AGE AND SEX FACTORS IN THE ATOPIZATION OF VASOMOTOR RHINITIS *

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The study of the prevalence of vasomotor rhinitis in the population has, in contrast to that of hay fever, received little attention, since the former is not an important endemic disease. It has long been known that allergic factors are involved in vasomotor rhinitis and asthma, and also that vasomotor rhinitis and asthma frequently occur together. Investigations done in the Department for Allergic Diseases of the University Hospital at Leiden have shown that with respect to asthma, atopic vasomotor rhinitis is either the result of a lower degree of atopic sensitization or, if the degree of atopy is the same, the result of a smaller exposure to inhalatory allergens.

Fig. 1. This diagram is the result of an investigation into the possible role of the degree of atopic sensitization in the occurrence of asthma and vasomotor rhinitis. We divided our patients who were under the age of 20 into 4 groups: 1) those with a strong atopy, reacting to 0.01 % housedust extract, 2) those with a fair atopy, reacting to 0.1 % housedust, 3) those with a slight atopy, reacting only to 1 % housedust, and 4) those with no atopic skin reactions, who did not react to 1 % housedust either. The total number of asthma and rhinitis cases are about the same. On the left: of the atopic cases (with positive skin reactions to 0.01 % of the standard housedust extract), 77 % had asthma and 23 % rhinitis. On the right: of the non-atopic cases, only 30 % had asthma and 70 % rhinitis.

As we can see, there is a gradual increase in the percentage of patients with vasomotor rhinitis when the degree of atopic sensitization decreases, thus an inverse proportionality. However, asthma and vasomotor rhinitis are not separate clinical entitities. It is frequently observed that the same patient has asthma and vasomotor rhinitis during the period of strong exposure to housedust allergen (July-November) and, during the other part of the year, due to a smaller exposure, only vasomotor rhinitis. The interrelation between non-atopic asthma and non-atopic vasomotor rhinitis, which occur less frequently together, is much more obscure.

In the same way as we had done for asthma patients (Varekamp and Voorhorst, 1963) we studied the clinical data of 1131 out-patients of the Department for Allergic Diseases during 1957—1961 who had vasomotor rhinitis as the main complaint. We distinguished the atopic and non-atopic patients and

* This investigation was supported by the National Organization for Health Research T.N.O.

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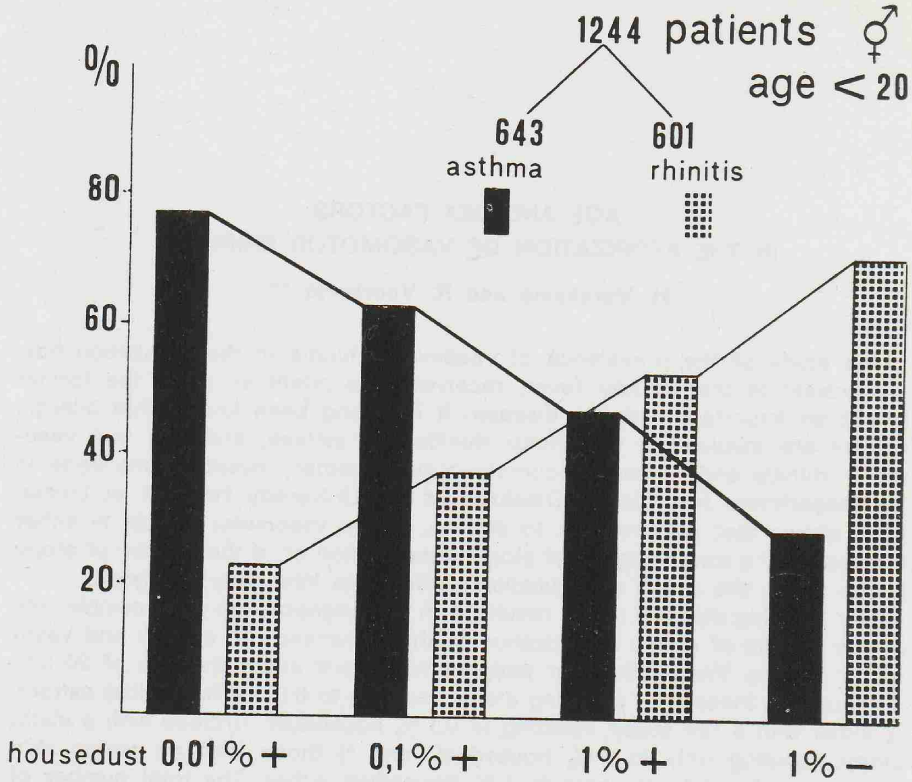


