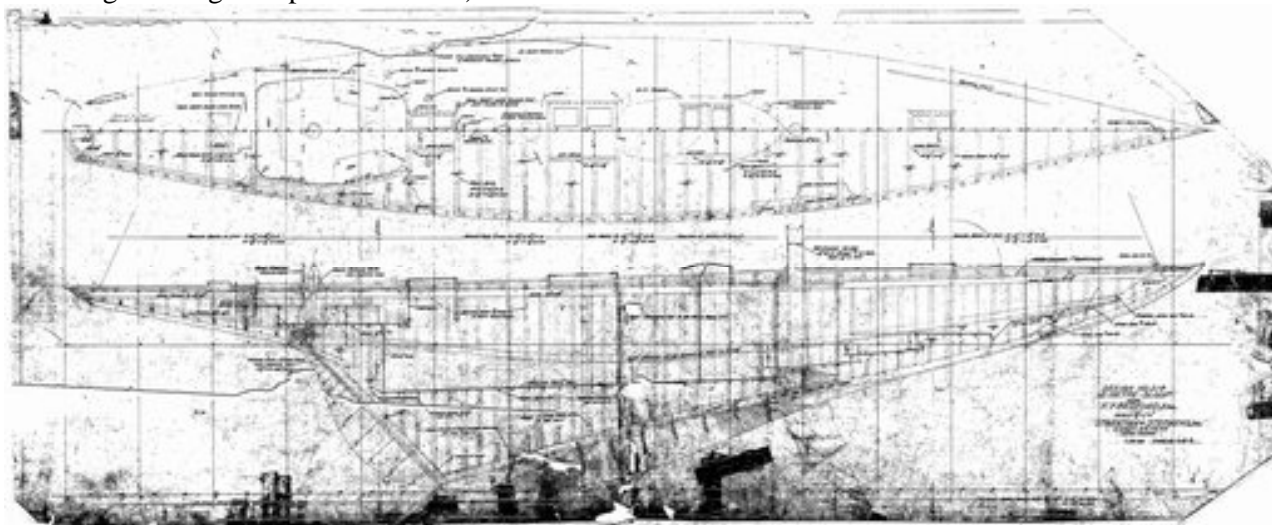


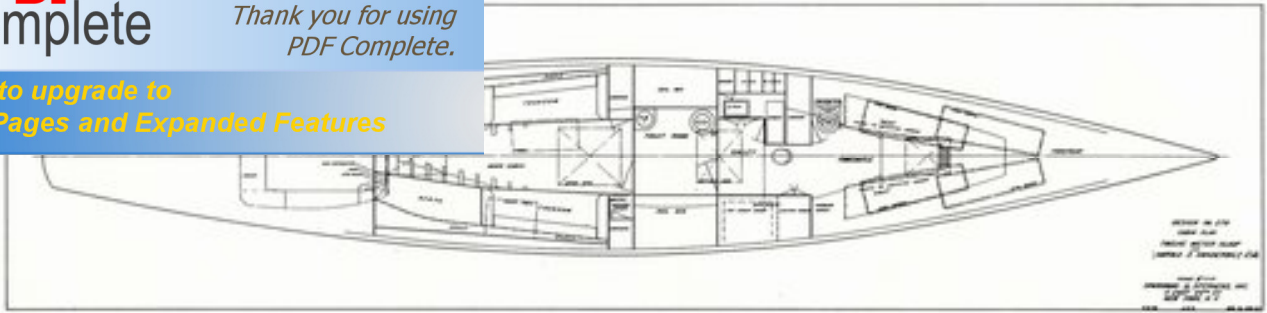
S&S INTERNATIONAL 12 METRE DESIGNS 1938 to 1985

The last great challenge for the America's Cup mounted using the 135 ft LOA J-Class yachts took place in 1937, just before the Second World War and the challenger was *RANGER*, a yacht commissioned by Mike Vanderbilt from the renowned older designer, Starling Burgess, that Olin Stephens was involved. It was during this project that he was introduced to Gil Wyland, a gifted young engineer who has studied at the Webb institute and who was to participate on so many of the successful *S & S* designs. By the following year, Harold Vanderbilt had realised that the big class boats were in decline and that finances might be tighter. He anticipated that the 70 ft long International 12 Metre Class, already popular in England and with a crew of eleven rather than the Jø 31, was going to be the future trial horse for the America's Cup races, rather than designs based on the American universal Rule that had been favoured in the Herreshoff era. The rule had given rise to yachts of rare elegance and speed in the M, P, Q and R classes which roughly related to 12, 10, 8 and 6 metres under the International Rule. On account of the war, the America's Cup series was not resumed until the disastrous British Challenge made by *SCEPTRE* against *COLUMBIA* in 1958.

