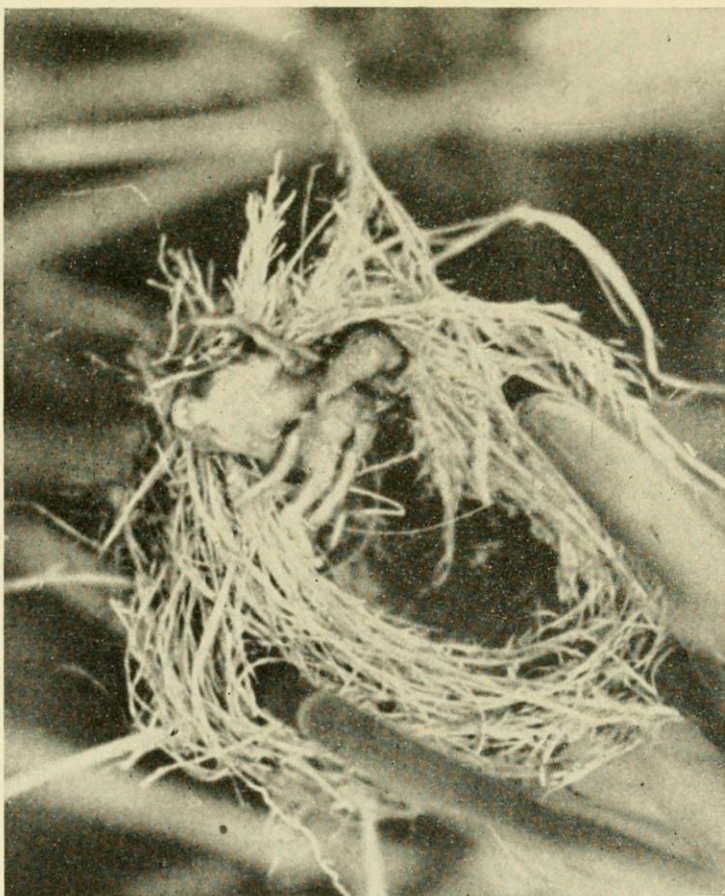
The reeds going along the Old-Körös about ten to fifteen km wide near Szarvas are most frequented as nesting territory by the great reed warbler (*Acrocephalus a. arundinaceus* L.). In the nests of this lays the cuckoo (*Cuculus c. canorus* L.) his eggs sometimes in a very great percent.

The plenty of cuckoos in the environs near Szarvas and Békésszent-andrás in the last years allowed me the following observations.

We see between the great reed-warbler and the cuckoo some rythm. The cuckoo arrives each year earlier as the great reed-warbler. After his first arrival he is nearly ten days silent (the 8 april 1940, 27 april 1942). Therefore observers often do not perceive its arrival. When it will be heard, it varies according its arrival. Generally I heard the cuckoo first some after the middle of april (20. April 1939., 18. April 1940., 16 April 1941., 6. may 1942.).

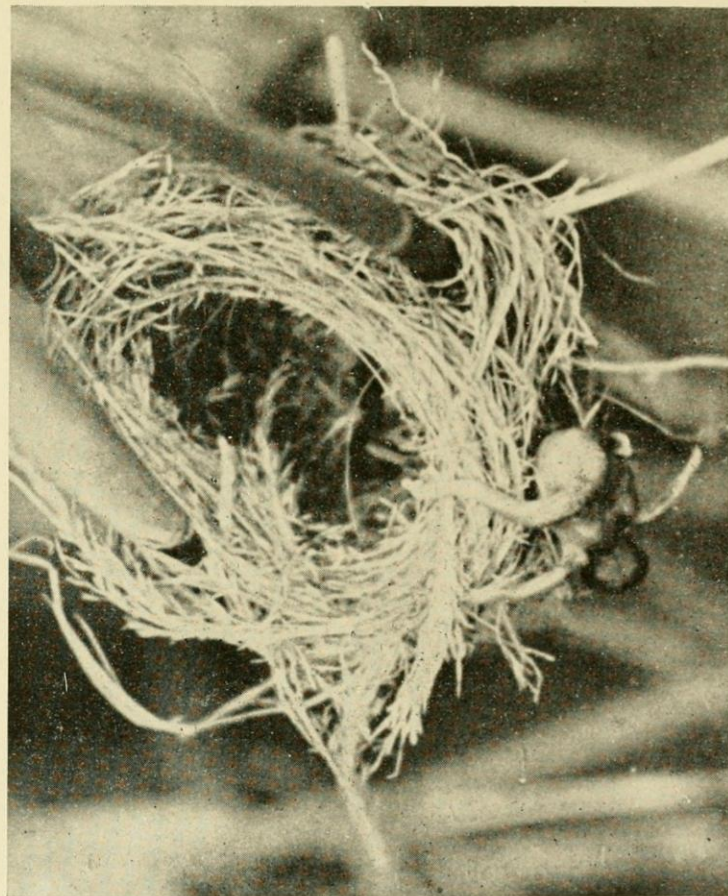
The nurse of its eggs, the great-warbler arrives only quite a time after it, sometimes 2—3 weeks later. We hear the great reed-warbler in the reeds of the Old-Körös generally at the beginning of may (2. may 1939, 28. April 1940, 2. may 1941, 10. may 1942). At this time use the cuckoos already to coupl. They come now together in little groups, so I saw the 3. June 1939 five cuckoos together at the coupling.

The femal cuckoo has at the coupling period not the whole time the same male.