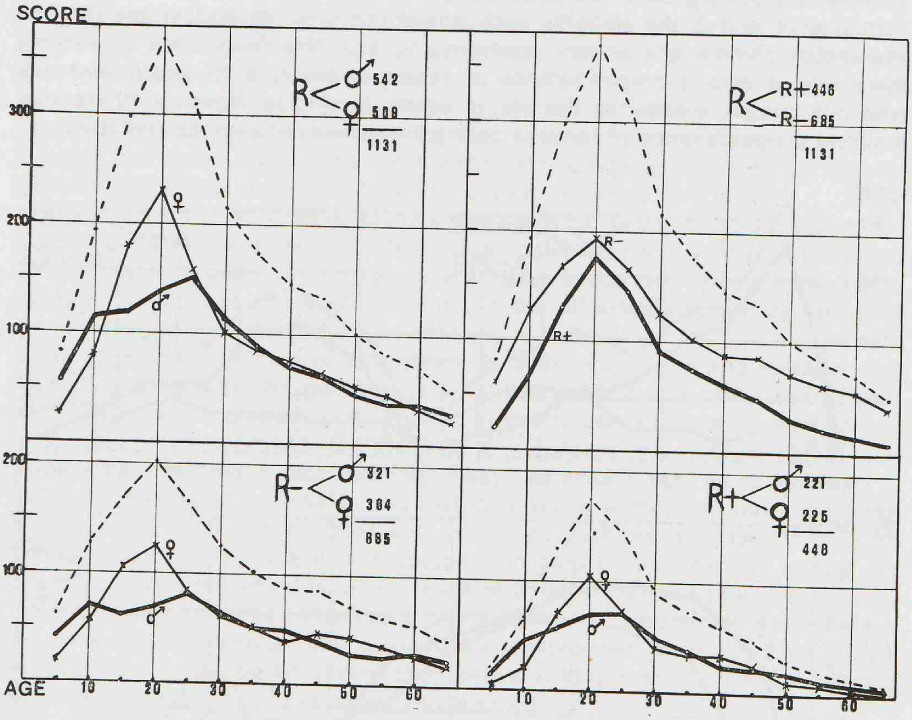
Fig. 1. 1244 patients with asthma and vasomotor rhinitis according to the strength of their skin reactions to house dust divided into strong, fair, slight and non-atopic patients. The number of asthmatic patients decreases with the degree of atopic sensitization.

studied the disease in both sexes. We are convinced that vasomotor rhinitis, like asthma, is a syndrome with a symptomcomplex: including sneezing, watery discharge, obstruction, anosmia. Specific diseases with analogous symptoms must be excluded (e.g. recurring acute colds).

Atopic asthma (A+) and atopic vasomotor rhinitis (R+) are definable only in cases where reagins to inhalatory allergens are present. It has appeared to us (at least in The Netherlands) that the most useful criterion for the presence of a sufficient quantity of reagins in our patients is a positive skin reaction to 0.1 % standard housedust extract (intradermal technique). For cases in which these skin reactions were negative and the presence of a sufficient amount of atopic reagins was otherwise not likely, we used the term non-atopic asthma (A—) and non-atopic rhinitis (R—), and allowed for the fact that there might be another cause for the asthma or rhinitis, possibly even another form of allergy.

The investigation involved 1131 patients with vasomotor rhinitis. We classified these 1131 patients according to sex, atopic and non-atopic cases,

and the age at which they visited the Department for the first time. We made 5-year groups and combined them into overlapping 10-year groups, i.e. 0—9 years, 5—14 years, 10—19 years, etc.



Figs. 2—5

Policlinical visits of all cases of vasomotor rhinitis.