Already before Olin turned to being a young designer he had showed rare skill as a helmsman and particularly delighted in sailing International 6 metres, a class in which, as a designer, he first made his name. His sense of touch at the helm certainly led to an appreciation of balance and the refinements of design required for the much larger Twelves. Indeed, Olin, in his autobiography, confesses to having been so taken by the feel of the tiller that he was loath to yield it. He was captivated by the quality of subtle yet positive propulsion, the slight heel in the light air and the small train of waves opened by the hull. In an interview with Francis Kinney Olin admitted to sailing and study Sixes for some years in his youth and stated that "I had in my head all of their dimensions and all of the characteristics. So I was very anxious to get into it." His first Six design *THALIA* was not an unqualified success but nevertheless brought the young Olin to the attention of the veteran American amateur designer, Clinton Crane, who encouraged him and who is reputed to have helped steer some potential commissions to Olin which subsequently resulted in successful designs.

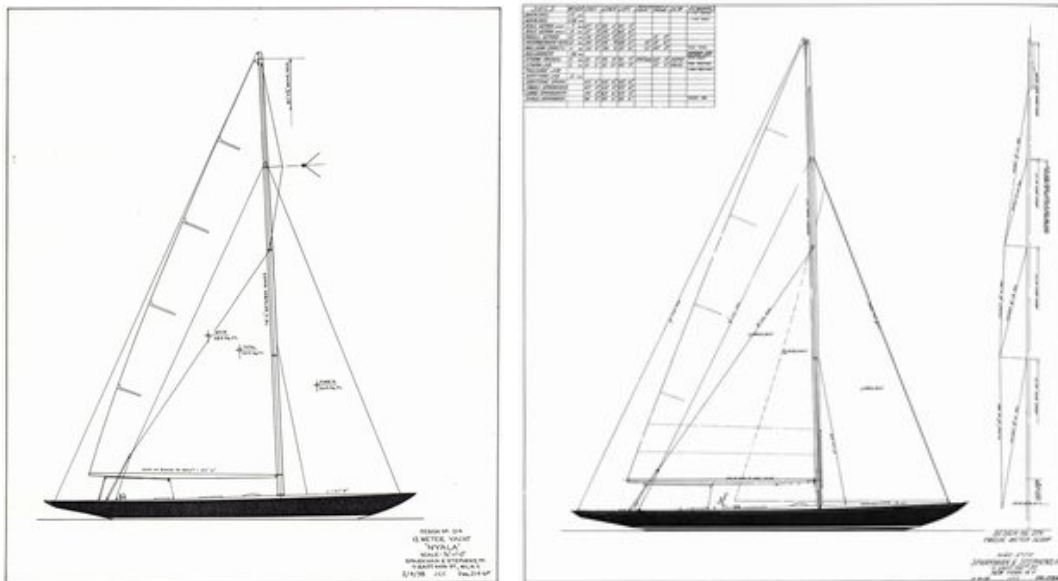
Although a number of Twelves were built in the US just before the war they entered a state of limbo as once the war ended skilled yachtsmen favoured cruiser-racers rather than these thoroughbreds for which there was no real international competition until the NYYC changed the deed of gift of the America's Cup. Just how slight the apparent differences actually were between one progressive design and its successor may be seen by comparing the drawings of *NORTHERN LIGHT* or her near sister *NYALA* (*S&S* Design No. 214 in 1937) with *VIM* (*S&S* Design No. 279, designed in 1938 & the surviving drawing is in poor condition).