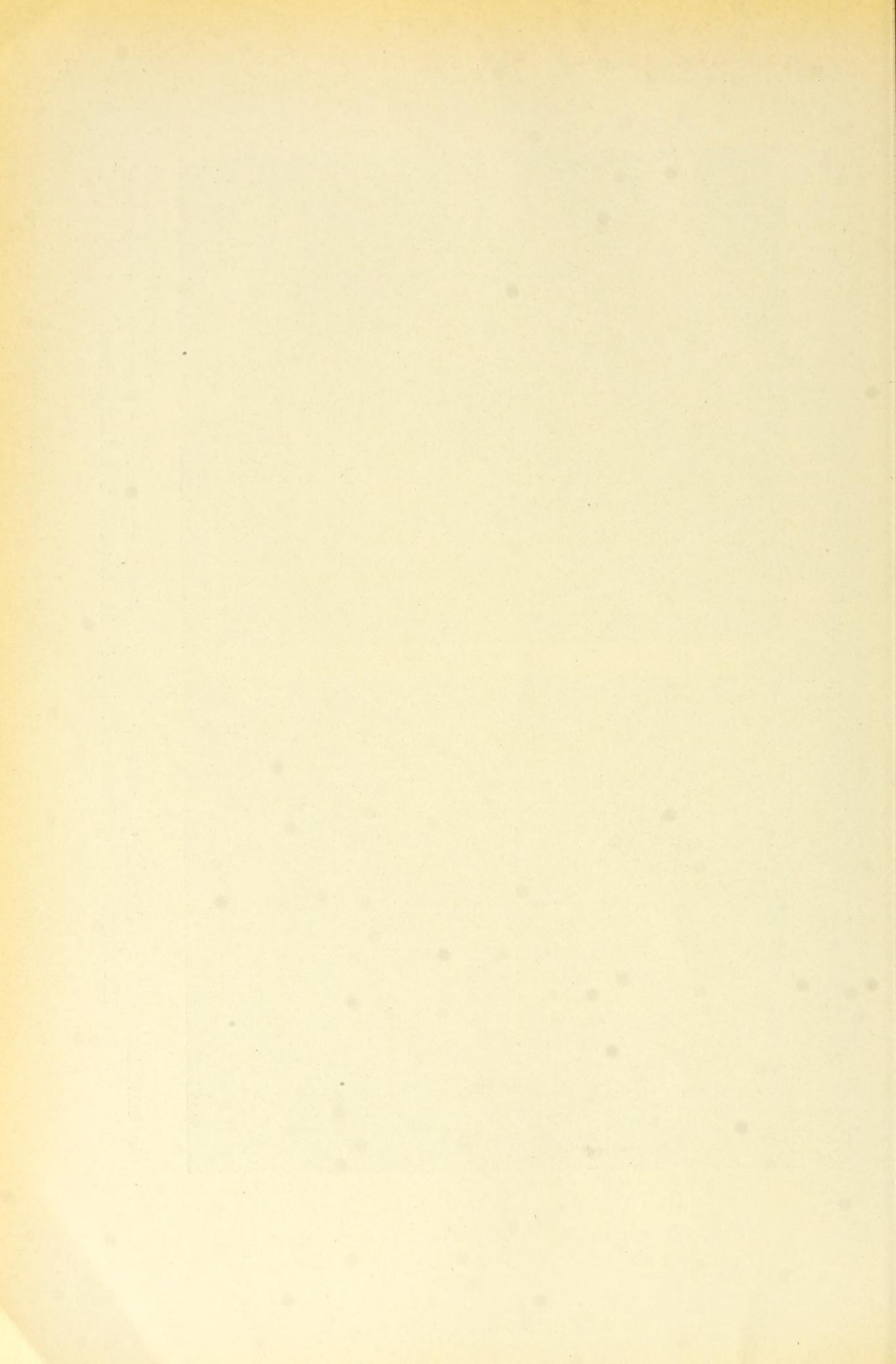
Két kakukfióka küzdelme „kihordás“ közben.

The struggle of two Cuckoo-Nestlings in the Nest of a Great-Redwarbler.



*Photo: J. Karbán. V. K. M. oktatófilm.*

Борьба двух птенцов кукушки во время „виношения“.



I observed a red female cuckoo at the end of may to couple with a dark male, and she was in the second half of june in an other garden in the company of a more light male, and after some days she had a third male.<sup>1</sup>

I saw on the same place one times six, and other times eight cuckoos to fight and couple. All this was made in a hight of 4—5 meters on willows. Two female cuckoos got this time their males. I could observe also the peculiar coupling movements of the male cuckoo. It placed itself some higher as the female cuckoo did, its body forewards and down inclining and letting its wings some downwards, moved its unopened tail slowly to left and to right. I saw the cuckoos couple from the early morning till night, but most of the times at the break of the day. I heard some males also after sundawn, already at darkness. The female cuckoo can be heard in the couple time just before coupling. The night from 5—6 may 1941 I heard cuckoos from more directions at 22, 23, 24 and 2 o'clocks. It seems, that it has more pleasure to yell, when the nights get warmer and the moon shines, I made similar observations also the 14, 18, 29 may and the 1. June.

The male cuckoo persues its female with persistence sometimes more hours. They shoot above the reeds, among the willows and fruit-trees. At times gets the one or other male nearer to the female. The males beat each other only with the wings; with theyr bodies they knock only seldom. During the persue the male can be heard all the times, and it varies the two syllables of its name in its excitement, getting also sometimes more high its voice. The female begins also more to "laugh" and she does it afterwards also in a higher sound, when she loughs long and tinkling. She stays on the tree, opens some its wings and inclines the tail to one side. The male gets on her back, and repeats two or three times the coupling. After the coupling during some seconds go both sexes its own way. One times I saw them coupling on a high current electrical vire. (At 8 o'clock, the 19. June 1942.)

I made my observations referring the occupied territory by the femal the most part according the colour, form and size, as to say according the type of the eggs. From these I could ascertain, that the female cuckoo gets for herself a territory, in which she returns year by year. I found clean territories, occupied only by one female. (About 1,5—2 km along the shore of the river.) On the greater part of the Old-Körös — about 20 km long — I found for instance in the nesting period 1935 only two such clean terry-tories, in the year 1938 only one.<sup>2</sup>

The male chooses for itself a territory too and he seems to hold it, till it has a possibility for couple.<sup>3</sup>

<sup>1</sup> It would be of interest, to know, whether it was always the same female?:  
The Redactor.

<sup>2</sup> *Molnár* names the places, where he found different types of eggs, „miscellaneous territories“. He means, that such territories are occupied the same time by more females. But the observations of other species showed, that all birds have their own territories, only these can reach in each other. *Molnár* did not think to examine such a possibility.  
The Redactor.

<sup>3</sup> *Molnár* thinks to acknowledge the male cuckoos according their voice. So he thought to could ascertain the return of a male cuckoo with a „faltering voice“ from 1936 till 1944, i. e. nine years! We know, that at other species the return of such birds could not be always ascertained, only by the ringing, colouring or by using coloured rings. *Molnár* failed such experiments.  
The Redactor.