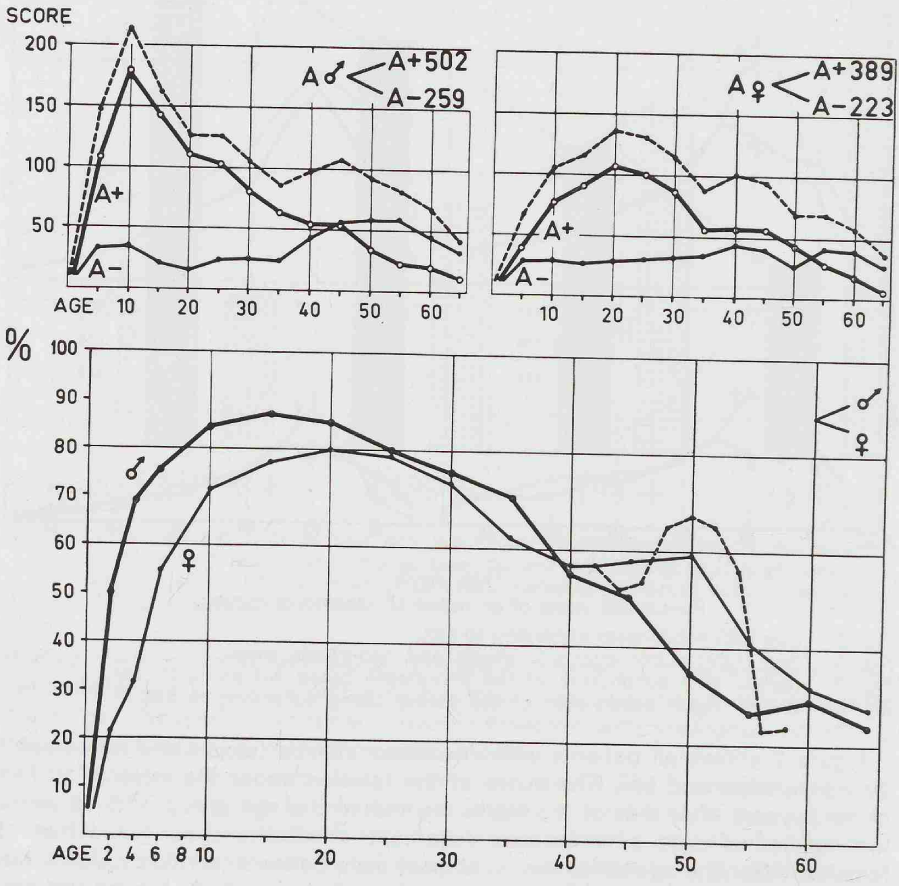
Fig. 2. (top left) subdivision according to sex.
Fig. 3. (top right) subdivision into atopic and non-atopic cases.
Fig. 4. (below left) subdivision of the **non-atopic** cases according to sex.
Fig. 5. (below right) subdivision of the **atopic** cases according to sex.

Figure 2 shows all patients with vasomotor rhinitis (atopic and non-atopic) by age groups and sex. The curve of the females under the ages of 10 lies about 3 years after that of the males, so that in the age group of 0—9 years the number of male patients with vasomotor rhinitis is about twice that of females. After the age of 10 the number of male patients increases slowly but that of the females very strongly, up to about the age of 20; around the age of 25 the numbers of male and female patients have become equal. **It appears that after the age of 25 the figures for males and females with vasomotor rhinitis are identical:** the influence of sex on the presence of vasomotor rhinitis has altogether disappeared.

Figure 3 shows all patients with vasomotor rhinitis, thus male and female together, according to age groups and atopic (R+) and non-atopic (R—). In contrast to asthma for vasomotor rhinitis we find more non-atopic than

atopic patients from the very first years of life. The preponderance of the non-atopic cases is smallest at about the age of 20. Above 50 the non-atopic patients are even more strongly preponderant, and now the circumstances are analogous to those in asthma.

In figs. 4 and 5 the patients with non-atopic (Fig. 4) and atopic (Fig. 5) vasomotor rhinitis are shown according to sex. We found that in asthma there was a strong preponderance of males in the first 15 years, and this was due almost entirely to the atopic cases. In rhinitis, however, there was a strong preponderance of females during the period between 15 and 25 years,



Figs. 6—8

Figs. 6 and 7. (top left and top right) the frequency of policlinical attendance of males and females divided into atopic (A+) and non-atopic asthma (A—). The 10-year groups overlap each other.