VIM Design 279 Copyright S & S Inc

VIM at LOA 69'7", waterline 49', beam 12', draught 8'1" was a very similar shape to the one year older *NYALA* at LOA 68'4", LWL 47', beam 11'5", draught 9'2". The differences shown on the rating certificates indicate that the differences were millimetres and since the original drawing for *VIM* is damaged a drawing for *NYALA* is also shown. In 1957 Olin made regular visits to Newport to tune *VIM*'s rig. There is a delightful story (*Wooden Boat 155*) of Olin and Rod one pre-dawn morning both relieving themselves from the Mount Hope bridge into Narragansett Bay far below. *VIM* proved a near unbeatable combination for almost 20 years! Indeed, she was used as a trial horse for the 1958 series, and having been lightened, her interior stripped, engine removed and under Rod's guidance the chainplates strengthened, ballast increased and coffee grinders added that she provided such serious competition for the much newer *COLUMBIA*, built in 1957, that she almost succeeded in acting as the defender. There is little doubt that had she done so she would still have handsomely beaten the English boat *SCEPTRE*. *VIM*'s lines present classic 12 Metre development and bear close similarities to yachts designed in Europe and America, throughout the previous decades. However, though she was the first 12 Metre to have bar rigging and an aluminium mast design changed little during the next twenty years.

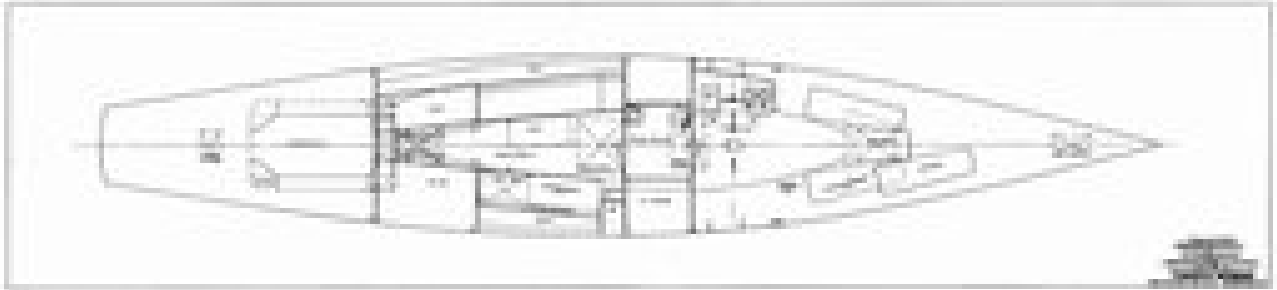


NYALA

VIM

Olin Stephens has called *COLUMBIA* [S. & S. design no.1343], really an improved *VIM* on which she was based though a tad longer and consequently allowed less sail. This lesser sail area was of course by that date more than made up by the rapid improvements in synthetic sail cloth and technology, notably that woven by Ted Hood's father on redundant New England mill equipment. The sails were still made by Colin Ratsey and were a light lavender in colour and so the main was dubbed the Purple People Eater after a children's character. The Twelves might carry a main, ten spinnakers and seven jibs. Olin was always concerned about weight especially aloft but the heavy 13.5 oz material set well though later sails were 10oz. The Twelves carried triangular side marks, the lower edge to touch the water when stripped of crew and gear and the upper not to be immersed when loaded.

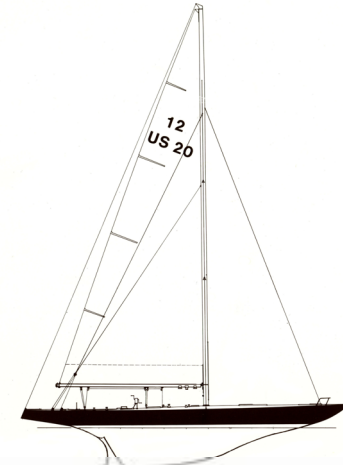
be in the keel. Olin remarks¹ "Although tacking duels are not
lmsmen seem to be more than ever dependent on personal
have been, was to let the boat do it by emphasis on speed
loose cover of the other boat, tacking infrequently. Even
today among the ocean-racing fleet with its great variety, the light boats win on the short courses but
the heavier types can occasionally come through when there is less demand for acceleration." This was
the first 12 Metre to have a reverse canted transom in order to save weight. She also had a much
shorter keel profile but her lines are a refinement upon a long string of predecessors. Her lead keel
when first delivered was not true owing to a defective mould and required considerable work to shape
to design. In addition her frames were epoxy laminated and owing to Nevins parlous financial state
they had not heated the shed warm enough so the glue joints were suspect and required additional
screw fastenings.



