International Network of Women Engineers and Scientists

VISION: *To build a better future worldwide through the full and effective participation of women and girls in all aspects of STEM.*

INWES is…

- **Alliance** of Organisations, (a few individual members for a limited time)
- Incorporated as non-profit in Canada (2003)
- Inclusive, multilingual and multinational
- Global representation (over 40 countries)

The Network is the instrument.

Goals

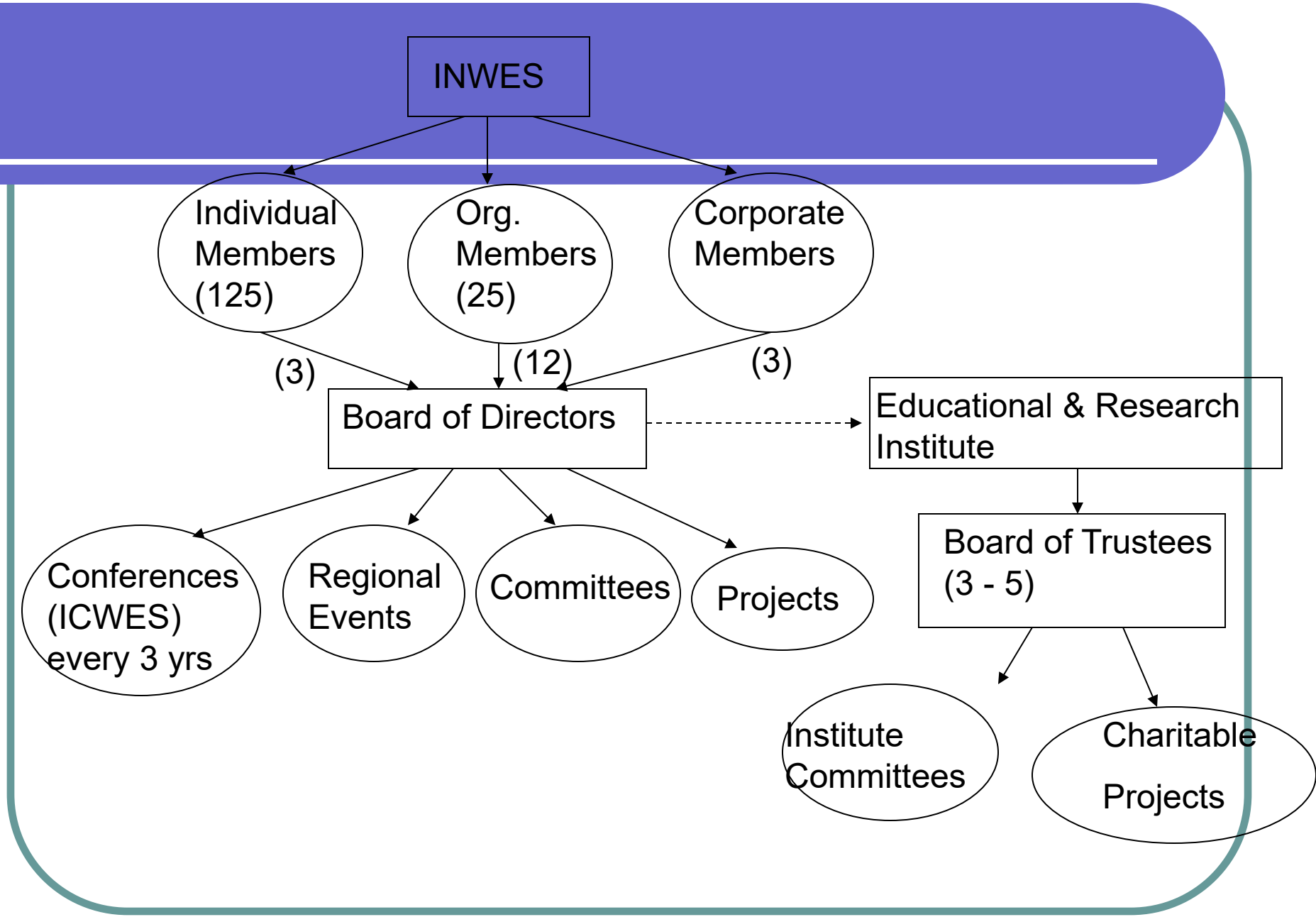
- **Strengthen the capacity** of individuals, organisations, and corporations through **education and professional development**
- **INWES Education and Research Institute**, incorporated in November 2007. Charity status requested, pending (programs).