I could not observe, whether there exist under the cuckoos, which are territory holders and which are vagabonds (*Chance*). Because a territory holder cuckoo can become a vagabond, when she has no more possibility to lay her eggs. And on the other hand a vagabond cuckoo can become on an other place a territory holder.<sup>4</sup>

In the environ of Szarvas the cuckoo became in the last 40 years more and more common, and also the goldfinch, the redstart and wryneck, too. We did not know here formerly the wood-pigeon and the syrian woodpecker, now we see them very often. But there became more rare the greenfinch, the red-backed shrike, the corn-bunting and the long-eared owl.

The very hard winter 1939—40 destroyed the most crested-larks. Since more years we see here no pratincole more. The year 1941 (15. june) I did also only hear about it. The blackredstart and the linnet seem to be desappeared. The number of the great reed-warblers became till 1937 higher, but the year 1941, because of the bad nesting opportunities they diminished till on one quart. In such an area, where I saw in 1935 27 nesting pairs, would found 1939 only six. I appreciated the number of the nesting great reed-warbler-pairs in the year 1939 on 130, 1940: 231, 1941: 89, and 1942: 54.

When the great reed-warbler breeds in old, dry reed, he uses for its nest always fresh green stems. I found its nest six-times on young willow-trees among the reeds, but it used also in this case as to hold the nest reedstems too. We find only exceptionally dry reedstems built in in its nest. It uses for its nest-building 3—7 stems. It nests in sedge only, when it founds there also some reed-stems and builds its nest of course on them. It is possible, that we found in its nest built in also the climbing stems of *Solanum dulcamara* (4 cases) and *Calistegia sepium* (one times). I observed threee-times also *Lycopus exaltatus* stems as holders of its nest. It happened also, that the great reed-warbler let a nest half built (18. may 1940) and 20 cm above it begun an other nest to build on the same stems (27. may).

It uses as nesting material beside of plant-parts also feathers. So I found its own feathers, than that-ones of cuckoo. The 22. may 1940 I saw a nest already from a great distance quite white: there were much hen feathers built in. The great reed-warbler used beside of the nesting material, characteristic to its species, in quite a plenty wool (one times), dungstraw (one times), hen-feathers (two-times), cuckoo-feathers (one times), oiled dirty rag in the neighbourhoud of a raylway-station. (In the year 1901 one times.)

According the size of the nests are my particulars, as follows (date; height over the water-level; measurements of the nest):

1939.

25. V. 100,22 ×	9·5, 6·2, 6·0	3. VI. 87,15 ×	9·0, 7·0, 6·0
28. V. 53,12 ×	9·0, 0·0, 6·0	3. VI. 64,12 ×	9·0, 6·5, 6·0
30. V. 62,11 ×	9·8, 8·0, 5·8	5. VI. 45,13 ×	10·0, 7·5, 5·8
1. VI. 41, 9 ×	9·0, 7·5, 6·0	5. VI. 64,13 ×	9·0, 7·0, 6·0
1. VI. 45,14 ×	9·0, 7·0, 5·0	5. VI. 68,10 ×	9·0, 8·0, 6·0
1. VI. 73,16 ×	9·0, 7·0, 6·0	6. VI. 37,10 ×	9·0, 8·0, 5·8
1. VI. 42,11 ×	9·5, 7·0, 6·0	15. VI. 82,10 ×	9·0, 7·0, 7·6
2. VI. 155,16 ×	9·0, 7·5, 6·0	23. VI. 62,12 ×	11·0, 8·5, 6·0

<sup>4</sup> *Chance's* meaning of it — as we think — does not oppose that of Molnár.  
The Redactor.

## 1940.

16. V. 30,10'0 × 10'0, 7'0, 7'0  
 16. V. 63,14'5 × 8'5, 6'5, 6'0  
 16. V. 62,10'0 × 9'0, 7'0, 6'5  
 25. V. 62,15'0 × 10'0, 8'0, 6'0  
 27. V. 36,16'0 × 8'5, 6'5, 6'0  
 27. V. 84,12'0 × 9'0, 6'0, 6'0  
 27. V. 72,22'0 × 9'0, 6'0, 5'5  
 27. V. 65,15'0 × 10'0, 7'0, 6'5  
 3. VI. 65,13'0 × 8'0, 6'0, 6'0  
 3. VI. 61,18'0 × 9'0, 6'5, 7'0  
 5. VI. 80,10'0 × 8'0, 7'5, 5'0  
 5. VI. 87,15'0 × 9'0, 6'5, 6'0

5. VI. 100,14'0 × 10'0, 7'0, 6'0  
 5. VI. 89,13'0 × 9'0, 7'0, 6'0  
 5. VI. 54,13'0 × 10'0, 7'0, 6'0  
 11. VI. 82,12'0 × 9'0, 7'0, 5'0  
 20. VI. 72,12'0 × 9'0, 7'0, 4'5  
 21. VI. 66,14'0 × 8'0, 6'0, 6'0  
 21. VI. 106,12'0 × 8'5, 6'0, 5'5  
 21. VI. 50,14'0 × 10'0, 7'0, 6'0  
 21. VI. 110,16'0 × 10'0, 7'5, 5'5  
 21. VI. 55,13'0 × 9'0, 6'0, 5'5  
 21. VI. 71,16'0 × 10'0, 7'0, 7'0  
 21. VI. 67,13'0 × 9'0, 7'0, 6'0

## 1941.

24. VI. 29,13 × 9'0, 6'5, 5'0  
 3. VI. 33,14 × 7'5, 6'0, 5'5  
 28. VI. 38,15 × 10'0, 7'0, 6'0  
 24. V. 34,16 × 9'0, 6'5, 6'0  
 9. VI. 37,14 × 9'0, 6'5, 7'0  
 21. V. 52,16 × 9'0, 7'0, 5'5  
 26. V. 72,14 × 9'5, 6'5, 5'5  
 28. V. 43,13 × 10'0, 8'0, 6'0  
 3. VI. 42,15 × 9'0, 6'0, 6'0  
 21. V. 63,16 × 9'0, 7'0, 5'5