COLUMBIA Copyright S & S Inc.



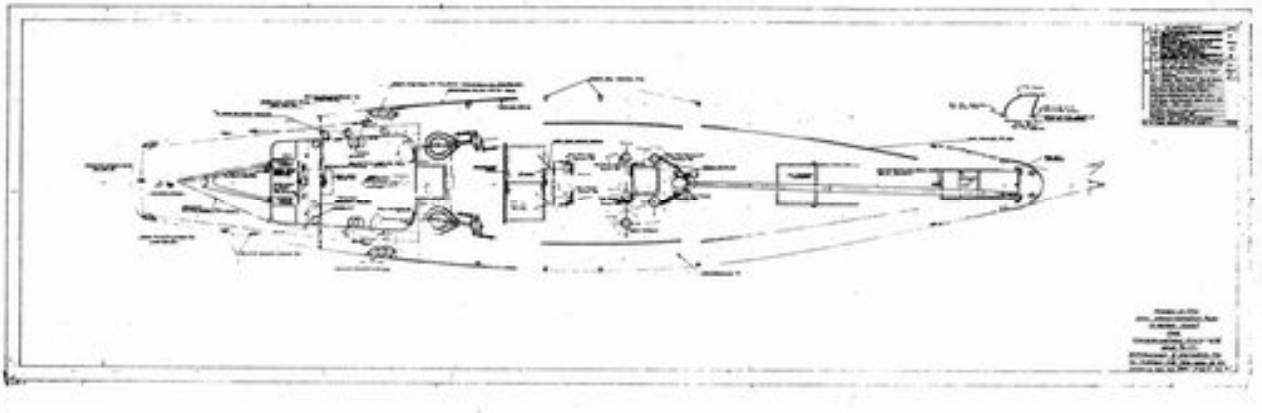
COLUMBIA



CONSTELLATION

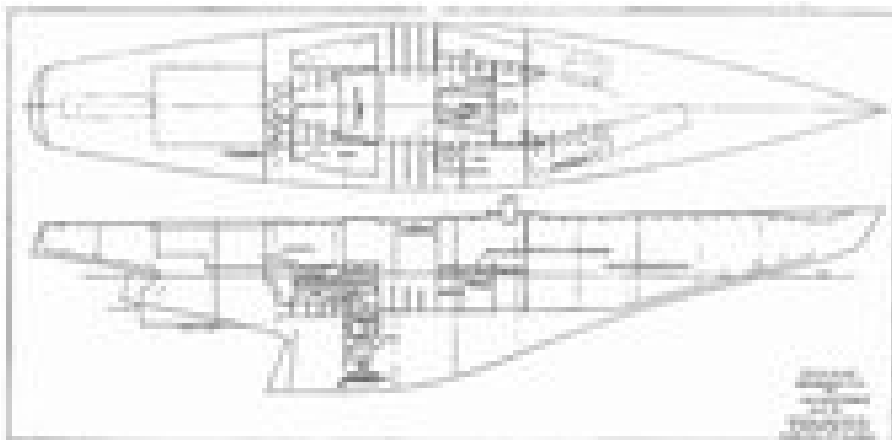
¹ *All Things and Sailing Too*, 1999, p.160.

73) was once again a completely different boat to *COLUMBIA* as much in the same way that *VIM* differed from 30 sq ft less. Olin, however, was experimenting all this time with the surface area of the hull and therefore the amount of drag that it caused passing through the water. Making an important discovery, he has said, "I had the feeling that a wetted surface aft was not as harmful, perhaps, as it was forward, because the water was then already going with the boat." As a result he invented something which was to become an S&S trademark on boats throughout the mid sixties and early seventies - the invention of a bustle, fitted above and aft of the rudder which seemed to act to improve the detachment of the laminar water flow from the hull. At the same time, *CONSTELLATION* had a radically new rudder shape, differing from the established shape for all previous vessels, which had been a semi-circular segment section. The keel was also shorter and the rudder tucked further aft - this helped in light weather while the moderately increased beam helped in a breeze. *CONSTELLATION*'s rudder was thinner at the top and broader at the base near the keel. This allowed for the rudder to bite more firmly on less disturbed water, allowing greater control downwind and better laminar flow off the aft end of the blade. *CONSTELLATION* also experimented with a v-shaped bottom to her keel. All previous boats from *DORADE* to *COLUMBIA* had had a U-shaped bottom. Discovery of the advantages of the V-shape in tank testing at the Stephens tank at Hoboken improved windward performance and reduced leeway. Finally a titanium boom was designed to bend and thus flatten the mainsail. *CONSTELLATION* handsomely beat the British Challenger *SOVEREIGN* in 1964.