Objectives INWES

- Become an ***influential voice*** on STEM issues for the benefit of women, gender equality, and society (advocacy).
- Increase presence of women in mainstream ***decision-making roles***.
- Promote *exchange of information*, networking, and initiate projects

INWES INSTITUTE'S objectives

- Promote gender equality and education of girls in all nations, especially where sex gap is largest and encourage them to stay in school
- Act as resource centre, with data bases
- Maintain a website to make the results of its research and programs available to the public
- Raise public awareness



Collaboration

Collaborate with members and partners:

NGO partner of UNESCO, MOU with WFEO and with Engineers Australia

- Share best practices, successes, failures, experiences, statistics, reports…
- Help change the status quo

Tools

- Web portal, newsletters, **manual « how to start organisation of women in STEM »**
- INWES helped groups in India, Pakistan, Arab Network, Zambia and some Eastern European countries to get started
- International Conferences
- Leadership workshop (Kenya)
- Regional symposium (Poland)
- Joint programs, twinning organisations, alliances

Strengths

- International expertise and perspectives
- Contacts and experts all over the globe
- Source of rich information, knowledge
- Invitations to mainstream platforms (UNESCO; WFEO, …)
- Potential for global advocacy strategies and plans
- ***Power in alliances, unity, solidarity***

Challenges

- Languages,cultural differences, are strength but slows communications (need to work slowly through agendas)
- Fundraising: many poor countries; must avoid competition with our members in their region
- Expensive to run Board meetings; but most Directors covered their costs; grants for those who applied from developing countries (7 / 7 meetings: UNESCO, Korea (2), Canada (2), France)

Sustainability of organisations

- We need to work together for success, at all levels; **solidarity!!**
- **Avoid duplication**
- **Avoid direct competition** (funds, events)
- Find allies and stable financing
- Assess break-even point operations
- Combine resources and voices; vehicle for public awareness and social change.

Board of Directors INWES (2005-8)

- Canada France Ivory Coast
- Poland Japan Korea Kenya
- India Pakistan USA
- UK Zimbabwe

Founders and Directors Institute

Start-up Board (until charity status application is successful)

- Monique Frize, President
- Claire Deschênes, Treasurer
- Gail Mattson, Treasurer

Future…

- *Women engineers and scientists have a good job and are valued, respected…*
- *They are happy with the culture and environment!*

De-Gendering the Science and Engineering Enterprise

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Content

- Attributes good science (culture)
- Objectivity and Subjectivity
- What is in the feminine?
- De-gendering the enterprise

Highly-valued attributes of good scientists

- Objectivity, Logical
- Active, Rational
- Independent, Forceful
- Risk-taking, Courageous
- Aggressive, competitive
- Innovative, emotionally-controlled

Source: Linda Shepherd (1993) *Lifting the Veil: The Feminine Face of Science*

Attributes dismissed as unimportant and minimised for good science

Western society expects women to be:

- Nurturing, receptive
- Emotional, irrational,
- Intuitive, subjective
- Compassionate, sensitive
- Kind, not aggressive
- Uncompetitive

Source: Shepherd

Why some women act like men

- Shepherd suggests this is one reason why women scientists are reluctant to express feminine qualities in their work, fearing loss of credibility (emulations of men in women's clothing).
- Shepherd also points out that some women scientists are nervous at being tagged as feminine because of its potential attachment to the concept of biological determinism. (Shepherd, 1993, xiv)

Myth of Objectivity…

- Political, financial, and social issues are often interlaced, potentially creating biases in research projects (questions asked, collection of data, analysis, interpretation, conclusion).
- Funding decisions involve some politics and are not value-free (agencies and committees, military, industry: set priorities, what is fundable, etc…)
- Spending on military research in the U.K. and in the U.S. continues to be substantial and probably increased dramatically after the tragedy of September 11, 2001 (Dillon, 1983; Rose, 1994)

Alternative

- Would we be more comfortable if research money was spent more importantly on reducing poverty and increasing literacy and health in our countries and around the world?
- Ex. Meeting of 50 senior women in computing in 1990s in Cape Cod (priorities of research and development):

Unanimous choice: Universal literacy

Who?