Fig. 8. (below) ratio between atopic asthma (A+) and non-atopic asthma (A—). Percentage (A+) of the total number of asthma patients. Subdivided into males and females. Under the age of 8 there are overlapping 4-year groups, over 8, overlapping 10-year groups. Dotted line: females from 40—60, into overlapping 4-year groups.

which can also be seen in Figs. 3 and 4, for both the atopic and the non-atopic patients. Over the age of 25 the visits of patients with vasomotor rhinitis no longer show any sex difference in either atopic or non-atopic patients.

There are considerable differences between the corresponding curves of asthma and vasomotor rhinitis. For asthma (Fig. 6) we see a very strong increase of male youths. The peak is reached in the age group of 5—15 years, after which a gradual decrease sets in. In females the increase is much slower but persists much longer, the peak being reached between the ages of 15 and 25. After the age of 25 the number of atopic male and female asthma patients is about the same. The curves representing the numbers of non-atopic asthma patients (Figs. 6 and 7) are about the same for males and females.

The curves for vasomotor rhinitis and asthma patients do not give the impression that there is any interrelation between the frequency of atopic and non-atopic patients. However, we had reason to calculate the ratio between atopic and non-atopic patients in the different age groups and thus we determined the "atopization percentage".

Fig. 8 shows the lines of atopization in asthmatic males and females. For each 10-year group, the percentage of atopic asthma was calculated. These percentages were plotted, and resulted in gently curved lines. In males there is a rapid initial increase. By the time the patients are in their teens their atopization percentage has reached 87 %. After the age of 20 there is a constant decrease. In females the increase starts somewhat later; the peak of the curve also comes later and is not as high as in males (80 %). In females, as in males, there is a decrease in atopization after the age of 30, but this trend is disturbed by an increase of atopization during the menopause.

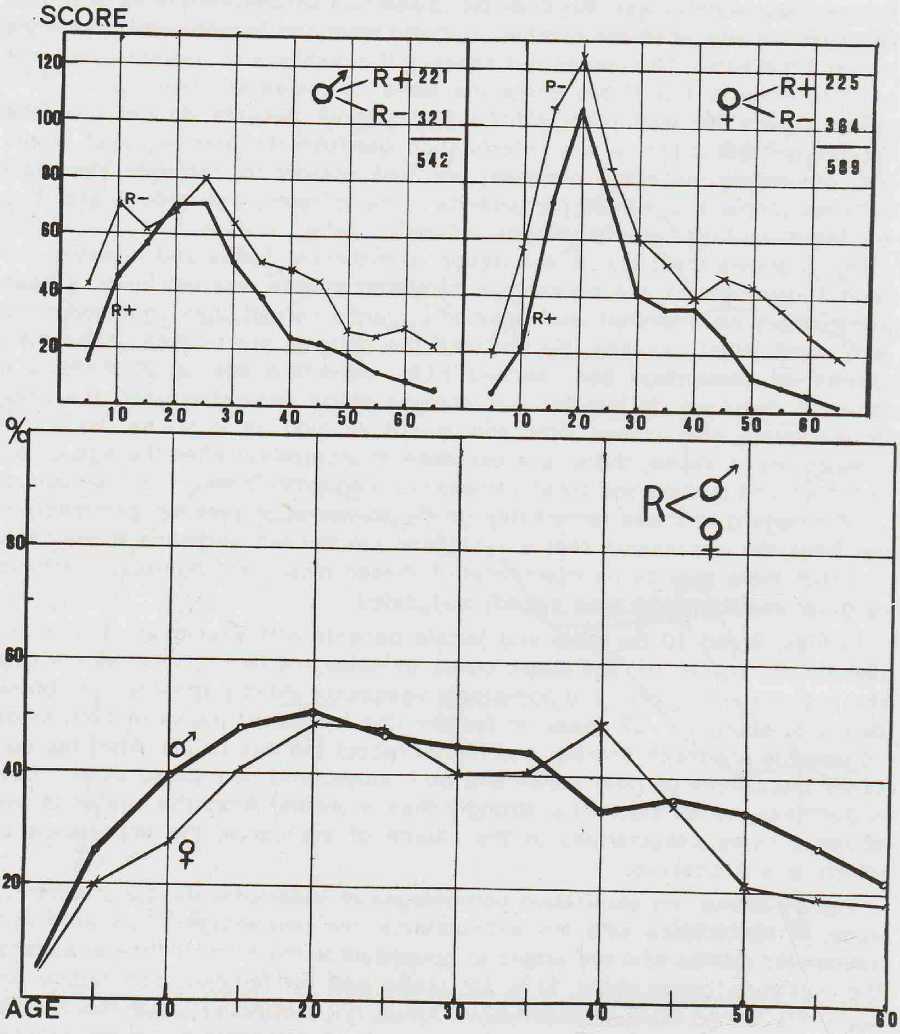
With regard to these remarkably gentle curves of atopization percentages, we have the impression that a biological mechanism underlies these facts and that there may be an interrelation between atopic and non-atopic asthma as other investigations have already suggested.