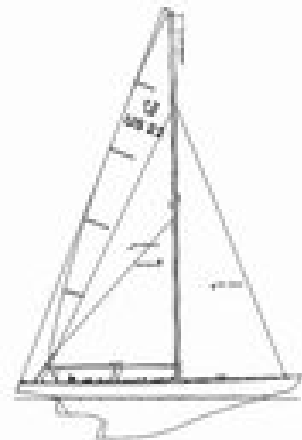


CONSTELLATION Copyright S&S Inc.

When in 1967 the Australians challenged again for the America's Cup, Olin decided that there was still much to be learned studying hydrodynamic flows and comparing them to progress that had been made on laminar airflow in aircraft wing development. The result was *INTREPID* in 1967 (S&S Design No. 1834). Once again the LOA of the boat was slightly shorter (LOA 64'6", LWL 45'6", beam 12'



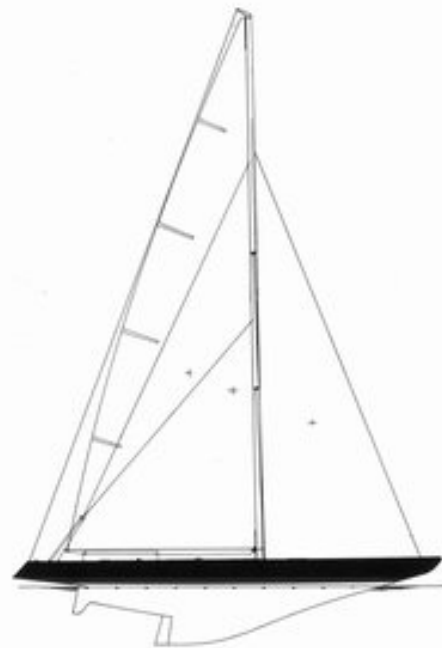
INTREPID Copyright S&S Inc.



draft 9') and the sail area marginally less. Olin has regarded *INTREPID* (1967) as his "most innovative 12 Metre". The snubbed knuckle bow was an attempt to reduce weight in the same way

COLUMBIA. The U shaped sections were intended for strong
the keel, was moved much further aft and closer to the water
ure. This improved light air performance further. The keel was
ed at its trailing end. This tab is used to help drive the boat to
windward and to assist in turning her quickly, while the aft rudder is used for steering. The separated
rudder was not a new invention ó it had been tried before on British and American yachts around 1900.
It had also started to be used in cruiser-racers such as those designed by Bill Lapworth and Dick
Carter. The new configuration and reduced sail area favoured a blow. *INTREPID* cost \$750,000, at the
time, the most expensive 12 Metre to date yet this figure, even adjusted for inflation, pales into
insignificance when one thinks of the costs of a current challenger! *INTREPID* also had the innovation
(an S&S first) of lowering the boom close to the deck. This was made possible by fitting much of the
deck gear and winches below decks. The top of her mast was also titanium allowing increased bendø
The result was a reduction in the öinduced dragö caused by the mainsail, whose effectiveness was
greatly improved in the same way that deck hugging genoa jibs created increased airflow. She also had
two large deck hatches on the foredeck for fast sail handling which worried Rod who was always
safety conscious. The boat had a reputation for öwet goingö and lost her mast on one race due to a
faulty spreader. Altered unsuccessfully aft by Britt Chance in 1970 she was again altered aft by S&S in
1974 this last incarnation resembling *COURAGEOUS* being the most successful. Indeed in this form
she closely competed with the latter boat in the trials of 1974. *INTREPID* beat *DAME PATTIE* in four
out of five races in 1967 and *GRETEL II* in 1970.