9. VI. 44,14 × 9'5, 6'5, 6'0  
 16. VI. 78,11 × 9'0, 6'5, 6'0  
 16. VI. 65,09 × 8'0, 6'0, 5'0  
 16. VI. 90,12 × 8'0, 6'0, 5'5  
 24. VI. 13,08 × 8'5, 7'0, 6'0  
 26. V. 55,12 × 9'0, 6'0, 5'0  
 28. V. 42,16 × 9'0, 6'0, 5'5  
 28. V. 45,19 × 9'0, 7'0, 6'0  
 20. V. 54,18 × 9'0, 6'5, 6'0

## 1942.

30. V. 56,12 × 9'0, 7'0, 6'0  
 10. VI. 87,14 × 9'0, 7'0, 5'0  
 29. V. 40,13 × 8'0, 6'0, 6'0

8. VI. 82,14 × 10'0, 6'5, 6'5  
 11. VI. 70,18 × 9'0, 7'0, 6'0  
 5. VI. 29,12 × 10'0, 7'0, 6'0

The growing reed-leaves can incline the nest, or some reed-stems growing too fast and becoming weak can't hold it and incline under its weight. In the year 1940 became nests reared by the uneven grown reed-stem in 12 cases, and 5-times got nests under water because of the fast raise of the water-surface.

As the great reed-warbler begins to build its nest, the cuckoo appears also, and therefore we can often find cuckoo-eggs built in with nesting material in the nest. In the year 1940 I found 5-times cuckoo-eggs in half-built great reed-warbler nests, and 9-times were the cuckoo-eggs built in among the nesting material. These data justify, how it was urgent for the cuckoo to lay its eggs. 1941 I found 5-times in-built cuckoo-eggs and 1942 also 5-times. But I could observe cases, when the great reed-warbler did built in its own eggs (26. May 1941, 9. June 1942). The 25. June I found a nest, in which were built in two cuckoo-eggs above each-other with quite much nesting material between them.

According the building of the nests I noticed 3 years exact data:

## 1940 :

16.—18. V.            21.—27. V.            28. V.—5. VI.        10. VI.—18. VI.

Begin of the building of the nests	5	24	16	1
Nestbuilding ceased	—	—	—	—
Building in work	13	23	26	3
Ready empty nests	13	17	13	2
Ready nests ceased	—	—	—	—
Nests with eggs	2	24	29	20

1941 :

	20.—24. V.	26. V.—3. VI.	4.—9. VI. a	10.—16. VI.
Begin of the nestbuilding	13	7	7	2
Nestbuilding ceased	—	—	1	—
Building in work	7	3	1	1
Ready empty nests	3	3	1	—
Ready nests ceased	—	1	1	1
Nests with eggs	10	18	8	1

1942 :

	28.—30. V.	5.—9. VI.	10. VI.—21. VII.
Begin of the nestbuilding	3	1	—
Nestbuilding ceased	—	—	—
Building in work	—	1	2
Ready empty nests	6	3	1
Ready nests ceased	—	—	—
Nests with eggs	17	11	9

I found the first great reed-warbler's eggs in the year 1939 the 25. May, the year 1940 the 18. May, 1941: 21. May, 1942: 28. May, and the first cuckoo eggs in the year 1939 the 5. June, 1940: the 17. May, 1941: the 20. May, 1942: the 28. May, 1944: the 30. May.

The female cuckoo lays her eggs sometimes also in the forenoon hours, but most of the times afternoon or in the evening hours. Not very seldom between 19 and 20 o'clock. The laying of the egg according my observations endures 8 seconds. The cuckoo lays her egg of course by sitting on the nest of the great reed-warbler, but nevertheless I could not ascertain about it, although I searched this to make year after year. I saw one times a cuckoo sitting on a half-built great reed-warbler nest (the 31. V. 1939.) but it did perceive me and flew off. It happened also, that cuckoo which were purchased by the great reed-warblers and knocked down on the water — by warming themselves layd their eggs. Therefore it must be sure, that cuckoos lay the eggs directly in the nests. The cuckoo lays its egg not only in absence of the nurse-bird, but also in its presence too.

When we trouble the nest of the great reed-warbler, it receives it most of the times with a great noise, by ruffling the feathers on its neck. But sometimes quite without clamour, nevertheless excited it makes only with the bill a crackling sound.

By this way happens sometimes, that the great reed-warblers defending vehemently the nest knock down the invading cuckoo in the water. The 23. May 1939 I saved near each-other two such wet cuckoos from the water of the Old-Körös river. (At 19 o'clock afternoon.) I took the two birds in a very grave condition home and by holding them during the night under a warm cloth let them the next morning in good healthy free. The night laid both birds their eggs. I found the 30. May 1942 a dead female cuckoo just drowned, in the oviduct of which was an egg ready to lay.

The many feathers on the water were the witnesses of the fight between the great reed-warbler and the cuckoo. The 2. June 1942 I found in the water of the Old-Körös a drowned cuckoo too. It was already rotten,

drowned perhaps before a week, but had a spotted egg in. In just the same condition was found a cuckoo also the 6. June 1944. I noticed also a case, when a great reed-warbler, just getting off from its nest, saw — seeming not to be troubled — as I took its eggs.

The cuckoo lays in the nests of the great reed-warbler only one egg. This is proved by the nests with more eggs, where all the eggs are of an other type. Along the Old-Körös I found often two eggs in a great reed-warbler nest, seldom three, exceptionally four. (The 8. June 1938., 10. June 1940.) Moreover in one case also five cuckoo eggs in one nest. (16. June 1941.) In this last case remained no great reed-warbler's eggs in the nest. We can find in the nests of the great reed-warbler cuckoo eggs with the type of the great reed-warblers eggs, as, for instance cuckoo eggs similar to the eggs of the wagtail, or corn-bunting.

The records are, as they follow:

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943*	1944*
5 cuckoo eggs	—	—	—	—	—	—	—	1	—	—	—
4 „ „	—	—	—	—	1	—	1	—	—	—	—
3 „ „	1	3	—	—	1	4	6	7	4	1	1
2 „ „	—	10	8	11	—	15	25	15	10	3	11
1 „ „	—	?	?	?	?	?	79	23	18	21	35

\* Only two third of the territory was controlled.