- Who sets the priority of projects and the consequence of knowledge acquired?
- Who will have access to the knowledge?
- Who decides what funds will be diverted from one project to another?

Myers-Briggs personality types

- Sensing, Thinking, Judging vs Intuition, Feeling, Perception
- If more scientists were Feeling types, then perhaps these questions would be seriously debated and taken into consideration by funding agencies, Foundations, and researchers themselves. (Shepherd)

Feeling types…

- Feeling types have a strong sense of values, reacting spontaneously to people, events, and ideas.
- Feeling judgments have their own rationality based on sense of good and bad, right and wrong, beautiful and ugly, and levels of importance and harmony.
- Such judgments depend on the context of the situation, rather than on a prescribed set of rules. As such, they can provide the basis for evaluating priorities and ethics in science, which has long-laid claimed to being ‘value-free’. (Shepherd, 1993, 58)

Feeling types…

- Should we try to attract more Feeling types in science and engineering to help assess the impact of the science or technology on society and to examine the ethical issues related to the work? The answer is yes, but will these Feeling types remain, if the culture does not change?

What is in the feminine?

- Subjectivity: Awareness of this can help to minimise biases, reduce personal or social agendas.
- But we can benefit from perceptions, experiences, interpretations of the world: need to blend the feminine and the masculine for a complete picture.

Receptivity

- Listening patiently to nature, to observations (ex. Goodall and Fossey)
- Emily Martin's observation of the lobster egg and sperm activity
- Primatology and archeology show prime examples of feminine impact on science and discovery.
- Pre-conceived models can lead to serious errors (ex. Discovery of ozone hole).
- Must avoid reductionism.

Nurturing

- A positive and supportive environment: Impacts the satisfaction and retention of students.
- Mentoring, tutoring, networking, team work. Develop self-assurance and communication skills.
- Respect diversity and teach that to all.

Ex. Women's ways of knowing (Belenky et al.)

Cooperation

- Encourage a culture of collaboration vs competitiveness in the lab.
- Sharing of information instead of secrecy (within the lab).
- Avoid a highly hierarchal structure; hold open meetings where students and professors learn from each other and all feel comfortable to make suggestions.

A debate…

- Are there not times when scientific knowledge distorts lived reality?
- Is technological power not only a boon but also a danger to human welfare? (Dillon, 1983 and others)
- Holbrook suggests that the debate (and tension) is occurring between the advocates of autonomy in research and those who argue for more societal control over the scope and direction of scientific research. (Holbrook, 2005, 438)

Future?

- Considering feminine characteristics have **not** been considered in a **positive light** since the beginning of time, it will take some time for the majority of scientists and engineers (**including many of the women themselves**) to understand their value and see how they can add complementary and enriching approaches to research.
- Then we can expect a change in the mainstream culture (science and engineering).

The future?

- Women and men who wish to be different will no longer fear the stigma.
- Then we can all live in a world designed by balanced teams of women and men—hopefully a world of peace and prosperity.

Contact

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- The Bold and the Brave: Investigation into the Past and Future of Women in Science and Engineering (under review)

Rompre le cycle de progrès et de recul

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Contenu

- Cycle du statut de la femme à travers les âges
- Stratégies pour rompre ce cycle
- Messages pour filles, universités, professionels

Statut de la femme à travers les âges

- 9ème: Charlemagne construit une autorité centralisée et patriarchale.
- début 10ème, femmes ont droits de propriété et d'héritage et les rôles étaient flexibles; insistance sur la similarité des hommes et des femmes.
- 11ème: abolition de monastères doubles;
- 12ème: les femmes sont valorisées pour leur savoir. Ex. Hildegarde de Bingen, Eléonore d'Aquitaine, Abélard et Éloise; (Guilds); les femmes ont une part du partage des profits et des affaires.

Source: Becoming Visible (women in European history): Bridenthal, Stuard, Wiensner

Recul au 13ème et 14ème

- Thomas d'Aquin (1224/5-1274) réaffirme l'infériorité des femmes (arguments d'Aristote sur la nature des femmes). On enseigne ceci dans les universités et écoles aux hommes, par des hommes qui professionalisent la médicine, le droit, l'éthique, et la théologie, excluant toutes le femmes de ces domaines.