Not every boat was a guaranteed success. *VALIANT* in Olinø's words öproved too extremeö. Boats had
been getting bigger and rigs consequently smaller and this proved a step too far. The boat was long but
heavy and her keel maybe too short, her aft overhang short and steep and her after-body full. Slow and
hard to steer she pulled a quarter wave something always absent from Olinø's best designs which seem
to glide through the water as if on Teflon. Another later disappointment was in 1977 when Olinø's
newest boat, *ENTERPRISE* ceded to a slightly modified *COURAGEOUS* which also outstripped
competing designs such as *INDEPENDENCE* . On this occasion much was said to be the result of
Hood sails being superior to Northø's.



COURAGEOUS Copyright S&S Inc.

COURAGEOUS, *INTREPID*'s successor, (1974) was a further development along similar lines. She
had been intended for a series in 1973 which had been deferred. She marked a return to longer
overhangs and shorter waterline, slightly less weight and good stability through extra ballast owing to

the first Twelve to be built from aluminium. *COURAGEOUS* successful and when modified slightly by Ted Hood in 1987 she ritors, proving unbeatable until 1980 when the *S & S.* designed *COURAGEOUS* was the last Twelve wholly designed by Olin Stephens.

FREEDOM design 2368 was a partnership between Olin and Bill Langan and successfully defended in 1980. Whereas *VIM* had been LOA 69ø7ö DWL 45ø Beam 12ø and draft 8ø11ö with SA 1916 sq.ft the last boat was LOA 62ø2ö DWL 44ø9ö Beam 12ø2ö and Draft 8ø10ö with a |SA of 1767 sq.ft. A shortage of funds forestalled new tank testing so the *COURAGEOUS* model was used as a basis. Olin states in *Lines* that as he knew Dennis Connors would sail the boat in his aggressive short tacking manner the boat needed to have minimum drag at low speeds so he rounded or snubbed the entry which had been decidedly sharp on the previous model. Freeboard was reduced reducing windage. When her rudder linkage broke on her first Cup series race Dennis Connors managed to steer her on the trim tab while wrapping a line round the rudder post leading it to a winch. Dogged by bad luck she lost the second race and in the third blew her spinnaker, tore the head of her jib, later lost a jib overboard, dropped her pole into the sea and nearly had a further spinnaker wrap ö yet still due to consummate seamanship and a sound design won the race and moreover the series.



FREEDOM Copyright S&S Inc.

The plans for *AMERICA II* designed, in 1985, represent the culmination of S&S 12 Metre designs. Without the need for a conventional keel and rudder set-up, the lines differ completely from their predecessors. The bow profile uses a U-shaped spoon bow which was favoured in many Metre boat designs circa 1910-20, yet this rapidly changes to a consistently V-shaped section in the mid sections, once again flattening aft of the rudder where an almost traditional counter reaches above the water line, allowing for a flattened run aft and an increased waterline when heeled. The rudder itself is fitted into a small streamlined blister excrescence which effectively is a modified development of the bustle while the winged keel with the lead ballast fitted at the lowest point for maximum stability is in answer to the innovations which had recently been made on Australian Challengers.

Olinø achievement and *Sparkman & Stephens* historic record in defending the *Americaø* Cup is likely to remain unbeaten. Olin himself would be the very first to acknowledge the importance of his brother Rodø contribution in overseeing construction, rigs and designing the deck layouts. In the early days an edge was achieved by Olinø realisation that 41.5 inch scale model (1/13th scale) tank testing could reveal specific data particularly where it related to keels, rudders and tabs. From 1974 onwards the



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... was increased to fifteen feet (1/3rd scale) leading to greater
... fact that small scale model tests for *VALIANT* had looked
... to deception. Modest as always he has also said "I think there
... re is not any real magic." Their J-Class co-design no. 77,
KANGAROO, won in 1957. 12 Metre designs won in 1958 (*COLUMBIA*); in 1964 (*CONSTELLATION*);
in 1967 (*INTREPID*); in 1970 (*INTREPID*); in 1974 (*COURAGEOUS*); in 1977 (*COURAGEOUS*); in
1980 (*FREEDOM*). It seems improbable that this record will be beaten. Sadly an era has passed. The
beauty of the International Metre class yachts is a treasury to be preserved. At the time of writing there
are five Twelves on the market and you can pick one up at an asking price of somewhere between
£140,000 and 150,000, a fraction of the development cost. However, when a blue blooded *S & S*
design such as *COLUMBIA* comes on the market the price is well over \$1,350,000. Doesn't this say it
all!

PATRICK MATTHIESEN