The cuckoo is always inclined to lay its eggs in a great reed-warbler nest. As we saw, there were cases, where it laid its egg in a halfbuilt nest. But it changes the eggs most of the times from the full, or nearly full sets. It happens sometimes, that it takes instead one of the great reed-warbler's eggs an other cuckoo egg from the nest. So I found in a nest, the 3. June 1939 on the place of a grey cuckoo egg a reddish one. The 28. May 1940 was in a nest a brown spotted white egg, and the 4. June was found on its place a dark grey-brown one with full wreath. In an other nest the 6. June 1940 was seen a greenish egg, and on its place was there the 26. June a grey-white. In a nest was found the 3. June 1941 a wagtail-egg-type cuckoo egg, and it was changed the 16. June on a blue-green one. An other time on the place of a grey-white spotted egg a brown-white wreathed egg, similar to the eggs of the red-backed shrike. The 10. June 1942 was in a nest a dark, little spotted egg and it was changed the 23. June on a wreathed blue-grey one. The cuckoo lays eggs also in plundered, abandoned nests. (5. VI., 15. VI., 20. VI. 1939., 20. VI. 1941.) One times in an abandoned nest with two cuckoo eggs was laid a third one. The 7. June 1942 at six o'clock in the morning struggled an at about two days old cuckoo nestling with a great reed-warblers nestling and close to it was a fresh laid cuckoo egg, which 24 hours before was not till there. Under the nest lay on the earth two great reed-warblers eggs and one of a cuckoo. So in this case was laid an egg in a nest, in which the young cuckoo partly ended the delivery. It must be noticed, that the eggs chucked out can immediately disappear, because I could observe, that the falling egg was at once snatched by an *Amiurus nebulosus*. (28. VI. 1944.)

In the neighbourhood of Szarvas I found cuckoo eggs besides the nests of the great reed-warbler only one times, the 12. July 1933 in a nest of the

marsh-warbler (*Acrocephalus palustris* Bechst.). There were four eggs longtimes brooded and the one egg of the cuckoo. I found neither before, nore afterwards this species nesting here. It was also found a cuckoo-egg in the nest of a black-cap (*Sylvia a. atricapilla* L.) close four eggs of the species. I did not observe myself, only heard, a case with the lesser white-throat (*Sylvia c. curruca* L.). The bird fed a young cuckoo nearly full grown. (The 4. July 1941.) Otherwise I never heard, that somebody did find in the neighbourhood of Szarvas or in the reeds of the Old-Körös cuckoo eggs in other nests, as in those of the great reed-warbler. I put experimentally a cuckoo egg in the nest of a red-backed shrike (*Lanius c. collurio* L.), but it was not accepted.

I observed in 19 cases, that the great reed-warbler pushed out the cuckoo egg laid in its nest, but it happened also, that it pushed out instead the egg of the cuckoo one of its own eggs. This observed eight-times. The removing of the cuckoo eggs is made sometimes only after more days. So for instance according my observations on the 1. June 1940 at least after six days, as to see the notice from the 14. June 1940 at least after eight days, according the observation on the 17. June at least ten days afterwards. The 6. July 1935 I found, that the great reed-warbler removed a cuckoo egg, which was already picked up to be hatched, when I put in a great reed-warbler nest on the place of the cuckoo egg already removed an other one, the nurse-bird removed it too. This observed more-times. It happened also, that a cuckoo egg built in among the nest-material was later taken out and removed. (20. June 1940.)

The cuckoo-nestling is hatched in the nest of its nurse-parents after 11—13 days, so generally it is hatched earlier, as its step-brothers. I saw the first cuckoo-nestlings the 5. June 1939, 4. June 1940, 6. June 1941, 6. June 1942, 10. June 1943, 12. June 1944. On the other hand the first young great reed-warblers were found (the hatching time is according my experience 14 days.) 9. June 1939. (just hatching), 10. June 1940, 11. June 1941, 16. June 1942, 12. June 1943, 15. June 1944. — The high level of the water in the year 1943 destroyed many nests, so for example on a nearly 4 km long territory from the 18 great reed-warbler nests were 12 inundated.

At the cuckoo-nestling begins the instinct of the chucking out the others, when it is about 8—10 hours old. At the begin it smoots only gently the eggs or the other nestlings and gets itself under them. After the beginning to lift them the cuckoo-nestling opens its little wings, puts its back against the other nestling or egg, and by pressing it to the wall of the nest, being itself towards the nest-middle with its head — begins to climb backwards by using its feet and wings too. It inclines so its neck, that the head touches often its belly. By working with the back, shoulders, neck — as it comes — it pushes, holds with the wings the egg or the nestling, taking care that it should not slide or fall back. „As it reaches the brim, clutches it with the wings, with a pushing movement throws it out from the nest the egg or other nestling, whether it is such one of the great reed-warbler, or one of an other cuckoo. Afterwards falls itself back to the nest-ground. It happens sometimes, that a three hours old cuckoo-nestling tries this to make. I observed the 12. June 1942, that a cuckoo-nestling, scarcely three hours old in a position half sitting, half lying by inclining itself back wards leant its back and shoulders against a great reed-warbler egg and by holding it with its already some swollen wings tries it to lift.

The out-throwing of eggs or nestling is not always easy. The instinct to it comes not suddenly with full energy, but it ripens during a short or longer time according to the individuality of the cuckoo-nestling, or depending from the situation. Because a cuckoo-nestling, which had done its work more easy, becomes quiet, and it gets never in an angry or wild state, as an other one, which has for instance much to do with it. It is also still more characteristic, if there are two cuckoo-nestlings in the nest.

During the out-throwing we can see on the body of the cuckoo-nestling tremors, which can increase so much, that it throws itself on the back against the nestwall. Its wings, which stand apart till its hatching, become now already some swelled, muscular: its body becomes quite stiff. Its movements are clumsies. It inclines its head and neck spasmodic forwards. This movement is characteristic to the out-throwing cuckoo-nestling. Its whole body seems to be swollen, more full, as it would become greater from the influence of the outthrowing instinct, in the full time of it. Afterwards its body becomes for a time smaller. Its hide seems during the full time of the out-throwing instinct to be translucent, some moist, dewy. It struggles more angry (if there are two cuckoo-nestlings in the nest), it becomes red, the veins of the neck and armpits become swollen and also more red. I saw most angry the cuckoo-nestlings two or three days old, if they could not get out till this time the eggs, i. e. the other nestlings. The out-throwing instinct can also be awaked by touching it with a finger.