Du 11ème au 14ème

- L'histoire des hommes et des femmes diffère et devient moins flexible. "women lost ground in the increasingly complex institutions that could enforce a rigid code of gender and in the commercial centers where authority over resources concentrated into fewer, largely male hands. "

Source: Becoming invisible

Cycle continue

- Au 14ème et moitié du 15ème: le rôle des femmes est décidé par les hommes et revient au foyer.
- Roman de la rose: vindictive contre les femmes (Jean de Meung); réponse par Christine di Pisan

16ème et 17ème

- Au 17éme, formalisation (science) avec les académies, les universités passent de l'éducation classique à la science (philosophie naturelle), mais pas de femmes.
- Salons, surtout en France; Margaret, Duchess of Newcastle, et Émilie du Chatelet, écrivent des livres sur la science et les mathématiques.
- Féministes du temps: Marie de Gournay (1564-1645); Mary Wollestonecraft (1759-1797); Mary Astell (1668-1731) et des hommes (Mill, Poullain, etc..).

16ème et 17ème

- La structure de la famille anglaise devient plus autoritaire et patriarchale. Le statut et droits des femmes mariées décline.

Mais…

- En Angleterre, certaines écoles de filles enseignent la science et les math (ex Bathsua Reginald Makin en 1673) pendant 200 ans (1670-1860);
- Les garçons n'étudient PAS ces sujets avant 1860; ils apprennent le Latin, le Grec et les études classiques.
- En 1860, réformes du système éducationnel; les filles sont mises au Latin et aux études classiques…encore aujourd'hui! Et les garçons à la science et aux mathématiques.

Confiance en soi et assurance

- Depuis des siècles, œuvres des femmes sont ignorées, oubliées et certainement moins valorisées que les contributions des hommes (Wenneras et Wold, Suède; Foschi, UBC).
- Le mythe de la supériorité des hommes a régné longtemps et continue dans certains milieux.
- Résultat: Moins de confiance en soi chez les jeunes adolescentes que chez les garçons du même âge, surtout pour les matières non traditionnelles.

Les dernières décennies

- Progrès dans la participation féminine dans les Facultés d'ingénierie et de science, passant de 12 % à 22% au Canada entre 1990 et 2002.
- Puis recul de 3% par an, en 2003, 2004, et 2005.
- Situation encore plus grave en informatique.

Pour rompre le cycle…

- Il faut rejoindre plusieurs publics en même temps: filles, garçons, parents, enseignant(e)s, conseillers scolaires, Facultés de science et d'ingénierie, les employeurs, employés, agences d'octroi, les sociétés savantes et professionnelles.
- Message: Réaliser que la contribution des femmes sera très positive pour tous ces domaines et qu'elles sont aussi compétentes que les hommes.

Messages pour filles

- Filles: aider la société est possible dans ces domaines; salaires sont biens et permettent d'être indépendantes financièrement;
- Augmenter leur confiance en soi (ex. Power Camp)
- Expliquer les opportunités, offrir du mentorat, réseautage, soutien (à toutes les étapes du parcours)
- Ne pas cesser les efforts pour ne pas perdre de terrain.

Stratégies jeunes

- Augmenter le contact des filles avec des femmes qui ont du succès dans ces domaines
- Démystifier, montrer le côté humain
- Impliquer des modèles de rôle masculins qui désirent le progrès
- Organiser des activités intéressantes qui impliquent de la conception et qui auront aussi pour effet d'augmenter la confiance en soi (ex. Design Tomorrow's World: Bâtir le monde de demain)