In Figs. 9 and 10 the male and female patients with vasomotor rhinitis are divided into non-atopic and atopic cases. In males, the two curves representing the patients with atopic and non-atopic vasomotor rhinitis show rather obtuse peaks at about 15—25 years. In females the frequency peaks of both kinds of patients are much sharper and higher (about the age of 20). After the age of 25 the curves of both sexes and both atopic and non-atopic cases show a decrease, in females more strongly than in males. After the age of 30 we observe some irregularities in the course of the curve, the importance of which is still obscure.

Fig. 11 shows the atopization percentages of vasomotor rhinitis at different ages. In accordance with our expectations, the percentage of patients with vasomotor rhinitis who are atopic to housedust is much lower than in asthma, the maximum being about 50 % for males and for females. For asthma we found 85 % and 80 % respectively. This is not surprising if we realize that patients with a stronger degree of atopy run a greater risk of getting asthma.

As in asthma, atopization in patients with vasomotor rhinitis develops in females more slowly than in males. Nevertheless, this retardation in the females is much smaller for vasomotor rhinitis (especially in the first decade) than for asthma.

Now it would be interesting to compare the atopization curves of asthma and vasomotor rhinitis. In males (Fig. 12) both atopization curves between 0 and 40 years are analogous. The only difference is a quantitative one (maximum: asthma 85 %, vasomotor rhinitis 50 %). The analogy becomes particularly clear if we increase the scale of the ordinate for the vasomotor rhinitis patients (dotted line), so that the peak coincides with that of the