As this instinct does not come suddenly, so it is also not permanent. It reposes meanwhile some time. Also in that case, when there are two cuckoo-nestlings in the nest. Their instinct comes also not in the same time. They can be active by turns. During the effort the cuckoo-nestling collapses suddenly to begin afterwards with new power the "work". In the nests, where hatched two cuckoo-nestlings and if it begins at boths the instinct in the same time, is fought a wild struggle for life and death, till one falls from the nest — or both.

Examples for such struggles:

1. The 16. June 1939 5 o'clock in the morning. There are two cuckoo-nestlings and three great reed-warbler eggs in the nest. 13 o'clock: there are twitchings to see on the cuckoo-nestlings, they touch each other and they lean with their nape against each other. 14 o'clock: they are separated, but the twitchings became more frequently. 15<sup>h</sup> 30 min.: Twitchings. The one cuckoo-nestling gets the other one on its nape, presses it with the back against the wall of the nest, little by little lifting it, towards the brim. It climbs with its wings, but the same is made by the other nestling too. This climbs in boths: in the nest, and in the first nestling lifting it. The lifted cuckoo-nestling falls back, after some seconds falls also the lifter, then they became quiet and repose inclined on each other. 16 o'clock: Twitchings. The one cuckoo-nestling begins to work, lifts an egg, climbs with its wings, lifts it with its back, whilst it makes little steps upwards. But the brim is too high and inclines a little inwards, the egg falls back. The nestling by holding itself remains a moment up there, than falls back too. On this day till 19 o'clock they removed nothing. Next day, the 17. June 4<sup>h</sup> 30 min. in the morning: Cuckoo-nestlings and great reed-warbler eggs as before. The great reed-warbler is sitting on the nest, is restless. 8<sup>h</sup> 40: The great reed-warbler is always restless, troubled: the cuckoo-nestlings surely work under it. 9<sup>h</sup> 12:

The one nestling lifts an egg till the lower part of the nest-brim, but it falls back. Meanwhile the other nestling lifts slowly an egg towards the higher place of the brim. Reaching scarcely the half height, slides back. 9<sup>h</sup> 33 min.: The great reed-warbler comes home and sits down; is quite restless, it seems to be pushed from below. 9<sup>h</sup> 41 min.: one egg is pushed out. The great reed-warbler jumps on the brim of the nest, inclining itself outwards and its head on the side looks on the egg swimming on the water. The parent great reed-warbler change themselves, some time they flow both off. I can easily controll the nest. 10<sup>h</sup> 35 min.: The female great reed-warbler is sitting, but is always pushed from below. 11<sup>h</sup> 26 min.: Tremblings on the whole body of the one cuckoo-nestling. 12<sup>h</sup>: The two cuckoo-nestlings lay close each other with its heads in contrary direction, hold themselves embraced with their wings, but they fall back from the nest-wall. On the nest-bottom they struggle wick each other. 12<sup>h</sup> 10 min.: They lay already quietly. 12<sup>h</sup> 18 min.: The one cuckoo-nestling gives a sound as: "ci". 12<sup>h</sup> 58 min.: The one cuckoolifts an egg again. The other cuckoo-nestling climbs in it, but first makes itself free and by standing nearly on the nest-brim pushes out the egg. 12<sup>h</sup> 59 min.: Works the other cuckoo with the third egg; although the egg falls back, the cuckoo makes pushing movements on. After two minutes they struggle already with each other, meanwhile they repose and ask for food. 13<sup>h</sup> 21 min.: Are again twined in each other. 13<sup>h</sup> 25 min.: They separate themselves and after a minute, at 13<sup>h</sup> 26 min., the one cuckoo throws out also the third egg. It stands nearly to the nest brim, holds itself with its feet, gesticulates with its wings, makes pushing movements than falls slowly back. The other cuckoo-nestling remained quietly. 12<sup>h</sup> 18 min.: The one cuckoo-nestling gives a sound as: "ci". one till the nest-brim (13<sup>h</sup> 37). The both breath heavily. Meanwhile the great reed-warbler feeds it with a great locust, which remains in its (in the cuckoo's) bill. Still during the struggle it wants to free itself with one foot from the desagreable obstacle — at last I did it help. 13<sup>h</sup> 45 min.: They seem both very tired. 15<sup>h</sup> 2 min.: Reposings more often and for longer time. 15<sup>h</sup> 28 min.: It is to see on the movements of the great reed-warbler that beneath it struggle the cuckoo-nestlings. 16<sup>h</sup> 8 min.: The pouses become longer. 16<sup>h</sup> 32 min.: I hear again the voice of the nestlings from the nest. The greather cuckoo pushes the lesser one to the nest-wall. The later climbs in the first and in the nest-wall. It reaches the brim of the nest only after reposing itself 2—3 times, than it pushes the cuckoo nestling with an energetic movement out from the nest. The victor holding its head upstairs remains some seconds on the brim, than falls back in the nest. The later one lutches with it left wing and foot at the nest, but at 16<sup>h</sup> 35 min. falls off.

2. An other example for the struggle. The 22. may 1940 the great reed-warbler pair builds its nest. 27. may 7 o'clock morning two eggs of the great reed-warbler and one cuckoo egg. The same day 18 o'clock: two great reed-warbler and two cuckoo eggs. The 28. may: three eggs of the great reed-warbler and two of the cuckoo. 10. june: three cuckoo-nestlings in the nest and one great reed-warbler egg on the water. The one cuckoo is in its second day, they tuch, grasp each other. The two great reed-warblers beat five-times against my head, during I was inclined over the nest. The greater cuckoo bores itself under the one day old nestling (14 o'clock). At 18 o'clock the two days old cuckoo lifts the youngest one, reaches with it nearly the brim, but it grasps and they fall both back. The old birds beat now six-

times against my head, one times both in the same time. The 11. june: 5 o'clock there are still all cuckoo-nestlings in the nest. Great movements in it. At 10 o'clock is one cuckoo wanting. The 14. june the nest is empty. In the ardour of their struggle they fall all from the nest.