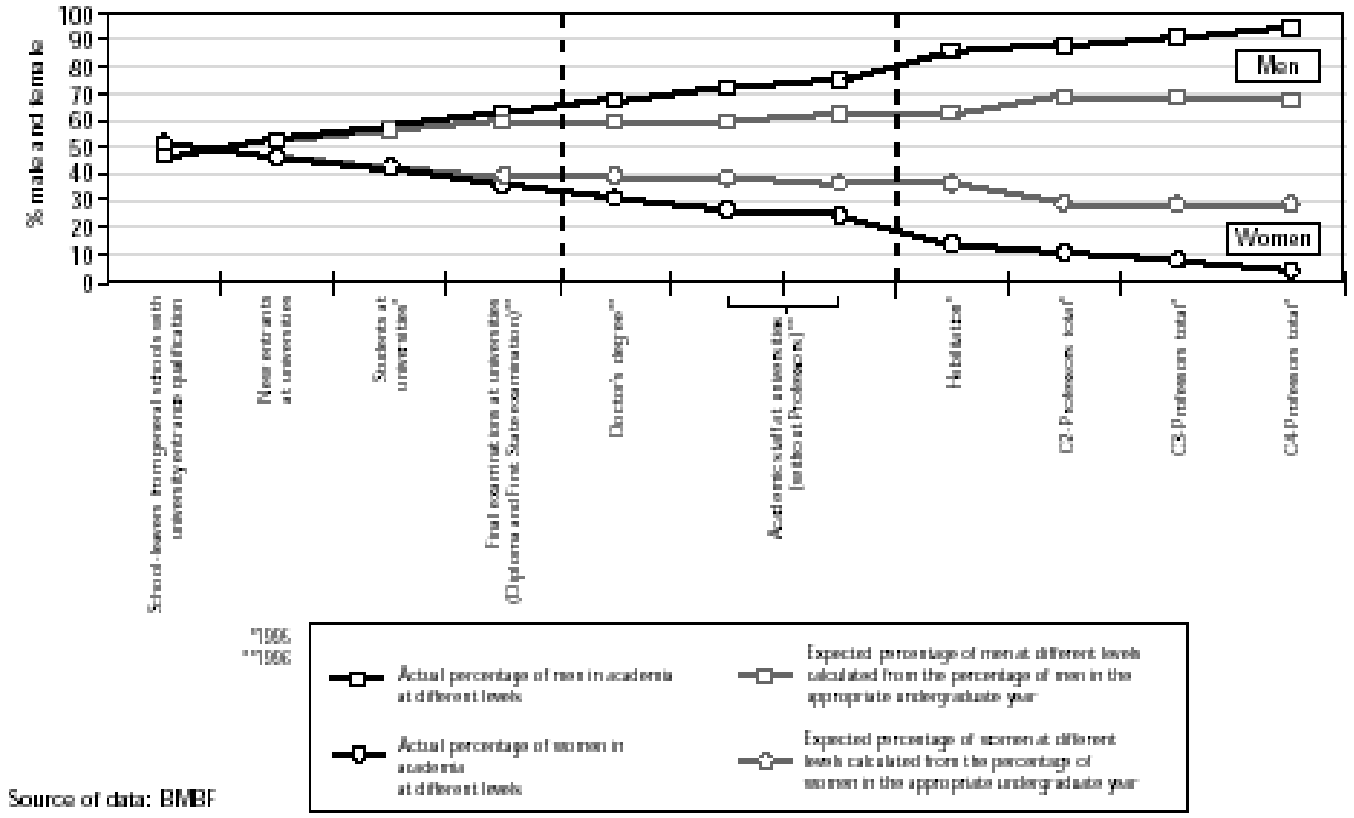
Universités

- Embaucher femmes professeures
- Améliorer le curriculum (ex. recherches de UOWERG) pour montrer les applications sociétales des théories et de ces domaines.
- Encourager les femmes à faire des études supérieures; sensibilisation des comités de bourses et de prix au potentiel de discrimination et doubles étendards.

Autres stratégies

- Nommer des femmes pour des prix, honneurs, exposer leur biographie sites web
- Soutenir les femmes durant des réunions pour augmenter leur crédibilité (V. Valian)
- Inviter des femmes comme conférencières

Figure 2.5:Women and men in academia in Germany: the scissors diagram (1995-96)



Source of data: BMBF

Stratégies…

- Formation sur les différents styles de communication et approches (Gilligan, Tannen)

- Encourager les hommes à partager les congés parentaux et les tâches domestiques (ex. Ordre des ingénieurs du Quebec: 21% hommes prennent un congé parental en 1998; aucun en 1991)

Stratégies…

Des sessions sur:

- Augmentation de la confiance en soi
- Comment devenir chef, leader
- Sensibilisation sur les questions de genre

Livres:

- Why so Slow? (Virginia Valian)
- The Natural Superiority of Women (Ashley Montagu)
- The Bold and the Brave (bientôt j'espère!...)

Ma vision des ingénieures et femmes de science…

Audacieuses

et

braves

Web et courriel

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