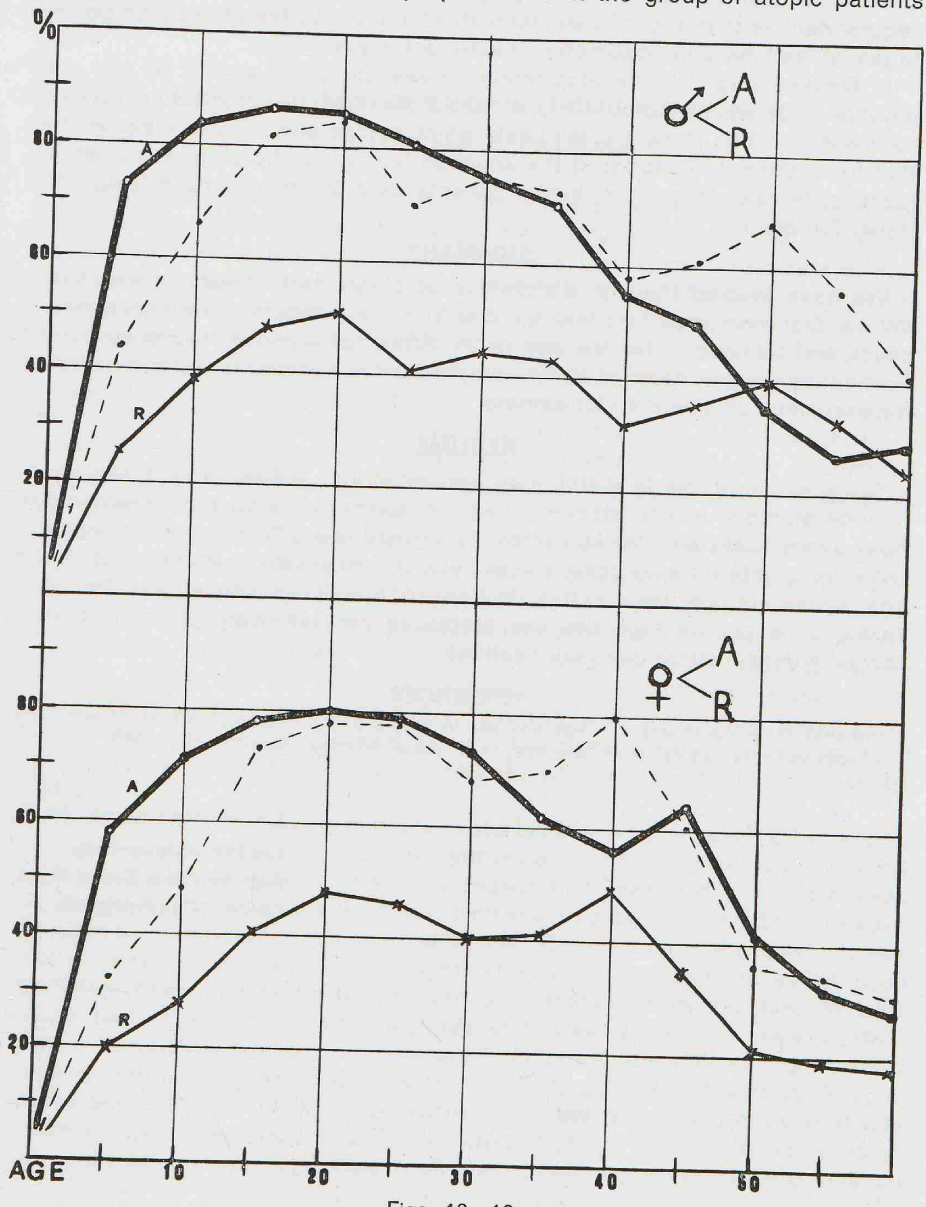


Figs. 9—11

Figs. 9 and 10: (top left and top right) policlinical visits of cases of vasomotor rhinitis divided into atopic and non-atopic for males (Fig. 9) and females (Fig. 10).

Fig. 11. (below) atopization percentages in vasomotor rhinitis in both sexes at different ages.

asthma curve. It appears now that under the age of 15 the increase in atopization is much smaller in vasomotor rhinitis than in asthma. A possible explanation is that — since the clinical symptoms of atopy are severe in these years — the number of asthma patients preponderate in the group of atopic patients



Figs. 12—13
Comparison of the atopization percentages of asthma and vasomotor rhinitis. Fig. 12 (top) for males, Fig. 13 (below) for females.

(thus A+ and R+ together), and consequently the number of atopic rhinitis patients is relatively smaller; thus a smaller atopization percentage will be found in the groups of patients with vasomotor rhinitis only.

In males over the age of 40 the atopization curve for asthma shows a more regular decline than that of vasomotor rhinitis. Over 50 the atopization percentages of asthma and vasomotor rhinitis are equal.

In females (Fig. 13) the atopization curves up to the age of 30 are comparable to those of males. Only at about 40 does the atopization curve of vasomotor rhinitis show a small peak, which comes about 5 years earlier than that for asthma. In contrast to the situation for males, the atopization percentages of female vasomotor rhinitis patients over 50 remain much lower than those for asthma.

SUMMARY

We have studied the age distribution of atopic and non-atopic vasomotor rhinitis. Our most important findings are: 1) a characteristic difference between males and females under the age of 25. After that age the frequency curves for both sexes are identical. 2) The atopization percentage is distinctly smaller for vasomotor rhinitis than for asthma.

RÉSUMÉ

Nous avons étudié la distribution par catégories d'âge de la rhinite vaso-motrice atopique et non atopique. Les constatations les plus importantes que nous avons faites sont les suivantes: 1) il existe une différence caractéristique entre les sujets du sexe masculin et ceux du sexe féminin en dessous de 25 ans. Passé cet âge, les courbes de fréquence sont les mêmes pour les deux sexes. 2) le pourcentage des cas atopiques est nettement plus faible pour la rhinite vaso-motrice que pour l'asthme.

REFERENCES

Varekamp, H. & Voorhorst, R.: Age and sex in atopic and non-atopic asthma. (Frequency of out-patients' visits and "atopization"). Acta Allergologica 18, 69, 1963.

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