It happens sometimes, that the great reed-warbler nestlings grasp so hardly in each other, that the cuckoo can make nothing with them. In such cases struggles-suffers it so long, till its instinct becomes quiet or — grows so weak, that it perishes. I observed such cases 10 times. For instance the 23. june 1939. At 8 o'clock hatched two great reed-warblers and at 20 o'clock hatched the third too. The 24. june 4<sup>h</sup> 30 hatched also the cuckoo egg, which was put in the nest by myself. I mean, this nestling hatched some hours earlier, as the last great reed-warbler's, which hatched at 9 o'clock on the same day. At 17 o'clock the five nestlings grasping in each other, the cuckoo begins to work. At 19 o'clock the young cuckoo is to tally covered by the great reed-warbler nestlings. It tries to lift them from below, but at this time the two elder great reed-warbler nestlings have the size each double, as the cuckoo has. 25. june, 4 o'clock: The great reed-warblers grasped in a bundle, the cuckoo moves on them. 16 o'clock: the cuckoo begins to lift the greatest one, but they fall back. 17 o'clock: The cuckoo gets under the bundle, all is moving. The cuckoo pushes again the greatest one, this slides from it, gesticulates with wings and feet. The cuckoo begins newly to work, lifts two in the same time. Without success. At 18<sup>h</sup> 45 min. the cuckoo tries to tear the great reed-warbler bundle from below, than it gets under one of the great reed-warblers and lifts it. Both get up on the brim, but the great reed-warbler slides from the cuckoo. This makes still some pushing movements, than falls back in the nest too. The restless the great reed-warblers are, the more they move and tuch the cuckoo's back — the more energetic begins the cuckoo to be. It moves again all the four great reed-warbler nestlings, but they grasp at each other. It begins to lift upwards one of them, but the troubled others fall upon it. It begins to lift an other one, but this grasps with its wings in its brothers and with its feet in the nest. Meanwhile the cuckoo nestling must from time to time to repose itself, asks food. The 26. june 4 o'clock in the morning: The great reed-warblers in a bundle the cuckoo reposing on them. 6 o'clock: The cuckoo moves the others, than lying on its side and by leaning its foot against the wall of the nest and its back against the great reed-warbler bundle begins to push them. It can no one to teare off from them. At 11 o'clock: At the great reed-warblers begin the feathers to grow. 14 o'clock: The great reed-warblers push the heavy breathing cuckoo against the nest wall. 19 o'clock: The cuckoo has no more an pushing instinct, it is very weak. The 27. june 7 o'clock it can hardly move, is pressed among the great reed-warblers. 28. june o'clock: I take it from under the great reed-warblers, and, although it is five days old, it is totally naked, its body is cold and stiff. The 29. june: There are three great reed-warbler nestlings, the fourth and the cuckoo desappeared.

During the pushing-lifting work the young cuckoo often does not notice, that the egg or other nestling lifted upwards is fallen back, but it goes on till more high, pushes in the air, makes pushing movements on the nest-brim without holding something. More often makes it such movements, if it has already thrown out from the nest the egg or nestling. This pushing movements makes it also in that case, when it has lost already in the nest,

perhaps in half a way to the brim, what it begun to lift and push. That is, it could not notice, that its burden is lost, or it makes perhaps these unnecessary pushing movements in its very strong instinct. It seems often, as it would seek also with its wings, what it has lost.

It succeeded us to take on a film the struggles of the cuckoo-nestlings and the out-throwing of the eggs i. e. of the other nestlings.

I made an experiment, whether an egg, laid on the nest-brim would interest the cuckoo nestling. I must say, that the young cuckoo did not care about it. When the cuckoo had itself lifted on the brim, the egg or nestling, in this case makes it movements also for the outchocking, or than too, if the egg by mere chance remained on the brim. This egg, remained there does not already care the young cuckoo. Therefore it did not care also for the egg, which I laid on the brim.

The outchocking of a set succeeds sometimes already in 3—4 hours, but it can endure more days too.

The young cuckoo is generally ready with its work, when it is 1—3 days old. As its eyes become open — normally on the fifth day — it is most of the times already alone in the nest. Its instinct disappears. Nevertheless the young stepbrothers — if there exist such in the nest at all — have soon no more place in the nest, because of the quick growing of the cuckoo. The outthrowing instinct of the young cuckoo becomes on the fifth day weak, and soon it disappears too.

Now we will look, how behave themselves during this time the nurse-birds, the great reed-warblers against the intruder and against the molestation.

The following numbers show, how many times the great reed-warblers abandoned its nest. In the year 1940: 77, in 1941: 44, 1942: 11, On the 20 km long section in 1943: 6-, in 1944 11-times. The cuckoo egg is by the great reed-warbler generally accepted without suspicion and also hatched. Nevertheless I know cases, when it threw out the cuckoo eggs. So in the year 1939 10 times, 1940: 16-, 1941: 6-, 1942: one times. In such cases did it sometimes happen, that the great reed-warbler by mistake threw out from the nest one of its own eggs, or perhaps two. Such was it 1940: 7-, 1941: 5-, and 1942 one times.

The fidgeting of the cuckoo nestling does not more trouble the nurse-bird. It tolerates indifferently, only at the most looks after it, when the cuckoo-nestling pushes out its eggs or nestlings. About this we made also a film. I made experiments since 1943, in which a measure influenced the great reed-warbler by the trouble of its nest. The succes: what is not on the bottom of the nest, it does not exist for the great reed-warbler and also not for the cuckoo.

I made so my experiments, that I took one or two eggs from the set, and laid them on the some stretched brim. An other time I laid foreigne great reed-warbler or cuckoo egg on the similar prepared brim.

Twelve experiments showed, that no one great reed-warbler abandoned its nest, when I laid one or two eggs from the set on the brim. But when I laid the half of the eggs on the brim (two cases), two thirds (one times), or three-fourths, the nest was abandoned. When I laid a some hours old nestling (one times), one day old (one times) or some days old (one times) nestling on the brim, the great reed-warbler did not abandoned the nest, but

it did this with the nestling laid on the brim: it did not care about it, it gave him no food more. But when the nestlings were already elder (more as three days), they were fed also in that case, if I laid the whole nest on another place (two times). I made also experiments with the divide of the set: I laid a part of it in another nest in a distance at about 5 m. The parent-birds fed its young in both nests in the same time.

In further details I had new successes in the year 1944: The great reed-warblers remained indifferent against its eggs laid on the brim, it is: it did not care about them; at first: when I laid the first egg on the brim (one time), and the second: if I laid a foreign egg on the brim, when the great reed-warbler had still no one (one time). The third: If I laid a foreign egg on the brim, when the great reed-warbler had its first egg in the nest (one time). The fourth: If I laid from the half full set one egg on the brim (3 times). The fifth: If I laid one egg on the brim from a full set (6 times). The sixth and seventh: I laid to the full set on great reed-warbler, or one cuckoo egg on the brim (1—1 times). The 8<sup>th</sup> I laid from the full set one after the other two or three eggs on the brim (5 times). The 9<sup>th</sup>: I laid two eggs in the same time on the brim (2 times).

The great reed-warbler abandoned its nest: first: when from the full set were 2—3 eggs laid one after the other on the brim (3 times). The 2<sup>nd</sup>: if there were laid in the same time two eggs from the set on the brim (one time).

The great reed-warbler nestlings laid on the brim, were abandoned and perished (two experiments). The 5 days old great reed-warbler nestling taken for control lived without care 34 hours, and a half day old cuckoo nestling 50 hours and 20 minutes.

The 19. June 1944 I changed a great reed-warbler set of 4 eggs with 3 elder great reed-warbler eggs and one cuckoo egg. It was accepted and the great reed-warbler was the 28. June still sitting on the nest, but I found it the 7. July abandoned and one great reed-warbler egg disappeared. When I laid the whole nest with the set on another place, the birds cared further about the eggs or nestlings, but only in that case, if I laid the nest on a lesser distance as 5 m (3 times), or I laid them in another nest — also not farther as 5 m. But if I carried the nest with the eggs or mites on a distance of 6 m or more (2 times), the set was abandoned. But near to the old nest the great reed-warbler began a new nest to build (1 time).

The divide of the sets was not accepted by the parent birds. The nestling carried experimentally in another nest, perished, but which were carried back in 24 hours, were brought up. I carried The 3. July 1943 from a great reed-warbler set of three nestlings — at about 3—4 days old — two in another experimental nest on a distance of 65 cm. The 5. July 6 o'clock seems the experimental nest to be abandoned. I cut the original nest off and at a distance of 4 m fastened it on other reed stems. The 6. July the two nestlings in the experimental nest are fed by the parents; it seems now the original nest — carried on 4 m with one nestling — to be abandoned and from the two nestlings — in the experimental nest — one is disappeared. At 17<sup>h</sup> 40 min. the parent birds feed their two remained nestlings. At 17<sup>h</sup> 40 min. the parent birds feed their two remained nestlings in the two separated nests. The 13. July the young great reed-warbler, grown up in the experimental nest, as we approached to it, flew from the nest.

The other young in the original nest — laid on an other place — is no more alive. Its wing-feathers just begun to develope, as it perished.

The nestlings, 1—2 days old and laid on the nest-brim got to the same fate, as the eggs.

The eggs laid on the nest brim, roll often back in the nest, or they fall out, or perhaps they get in in the material of the nest. It is easy to understand, because the old bird by its coming and going can cause it.

It seems, that the great reed-warbler likes to feed with Orthoptera. So we saw, that it feed the two cuckoo nestlings, struggling with each other with green grasshoppers. The 19. june 1942 gathered the great reed-warbler the grasshoppers for the cuckoo nestling on the drying hay.

The feathers of the wing and tail begin to grow generally on the third day. At the one week old cuckoo nestling begin to develope the "flags" of the feathers. So the 21. june 1943 is the cuckoo nestling still blind, but the feathers of the wing and tail begin already to grow.

The year 1940 flew the first young cuckoo on the 21. june from the nest, — as 19 days old. In the year 1941 on the 24. june — 21 days old. In 1942 the last young cuckoo flew out from the nest on the 7—8. august, — 23 and 24 days old.

I heard the cuckoo in the year last the 10. july. After the second third of july we see already seldom old cuckoos. The year 1940 it was heard at last the 20. july. Generally we can hear last the cuckoo year for year between the 6. and 10. july.

I saw a cuckoo the last the 22. octobere 1938.

I made according the cuckoo altogether 277 observation-series between 1939 and 1944, which I brought in all details in my hungarian papers.

#### Litterature:

<sup>1</sup> Drosselrohrsänger und Kuckuck. Aquila, 1935—1938. p. 251—264.

<sup>2</sup> The great reed-warbler and the cuckoo. Szarvas, 1939. pp. 16. (in Hungarian).

<sup>3</sup> About the cuckoo. About the outthrowing instinct of the cuckoo nestling. (Szarvas, 1939. pp. 24. In Hungarian.)

<sup>4</sup> Further observations and experiments about the great reed-warbler and the cuckoo; about the outthrowing instinct of the cuckoo nestling. (Szarvas, 1940. pp. 39. In Hungarian.)

<sup>5</sup> Supplementary to the „Further observations etc.“ (Szarvas, 1942. pp. 39. in Hungarian.)

<sup>6</sup> About the probleme of the cuckoo. (V. K. M. A school film. Offic. Paper 1941. p. 281—289. in Hungarian.)

<sup>7</sup> The settle of the great reed-warbler and the cuckoo on the Old-Körös, and other cuckoo essays. (Szarvas, 1942. pp. 35. in Hungarian.)

<sup>8</sup> The cuckoo on the biennial at Venice and at home. (Szarvas, 1943. pp. 13. in Hungarian.)

<sup>9</sup> Sketches about the appearance of the increase instinct of the bird. (Szarvas, 1943. pp. 40. in Hungarian.)

<sup>10</sup> Further sketches about the appearance of the increase instinct of the bird. (Szarvas, 1944. pp. 44. in Hungarian.)

<sup>11</sup> Über den Instinkt des Hinaustragens beim jungen Kuckuck. (Kócsag, 1939—1942. p. 1—9.)